

NATURE and NURTURE

Boys will be Boys

This is the second of three essays relating to a female bias in picture book content. The first essay, *COOL not CUTE*, examines the origins of this bias and how it manifests itself. The third essay, *FIGHTERS and FASHIONISTAS*, addresses gender-stereotyping. This essay is intended to be read between the other two. All three essays can be found at coolnotcute.com

In this essay I'm going to examine some of the scientific research that relates to the argument I've made about the female bias in picture book content in *COOL not CUTE*. I'll be focussing on the work of psychologists Melissa Hines¹, Simon Baron-Cohen² and Richard E. Tremblay³ in particular. Although I have a keen interest in psychology, I'm obviously not an expert, so I've asked psychologist Claire Lawrence⁴, a friend of mine, to proof the science of this essay. While I've included some of Claire's comments, it should be assumed that the opinions expressed are my own, unless otherwise stated.

As I mentioned in *COOL not CUTE*, when I refer to *boy-typical* or *girl-typical* preferences, I'm making a generalised argument. Girls with boy-typical preferences and boys with girl-typical preferences need books that appeal to them just as much as any other child. I'm aware that even labelling preferences as "boy-typical" and "girl-typical" will raise concerns with some readers about conditioning children to conform to sexual stereotypes. These are important concerns and I've addressed them in a separate essay, *FIGHTERS and FASHIONISTAS*.

However, I believe that an acceptance of innate gender-typical preferences is in the interest of children's literacy, and boys' literacy in particular. In this essay I'm going to outline some of the scientific research that I believe demonstrates the existence of innate gender-typical preferences.

I suspect that of all the missing ingredients listed in *COOL not CUTE*, the one many readers will have most difficulty accepting is *combat*, so I'm also going to use this essay to outline some research relating to this.

Twin Peaks

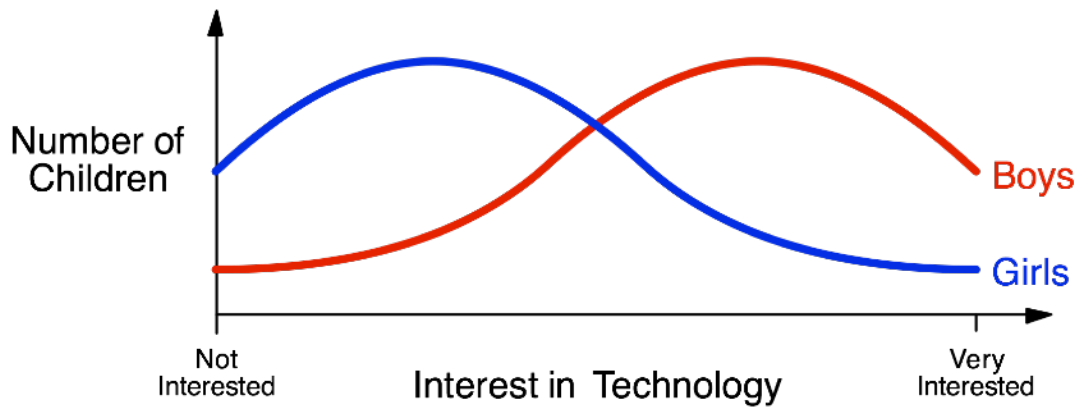
Before I go any further, I want to clarify what I mean by gender-typical preferences. Consider my pet ingredient of technology. If you could draw a graph showing children's interest in stories in which technology features prominently I think it might look something like this:

¹ <http://www.neuroscience.cam.ac.uk/directory/profile.php?mh504>

² <http://www.neuroscience.cam.ac.uk/directory/profile.php?sb205>

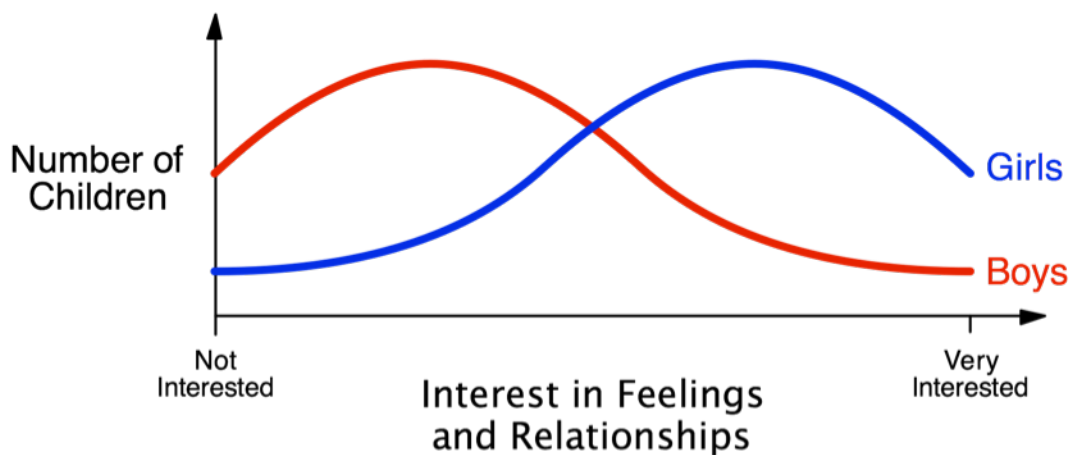
³ <http://www.crim.upenn.edu/aec/rtremblay.htm>

⁴ <http://www.psychology.nottingham.ac.uk/staff/cl/>



I've drawn the boys' peak to the right of the girls' peak to reflect my belief that boys are *generally* more interested in stories about technology than girls are. The graph indicates that there will be some girls who are just as interested in stories about technology as the most interested boys, but there will be fewer of them than there are boys. And there will be some boys who have no interest in stories about technology, but there will be fewer of them than there are girls with no interest.

Similarly a graph for interest in stories in which feelings and relationships feature prominently might look like this:



This time, I've drawn the girls' peak to the right of the boys' peak to reflect my belief that girls are *generally* more interested in stories about feelings and relationships than boys are. Again, there will be some boys who are just as interested in stories about feelings and relationships as the most interested girls, but there will be fewer of them than there are girls. And there will be some girls who have no interest in stories about feelings and relationships, but there will be fewer of them than there are boys who are not interested.

It's worth pointing out that the two factors I've used for these examples may be entirely independent: there may be girls who are very interested in stories about technology AND feelings and relationships, just as there may be boys who are not interested in stories about either.

