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Screening Women in SET: How Women in Science, Engineering and Technology Are Represented in Films and on Television

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About the UK Resource Centre for Women in SET

Established in 2004 and funded by DIUS, to support the Government's ten-year strategy for Science and Innovation, the UKRC works to improve the participation and position of women in SET across industry, academia and public services in the UK. The UKRC provides advice and consultancy on gender equality to employers in industry and academia, professional institutes, education and Research Councils. The UKRC also helps women entering into and progressing within SET careers, through advice and support at all career stages, training, mentoring and networking opportunities.

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Executive summary

This report is part of a series of four reports examining the representation of gender and science. The work was commissioned by the UK Resource Centre for Women in Science, Engineering and Technology (UKRC). This part of the research examined representations of women in Science, Engineering and Technology (SET) in films and television drama, drama-documentary and documentary. Textual analysis was complemented by interviews with those involved in producing programmes and analysis of some audience responses. The overall findings are as follows.

- It is important to recognise differences between diverse outlets (e.g. film and television) and genre (e.g. documentary versus crime drama) rather than generalising about how ‘the media’ represent women in SET.
- The representations of women in SET in any film/programme are influenced by a complex interplay of production values and practices, and negotiations between the production team (ranging from the commissioning editor or scriptwriter, to the actress who plays the part).
- Different media offer different challenges and opportunities e.g. a series format allows for the evolution of nuanced storylines over time and ‘ensemble’ casting (portraying several female characters) lessens the ‘burden of representation’ which could typecast an individual woman as a ‘representation’ of all women in SET.
- Trying to create ‘positive’ representations for women in SET is complex. The intentions of the producers do not predetermine audience reactions. For example, a female character may be intended (by writer and actor) to be a positive role model of a strong and rational scientist who refuses to employ feminine wiles. However, there may be a double-standard at work in the *reception* process. A female character who does not display such traditional ‘feminine’ characteristics may be interpreted by the audience as ‘a bit of a bitch’.

Our report concludes with reflections for organisations seeking to promote the positive representation of women in SET and for scriptwriters and producers who wish to avoid reinforcing inequalities and stereotypes. We highlight work that could be done with *media producers*, with *scientists* and with *young people* as media consumers.

Chapter 1: Introduction

1.1 Background

This research report is part of a series of four reports examining issues around the representation of gender and science in the mass media. The reports were commissioned by the UK Resource Centre for Women in Science, Engineering and Technology (UKRC). Established in 2004 and funded by DIUS, the UKRC works to improve the participation and position of women in Science, Engineering and Technology (SET) across industry, academia and public services in the UK.

There are major issues around training, recruitment, retention and promotion for women in science, engineering and technology (SET). Girls/women are less likely than boys/men to study SET subjects both at school and university (Rees, 2001; Roberts 2002; Murphy and Whitelegg, 2006). Even after training women are less likely than men to develop a career in SET and to be promoted to senior positions and there are particular challenges for women taking time out to have children (European Commission, 2006).

The mass media may have a crucial role in either reinforcing, or challenging such gender segregation and inequalities. The media have long been recognised as key players in society: helping to define people's sense of taken-for-granted normality as well as sometimes facilitating social change (see Eldridge et al., 1997). The media can also be an important source of 'role models': showing young people that women can develop successful careers in science, engineering and technology (Phillips and Imhoff 1997).ⁱ

It is against this background that the UKRC commissioned the Cardiff University School of Journalism, Media and Cultural Studies to carry out some work in this area.ⁱⁱ We were commissioned to conduct a series of studies examining the media presentation and representation of women in SET – with a particular focus on recent media representations circulating in the UK. Our research included studying scientists' views and experiences of the media; exploring representations of women scientists in *newspapers*; and talking to press officers to explore the role they might play in promoting positive media representations of women in science. (See Kitzinger et al., 2008a, 2008b and Boyce and Kitzinger, 2008). The research summarised in this report focuses on the strand of our research which examined how scientists appear in film and on television. (Throughout this report, we use 'scientist' as a general term to refer to anyone working within science, engineering or technology).

The rest of this introduction is structured as follows:

- Section 1.2 briefly summarises existing research addressing the media representation of women in SET (including findings from our own earlier work for the UKRC on scientists' views of the media, and the nature of newspaper representations)

- Section 1.3 introduces the overall design of this part of the study focussing on film and television
- Section 1.4 highlights some key issues to take into account when examining diverse media (e.g. the difference between a film and a TV series)
- Section 1.5 maps out the structure of the report as a whole.

