HIPPY CHIX AND GEEK CHIC: WHAT DO POSITIVE IMAGES OF WOMEN MATHEMATICIANS LOOK LIKE?

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In this article I explore images of women mathematicians within popular culture (including film, TV and the internet) and how they might help young women to build positive relationships with the subject. There have recently been several films about male mathematicians, all depicting highly gendered images of mathematics and mathematicians. I explored these at BSRLM last year. Since then I have been looking at images of female mathematicians, and trying to be more positive. The images I discuss are Carol Vorderman from Countdown*, Willow from* Buffy the Vampire Slayer*, Seth Cohen from* The OC *and a cosmetics bag bearing an image of a woman and the words: 'I'm too pretty to do math'.*

THE STORY SO FAR…

This is a sequel to an earlier session that I did at BSRLM (Mendick 2004) in which I looked at four films: *Enigma*, *A Beautiful Mind*, *Pi* and *Good Will Hunting*. I argued that these align mathematics with masculinity not just because the main characters are male but also because they depict doing mathematics as a linear, single-minded quest and locate it in binary opposition to emotional connections and relationships. Since then I have been thinking about images of women mathematicians and this is a first attempt to put these thoughts into writing. I have organised the piece around 4 images: Carol Vorderman from *Countdown*, Willow Rosenberg from *Buffy the Vampire Slayer*, Seth Cohen from *The OC* and a cosmetics bag with an image of a woman and the words: 'I'm too pretty to do math'.

CAROL VORDERMAN

When looking for images of female mathematicians, many people think first of Carol Vorderman. She features in many TV shows, but the one through which she made the leap from engineering to entertainment and for which she is most famous is *Countdown*. This is mainly a words-based game show, but includes three rounds that involve contestants in using six smaller numbers, combined through the four operations, to make one larger number between 100 and 999, all within 30 seconds. Carol is the resident 'vital statistician' who steps in both to check the contestants' sums and to provide a solution when they cannot. Susan Picker and John Berry (2000), in a recent study that asked children between 12- and 13-years old in the US, the UK, Finland, Sweden and Rumania to draw pictures of a mathematician at work found evidence of a 'Vorderman factor'. In the UK 6.3% of boys and 56.9% of girls drew female mathematicians, almost double the levels in the US which was next with 3.1% of boys and 30.5 % of girls drawing a woman, no boys in the remaining 3 countries drew women and only about 1 in 5 of the girls did, leading the researchers

to conclude:

> There is no equivalent program to *Countdown* on television in the United States, but there has been an increasingly well-funded gender equity movement…Yet for all the programs and money being spent in the United States, it appears that one television program in the United Kingdom, *Countdown*, has been able to accomplish more, showing the effect the media tends to have on children and society. (Picker and Berry 2000)

How can we understand this phenomenon?

It could be claimed that Carol is a role model for young women coming into maths. She makes it seem possible. But this idea is based on a simple cause and effect model of the way that the social forms the individual, with a passive child being pressed into shape by exposure to the media, education etc. Eileen Byrne (1993: 92) questions the claims that girls or boys will identify with same-gender role models so as to induce them to change their choices and behaviours:

> We still do not know what the real messages are which reach adolescents and young adults when they see a same-sex role model ahead of them. Does a Grade 12 girl only think that "women can do that" when she sees a woman engineer or a female University Professor, and not that "I, Jane can do that"? And what is "that"? Having a career? Combining a career with marriage? Settling happily for a single life with a rewarding career independence? Or handling machines or management ascribed in her circles as "male" and therefore being an untypical woman if she follows her model?

We do not know what people see when they see a woman mathematician or if it makes them more or less likely to want to be a mathematician.

