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Co-Education and Gender: The End of the Experiment?

Ian Clark

Lancaster University (UK)

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Abstract

This article has two inseparable aims: (a) to analyse the relative merits of single-sex and co-educational constructs on self-concept, academic performance and academic engagement; (b) to investigate the manner in which each type of schooling interacts with the individual student; student “peers,” close family, and teachers.

“In the past women have been hindered in development by the persistent statement that men and women were unlike. We expect that man may be or accomplish anything, his possibilities are great, and the tread of his life must be as broad as possible. We have been told that women came into the world as an afterthought as a supplement to man....” (“The Value of Unmarried Women,” 1882)

The extract quoted above, an echo of a sentiment expressed more than one hundred years ago, may appear to relate to the problems associated with the segregation of genders in school rather than the inclusive comprehensive systems of 21st Century, yet this is not the case. Indeed during the course of this necessarily nuanced discussion it will at times be asserted that it is co-educational schooling that significantly contributes to, and re-embeds social inequalities outside and beyond school. The arguments that surround best practice in education are necessarily nuanced due to the atomistic composition of educational research efforts. The many differing perspectives culminate in a kaleidoscope of often non-interdependent and even conflicting results, which defy unification and clear

direction. Indeed in the course of this relatively short article it will be seen that once again feminist theory conflicts with motivational theory and that economically grounded performance-goal outcomes conflict with socially beneficial learning-goal oriented outcomes. The relationships among such phenomena are not as clear cut as two diametrically opposed forces. Rather it is a complex and dynamic process of diplomacy as the facets of each interact in accordance with each unique contextual circumstance, and thus the creation of codes of 'best practice' has become a virtually intractable problem.

In the UK Rab Butler's 1944 Education Act was an attempt to create the structure for the post-war British education system, "yet this seems to have taken place without serious discussion about policy..." (Sutherland, 1981, p.155). If Sutherland's remark is valid and policy in this area was developed in an "absent minded way" (p. 155) then an investigation into the impact of co-educational reform is all the more necessary. Logically, the necessity for such an investigation extends beyond the UK (and the US) and has compelled many researchers in non-Anglophone countries to explore the academic and social ramifications of co-educationalism.

As this article cannot be specifically concerned with the endemic and deeply engrained socio-cultural (and religiously 'decreed') aspects of the woman in society, the *pre*-quotation aims to contextualise the social 'origins' of women as seen by an early feminist. Such issues are certainly not discrete from those regarding education; indeed they form the core and the foundation of our society and profoundly impact on modern day educational epistemologies.

In this contemporary context, the debate about the relative merits of co-educational schooling have been subjected to a number of challenges since the landmark, but now hopelessly outdated research conducted by the staunchly co-educational R. R. Dale (1969, 1971, 1974). The Inner London Education Authority (1985) firmly rejected Dale's views on ideological grounds:

"His findings...can no longer be regarded as in any way central to the renewed debate...is now outdated. He was aware...that in mixed schools the welfare and the curriculum of girls may have received less attention than that of boys, but did not rate this as a problem."

Two broad complimentary discussion hypotheses are presented here regarding the provision of single-sex education as an alternative to co-educational schooling, they are:

- Single-sex schooling hinders the social, spiritual and moral development of boys and doesn't impact significantly on academic performance.
- Single-sex schooling improves the self-esteem of girls and measurably improves academic performance.

These hypotheses will be discussed in the forthcoming sections of this article.

The debate takes place most crucially in the areas of Math and Science (girls) and English (boys); "the question of co-education versus single-sex schooling will have particular pertinence for those subjects" (Harker, 2000, p. 207). It would also seem appropriate that girls are the focus of such research due to the marked negative implications of co-educational schooling upon female identity, autonomy, self esteem and subsequent life-chances upon leaving formal schooling. However, Jones & Jacka (1995) specifically

condemn single-sex approaches to educational research because it frames girls as patients in need of “treatment”. Therefore it is interesting to note that research suggests that boys are less psychologically impacted upon than girls by either segregation or inclusion. Indeed, Brutsaert (1999) found that the general background context of schooling didn’t alter the way boys perceived their self-concept to any meaningful degree (also Lee & Bryk, 1986). However issues of academic engagement reveal similar patterns of psychological dissonance in both girls and boys. Both genders exhibit a ‘fear of success’ in non-traditional gender domains such as mathematics in the case of girls, or MFL in the case of boys because they assume their success in these areas invites unfavourable and negative attitudes from their peers (Kobayashi, 2002). It will be seen during the course of this article that single-sex schooling mitigates such psychological barriers to academic engagement in both genders.

Boys

Recent debates in the UK and various other nations have revolved around the relative academic under-performance of boys. In an attempt to resolve this problem the then UK Secretary for Education called for co-educational schools to embark on the experimental use of single-sex classes, emphasising Maths and English (Blunkett, 2000). Yet naturally occurring evidence pertaining to the attitudes of boys towards single-sex classes seems to partially contradict Blunkett’s faith in their value. Boys perceived single-sex classes to be ineffective in improving their understanding of Math instruction (59%) and 72% responded that they enjoyed co-educational schooling more. Further and more significantly, the social consequence of all-boys classes seems to be a decline in the standard of conduct. A totally male environment, assert Askew & Ross (1990) adversely affects male emotional sensitivity. They found that all boys-classes served to increase the instances of bullying as less masculine males were treated as ‘girl substitutes’. If this is so, then there can be little doubt that girls are forced to adapt their identities in accordance with an oppressive male dominated co-educational culture. It would seem that boys need to exert their masculinity upon any suitable entity, and clearly that need is most readily met by the presence of girls. Concordantly, Hontatuka (2000) found that 41% of her 15 year old respondents reported experiencing some form of sexual harassment. Significantly only 2% of those reporting harassment informed a school official, underscoring the social acceptance of such behaviours in schools in the minds of young females.

The apparently hegemonic nature of the male in school would appear to be reinforced by the curriculum content. Jackson (2002) noted that I.T case studies were matched to the gender of the student. While this may perpetuate the existing social order it does also have beneficial motivational characteristics. For example, Cashin (1979) and Lucas (1990) suggest working in accordance with the students’ strengths and interests is a key component of any strategy to enhance learning-goal motivations. Similarly, Ames & Ames (1990) and Cashin (1979) recommend empowering students by giving them a partial mandate in the selection of study topics. It certainly does seem reasonable to assert that a class of boys would choose, and be well motivated by a Premiership Football League case study.

In general, instances of differing task-content are subsumed by the pre-supposed notion of inclusiveness. For sociological reasons both boys and girls are educated in identical ways in an attempt to teach them that they are equal and as capable as each other. It appears that biological constraints and consequences have largely been ‘forgotten’. By drawing

data from across science a 1995 study conducted by van Goozen *et al* (Department of Child and Adolescent Psychiatry, University of Utrecht) has strongly implied that biologically explainable events do impact at a level that pedagogy should recognize as fundamental. Van Goozen's study impacts upon part of hypothesis (i); because the 'social, spiritual and moral development' of boys is 'managed' by educationally significant biological drives that exert stronger influences upon the student than the proceedings of any NGO convention or government administration:

“The *administration of androgens* to females was clearly associated with an increase in...spatial ability performance. In contrast, it had a deteriorating effect on verbal fluency tasks” (van Goozen *et al*, 1995, p. 343).

Hormones may then explain the origination of the relative successes exhibited by males in Math and Science subjects and also the problems many males face in English and Modern Foreign Languages. Although contemporary research concerns itself with the impact of the social milieu upon the differing biological paradigms, the existence of such radically different paradigms cannot be ignored. It has been argued that teacher interpretations of such biological factors often lead to the 'punitive education' of boys. For example, primary school boys may struggle with aspects of English and languish behind female 'peers'. Despite the fact that there is much evidence to suggest that hormonal factors render boys less linguistically proficient, the teacher may yet interpret this as a perceived lack of academic effort and deride his efforts by using harsh words, tones and even extended punishments (Jackson & Lahaderne, 1971).

If purely biological constraints exist then one-way forward for boys might be to improve self-concept (*motivational/psychological*) regarding their own linguistic fluency by teaching them separately. All-boys classes circumnavigate the problem of comparison with 'superior' females and mitigate the stereotypes many males attribute to those that undertake 'non-masculine' subjects. This view is corroborated by Lawrie & Brown (1992); all-boys schools reported higher engagement with more 'feminine' subjects (e.g. English, MFL) in the same way that all-girls schools/classes reported vastly increased intakes of Maths and Science examination candidates.

The various tactics of boys in teasing and undermining the confidence of girls' impacts upon the nature of educational provision in the co-educational classroom: Ken Rowe (University of Melbourne) states that irrespective of the gender of the teacher, two-thirds of the teacher's time is taken up managing ego trips, particularly those of 10-16 year old boys (Klan, 2001).

Girls

All-girl classes within co-educational schools have been widely applied in such countries as Australia (Rowe, 1988), Sweden (Berge with Ve 2000) the UK (Swan 1998), as well as New Zealand and the US. An Australian study by Rowe *et al* (1986) found that girls in single sex classes exhibited better academic performance in Maths class and, crucially, higher levels of social adjustment. The perceived value of single-sex Science classes by girls seems in no doubt as such schools as the Kings Wessex Community H.S (Gillibrand & Braun, 1994) and Shenfield H.S (Swan, 1998) reported an unprecedented volume of candidates for all-girl Science subjects.

Ellen Silber (Marymount College, NY), undertook extensive research into ‘gender-bias’ in co-educational classrooms. The teachers she videotaped were observed addressing 92% of their questions to the boys as a punitive device for keeping them on task and to compensate for a perceived lack of academic effort on the part of boys (Klan 2001).

“The implication is that both male and female pupils experience the classroom as a place where boys are the focus of activity and attention-particularly in the forms of interaction, which are initiated by the teacher – while girls are placed on the margins of classroom life.” (Stanworth, 1981, p.34).

Over the course of years this inequitable distribution of teacher time, energy and talent ‘cheats’ girls of their full potential. Although the estimates of such teacher ‘bias’ vary widely, there is consensus that boys are subjected to relatively more teacher interaction in terms of; approval; instruction; listening to and disapproval.

Schools are benchmarked (e.g. league tables) and are embedded within a credentialist society; thus performance outcomes are of prime concern to politicians and policy makers. However schooling is in itself a social process, and if such authors as Arnot (1982) are to be believed, co-educational schooling is a very powerful reproductive force behind the inequitable social and economic constructions in today’s society. Indeed even the concept of ‘credentialism’ may be challenged as inequitable: Credentials provide the illusion of social equity because the national laws of developed nations have enshrined the rights of males and females to equal learning opportunities at school, and the freedom to apply those credentials to the competitive labour market. Although such legal initiatives explicitly announce the existence of a level playing field the reality is a notable discourse-gradient affirming and reinforcing male dominance in school.

Despite the inequitable social realities experienced in and supported by mixed schools, a key aim of co-education must continue to be the provision of a healthy and productive environment within which identities that support success in the wider world may be formed. With regard to this mission Reed (1999) presents an important caveat and suggests the broad direction of future research:

“...a narrow focus on measurable outcomes inadequately captures the complexity of gender issues in education, and ...a broader concern with the...social processes of schooling should remain a key priority.” (p. 97).

Some determiners of the quality of these ‘social processes’ are confidence (esteem) and enjoyment (motivation). In accordance with motivational theory, it seems reasonable to assert that a confident and happy student will learn more than one who is discontented and insecure. Regretfully it is the latter state of mind that co-educational schooling seems to propagate in the minds of girls – the diametrically opposite position to that which approximately half of all student stakeholders (i.e. females) would support. It should be remembered that co-educational schooling is considered a relatively recent innovation in the UK and when Hall & Hord’s (1984) *Concerns-Based Adoption Model (CBAM)* is applied to the innovation it singularly fails to deliver the super-ordinate promise of inclusiveness into the hands of females.

Let's consider a fundamental component of CBAM; the Innovation Component Checklists, which begin by explaining the ideal use of the innovation, then as one traverses the page from left to right additional columns are added that state less ideal implementations until one reaches the final column containing wholly unacceptable usages. CBAM advises the use of differing genres of 'Checklist for different stakeholders in the change process (e.g. administrators and teachers). Hall & Hord, perhaps wisely, decline to venture into the political minefield of gender in their model of educational innovation. However, it isn't a conceptually challenging leap to include students as stakeholders and then to further refine the data into sub-sets of females and males. The naturally occurring analysis and democratic application of innovation management models map directly into the burgeoning collaborative epistemologies of the modern day and are unusual only in that practice does not yet reflect theory.

Indeed, the psychological impact of single sex classes on girls is very significant: in Math 80% of the sample responded that they felt more confident and 55% said they found it to be more enjoyable. Conversely, female respondents from a mixed environment spoke of feeling "embarrassed" and "ashamed" in front of male 'peers' in the classroom (Jackson, 2002). Such negative emotions act as inhibitors to motivation and suppress learning-goal oriented learning.

As the opening *pre*-quotation expresses, the place of the woman in society has been, sometimes literally, several places behind her male 'peer'. Rather unfortunately, early research by Dale (1969, 1971, 1974) presented girls as civilising agents or as 'caretakers' of the boys and heralded this to be a welcome hallmark of effective co-educational schooling. So, in retrospect Dale's logic was rather misconstrued and merely 'rubber-stamped' the social roles of men and women in wider society. Foster (1998) suggests that the auxiliary support function performed by girls at mixed-school is a major constraint on individual autonomy. Similarly, Brutsaert (1999) holds that gender roles are generated through the exposure to every-day co-educational school life. He discovered that girls exhibit two notable psychological reactions to co-education.

Firstly, girls represent a more 'traditional' model of femininity in the co-educational construct. This occurs because girls (like most children) desire social acceptance, which may be sought by conforming to the expectations of a male dominated society (also Eder 1995). The result, noted Bailey in his 1992 study, was manifested in girls in grades six and seven who rated being popular and well-liked as considerably more important than being perceived as competent or independent. On the other hand, boys were more likely to rank independence and competence as more important.

Secondly, girls in co-educational establishments reveal higher levels of 'masculinity', e.g. competitiveness, mastery/ego goal orientations etc, than their counter-parts in single sex schools. Brutsaert explains this phenomenon by underscoring the particular need for girls to compete with boys for the attention of the teacher. Regardless of the gender of the teacher boys receive the vast majority of attention in terms of student-teacher interaction and girls feel a display of masculine qualities helps decrease 'isolation' from the teacher:

"...achieving within a mixed setting implies having to compete with boys, while at the same time being more or less forced into a feminine role." (Brutsaert, 1999, p. 351).

The existence of endemic discrimination throughout society requires that girls are equipped with the knowledge and the tools for dealing with social phenomena, and adds weight to the argument for a single-sex 'reform agenda' (Jackson 2002) for girls and indeed boys. This entails teaching the same subject differently according to gender yet in a way that mitigates social and economic inequalities between the genders. A less systemically surgical strategy may be to eradicate the performance goal or aggressive/competitive construct in the classrooms – a methodological shift that requires careful attention to spontaneous discourse rather than pre-planned physical resources. Indeed, Butler (1992) in his research on motivation noted that girls with less successful academic records suffered “devastating” psychological consequences when they compared themselves competitively to classmates. By way of contrast the girls responded that single-sex education had given them more confidence when dealing with boys at school and therefore in competitive social situations beyond the school unit.

Despite the fact that girls thrive in a single-sex construct they were happy to re-admit boys to the classroom actually believing that their role was partially one of support and the enhancement of the male learning environment (Jackson, 2002). It would seem that the “support role” is re-embedded through the process of schooling and thus actually becomes a part of female pathology. This type of often preconscious perception by females creates unnecessary levels of stress as they attempt to compete with males for limited social resources. Conversely, follow up research on the impact of single-sex schooling upon girls has revealed a sustained and positive psychological effect; even some years after leaving school (ex) single-sex school girls hold less stereotypical views regarding gender roles than their co-educational counterparts (Lee & Marks 1990). Such long-term effects confirm that the type of school is very influential in the process of identity formation and how they perceive the world around them for the remainder of their lives. It is most appropriate to view this phenomenon through the epistemological lens of the social constructivist. For example, in Wardekker's (1995) neo-Vygotskian perspective *autonomy* is equated with the ability to handle change in a positive way and to the process of “writing” (“active participation...”) of the cultural “texts” (“...in ‘X’ number of social contexts.”), which in themselves define and constitute this plurality. Thus, autonomous individuals are not just the product of these texts; they are also its co-authors. Creative participation in culture (i.e. cultural co-authorship), characterises the truly autonomous person. Girls seem to have inherently less autonomy from the outset (due to family socialisation/role-models) and attendance at a co-educational school denudes autonomy yet further. Additionally, Lawrie & Brown (1992) discovered that girls are inculcated with stereotypical views in the co-educational setting by taking up the most easily defensible default positions, i.e. boys protected their tough ‘macho’ image and girls felt that they were hard working and more mature. Yet surely even the most ardent of feminist writers wouldn't celebrate the day that females perceive themselves as “macho.”

In summation, girls who wish to self-actualise in the male dominated landscape must be empowered with the skills to be effective co-authors, and to develop an identity that will support this aim. The earlier research of Lawrie & Brown demonstrates that girls from co-educational establishments “write” these texts differently than those from single-sex schools. This may be observed in their career aspirations, with those from co-educational schools emphasising traditional choices: 13% of girls in the single-sex school considered nursing as a future career whereas a statistically significant 23% aspired to be nurses in the co-educational school (Lawrie & Brown, 1992).

Background Variables

Beyond the perceptions of the students (esteem & motivation) and the form of the classroom (co-education/single sex) there exists the wider social context; that which exists beyond the school unit.

It would be remiss to embark on an analysis of identity construction within school walls without briefly explaining the 'cultural baggage' that very young school children bring from their homes even before they start full-time formal school at the age of 5 years old. Lloyd & Duveen (1992) observed that it is often the children in reception classes who have the most rigid and stereotyped views of sex group behaviour. Further, Huston (1983, 1985), found that even 2 – 3 year olds can voice occupational preferences which parallel adult gender stereotypes. Children at this early developmental stage cannot ascribe gender specific traits to occupations i.e. they don't know *why* they chose them as gender specific occupations. At this young age the child imitates prominent role models in spite of the fact that the structures acquired often surpass the underlying cognitive capacity of the child (Livesey & Bromley 1973). Such research lends credibility to Lloyd and Duveen's belief that even at the pseudo-conceptual stage of development children exhibit considerable awareness about the gender marking of objects, activities, and occupations. Therefore, at this age (2-3 years old) the prospective schoolchild has already absorbed stereotypic social roles as characterised in the home.

In the domestic scenario we often see parents encouraging exploration and aggression in pre-school boys. Parents anecdotally mete out punishment to boys, stimulate relatively more gross motor movement in male infants, and encourage gender stereotyped play. Conversely, girls have the social constraints of compliance and relative inactivity placed upon them. Such traits present themselves on the first day of primary school along with the schoolchild. From this point on the power of schooling is a formidable force in the child's life. It is therefore surely no coincidence that young girls, in the co-educational setting, are reinforced for silence, neatness and for conformity to the social rules, particularly in the primary school. Consequently, young schoolgirls quickly realise that rewards and praise may be obtained from the teacher in this way. A highly problematic side of that this reward seeking, according to Silberman (1971), is its tendency to negate intellectual curiosity because girls may avoid situations of intellectual challenge.

Academic Achievement

Aside from those background variables concerning the age of the child and the extent of 'gender marking' in the home, the *economic* circumstances of the family should be considered. Harker (2000), suggests that the latter part of hypothesis (ii), [(ii) Single-sex schooling...measurably improves the academic performance of girls], is nothing more than a myth given substance by time and tradition. Marsh *et al* (1988) found that background was a more accurate predictor of student attainment than school composition/organisation. With this in mind illuminating data can be gathered from the home environment of the student. It seems that parents perceive single-sex schooling as being superior to co-educational schooling irrespective of their economic standing. For example, since the early 1990s the US has seen applications to all-girl schools mushroom by 21% and four new, all-girls secondary schools have been established. American all-girl elementary and secondary schools are in the midst of a "renaissance", according to

Whitney Ransome, the then Director of the (US) National Coalition of Girls' Schools (Kaminer, 1998). Yet the myth of single-sex superiority has, it appears, been driven by the economic circumstances of those families fortunate enough to enjoy the required level of financial privilege. This type of student already exhibits notably better academic attributes prior to the commencement of single-sex schooling. Thus, the differences in socio-economic background and consequent academic ability renders any uncontrolled comparison between single-sex schools and co-educational school meaningless. Similarly, Marsh *et al* (1988) reached the following conclusion regarding relative academic outcomes:

“...once pre-existing differences such as intelligence and social class differences are controlled, the differences tend to be small or non-significant.” (p. 241 - 242).

This seems to support part of our “in-house” hypothesis (i) and reject part of hypothesis (ii) because it strongly suggests that when background factors are controlled there are no measurable improvements in the academic performance of boys or girls at single-sex schools.

It should be remembered that even those that argue against the monopoly of the rich over educational opportunity remain supporters of single-sex schooling but on a fully inclusive basis entailing full provision to all socio-economic strata.

Parents and Siblings

Parents who advocated single-sex schooling felt that it encouraged harder work (77%), whereas proponents of co-educational classes felt it was socially ‘natural’ (West & Hunter, 1993). Nearly one third of parents whose daughters attended all-girls schools cited the fact that the school had a single sex policy as the reason for selection. Further, over 75% of parents with girls at single sex establishments believed that a single-sex environment promoted self-confidence in their child(ren). Contrastingly, only 34% of parents with daughters at mixed schools felt the same way. Many parents responded that co-education was more natural because it reflected wider society. Yet if the nature of wider society itself is inequitable (and arguably illusionary) then co-educational schools must logically be a significant contributor to this social problem. When assessing the cogency of West & Hunter’s study one must consider the level of parental awareness and knowledge. How would the views of the parents in West & Hunter’s research have changed if they would have grasped the central issues more fully? The low level of agreement (9%) by parents with daughters at co-educational schools with the statement that “genders develop differently and should therefore be educated differently” may be explained by a lack of knowledge about this matter. A further consideration is the defence mechanism of ‘co-educational parents’ who may actually prefer single-sex education in their hearts and minds but don’t enjoy the required level of financial leverage. Such people are more likely to defend their own ‘choice’ especially when, due to the absence of data they resort to thinking emotionally when talking about their own children.

Lawrie & Brown (1992) looked at the impact of siblings upon the construction of gender identity. Once again the effects are most notable when girls in co-educational schools have male sibling(s), “...girls in the mixed school and girls with an opposite sex sibling appear to give the most stereotypical responses” (p. 137). The “significant others” referred to most famously by Vygotsky exist both at school and in the home. It seems that

the majority of male “others” are only “significant” in their ability to impact on those female members of the home and the classroom in a way that reinforces traditional gender roles (Lawrie & Brown, 1992). If a social constructivist’s angle is taken on the issue of gender and schooling then it seems clear that girls and boys should be taught separately in order to facilitate the full realisation of their ZPD. The threat to their ZPD’s was consciously recognized by the schoolgirls in Lahelma’s (2002) study of Finnish secondary schools. It was discovered that by 13-14 years of age girls realised that the male domination of the ‘physical realm’ (i.e. space and voice) limited the fulfilment of their own unique ZPD’s.

Overwhelmingly West & Hunter’s research can be seen to reconfirm the opinion that girls don’t benefit from contact with boys in school. Yet, (a) many parents anecdotally expressed a preference for co-education because they felt that there were social advantages for their sons. Conversely, (b) parents whose daughters attended single-sex schools used substantially different reasoning, feeling that it would increase self-esteem and encourage engagement with Technical and Scientific subjects. In the former instance (a) we see girls supporting boys; in the latter instance (b) girls encourage and assist each other, yet there is very little evidence to suggest that the presence of boys promotes the status of girls either emotionally or academically or any way either at home or at school.

Summing up

To revisit hypothesis (i):

- (i) Single-sex schooling hinders the social, spiritual and moral development of boys and doesn’t impact significantly on academic performance.

Kelly (1996) challenges hypothesis (i) by observing the benefits to boys who studied in a single-sex paradigm; noting a relative gap of 2.43 GCSE points. However, there exists a considerable volume of research suggesting that background variables and not the form of schooling are responsible for relatively better academic performance by either gender in single-sex constructs (Marsh *et al*, 1988; Harker, 2000). In terms of academic engagement: Lawrie & Brown (1992) discovered that male engagement with traditionally female subjects improved notably in an all-boys environment. The issue of social, spiritual and moral development of boys fundamentally revolves around what it is ‘natural’ for boys to do and how they might do this in a more socially acceptable way. This prominent debate regarding boys seems to contain the implication that all would be improved by adapting (‘enhancing’) their natural hormonal tendencies to less gender-stereotypic environments. Perhaps therefore boys may be steered away from traditional modes of interaction with girls through the use of a school-based ‘reform agenda’. Indeed, it is only relatively recently that connections have been made between the prevalence of psychological pain and physical violence in our communities and the socially approved forms of masculinity dominant in our society. Thus a newly emergent and crucial context for this debate has recently begun to crystallise.

To revisit hypothesis (ii):

- (ii) Single-sex schooling improves the self esteem of girls and measurably improves performance.

There is a good deal of research evidence to support the claim that co-educational schooling impacts negatively the self-concept of girls in the following ways:

Firstly, a general reinforcement of traditional (subordinate) gender roles (Jackson, 2002; Lawrie & Brown, 1992):

“...increased contact [with the opposite sex] has not led to a convergence in their views or a breakdown in sex stereotypical attitudes, but if anything, the reverse.” (Lawrie & Brown, 1992, p. 138).

Lawrie & Brown have found evidence to support hypothesis (ii) and have shown girls' willingness to engage in non-gender stereotypic subjects in single-sex environments. There does seem to be a sufficiency of evidence to support this claim as denoted by the research of Gillibrand & Braun and Swan. Related connotations have been provided by Galitis (2002) who found that when co-educational primary school girls were moved to a single-sex chess club the nature of discourse and self-concept altered dramatically. One young female chess club member responded, “...there's no criticising, like by the boys, so that means we can learn” (p. 79). Others reported feeling more confident and displayed a readiness to become unselfconsciously immersed in the traditional male discourse of strategic conflict, for example: “kill the rook!” and “bomb the knight!” (pp. 79 – 80). Galitis also noted that the mixed club suppressed the quantity of verbal interaction between girls.

Secondly, girls endure the penalty of less productive contact time with the teacher (Sadker, 1994).

Thirdly, girls in mixed environments demonstrate relatively low self-esteem and therefore lower levels of motivation in Math and Science. It is a fact that disaffected or alienated students don't achieve their full potential, indeed students who exhibit poor self-concept behaviours are at increased risk of downwardly-spiralling motivational problems (Covington, 1984b).

Lastly, the sustained effect of co-education upon the social perceptions, behaviours and career aspirations of girls beyond their school years contributes significantly to social inequalities (Lee & Marks, 1990; Lawrie & Brown, 1992).

Kelly (1996) ventures to support the statement that single-sex schooling does improve the academic performance of girls. By way of evidence she points to a 3.69 GCSE point gap between all-girl schools and co-educational schools. Kelly's findings broadly concur with a 1982 ILEA report that did control for intake ability. However and as previously mentioned, benefits to academic performance are hotly contested by a significant weight of contrary evidence and therefore perhaps *engagement* would be a more valid measure of effective schooling. Research suggests that girls in co-education demonstrate a lack of self-esteem in Math and Science classes (or indeed anything considered a male bastion). Conversely they display much improved interest and engagement with these subjects in the single-sex paradigm (Jackson, 2002; Galitis, 2002; Gillibrand & Braun, 1994). This being the case, motivational theory suggests that the academic performance of girls and boys may be adversely affected in a co-educational environment regardless of background

variables. Indeed, the impact of background variables upon students becomes an almost peripheral enquiry when one considers the great individual and social cost of co-educational schooling, particularly to the girls. Perhaps the greatest tragedy is that this situation has arisen at all, the question is now what we should do to rectify the considerable damage co-educational schooling inflicts within our modern societies.

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About the Author

Ian Clark graduated with an honors degree in 1999. After a year working within the Japanese state education system in a variety of establishments, he studied to become a state school teacher of 11-adult age students in the UK at Manchester University. While studying for this degree he participated on many short-term international teaching projects in countries as diverse as Romania, Saudi Arabia and China. After graduation, he returned to Saudi Arabia for a short time before embarking on an MA in Educational Research at Lancaster University in 2002, ostensibly the first year of a PhD in the field. Ian Clark now lives and works in southern China where he continues his PhD work at the University of Hong Kong.

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General questions about appropriateness of topics or particular articles may be addressed to the Editor, Gene V Glass, glass@asu.edu or reach him at College of Education, Arizona State University, Tempe, AZ 85287-2411. The Commentary Editor is Casey D. Cobb: casey.cobb@uconn.edu.

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