Every child is different, but there are preferences that are typical to boys and preferences that are typical to girls. Environmental factors, such as the way a child is brought up, play an important part in establishing these gender-typical preferences, but I believe that *some* of these preferences have an innate component too.

The innateness of some gender-typical preferences is not essential to the argument I outlined in *COOL not CUTE*. Even if these preferences could be shown to be entirely a result of conditioning, responding to them in female-biased manner would still exacerbate the gender gap in reading ability. And even if society made a concerted effort to eliminate such conditioning, there would be at least one generation of boys whose reading would continue to fall behind their female classmates while we undertook such a massive feat of social engineering.

Science versus Sexual Politics

The concept of innate differences between the sexes has major implications for sexual politics. Most psychologists and neuroscientists exploring sex differences are acutely sensitive to this and are very careful with the way that they present and qualify their arguments.

In the opening chapter of her book, *Brain Gender*⁵, Melissa Hines clarifies the definition of a sex difference in the following way:

This concept of a sex difference as an average difference between the sexes, rather than an absolute one, should be familiar. When we say that there is a sex difference in height, we do not mean that all men are tall and all women are short. Instead, we mean that, on average, men are taller than women. Height is a good example because it is a familiar sex difference, and when I discuss sex differences in different behaviours or psychological characteristics, I will use height as a reference for understanding their magnitude. It bears noting, even at this early stage in the discussion, however, that most psychological sex differences appear to be smaller than the sex difference in height.

And in the opening chapter of Simon Baron-Cohen's book, *The Essential Difference*⁶, he has this to say:

Discussing sex differences of course drops you straight into the heart of the political correctness debate. Some people say that even looking for sex differences reveals a sexist mind that is looking for ways to perpetuate the historical inequities women have suffered. There is no doubt at all about the reality of the oppression of women, and the last thing I want is to perpetuate this. Nor for that matter do I want to oppress men, which has been the aim of some authors. Questions about sex differences can still be asked without aiming to oppress either sex.

It's worth pointing out that neither Hines nor Baron-Cohen are on the fringes of the scientific community; as the director of Cambridge University's Hormones and Behavioural Research Lab, Hines is arguably the leading expert in her field in the UK and Baron-Cohen has a similarly authoritative position as the Director of Cambridge's Autism Research Centre. Despite his academic credibility, Simon Baron-Cohen is clearly aware that, as a man, he is more prone to accusations of sexism than a female psychologist presenting a similar case. Consequently the tone of his book is conspicuously conciliatory. Nevertheless, the evidence for innate sex differences presented by Hines, Baron-Cohen and other psychologists such as Susan Pinker⁷ have met with fervent opposition from some quarters.

⁵ Melissa Hines, *Brain Gender*, Oxford University Press, 2004

⁶ Simon Baron-Cohen, *The Essential Difference*, Allen Lane, 2003

⁷ <http://www.susanpinker.com>

A prominent opponent in recent years is Cordelia Fine⁸, a psychologist at Melbourne Business School. In her book, *Delusions of Gender*, Fine dismisses claims of neurological sex differences as “neurosexism”. The publisher’s summary of the book on Amazon⁹ begins as follows:

A vehement attack on the latest pseudo-scientific claims about the differences between the sexes. Sex discrimination is supposedly a distant memory. Yet popular books, magazines and even scientific articles increasingly defend inequalities by citing immutable biological differences between the male and female brain.

Fine’s book has been widely acclaimed by reviewers in the mainstream media, some of whom join her in pouring scorn on psychologists like Hines and Baron-Cohen whose studies she claims to debunk. A London Evening Standard review describes these such studies as “sexism masquerading as psychology”¹⁰, and a similarly glowing review in The Metro refers to “delusional myth-making that often passes for popular science”¹¹. Commending it as one of her books of the year in The Guardian, author Jeanette Winterson states that “Cordelia Fine’s brilliant book *Delusions of Gender* debunks the likes of Simon Baron-Cohen, dressed up in one of his brother’s¹² outfits as a mad scientist”¹³. With such hostile responses and vitriolic personal attacks directed towards them, it’s with some trepidation that I take the side of those psychologists who accept the existence of innate sex differences. However, having examined the evidence given by both sides, I find I am obliged to do so.

Nature versus Nurture - The Current Consensus?

Before writing this essay I outlined its content to psychologist Claire Lawrence to get her professional perspective. Although I’ve known Claire for several years, up until then we’d never discussed the topic of sex differences and I had no idea of her views on the issue. One area of research I wanted to discuss indicates that girls generally have an innate preference for playing with dolls and Claire had told me previously that she had an intense dislike of dolls. This had made me think that she might be sceptical of innate sex-differences. However I discovered that Claire is of the view that many sex differences, including toy preferences, may have an innate component.

Earlier that week I’d heard a discussion of sex differences on the BBC’s *Woman’s Hour* programme¹⁴ between Simon Baron-Cohen, who was advocating that **both** nature and nurture have a role in determining sex differences, and Laura Nelson¹⁵, a neuroscientist who is sceptical of the role played by nature. Both sides of the argument were given equal prominence. Having spent

⁸ <http://www.cordeliafine.com>

⁹ http://www.amazon.co.uk/Delusions-Gender-Science-Behind-Differences/dp/1848312202/ref=tmm_pap_title_0?ie=UTF8&qid=1355311641&sr=8-1

¹⁰ Taken from Rosamund Urwin’s London Evening Standard Review of *Delusions of Grandeur*. 06.09.10

¹¹ <http://metro.co.uk/2010/09/14/delusions-of-gender-book-review-512071/>

¹² I assume this was intended a reference to Baron-Cohen’s cousin, the comic actor Sacha Baron Cohen, rather than his brother (should he have one).

¹³ The Guardian 27/11/2010 <http://www.guardian.co.uk/books/2010/nov/27/christmas-books-year-roundup>

¹⁴ You can listen to it here. It starts at 27 mins 26 secs: <http://www.bbc.co.uk/programmes/b01nl965>

¹⁵ <http://drlauranelson.com/>

some time researching the subject and reading related articles and correspondence in professional journals such as *The Psychologist*¹⁶, I'd formed the impression that the view Baron-Cohen was advocating represented the overall consensus within the fields of psychology and neuroscience. However the programme gave the impression that there was no consensus on the subject.

When I asked Claire where she felt the current consensus lay, she told me that, in her opinion, most psychologists now accept that both nature and environment (nurture) have an important role in determining gender characteristics.

The central argument of Simon Baron-Cohen's book *The Essential Difference* is that women are generally better at empathising than men, and that men are generally better at systemising than women. He describes those individuals with a greater ability to empathise as having "brain type E" and those with a greater ability to systemise as having "brain type S". The book's opening chapter touches on the subject of preferences in reading material.

We have always known that people are drawn to certain subjects when they want something to read. In the newsagent's on the railway platform or airport departure lounge, those with brain type E will go to the magazine rack featuring fashion, romance, beauty, intimacy, emotional problems and agony-aunts, counselling, relationship advice and parenting. Those with brain type S will go to a different magazine rack (we should thank the shop owners for separating them so clearly for us) featuring computers, cars, boats, photography, consumer guides, science, science fiction, DIY, music equipment, hi-fi, action, guns, tools and the great outdoors.

Baron-Cohen would be the first to admit that social conditioning will have been a big influence in creating the marked division in preferences he's describing here, but the book goes on to argue that innate differences also have a significant role.

Although there have been studies demonstrating significant sex differences in children's reading preferences, it's difficult to draw any conclusions from these studies as to whether or not such preferences are innate as by the time a child is old enough to select their own reading material they will have been subjected to sustained conditioning that might equally have determined these preferences. Instead I'm going to examine three studies that suggest innate sex differences in related preferences.

Little Monkeys

Children's reading preferences are closely related to their toy preferences and there have been many studies relating to sex differences in this area which show that boys have a preference for mechanical toys, such as cars or diggers, while girls prefer to play with character toys such as dolls. However, like the studies into children's reading preferences, it's difficult to draw any conclusions from these studies as to whether or not these preferences have an innate component. Research demonstrates that adults tend to encourage children to play with boy or girl-typical toys that correspond to their sex; so a parent is more likely to encourage a boy to play with a digger

¹⁶ <http://www.thepsychologist.org.uk>

than a doll.¹⁷ This could mean that any preference a child displays is entirely a result of conditioning by adults.

Psychologist Melissa Hines realised that one way around this problem would be to find a group of children who hadn't been conditioned according to their sex to see if the same preferences were evident. Unfortunately, no such children exist, since all human cultures engage in such conditioning. So Hines decided to test our close genetic cousins, monkeys, instead¹⁸. The experiment, which she conducted with fellow psychologist Gerianne Alexander¹⁹, was carried out on a group of 88 vervet monkeys (44 male, 44 female) who'd had no previous experience with toys.

Six different toys were used: two typically preferred by boys (a car and a ball), two typically preferred by girls (a doll and a cooking pot) and two typically preferred equally by boys and girls (a picture book and a stuffed dog).

Although it's reasonable to assume that the monkeys would recognise the doll as representing a primate and the stuffed dog as representing another animal, it's not likely that they would associate the other four toys — the car, the ball, the cooking pot and the picture book — with the objects from human culture that they represented. Although critics of the experiment have focused on the irrelevance of these cultural associations to monkeys²⁰, this lack of cultural relevance is itself irrelevant; the purpose of the experiment was to see if the *object features* of these toys (their colour, shape, texture, movement and whether or not they have moving parts) made them attractive to one sex more than the other.



Sex-typed toy play in male and female vervet monkeys

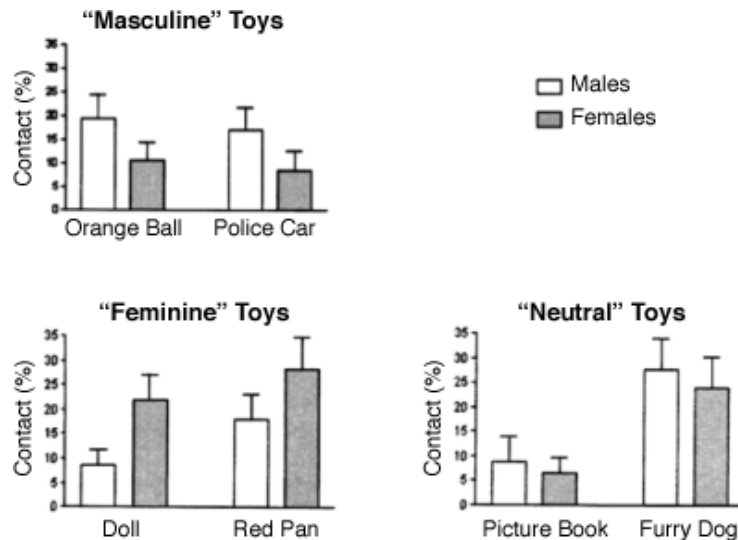
¹⁷ You can see an example of this research at the beginning of this clip. <http://www.youtube.com/watch?v=8mvZ4EbPbME&list=LP7nM0a7Gfqpo&index=6&feature=plcp>

¹⁸ Based on an interview with Hines in the second half of the above clip.

¹⁹ <http://psychology.tamu.edu/html/bio--galexander.html>

²⁰ After attempting to ridicule the selection of a cooking pot by pointing out that monkeys are unfamiliar with "the art of heated cuisine" Cordelia Fine states "that it is not at all clear that a toy taken from human culture has the same meaning to a monkey, to which it is unfamiliar, that it does to a child". Whether Fine has genuinely misunderstood the purpose of the experiment or whether she is wilfully disregarding it in an attempt to undermine the study's credibility is not clear. Fine, Cordelia, *Delusions of Gender* (Kindle Edition 2010) Chapter 11

The monkeys were tested in seven groups, with each group tested two or three times over a period of weeks. Each of the six toys was placed in the group's cage one at a time, in a random order, and a video camera was used to record how much time each of the monkeys played with each of the toys. The results showed that, on average, the male monkeys spent more time with the boys' toys than the females and the females spent more time with the girls' toys than the males. Both sexes spent a roughly equal amount of time with the neutral toys.



Charts showing the results of Alexander and Hines' Experiment

In the paper they published on the study²¹, Alexander and Hines make suggestions as to why these preferences might exist. Referring to previous studies, they suggest that the car and ball may have been more attractive to the male monkeys as they are "objects with an ability to be used actively or can be propelled in space. Preferences for such objects may exist because they afford greater opportunities for engaging in rough or active play." They suggest that the doll may be of interest to the female monkeys since females interact more with infants than males do.

The popularity of the cooking pot with the females was more of a puzzle. The paper suggests that this may have had something to do with its red colour, which is similar to the colour of an infant vervet's face. However, it's worth noting that a subsequent study of human children²², which Hines was also involved in, suggested that "both girls and boys preferred reddish colours over blue". The same study also suggests that girls' fondness for pink is the result of conditioning rather than any innate preference.

In their conclusion to the paper, Alexander and Hines suggest "that children's toy preferences reflect innate object preferences that are elaborated in typical human development by subsequent

²¹ Alexander GM, Hines M. Sex differences in response to children's toys in nonhuman primates (*cercopithecus aethiops sabaeus*) *Evolution and Human Behavior*. 2002;23:467-479.
[http://www.ehbonline.org/article/S1090-5138\(02\)00107-1/fulltext](http://www.ehbonline.org/article/S1090-5138(02)00107-1/fulltext)

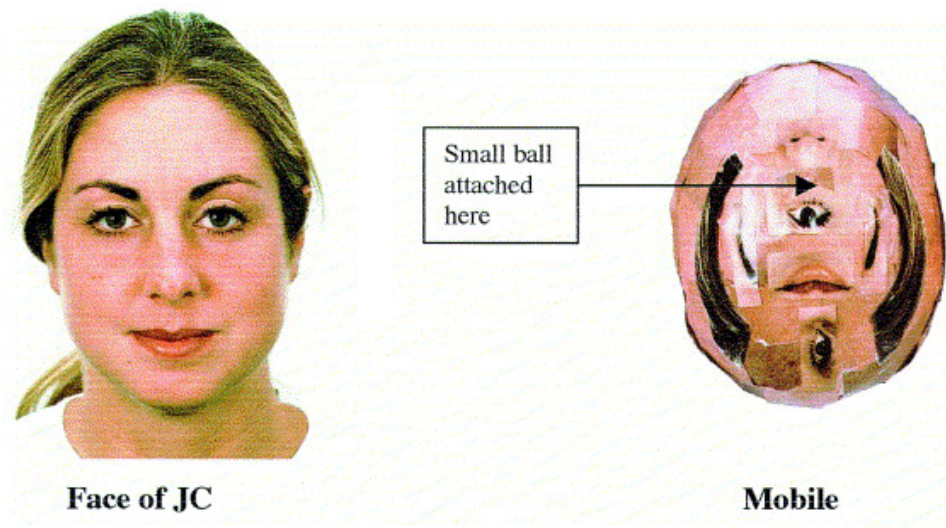
²² Jadv, V., Hines, M., & Golombok, S. (2010). Infants' preferences for toys, colors, and shapes: Sex differences and similarities. *Archives of Sexual Behavior*, 39, 1261-1273.
<http://link.springer.com/content/pdf/10.1007%2Fs10508-010-9618-z>

gender socialization.” Or to put it more simply, children are born with sex-typical preferences that are usually developed and reinforced by their upbringing.

Mugs and Mobiles

Simon Baron-Cohen was involved in an experiment²³ with fellow psychologists Jennifer Connellan and Anna Ba'tki to test the theory that boys were innately more interested in mechanical objects, while girls were innately more interested in people. To eliminate the possible effects of environmental conditioning on their subjects, the experiment was carried out on 100 babies who were a single day old.

Each of the babies were shown two different stimuli one after the other: Connellan's smiling face and a specially constructed mechanical mobile. The mobile was made from a ball the same size as Connellan's head, with the same colouring, but with her features rearranged, so that the overall impression was no longer face-like. The purpose of this strange piece of collage was to ensure that characteristics such as colour and individual facial features, such as eyes, were present in both stimuli. To make the mobile more mechanical they hung objects from it.



The two stimuli used in the experiment

The babies were videotaped and when the results were analysed it was found that the boys spent more time looking at the mechanical mobile, while the girls spent more time looking at Connellan's face²⁴. The fact that this sex difference was evident only one day after birth was interpreted as demonstrating “that sex differences are in part biological in origin”.

The supposed “debunking” of this experiment has been given considerable exposure by the mainstream media and gained so much currency as a consequence that it's worth setting the record straight. In Chapter 10 of her book *Delusions of Gender*, Cordelia Fine accuses Connellan's

²³ Sex differences in human neonatal social perception

Infant Behavior and Development, Volume 23, Issue 1, January 2000, Pages 113-118

Connellan, J.; Baron-Cohen, S.; Wheelwright, S.; Ba'tki, A.; Ahluwalia, J.

²⁴ 36.2% of the girls preferred to look at the face, 17.2% preferred the mobile and 46.6% showed no preference.

43.2% of the boys preferred to look at the mobile, 25% preferred the face and 31.8% showed no preference.

team of having a “cavalier approach to normal policy and procedure in infant testing” and alleges several flaws in the way the experiment was carried out. Although Simon Baron-Cohen subsequently refuted these allegations in a professional journal²⁵ immediately after the publication of Fine’s book, the allegations remain in current editions²⁶. Fine claims that the “most major problem with the study” was that the experimenters were aware of the sex of the babies they were testing. Fine suggests that this knowledge would have unconsciously affected the way that Connellan’s team had carried out the experiment and may have led to them misinterpreting the results in a way that fitted the hypothesis they were testing. To drive the point home, Fine includes a description of another study where precautions were taken to conceal the babies’ sexes from the experimenters and alleges that “No such precautions were taken in Connellan’s study”.

This may be the way that Fine would like her readers to imagine that Connellan’s study was carried out; here’s the way it was actually conducted. The mothers who consented to take part in the study were asked not to reveal the sex of their babies to the researchers until after the data recording was complete.²⁷ In 95% of the cases, this information was not revealed. In the other 5%²⁸ the experimenters did, inadvertently, become aware of the babies’ sex. Nevertheless, to eliminate any unconscious bias on behalf of the observer, the images on the videotapes were cropped so that just the eye regions of the babies’ faces were showing, making it almost impossible to judge the babies’ sex. The cropped video tapes were then shown to an *independent* panel of judges, who analysed the babies’ eye movements²⁹ and logged how much attention each stimulus received. So, contrary to Cordelia Fine’s “no precautions” claim, Connellan and her team took considerable precautions to conceal the babies’ sexes from the experimenters. If you’re wondering how Fine can get away with publishing an account of a study that is so at odds with the way in which it was actually conducted, bear in mind that, by common consent, the law of libel does not apply to the scientific community.

Nature’s Experiments

Some of the most compelling evidence for the existence of innate sex differences in preferences comes from outside the field of psychology. In her book *Brain Gender*, Melissa Hines refers to several *clinical intersex syndromes*. These are biological conditions where children are born with external genitalia that are neither clearly male or female.

One such condition is a rare birth defect called *cloacal exstrophy* which affects both boys and girls. Although boys with the condition are genetically male³⁰, when they are born their penises are tiny, malformed or entirely absent. Until recently, the conventional way to treat boys with this condition was to reassign them surgically as girls by removing their testes (and penis if present) and constructing labia. The boys were then raised as girls. Their parents were warned to keep their

²⁵ See Baron-Cohen’s review of the book in *The Psychologist* Volume 23 - Part 11 - (November 2010) and letter to *The Psychologist* Volume 24 - Part 1 - (January 2011)

²⁶ Including the Kindle edition I purchased in December 2012

²⁷ Taken from Baron-Cohen, *The Essential Difference*.pp.87

²⁸ Percentages taken from Baron-Cohen’s letter to *The Psychologist*.

²⁹ Description taken from Baron-Cohen’s review of Fine’s book in *The Psychologist*.

³⁰ They possess XY rather than XX chromosomes

child's genetic sex secret, especially from the child, as this knowledge would harm the child's psychosexual development. The reasoning behind this approach was that, if the child believed they were a girl and was brought up as a girl, this conditioning would re-assign the sex of their brain. In short, it was believed that nurture alone could determine sexual identity.

In 2004, paediatric urologists William Reiner³¹ and John Gearheart³² published a paper on cloacal exstrophy³³ describing a long-term follow-up study of a group of sixteen genetically male children with the condition. Fourteen of the children had their sex reassigned — socially, legally and surgically — at birth; the parents of the remaining two refused to do so. The study monitored the development of these children between the ages of five and sixteen years old. Both parents and children were asked to complete six detailed questionnaires evaluating the subjects' psychosexual development and sexual identity. The questionnaires "assessed multiple topics concerning sexual role, such as the subjects' interest in toys, dolls, clothing, and infants; interest and time spent playing games and participating in various activities; athleticism; aggressive behaviours; career interests; sexual interests; sex of friends; and whether and to what degree the parents focused on expected behaviours for a daughter."³⁴

Here's an excerpt from the results:

The parents of all 14 subjects assigned to female sex stated that they had reared their child as a female. Twelve of these subjects have sisters: parents described equivalent child-rearing approaches and attitudes toward the subjects and their sisters. However, parents described a moderate-to-pronounced unfolding of male-typical behaviours and attitudes over time in these subjects — but not in their sisters. Parents reported that the subjects typically resisted attempts to encourage play with female-typical toys or with female playmates or to behave as parents thought typical girls might behave. These 14 subjects expressed difficulties fitting in with girls. All but one played primarily or exclusively with male-typical toys. Only one played with dolls; the others did so almost never or never. Only one ever played house.

By the time the study had finished, four of the fourteen re-assigned children had spontaneously declared a male identity³⁵, four chose to identify as boys after being told that they were born male³⁶, five persistently declared unwavering female identity and one refused to discuss their sexual identity. Not surprisingly, Reiner and Gearheart concluded that the policy of sex re-assignment for boys with cloacal exstrophy should be reconsidered in light of their findings and as a result of this and other studies, gender reassignment is now only used on infants in exceptional circumstances.

³¹ <http://www.oumedicine.com/urology/general-program-info/faculty/william-g-reiner-md>

³² <http://urology.jhu.edu/johngearhart/>

³³ Reiner WG, Gearhart JP. Discordant sexual identity in some genetic males with cloacal exstrophy assigned to female sex at birth. *New Engl J Med* 350:333-41, 2004.
<http://www.nejm.org/doi/pdf/10.1056/NEJMoa022236>

³⁴ Taken from the "Methods" section of the paper.

³⁵ At the ages of 7, 9, 9 and 12 years.

³⁶ At ages 5, 7, 7 and 18 years.

This and similar studies into other intersex syndromes are seen as confirming that many sex-typical preferences are present in children's brains from birth and not simply the result of the environment they were brought up in. Opponents of innate sex differences have struggled to discredit such evidence³⁷.

What's in the Box?

I think one of the reasons there is such fervent opposition to the concept of innate sex differences is that once you have a box labelled "innate sex differences", people will inevitably make provocative and unfounded claims about what is or isn't in that box.

In *COOL not CUTE*, I listed several ingredients that I believe are generally more appealing to boys than girls. Based on various studies, including those outlined in this essay, I think there's evidence to suggest that *some* of those ingredients are more appealing to boys as a result of an innate preference.

However, it may be that boys' preferences for some of those ingredients are entirely the result of nurture. I can't think how you could scientifically determine that boys have an innate preference for rude humour for instance, so who's to say whether or not that should be included in the box?

So far I've confined my argument to innate sex differences in *preferences*. One of the things that makes innate sex differences such a contentious issue is the claims that there are sex differences in male and female *abilities* as well. The central argument of Simon Baron-Cohen's book, *The Essential Difference*, is that women are *generally* better at empathising than men, who are *generally* better at systemising. Although Baron-Cohen takes great pains to point out that both skills are of equal importance and usefulness in societal and evolutionary terms, many interpret his argument as an attempt to justify old-fashioned sexual stereotypes; that women are better suited to staying at home looking after the kids, while men are better suited to making stuff and organising things. The acceptance of innate sex differences is often equated with the acceptance of inequality between the sexes. I think this is a rather crude interpretation of Baron-Cohen's argument. I also think that an awareness of innate sex differences in both preferences and abilities could help to reduce inequalities in the sexes rather than increase them. In my other essay, *FIGHTERS and FASHIONISTAS*, I've looked at how neuroscientist Lise Eliot has suggested using such an awareness to close gender gaps in a range of abilities.

Up until now I've been writing about innate sex differences in *preferences* and how they affect the literacy gender gap. What if innate sex differences in *abilities* are also part of the problem?

A Double-Edged Sword

My first essay, *COOL not CUTE*, began by describing the gender gap in boys' and girls' reading abilities. One reason I've written this second article is that I feel that this gender gap is partly a consequence of a female-dominated picture book culture that is relatively unresponsive to the boy-

³⁷ Cordelia Fine makes no reference to Reiner and Gearhart's study or cloacal exstrophy anywhere in *Delusions of Gender*. Fine does criticise the interpretation of other studies of intersex syndromes, such as congenital adrenal hyperplasia (CAH). Reviewing *Delusions of Gender* in the professional journal, *Biology of Sex Differences*, Margaret McCarthy and Gregory Ball describe Fine's dismissal of intersex syndrome studies thus: "Instead of acknowledging that perhaps there is something interesting going on here, Fine refuses to yield an inch and instead goes through a contorted and ultimately irrational argument about the scientists' 'not even knowing' the parameters of male versus female toys that make the toys preferred. Why this undermines the data is unclear."

McCarthy and Ball *Biology of Sex Differences* 2011, 2:4 <http://www.bsd-journal.com/content/2/1/4>

typical preferences. But the innate sex difference argument cuts both ways and I believe that the gender gap could also be a consequence of innate sex differences in abilities.

It may be that girls are innately better at reading than boys!

There is a lot of evidence to suggest that girls generally have superior language skills to boys, some of which is outlined by Baron-Cohen in *The Essential Difference*.

On average, women produce more words in a given period, fewer speech errors (such as using the wrong word) and perform better in the ability to discriminate speech sounds (such as consonants and vowels) than do men. Their average sentences are also longer, and their utterances show standard grammatical structure and correct pronunciation more often. They also find it easier to articulate words, and do this faster than men. Women can also recall words more easily. Most men have more pauses in their speech. And at the clinical level of severity, males are at least two times more likely to develop language disorders, such as stuttering.

In addition, girls start talking earlier than boys, by about one month, and their vocabulary size is greater. It is not clear whether receptive vocabulary size (how many words a child understands) differs between the sexes, but it seems that girls use language more at an earlier age.³⁸

Baron-Cohen goes on to say:

Girls are also better spellers and readers. Boys tend to be faster at repeating a single syllable (e.g. ba-ba-ba), whilst girls tend to produce more syllables when the task is to repeat a sequence of different sounds (e.g. ba-da-ga). Girls are also better on tests of verbal memory, or recall of words. This female superiority is seen in older women, too, including those who are well into their eighties.

It's worth noting that Baron-Cohen qualifies the claim that girls are better readers by suggesting that some reading assessment tests may be biased towards children with a higher ability to empathise.

Some measures of language, such as reading comprehension, may actually reflect empathizing ability. For example, girls tend to perform better than boys on reading achievement tests overall, but this is because they are particularly better at understanding social storylines, compared to non-social ones.³⁹

Accepting that there may be an innate sex difference in boys' and girls' reading abilities is not the same as accepting the inevitability of a gender gap between the two. Like many who accept the existence of innate sex differences, I believe that such differences can be minimised or overcome by environmental factors — in this case an increased availability of reading material that reflects boys' innate preferences. While it might not be causing it, I think the current scarcity of uncompromisingly boy-friendly reading material is exacerbating the gender gap. I also believe that this problem can be tackled far more effectively if we acknowledge that innate sex differences exist.

³⁸ Baron-Cohen, *The Essential Difference*.pp.59-60

³⁹ Baron-Cohen, *The Essential Difference*.pp.62

If the Tables were Turned ...

Before I leave the topic of innate sex differences, I want to pick up on a comment I made at the end of Part 1 of *COOL not CUTE* about men being no better suited than women to the gatekeeper roles I'd outlined. I went on to say that, if anything, I believed that men are generally less suited to these roles than women. This belief stems from an acceptance of innate sex differences.

The evidence of superior language skills outlined above could be taken to suggest that *generally* women might make better editors than men. Baron-Cohen's book, *The Essential Difference*, also presents evidence that women are *generally* better empathisers than men. If this is the case, it suggests that women gatekeepers, both inside and outside the publishing industry, might *generally* be more considerate of boys' preferences than male gatekeepers might be of girls'. So if the tables were turned and the UK picture book industry was dominated by men instead of women, I suspect that girls would be getting a far rawer deal than boys currently are.

The Trouble with Combat

Of all the "missing ingredients" I listed in *COOL not CUTE*, I suspect the one that will be the most contentious is *combat*. Some readers might feel that the inclusion of more combat in picture books would inevitably encourage children to behave more aggressively.

In the first chapter of her book, *Brain Gender*, Melissa Hines includes aggression in a list of factors influenced by sex differences and has this to say:

Boys and men are more aggressive than girls and women in several contexts. This sex difference is also seen in many cultures. Findings have suggested greater aggression in males than in females, including more aggression in fantasy, more verbal insults, greater imitation of models acting aggressively, administration of what appears to the subject to be more painful stimuli to others in experimental situations where this is requested, and greater self-report of aggression on paper-and-pencil questionnaires. Metaanalytic results also support the conclusion that males are more aggressive than females, and suggest the sex difference is of moderate size.

Another reason I asked psychologist Claire Lawrence for her input into this article is that she specialises in the study of aggression and the factors that trigger it. Claire shares the view that typically, males behave more aggressively than females. She explained to me that most studies show that both sexes get equally angry, but boys are more likely to allow this anger to exhibit itself in their behaviour.

I explained to Claire my observations about the differing standards of age appropriateness between picture books and more boy-friendly media such as films and asked her whether she thought exposure to depictions of combat similar to those in films such as *The Incredibles* and *Star Wars* were likely to encourage aggressive behaviour in young children. At best, I was hoping that Claire would say they'd have a relatively small or no effect, so I was surprised when she told me that, in her opinion, if presented in the right way, depictions of combat might actually help to discourage aggressive behaviour.

That last statement needs some qualifying.

There is substantial evidence to suggest that prolonged exposure to depictions of combat can have a priming effect, particularly when the depiction encourages the individual to identify with an aggressor and their aggressive behaviour is shown as being rewarded or depicted in a positive way.

So, if aggression is depicted positively, as a rewarding behaviour, the evidence suggests that this may encourage children to behave aggressively themselves. But what happens when aggression is depicted negatively and aggressive behaviour is shown as being penalised?

One of the reasons that Claire suggests that depicting aggression in a negative light could be beneficial to boys in particular is that, while girls worry about the social disapproval or emotional hurt that might result from acting aggressively, boys, particularly aggressive boys, are more likely to believe that aggression will have a positive outcome. Depictions of combat that show negative outcomes for an aggressor, may discourage a child from using aggressive behaviour themselves.

The Cantina Bar Incident

This approach sits well with the BBFC's outlines for U certificate media, which state that any violence "should be set within a positive moral framework".

In *COOL not CUTE*, I mentioned the high body count in the original U certificate *Star Wars* film, *A New Hope*. Most of the combat in this film is bloodless since the fighting is done with laser weaponry. However blood does make one brief appearance in the film — when Ben Kenobi cuts off someone's arm with a light sabre. If you've not seen the film, you may be shocked to learn that the BBFC deemed the depiction of such an act suitable for four-year-olds. It's certainly one of the most shocking scenes I've seen in a U certificate film. I can still remember being shocked by it when I first saw it at the cinema as a twelve-year-old. I expect that my four-year-old son was shocked by it the first time he watched it with me. An act like this should be shocking. The fact that the BBFC still deemed this scene appropriate for a four-year-old reflects the care the filmmakers took to present it within a "positive moral framework" and the way the act was represented on screen.

The scene takes place inside a smuggler's bar that Ben is visiting with Luke, his young companion. One of the bar's other occupants, a criminal called Evazan, takes a dislike to Luke who, clearly keen to avoid a fight, apologises and tries to turn away. When Evazan persists and becomes threatening, Ben steps in and tries to placate the criminal by offering to buy him a drink. It's clear that Ben also wishes to avoid a fight, but Evazan is just as keen to start one and pulls a blaster on Ben. Before Evazan is able to fire, Ben pulls out a light sabre and cuts off Evazan's arm. The severance is not shown on screen, but a fleeting shot of the detached arm holding the blaster makes it clear what has happened.

The message of this scene, and arguably the whole film, is that aggression is best avoided and if pursued can have unfortunate consequences for the aggressor.

The Anger Within

In Claire Lawrence's view there are good grounds for getting to grips with aggression at an early age. Humans of both sexes are at their most aggressive when they are two-years-old. At this age children haven't learnt to control their behaviour; they will kick someone in the shin as they have no concept of the pain it causes the other person. An important aspect of socialisation is that children learn to appreciate the effects of their actions and inhibit such impulses.

Claire told me about the work of Canadian psychologist Richard Tremblay who specialises in the development and prevention of antisocial and violent behaviour in children. Many of Tremblay's findings are summarised in *Early Learning Prevents Youth Violence*⁴⁰, a report he co-authored with Jean Gervais⁴¹ and Amélie Petitclerc⁴² for two development and learning organisations funded by the Canadian government.⁴³

The exclusion of depictions of combat from children's media is sometimes justified on the grounds that aggression is a learnt behaviour that will be picked up from such depictions. This brings us back to nature and nurture. The Canadian report states that "*According to the latest research, physical aggression actually appears very early in life. Experts have reported that infants express anger before two months of age.*"⁴⁴

Such research has led psychologists to regard aggression as an innate behaviour. As the report puts it, "children do not need to see aggressive behaviour in order to learn to act aggressively." Children are born with aggressive tendencies, although environmental influences, such as books films and TV shows, can certainly reinforce or inhibit them.

Although aggressive behaviour is innate to both sexes, the report describes the development of a marked sex difference as children grow older.

*Until approximately the age of three, physical aggression is seen in both sexes nearly equally, but girls tend to attain a lower peak of physical aggression than boys, and they generally start to diminish their use of physical aggression sooner and faster. After the age of four, twice as many boys use physical aggression as do girls*⁴⁵.

The report makes this one brief comment regarding children's media:

*Studies of school children reveal that the vast majority of youngsters continue to reduce their physical aggression from the time they begin kindergarten to the time they finish high school. Both girls and boys show the same gradual reduction of physical aggression. This positive change occurs despite the fact that, as children grow older, their exposure to aggressive models in the media, such as violent television shows and video games, actually increases.*⁴⁶

The fact that children's physical aggression reduces as their exposure to depictions of violence increases cannot be taken to demonstrate that this exposure is having an inhibiting effect. It could be that if children were not subject to this exposure, the reduction in aggression would be quicker or greater. However the report refers to other evidence that suggests that exposure to carefully

⁴⁰ Tremblay, Richard Ernest ; Gervais, Jean ; Petitclerc, Amélie ; Early learning prevents youth violence, Centre of Excellence for Early Childhood Development 2008 See footnotes in report itself for relevant studies

You can find the full report here: http://www.excellence-earlychildhood.ca/documents/Tremblay_AggressionReport_ANG.pdf

⁴¹ http://www.centrepse.d.qc.ca/notes_gervais.htm

⁴² http://bfi.uchicago.edu/humcap/members/petitclerc_a.shtml

⁴³ The Centre of Excellence for Early Childhood Development <http://www.excellence-earlychildhood.ca>
The Early Childhood Learning Knowledge Centre <http://www.ccl-cca.ca/childhoodlearning>

⁴⁴ P.5 of the report

⁴⁵ P.11 of the report

⁴⁶ P.7 of the report

moderated scenes of combat, particularly in books, might have an inhibiting effect on aggression. I'm going to highlight a couple of areas that are of particular relevance.

Play Fighting

I think it's reasonable to claim that children's media preferences are strongly related to their play preferences. The books, films and TV shows that children find appealing are likely to be reflected in the imaginary games that they play. From my own experience I can tell you that many of the schools that chose to ban *Power Rangers* books from their bookshelves, banned *Power Rangers* play-fighting from their playgrounds as well. The rationale being that such play-fighting would encourage aggressive behaviour in the children taking part. Richard Tremblay would not agree. Here's what the Canadian report has to say about play-fighting:

Both humans and animals use play fighting. Parents and educators should understand that play fighting in young children provides a valuable learning experience. While the fights may appear dangerous, particularly among boys, the onset of play fighting actually marks a new stage in child development, as play fighting requires self-control and the ability to make believe, while still using aggressive gestures.

Play fighting allows children to test themselves against others, learn who is physically stronger, and understand which aggressive behaviours are acceptable and which are not. Play fighting also requires that children learn compromise and respect for rules. Typically, the rules that govern play fighting include letting others win occasionally, not using too much force, not hurting the other player, and ensuring that all players are having fun.⁴⁷

This statement is backed up by references to numerous studies listed at the back of the report.

While playing and reading are different activities, I don't think it's unreasonable to suggest that morally framed depictions of fighting in picture books *might* have similar benefits to those Tremblay claims for play-fighting.

The Pen and the Sword

The report also highlights another factor influencing aggression, directly related to reading — the development of language.

Language fluency involves two skills: the ability to decipher what others are saying, called receptive language, and the ability to make oneself understood, called expressive language. The mastery of language gives children a new tool to express frustration, and one that does not bring the negative consequences of physical aggression. In general, the more developed a child's language skills, the less that child is likely to use physical aggression, and the less developed the language skills, the more that child is likely to maintain frequent use of physical aggression.⁴⁸

Literacy and language skills are inextricably linked. An improvement in a child's literacy is likely to be matched by a similar improvement in their language skills. I've argued that more boys would find picture books appealing if they included depictions of combat and I've suggested that, if set in a "positive moral framework", such depictions might help to inhibit aggression. In addition to this,

⁴⁷ P.7-8 of the report

⁴⁸ P.7 of the report

the development of language skills that comes from reading such books could help to amplify this inhibiting effect.

The introduction to the report notes that, while the general public tends to be more concerned about addressing aggressive behaviour in adolescents, it's far more effective to address the problem at an earlier age.

The research literature demonstrates that interventions with aggressive adolescents often substantially increase the likelihood of criminal behavior while interventions with at-risk preschool children have long term beneficial effects.⁴⁹

It seems that aggressive tendencies are best addressed at the age when children are reading picture books.

In Part 2 of *COOL not CUTE*, I highlighted the contrasting standards of age appropriateness between picture books and other children's media. I think some publishers see their rejection of combat as reflecting "higher standards" in picture books. Unfortunately, these "higher standards" result in some boys abandoning books in favour of other media. Some of these boys will have access to age-inappropriate media with dubious moral frameworks, such as violent shoot-'em-ups, and the evidence suggests that this will result in them becoming more aggressive in later life. I suspect that the others, who stick to age-appropriate media with its accompanying "positive moral framework", will fare considerably better and are far less likely to become aggressive adults.

But no matter how positive the moral framework of a film, TV show or video-game, these media will not be as effective as picture books would be in developing a child's language skills. This is one powerful weapon in the fight against aggression that only literature possesses.

I think it's time for picture books to climb down off their pedestal and join in that fight.

⁴⁹ P.2 of the report

Further reading and viewing

Video

***Bang Goes the Theory* (BBC 2009):** this YouTube clip from the BBC's science programme offers a bite-sized primer on sex differences in children's toy preferences, featuring Melissa Hines.

<http://www.youtube.com/watch?v=8mvZ4EbPbME&list=LP7nM0a7Gfqpo&index=6&feature=plcp>

***Horizon: Is Your Brain Male or Female?* (BBC 2014):** Michael Mosely and Alice Roberts examine recent evidence, with Mosely presenting the evidence for nature in the first half and Roberts the evidence for nurture in the second.

<https://www.youtube.com/watch?v=s9iFOlnsEdc>

***Brainsex* (2005):** This documentary examines a range of sex-difference studies including those carried out by psychologist Richard Lippa in collaboration with the BBC. The Lippa/BBC studies are based on the analyses of survey results from 200,000 people across 53 countries and demonstrate consistent sex differences in preferences across all cultures.

<http://www.cornel1801.com/bbc/SECRETS-OF-THE-SEXES/Brain-sex.html>

***Brainwash – The Gender Equality Paradox* (NRK 2010):** Norway has been identified as the country with the greatest sex equality and yet young Norwegians' career choices are more traditional now than they were 15 years ago. This Norwegian documentary explores this paradox and interviews advocates for both sides of the innate sex differences debate including Simon Baron-Cohen. (In English and Norwegian with English-subtitles).

<http://vimeo.com/19707588>

***The Gendered Brain* (Wellcome Trust and Kings College London 2013):** This panel discussion features psychologists Melissa Hines and Simon Baron-Cohen and novelist Michèle Roberts.

<https://www.youtube.com/watch?v=ydl3VaaqMsY#t=168>

Autism, Sex and Science: In this short 2013 TED lecture, Simon Baron-Cohen outlines the links between prenatal hormone levels and certain sex-typical characteristics such as pattern recognition.

<https://www.youtube.com/watch?v=eEYy1GXaNNY>

Books

***The Essential Difference*. Simon Baron-Cohen, Penguin/Basic Books 2003**

The central argument of this book is that women are generally better at empathising, while men are generally better at systemising. Written to be accessible to ordinary readers, Baron-Cohen backs up his argument with references to numerous studies of sex differences that are listed in an extensive bibliography at the back. The later chapters of this book explore the possibility that autism (the author's specialist field) is an extreme form of the male-typical brain type.

***Brain Gender*. Melissa Hines, Oxford University Press 2003**

More academic than *The Essential Difference*, this book presents a balanced overview of the scientific evidence for sex differences, exploring the underlying biological factors in some detail. Each chapter is written as a stand-alone article and Hines suggests that ordinary readers might wish to skip material that is too technical for their needs.

***Pink Brain, Blue Brain: How Small Differences Grow into Troublesome Gaps – and What We Can Do About It*. Lise Elliot, Houghton Mifflin Harcourt, 2009**

This book, by neuroscientist Lise Eliot, also assesses the evidence for innate sex differences. More sceptical in tone than Hines' book, Eliot acknowledges the existence of innate differences but argues that they are greatly magnified by environmental factors. She also suggests ways in which upbringing might minimise gender gaps in abilities.

Papers and Reports

Sex differences in response to children's toys in non-human primates (*Cercopithecus aethiops sabaeus*)

(The experiment testing the toy preferences of vervet monkeys)

Evolution and Human Behavior. 2002;23:467–479. Gerianne M. Alexander & Melissa Hines,

Online version: [http://www.ehbonline.org/article/S1090-5138\(02\)00107-1/fulltext](http://www.ehbonline.org/article/S1090-5138(02)00107-1/fulltext)

Sex differences in human neonatal social perception (The newborn baby experiment)

Infant Behavior and Development, Volume 23, Issue 1, January 2000, Pages 113-118

Connellan, J.; Baron-Cohen, S.; Wheelwright, S.; Ba'tki, A.; Ahluwalia, J.

Discordant sexual identity in some genetic males with cloacal exstrophy assigned to female sex at birth

New Engl J Med 350:333-41, 2004. Reiner WG & Gearhart JP

Online version: <http://www.nejm.org/doi/pdf/10.1056/NEJMoa022236>

Early learning prevents youth violence

Centre of Excellence for Early Childhood Development 2008.

Tremblay, Richard Ernest ; Gervais, Jean ; Petitclerc, Amélie

Online version:

http://www.excellence-earlychildhood.ca/documents/Tremblay_AggressionReport_ANG.pdf