In one sense, a woman doing maths does disturb the neat arrangement of the binaries that aligns maths with abstraction, objectivity, rationality and masculinity. However, binaries are resilient things, their logics are tricky to escape, they are part of the general background of our thinking. Carol Vorderman exemplifies these problems. Although she is a woman, I think that it is too easy to label her a calculator as opposed to a reasoner:

> To be thought of as calculating is not complementary. Calculating is often what the other is: women; scheming; wheeling, and dealing bargainers. The refined mind reasons, but does not calculate. Indeed, witness the oft-told joke that mathematicians cannot add up. (Walkerdine 1997: 57)

This locates her with the second terms in the following oppositions: reason/calculation; reasoning/calculating; masculine/feminine. Similarly she is a game show hostess and referred to as a vital statistician, positions that locate her within the visceral half of the mind/body opposition; this is an association that Carol uses to her advantage in marketing her detox and other health-related products. Perhaps these tensions and ambiguities around how you position yourself and are positioned are part of being a female mathematician. However, this analysis led me to ask: What kind of images might subvert/go beyond/cut across this binary logic?

WILLOW ROSENBERG

In contrast with Carol, the figure of Willow in *Buffy the Vampire Slayer* presents an image that is queer in more ways than one; she continually slips and slides around the oppositions, confounding binary logics. In one sense, focusing on her is cheating because she is not a mathematician but is a general science/maths/computing whiz, with computers being her strength. However, I cannot think of any maths examples that struggle against rather than glorying in the oppositions in the way she does.

Willow starts series one as a 'nerd', her appalling fashion sense, fascination with school work and habit of hanging with the out-crowd of Xander and Jesse make this clear in the first episode. Fifty-six episodes later, after helping to save the world a few times and developing her magic skills she goes to university, still intelligent but no longer a 'nerd'. However, there is always a question around this shift because a dream sequence at the end of her first year at university indicates that Willow still fears going back into this way of being, suggesting it is still very much part of her sense of self. As this exemplifies, the remarkable thing about Willow is how she always keeps moving. There are many examples of this that I could cite, perhaps the best is the way the series plays with the character of Dark Willow, but there is not enough space for that one here (see the discussions in Jean Battis 2003). Instead I will use the example of her sexuality. In high school she is suffering from a bad case of unrequited love for her best friend and then she goes out with a boy who plays guitar in a band. Pretty typical teen TV fodder. However, in her first year at university she has a relationship with a boy and then a girl, slipping beyond the binaries imposed by heterosexuality. Although later in the series she declares herself "gay now" once again fixing her sexual identity, her attraction to the strong male presence of Dracula means that even then she slides beyond these boundaries, preventing any easy location of her within the straight/gay opposition.

Thus the character of Willow is untraditional in the ways that it challenges our readings of the world in terms of clean cut oppositional categories and of the ways that maths fits into these. However, in one sense Willow is a traditional pop culture female geek/nerd in that she is not allowed to grow up geek in the way that boys are. The female geek/nerd must be redeemed, usually through the love of a man, who can see through to her essential femininity. She leaves nerd status and enters the world of adult women through becoming the object of the heterosexual gaze. Willow too begins as asexual; her body hidden under shapeless clothes, she reverts to a preverbal, child-like state when she encounters a boy she likes. The recent phenomenon of Geek Chic, making geekdom fashionable, might appear to have some potential for women, no longer making such a transition compulsory, but I show below how it makes male, but not female, geek a liveable adult identity.

GEEK CHIC

The OC is a North American show set among the wealthy of Orange County, California. In the UK, it airs in the T4 strand of Channel 4: youth oriented TV linked

by items on music, film and the programmes themselves. After recent episodes, T4 ran slots on 'geek chic' based on the character of Seth Cohen. Writing about the small screen portrayal of geeks, Justin Winters (2005: online) hails *The OC* as a "breakthrough":

> Going through the geek checklist, the character of Seth Cohen fulfills most of the qualifications. He loves comic books. He's awkward around girls. He's witty and funny. Wait a sec. He's also likable. I want to be Seth Cohen. And millions of viewers agree. Seth Cohen is the biggest thing since sliced multigrain bread. Girls love him. Guys want to be him. Adam Brody, the actor, walks outside and is pelted with ear-piercing screams. It's frighteningly amazing.
>
> All of a sudden, it's cool to be a geek on TV. Marshall on Alias, the entire cast of every single CSI, Conan O'Brien, and Jon Stewart and the correspondents on The Daily Show have all shown the viewing public that geek is undeniably chic.

However, this is not an entirely new phenomenon. There are important continuities with what has gone before. For men, geek has always been portrayed as, if not chic, then at least adorable, admirable and, in some contexts, even desirable. Male nerds, unlike the female version, do not need to grow out of it or be redeemed by heterosexuality. This is evident in this passage written about Alan Turing during his time as a code breaker in World War 2:

> At Bletchley Park he chained his coffee mug to a radiator to prevent theft, sometimes cycled to work wearing a gas mask to guard against pollen, and converted his life savings into silver ingots which he buried in two locations in nearby woods. Sadly, though, he failed to find the ingots when the war was over. (Christopher Andrew, 2001: 3)

The heroic images of male mathematicians in *Enigma*, *Good Will Hunting* and *A Beautiful Mind* provide other examples of this trend and, in particular, the ways that these men's abilities at and fascination with maths is portrayed as evoking female desire. Women with such qualities are in a more complex position and I end with a controversial and ambiguous image which is perhaps a way in which young women negotiate these complexities.

HIPPY CHIX

The final image is a cosmetics bag bearing a lurid depiction of the face of an over-made up young woman, surrounded by pink and purple her large blank eyes stare out at you and the bag carries the inscription 'I'm too pretty to do math'. This bag was originally spotted by someone on the mainly North American Women and Mathematics Education e-mail discussion list and was widely derided. Many list members sent e-mails to the owner of Hippy Chix, the web-based company selling the bag, to complain about the stereotyping. It was like Barbie had once again said: 'Math Class is Tough' (Barbie's 1992 voice chip by Mattell, cited in Leach and Mudry 1998: online). But she hadn't. The woman on the bag was no Barbie; the ridiculousness of the image suggests a parodying rather than a supporting of the

stereotype. And, Hippy Chix (Chavez 2005: online) was no Mattell:

> The Hippy Chix Shop was originally born out of frustration. Frustration in not finding trendy and cool clothes for my daughters to wear to school. I wanted clothes that actually fit their curves and bodies. Frustration in not being able to find funky clothing for myself. Frustration with the corporate world that kept a glass ceiling over my head…We believe strongly in supporting the aspirations of girls and women. We believe in a diverse world because without diversity imagine how boring our lives would be.

The bag was originally purchased on the request of a group of college architecture students, who obviously did not consider themselves too pretty to do math.

Finally, the socio-cultural context of those using and seeing the bag is very different now than it was in 1992. Young people have become sophisticated readers of images. Naomi Klein (2000: 292) has written about culture jamming, based on how "marketing affects communities not only by stereotyping them, but also - and equally powerfully - by hyping and chasing after them".

> The most sophisticated culture jammers are not stand alone ad parodies but interceptions - counter-messages that hack into corporations own method of communication to send a message starkly at odds with the one that was intended. (2000: 281)

> Many female culture jammers say they first became interested in the machinations of marketing via a 'Feminism 101' critique of the beauty industry. Maybe they started by scrawling 'feed me' on Calvin Kline ads in bus shelters, as the skateboarding members of the all-high-school Bitch Brigade did. (2000: 289)

In that spirit, I would argue that this image operates playfully and subversively to insert the harmful words into a new context that challenges their original meaning. These architecture students were addressing Judith Butler's question: "Is there a repetition that might disjoin the speech act from its supporting conventions such that its repetition confounds rather than consolidates its injurious efficacy?"(Butler 1997: 20).

Although it may not be a positive image of women mathematicians perhaps it is a positive image *for* women mathematicians helping them to negotiate the tensions involved between doing something masculine like mathematics and being female.

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