1.2 A brief review of existing literature and our own previous research

Research into how the media represent women in SET has explored a wide range of media, including news reporting on TV and in the press, profiles of prominent women in magazines, and the portrayal of scientists in films and in TV fiction. This section briefly summarises key points from such previous research in relation to each type of media/genre.

The news reporting of women in SET: Studies of news reporting highlight asymmetry in how the news media use and present male and female scientists. A study of stories in *The New York Times* for 1996 and 1997, for example, found that women scientists were used as ‘tokens’ in science stories with a strong emphasis placed on their role as wives and mothers (Shachar, 2000). Our own work for the UKRC which examined how male and female experts were quoted in news stories found that men were much more likely to be quoted than women (5:1) and that women tended to be used more in particular types of stories (e.g. science reports related to biology rather than reports related to transport (Kitzinger et al., 2008b). Another study (examining news reports of science around 2004 to 2007) focussed on how scientists were framed in press and TV news discussions of stem cell research and human cloning. This identified how the respectable face of cloning research was illustrated by an unthreatening, demure and conventional image of a female scientist. By contrast, the disreputable danger posed by reproductive cloning was highlighted through the image of the deviant female ‘pseudo scientist’ who, according to one commentator, ‘was dressed all in black down to her fishnet stockings, with her hair dyed orange’ (Haran et al., 2008: 89-91). This work highlights how assessments of ‘respectable’ and ‘deviant’ science can be refracted through norms of femininity. The ‘bad’ female scientist here was framed through the lens of the monstrous feminine (Haran et al., 2008: 89-91).

“dressed all in black down to her fishnet stockings, with her hair dyed orange”

Magazines and newspaper articles and profiles: Research into the profile of female scientists in magazines and newspapers has also highlighted problems. Studies reviewing magazine and press reports from the 1920s to the 1980s in the US, for example, highlight the emphasis that was placed on female scientists’ maternal, wifely or housekeeping prowess. LaFollette (1988) examined 11 mass circulation U.S. magazines from the first half of the twentieth century (1910-

1955). In over 3,300 magazine issues published over a 45-year period, she found that not one single woman was listed as the author of an article on mathematics, astronomy, archaeology, or palaeontology. This was despite the fact that women were actively engaged in research in those fields. Articles about successful female scientists were rare, and those that were published repeatedly asserted that these women were still fulfilled through marriage and motherhood rather than through research. Many of the examples she cites now seem very dated and sexist indeed. In 1926 *The World's Work magazine* introduced eminent medical researcher, Florence Rena Sabin, as a woman whose mahogany furniture 'gleams'. In 1940 the *Watchman* magazine profiled a leading astronomer, Helen Sawyer Hogg, and informed readers that she made her own bedspreads. In 1950 *American magazine* praised the chief of the Mineralogical Laboratory at the Atomic Energy Commission because she designed and made her own clothes (LaFollette 1988: 267).

A subsequent study by Nelkin (1986) examining reports from the 1960s to the 1980s found that such feminine reference points were still very much in evidence. For example, Maria Mayer, who shared the Nobel physics prize in 1963 for her work on the structure of the nucleus, was described by *McCall's* (1964) as: 'a tiny, shy, touchingly devoted wife and mother...who makes people very happy at her home...her children were perfectly darling' and pictures in the *Science Digest* showed her at her kitchen stove not in the laboratory (Nelkin 1995: 19). Barbara McClintock, recipient of the 1983 Nobel Prize in medicine featured in the *New York Times*, as 'well known for baking with black walnuts' (cited in Nelkin 1987: 19).

“a tiny, shy, touchingly devoted wife and mother...who makes people very happy at her home...her children were perfectly darling” (McCall's, 1964)

We followed up such work by examining all profiles of women in SET which appeared in the UK press for a six month period (January to June 2006). This research found that although women were no longer judged by the quality of their baking or their skill with a needle, emphasis was still placed on their femininity – now through attention to their clothing and appearance (Kitzinger et al., 2008a).

Films and TV fiction representations of women in SET: The representation of the female scientist in *fiction* is a particularly popular area of study. This may be partly because female scientists are quite prominent in some dramas/films – women scientists have become popular characters in several UK and US TV series and they also star as characters in various box-office successes. Several scholars have thus produced detailed analysis of particular TV drama (e.g. Nunn and Biresi, 2003) or films (e.g. Colatrella, 2001; Crawford, 2000; Steinke, 1999). Some representations are welcomed as positive, however, systematic overviews of films suggest there are some recurring stereotypes. Flicker (2003), for

example, charted the role of the female scientist in 20 feature films as: 'old maid', 'male woman', 'naïve expert', 'evil plotter', 'daughter/assistant' and 'lonely heroine'.

Steinke (2005) study of over 23 films paints a more optimistic picture in some ways. She found that women scientists were portrayed more positively compared to Flicker's (2003) findings in which most portrayals of female scientists focused on appearance and romantic relationships. Her study highlights how female scientists in films are represented as professionals holding key positions such as research directors or heads of research teams. While many of these depictions of female scientists and engineers did emphasize their appearance and focused on romance, most also presented female scientists and engineers in professional positions of high status. Steinke argues, however, that some films portrayed women's interaction with male colleagues in ways which reinforced traditional social and cultural assumptions of women in SET through overt and subtle forms of stereotyping. The findings from Steinke's study also revealed depictions of female scientists and engineers that reinforced traditional social and cultural assumptions of role of women in SET. Most female scientists and engineers in these films were single and most did not have children. Few films presented depictions of female scientist and engineer primary characters as working mothers.

Research into women's experiences of, and views of the media:

Detailed research into people's views of the media representation of women in SET is less common than analyses of media representations themselves. However, professionals and policy makers in the field know that there is some concern from scientists (both men and women) about how those who work in SET, and the fields themselves, are represented in the mass media. Our earlier work pursued this issue by collecting data from 86 women working or training in SET (or seeking to return to a career in SET). We explored their experiences of growing up, and the type of role models available to them at that time, and asked about the type of media they now enjoyed consuming, and how they would like to see women in SET represented.

This research highlighted concern about the *low profile* of women in SET and criticisms of stereotypical representations which framed women scientists as, for example, dowdy, socially isolated, or over-emotional. It also highlighted debate among female scientists about certain aspects of media representation, such as the extent to which the media should profile the difficulties women face in male-dominated work places or the challenges facing 'working mothers'. (Kitzinger et al., 2008a). It was notable that in commenting on 'the media' interviewees might refer to a newspaper article, a film, or a TV series, but such differences were rarely unpacked. It was clear however that films and TV drama series as well as documentaries were significant media for women in SET.

1.3 Research design

It is against this background of previous research (our own, and others scholars') that we developed the research reported here, focussing on film and TV and explicitly comparing different media forms and genre. When people talk about 'the media' they often generalise, shifting seamlessly from criticising the news media, to talking about film or documentary. However, the ways in which different media are produced, and the forms of representation they promote are often quite distinct. In order to critically engage with 'media representation', and seek to change it, attention to these differences is crucial.

We had already analysed newspaper reporting – and that report also included some basic analysis of TV and radio news reporting (see Kitzinger et al., 2008b, TV and radio news discussed in the footnotes). Our decision to expand the research to include a broader range of media was partly informed by our work exploring the views and experiences of those working or training in SET. These research participants reported a distinct dearth of media representations of women in SET. However on probing it became apparent that this dearth was mainly with regard to *factual* representations of 'real' women and of their work, particularly in newspapers and in TV news. By contrast, TV documentaries were sometimes mentioned quite positively and television and film *fiction* were often (implicitly or explicitly) recognised as exceptions to this rule of 'invisibility'. Indeed, dramatic representations of women in SET generated lengthy comments in interview and animated discussion in the focus groups. Thus, despite the perception – and the claims made by some of our interviewees – that women in SET just do not have the time to view film or television fiction, this perception was not borne out by our research. In fact a number of our respondents voiced strong and detailed responses to dramatic representations of women scientists.ⁱⁱⁱ

For this report, we examined four different types of media outlet/genre and selected examples from each type which included lead female characters/experts. Our research thus explored the following.

- **Film.** We focused on three films: *The Net*, *Hackers* and *Flightplan*.
- **TV drama.** We examined 46 episodes of: *Silent Witness*, *Waking the Dead*, *Bones* and *CSI: Crime Scene Investigation*.
- **Drama-documentary.** Our case study here focussed on one programme which fused elements of drama and documentary approaches. It was called *If...Cloning Could Cure Us*.
- **Documentary.** We examined 10 episodes of the *Horizon* documentary featuring female scientists.

Where possible we not only examined the actual programme or film text, we also spoke to some of those involved in producing such outputs (e.g. scriptwriters) and explored how audiences made sense of such representations.

As each case study involved a slightly different method of analysis we summarise our method (including rationale for how we selected our examples of

each genre) under the relevant chapter. In this overall introduction, we simply wish to reflect briefly on the overall study design – and the aim in exploring such diverse types of media.

1.4 An introduction to theoretical issues around diverse media.

The range of media we examine in this report have to be understood in broader debates about the difference between film and television, the political economy of production, divisions such as ‘fact’ and ‘fiction’, and the relationship between genre and gender. They also have to be understood in the context of debates about the difference between film as a ‘star vehicle’ (with the individualised hero) and TV drama as an ‘ensemble’ vehicle (with multiple central characters). We draw out some of the distinctions which are relevant to the representation of women in each chapter. Here, however, it is important to map out just some of the key variables across our choice of media/outlet sample. We hope this will help the reader of this report to navigate through some of the issues we explore and understand why we have pursued the research design that we did. The key variables are as follows.

- **Fact/fiction.** The division between ‘fact’ and ‘fiction’ is not completely watertight. However, in spite, or perhaps *because*, of the permeable nature of the fact/fiction boundary it is an important analytical category. The variety of media genre included in this report range from those which position themselves as largely fictional (a film such as *Flightplan*) through to those that position themselves as ‘fact-based’ (*Horizon* documentary). We have also deliberately included a programme which challenges the division - the dramadoc ‘*If...Cloning Could Cure Us*. Alongside the division of fact and fiction these media forms also position themselves differently along a continuum of ‘**entertainment**’, ‘**edu-tainment**’ and ‘**education**’.^{iv}
- **Public service broadcasting versus commercial** is another key variable in our sample. The BBC embodies a strong PSB tradition. Hollywood, at the other extreme, encapsulates commercialism.
- **Focus on the Scientist or the Science.** Related to the above point, different types of outlets/genre vary in their foci: some may be ‘about’ the scientist, and the challenges she faces (e.g. as a character in a drama); other will focus on the science, and the persona of the scientist will be secondary (e.g. in a documentary).
- **UK/US variables** also play out across our sample, including *within* programmes of the same genre. For example the TV drama *Silent Witness* is produced in the UK, whereas ‘CSI’ (although consumed internationally) is produced, and set, in the US. These are quite different production, and consumption, contexts.
- **One-off** programme/film versus a **Series**: There is a contrast between the usually one-off, self-contained, narrative typical of feature films and a television series. We explore how this allows for different types of character development and how this aspect of a media product may contribute to the reinforcement of, challenge to, stereotypes of women in SET.

- **Star/Ensemble.** Another key difference between a typical feature film and a TV series is that the former is often built around a star (or two) whereas the latter may have a more varied cast. This difference has implications for how women in SET might be represented in these different outlets. We will argue that ensemble dramas rather than those organised around a single star (or a pair of stars) can offer viewers multiple points of identification, diverse subject positions / role models. The ensemble drama can also provide writers with the opportunity to distribute positive and negative characteristics across a range of protagonists, rather than attempting to embody them all in one iconic individual.
- **Gender, genre and audience engagement.** The final point we wish to make is that there are complex relationships between gender and genre. In terms of gendered viewing, it has famously been argued that the stereotypical gaze in Hollywood cinema is the male gaze, and that film narratives are organised around male heterosexual pleasure in viewing – with an objectifying gaze on women (Mulvey, 1989). At the other extreme, it has been argued that soap operas with their open-ended narrative structures and recurring characters suit the viewing practices of women better, enabling them to dip in and out of storylines. An exploration of viewing practices is beyond the scope of this particular project, but could usefully be taken into account in interpreting the findings.

1.5 The structure of the report

Having highlighted some basic issues which frame our analysis of film and TV, we now introduce each part of the study and the key findings. This report is structured as follows.

- Chapter 2 explores how women scientists are represented in *film* and *TV drama*.
- Chapter 3 presents an in-depth case study of a *drama-documentary* to explore how the female scientist was represented in this programme.
- Chapter 4 examines how women scientists featured in 10 episodes of a *documentary* (the flagship BBC programme, *Horizon*).
- Chapter 5 summarises our findings and recommendations.

Chapter 2: Representing women in SET in film and TV drama

2.1 Introduction

This chapter examines how women in SET are represented in films and TV drama series.

- We start by describing how we *selected* our sample of films and TV drama series for analysis.
- We then go on to outline how we developed thematic categories to analyse our texts. We define each theme and show how it related to key ideas about positive and negative representation raised by our research participants in our earlier research.
- We also point to some additional analysis developed through talking to programme producers and examining audience reviews and fan commentary on the programmes.

Having outlined our research method we then:

- Introduce our findings. We examine key themes such as: the share of narrative time allocated to women, how hierarchies are represented, how life-course/career trajectory of scientists is portrayed, the role of emotion, and the portrayal of relationships between scientists and non-scientists.
- We then reflect on our textual analysis by drawing briefly on audience comments and the perspective of TV script writers we interviewed.
- Finally we conclude with some observations and recommendations for working with fiction.

2.2 Method

2.2.1 Sample selection

We selected our sample of films and TV series to reflect those most often mentioned by our research participants (see Report 1, