educating boys the GOOD news

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About Boys:
the core of the matter

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From her research into brain function, Dr Martine Delfos concludes that we can enhance boys learning by taking into account their preferred ways of responding to classic stimuli but to also keep in mind that, for children in general, school is primarily a place to meet peers. Our teaching strategies should therefore encompass boys' preference for competitive behaviour; a cognitive style oriented more towards discovery and rote-memory; and a need for strong peer connections.

Gender Differences

There are important differences between men and women that are not only expressed in their physical appearance. Subtle brain differences can make people behave very differently. Clearly biological and evolutionary factors explain why men and women are different, however the similarities between them are even more striking. In my work on the differences between men and women I put forward arguments on a biological and evolutionary level for these similarities, which could free up our thinking about gender roles. Emancipation could take place in humankind just because of these similarities.

Human beings are born extremely vulnerable and must be taken care of for many years. The maturation of our brain takes some twenty-five years to reach mature functioning and continues to mature even longer. No species takes that long to mature and to adopt adult functioning, so the roles of men and women needed to be interchangeable to ensure the survival of the species. The dimorphism of the two sexes however has resulted in a more refined species. Consequently the differences are the baseline and the similarities the second layer. I will not go into this much further, as it is beyond the scope of this article; however, one of the results of my research is that men and women know interchangeable behaviour, but that they are basically attached in their behaviour to their fundamental role. This leads to the concept of *preference behaviour* (Delfos, 2004a). Men and women can display similar behaviour, but when they are confronted with a fundamental situation they tend to display different behaviour. The most fundamental situation is the confrontation with danger and the emotion of anxiety that goes along with it. In those situations men and women display their preference behaviour. In this context danger not only constitutes a physical threat but also a cognition, a most prevalent danger in these times. For instance: 'Will I be able to pass my exam and will my parents be proud of me?' This type of danger and anxiety may appear on a daily basis.

Anxiety as a basic motive

It is often anxiety that causes babies to cry during the first months of life. The child is anxious, experiences a need that is not satisfied but does not possess sufficient means of communicating his wishes to those looking after him. Even Watson (1924),

who was convinced that all behaviour was learnt behaviour, even love, considered anxiety as an innately present *basic emotion*.

In autistic people, especially children, anxiety is quicker to emerge (Delfos, 2004b); but the older the autistic child, the more s/he understands how things work. Also, those around the child understand the child's anxiety better and are better able to respond. Autism involves a fundamental problem with social interaction and thus a problem with human nature itself. Autistic people therefore have much anxiety because they cannot easily evaluate social interaction. But even for non-autistic people social interaction is quite complicated and can generate much anxiety. Anxiety diminishes with the increase in possibilities of communication (Delfos, 2000), at least if the parents and carers respond to the child's needs.

Anxiety is a basic emotion, and is an important drive for behaviour. Men and women react differently to anxiety. The response to anxiety can be *active* or passive, to *take action* or *not to take action*. In its extreme form it may lead to *aggression* or withdrawn, anxious behaviour even *depression*. Anxiety is indelibly linked with aggression and depression. To clarify this connection, I outline below the *anxiety scheme* presented in detail in Delfos (1997-2003, 2004c, a), where the consequences of anxiety for psychosomatic diseases are presented in a *psychosomatics model*.

Anxiety and stress

Anxiety and stress are interrelated. Stress is in fact a form of 'danger', by which we mean both a physical and a psychological threat. Table1 outlines the various forms of danger, with examples.

Table 1 Forms of danger

Form	***Example***
External direct physical danger	Someone who is about to hit me
External indirect physical danger	A fire breaking out
Internal direct physical danger	A sudden pain in my body
Internal indirect physical danger	A symptom such as fever
External direct psychological danger	Someone who threatens me verbally or pressure exerted by another person (stress)
External indirect psychological danger	Arachnophobia
Internal direct psychological danger	A negative thought emerging
Internal indirect psychological danger	Pressure I experience myself (stress)

In reaction to danger, the brain gives a signal to produce hormones, triggering a chain reaction in the body. *Anxiety*, *aggression* (here we mean specifically physical aggression) and *depression* can be brought together in a single hormonal model, at the same time illustrating the differences between men and women with regard to anxiety, aggression and depression (Delfos, 1997-2003, 2004a, b, c). The model is reproduced in Figure 1.

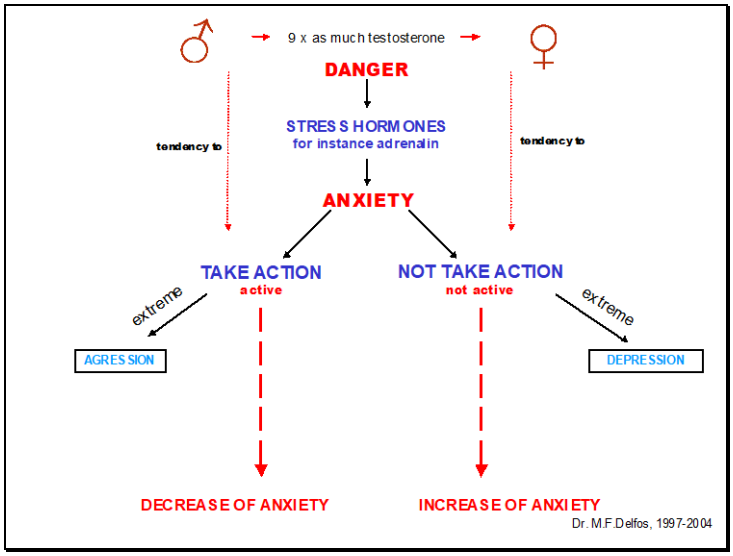

Figure 1: *Anxiety scheme 1* (Delfos, 1997-2003, 2004a, b, c)

Danger may entail a physical threat but also a negative thought. Danger activates the stress system (HPA: hypothalamic-pituitary-adrenocortical system) and makes the body produce stress hormones, including adrenalin. A number of physical processes are set in motion, enabling the person concerned to take action. The heartbeat accelerates, causing the blood to be pumped faster through the body and oxygen to be carried faster to the muscles to fight or take flight, and to the head to stimulate thinking. Respiration intensifies to get more oxygen into the lungs. The pupils dilate to be able to take in more visual information. The body is brought into a general state of *arousal*, enabling it to face the danger through the *fight-or-flight* response (Selye 1976).

It is beyond the scope of this article to explain the model in detail, but important to stress that men and boys tend to react to anxiety by taking action, possibly evolving into *hyperactivity* in boys, sometimes into aggression; and that women and girls tend to react with not taking action resulting in the possibility of depression. The difference in production of adrenergic hormones especially adrenalin (very easy and quick to be produced by the body) and androgens, especially testosterone (easy to access in male bodies as it is bound to proteins in the blood and quite difficult to produce for female bodies) makes quite a difference in behaviour.

It is not that men do not experience anxiety in the face of danger, but often they are more effective in facing it because they take action. The point is that the emotion of anxiety is coupled to the production of hormones like adrenalin. Taking action 'uses' adrenalin, and as a consequence diminishes the anxiety.

If there is good balance between testosterone and adrenalin (A/T), it is possible to take action. If both are at a high level, *aggression* may occur. If we have not enough testosterone for the amount of adrenalin, we cannot move into action and *depression* can develop. If adrenalin is not translated into action, it may become harmful to the body. *Psychosomatic symptoms* may be the result of this process. For the psychosomatic component of anxiety-aggression-depression, see the psychosomatic

model (Delfos 1997-2003; 2004a, c).

Obviously, the action we take does not always solve everything. The most effective approach is of course any action that actually reduces the danger. Nevertheless, bringing about some reduction of anxiety through physical activity is positive in itself, even if only to boost our flow of thoughts.

Since aggression, which is linked to testosterone (Dennen, 1992; Delfos, 2004 a, b, c), can be viewed as the most extreme form of action in the face of danger, it is not surprising that problems of aggression occur significantly more often in men. Men are not less fearful as such but are often more effective in dissolving their fear because they tend to move into action. On average, men are much more solution-oriented than women. Because men act, they experience less anxiety and for shorter periods. In fact, they have an effective method of getting rid of feelings of anxiety. Women are less inclined to act and as a result feel more anxiety and for longer. The most extreme form of inaction is depression. Someone with depression is listless and can hardly be persuaded to move. Women therefore have depressive symptoms much more frequently than men.

In terms of action, there is a difference between men and women. Men have a stronger tendency toward action, to deal with the danger and they initiate physical activity sooner. Women, on the other hand, have a greater tendency to act by seeking security and help when faced with danger. Under the influence of the oxytocin hormone, women will be more inclined to look after the nest, the children or the housework and talk to their female friends (Taylor, Klein, Lewis, Gruenewald, Gurung. and Updegraff, 2000). See figure 2, anxiety scheme 2 for the difference in action in men and women facing danger and stress.

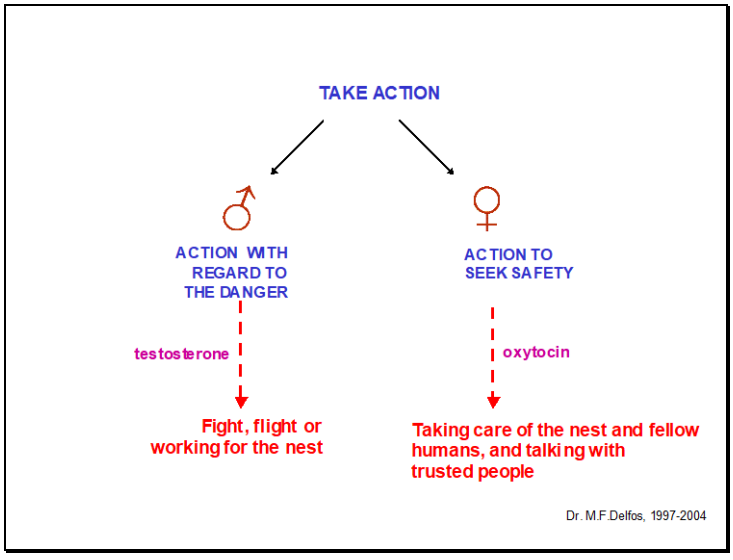

Figure 2: *Anxiety scheme 2* (Delfos 1997-2003, 2004a, b, c).

If we take the consequence of this difference in action between man and women seriously, we can better understand a number of problems between the sexes. We often see this pattern (working *versus* talking) arising when men and women are in

stressful situations. The most painful among these is possibly the loss of a child, probably the strongest grief known to humans. The risk of divorce is particularly serious in this situation (75%). The cause of the divorce is the different way in which the man and the woman respond to the pain of the loss of their child. Women blame men for 'escaping' into their work and not talking with them about their child. Women do not sufficiently realize that working is a strategy for the man to alleviate his pain about the loss, just as talking fulfils the same function for women. These are two solutions to the problem, rather than one, and the two pieces together can solve the puzzle. The same pattern can be observed when a partner dies, for instance. Men who are widowed tend to concentrate on their work and neglect their family; women tend to focus on their family and neglect their work (Worden 1996).

Fight and flight can be seen as two basic responses to stress, two coping mechanisms mainly found in men. Because of their physical predominance and orientation, they have a stronger tendency towards a physical response to stress. Women tend to respond less physically and their reactions to stress are therefore more social and psychological in nature: *tend and befriend*.

In my work I go beyond this and discovered that fight-or-flight are the male reactions to danger, but that women in fact have two strategies (Delfos, 2004a) The two basic responses of women are being nice and being a victim: the *nice-or-victim* response. Both are strategies protecting against attack. One does not attack victims or people who are nice. In the animal kingdom, we observe this for instance in the case of a puppy which, when taken for a walk, may meet a larger dog. The puppy presses itself against the ground to indicate that it is the smaller, inferior one and the larger dog need not attack it. Women's most common coping mechanisms are therefore 'nice' or 'victim' (Delfos, 2004a).

These strategies used by men and women in the face of danger and stress are exhibited equally in boys and girls. The most important problems for boys at the end of primary school are behavioural; with girls the most frequent problem is a tummy ache, a psychosomatic reaction. It is important to keep this in mind when we are talking about boys and girls and the way they learn at school and react to problems. Boys tend to *externalize* their problems (outward directed, aggressive behaviour), girls tend to *internalize* (inwardly directed, anxious and timid behaviour) as Achenbach (1978) showed us so clearly. Many children with the - false - diagnosis ADHD are boys that react with energy and hyperactivity to a problematic surrounding, for instance the divorce of their parents (2004c) and have no maturation - ADHD - problem as such. The externalized behaviour as a reaction to problems can also lead to an evaluation of social inadequate behaviour and fosters diagnosis as PDD-NOS whereas it is only a boy reacting in a 'sane' way to an 'insane' situation (Delfos, 2004b).

This difference in externalizing and internalizing behaviour already shows us that boys need an educational surrounding with more possibilities to express their energy and their discomfort. In thinking about learning strategies we should take into account that boys have a tendency to act and that teaching programs with more action and experimenting in them would be more appropriate for boys.

Still there are more elements to take into account. Another one is the cognitive style of boys.

Cognitive style
As human kind is born as a very fragile and vulnerable species, babies have a lengthy experience of being dependent on others for their security; food and so on. They form an imprint, *aidant* (Delfos, 2004a) that they need other people to feel secure. So, from the beginning boys and girls are driven by behaviour to ensure their security.

From their fundamental being these drives differ in the behaviour it fosters. Boys seek their security through competitive action, trying to get a good place in the hierarchy. When they are young they do this by fighting and you can see how important it is by the price they pay. They are willing to accept bleeding noses and bruises in order to discover their place in the hierarchy and climb one step higher. When they become adults the competition in order to secure their place in the hierarchy continues with cars and salaries.

For girls the situation is different. They know very soon that they cannot compete on a physical level and they choose another strategy. For them the first strategy is to be liked. They feel secure when people like them, because they know that normally you do not attack someone you like. The problem is that the other person is not supposed to know that girls are displaying behaviour in order to be liked, because then it is considered hypocritical. In their most important virtue, being kind to others, women have a double agenda: they need to be liked. As they grow tired of this strategy, being kind all the time and putting their own interests on a second level, women choose a second strategy: victim. Once again, they know the rule is that you do not attack a victim. So they feel safe from the danger of being attacked. Here too, the reason is hidden from the other person lest it be considered fake. For girls and women it is very difficult to attain security. Being liked is very unstable and takes a lot of energy and constant evaluation, whereas competition can end in a fairly clear conclusion.
So, competition is a basic strategy for boys and men to seek security. As it is a fundamental strategy it means that in school, boys need competition in order to feel stimulated and know their place in the hierarchy: fight being the first strategy for boys and men. When fight is not possible or too dangerous, the boy and man can take recourse to flight. In school we encounter this in the strategy of not doing their homework and playing truant.

For girls the first strategy, being liked, leads to doing her homework and to paying attention in class. When they cannot live up to expectations, girls have recourse to the victim strategy and ask for help. As a matter of fact girls do well at school at every level, also university, because of their strategies. Already Heymans (1932) researched male and female capacities in universities.

> *...of all capacities and characteristics that can be considered as conditions or signals of scientific qualities, only general knowledge, zeal, perseverance and patience, regular class attendance, docility, orderliness and accuracy in studying and a good memory are more often observed in female than in male students; with resoect to accuracy with quantitaive research no considerable differences are being observed, whereas on all other aspects men are in favour* (Heymans, 1932, *140*).

Girls tend to have good school results through non-specific factors, which we could call '*learning conditions'*.

The strategy of girls is more often to please the teacher, whereas that of boys is more to compete with the teacher. We have to take that into account when developing teaching programs for boys.

Another aspect of cognitive style, beside the non-specific factors and the urge toward action, is the tendency of boys to experiment and to understand the working of something.

We have known this for a long time; boys are more interested in objects and girls are more interested in human relations. But the research of Connellan and her group made it very clear: from the first day after birth, boys tend to look longer at objects and girls tend to look longer at faces (Connellan, Baron-Cohen, Wheelwright, Ba'tki and Ahluwia, 2001).

Figure 2: *Girls tend to look longer at faces the first day after birth, boys longer at objects* (Connellan et al., 2001).

We see boys' tendencies to discover the meaning of material at work when six years olds are given modelling clay to play with as they please. Boys soon prick the clay and smear it on the table while girls make puppets and trees. Boys want to discover the characteristics of the material and as a result will be able to use it in very different functions years later, whereas girls will tend to cling to the use they were taught.

Trying to discover the workings of something is an important cognitive style of boys, and therefore teaching should incorporate experiments and discovery as important learning mechanisms.

Learning strategies boys-girls

The learning strategies and educational surroundings of boys and girls as a result of the aspects we considered above could be very different. Boys have a tendency to action, and need action in class. A variation between movement and sitting still is more important for boys than for girls.

In order to stimulate their progress boys need to compete and struggle their way

through the class hierarchy. Their cognitive style is more oriented to discovering the workings of a subject and they are less oriented toward pleasing the teacher. Their thinking is more competition-driven, whereas the thinking of girls is more security-driven. Educational campaigns about venereal diseases show how this applies. Girls and boys are different in the way they respond to slogans. If we want girls and boys to think about safe sex we should formulate different slogans:

Security-driven thought processes, more girls-women:
If you don't want to get a disease you shouldn't have unsafe sex.
If you cannot really trust yourself or your partner you either be honest about it and use condoms, or withhold from intercourse.
Competition-driven thought processes, more boys-men:
Would you use condoms if intercourse would give you acne?
A real man uses condoms, even when it is not necessary.

Boys, more often than girls develop idiosyncratic learning strategies. This is especially true for autistic children. Autism can be considered as the more extreme male brain (Asperger, 1944/1997; Baron-Cohen, 2003, Delfos, 2004a, b) Autistic children develop their learning strategies by themselves. Their learning strategies are different from other children because they are not developed through contact, and consequently not from what they learn at school. People with an autistic disorder use different strategies to call up things from the memory than non-autistic people. They do not use categories to organise facts or to remember them better (Bowler et al., 1997). It is as if they just store facts. 'Remembering' occurs automatically, without being based on a strategy. This form of remembering can be seen with young children. Berversdorf and Hughes (2000) indicate that facts are not remembered within a context, but as loose data. They indicate that neurally this can be expected in the brain, because the brain cells in certain areas (for example the hippocampus) with autistic people show fewer branches and fewer connections with each other.

In general boys have a better rote memory and girls have a better short memory. Men collect facts, women are more oriented to the relations between facts. (Delfos, 2004a, b). In teaching one should be alert to these differences. An exam based on rote memory will generate much better results with boys than an exam based on relations between the facts.

Separated or mixed education
All these aspects of difference in learning by boys and girls could easily lead to the idea of single-sex education. Much research shows the benefit of single-sex education, but mostly the benefit is for girls. In fact boys probably do better in languages in co-education classes, whereas girls do better in mathematics in single-sex schools (Van de Gaer, Pustjens, Van Damme and Munter, 2004). However, simply single-sex classes in co-educational schools can help girls perform better but does not challenge the problematic male macho culture and may even exacerbate the situation if you do not change the curriculum to adapt more the learning needs of boys (Jackson, 2002). Girls have higher real career aspirations when educated in single-sex schools (Watson, Quatman and Edler, 2002).

Single-sex education in single-sex schools seems to improve the results of both boys and girls. However, the results suggest that this effect can only be effectuated when differential teaching styles are developed (Younger and Warrington, 2002).

So the question is not whether one should choose single-sex or mixed-sex education, but how teaching styles can be adopted to learning strategies of boys and girls.

In co-education, single-sex classes together with mixed-sex classes can help boys and girls to perform better together with learning to live together. Still, we should not underestimate the effect boys have on girls. Girls sense less belonging in co-educational schools. We should take account of this. Their feeling of security seems less developed in mixed-sex schools. This is important because boys and girls do not attend school to learn something, but first of all to meet peers! So, in order for school to be effective in teaching and social education the interrelations of boys and girls should be given ample attention.

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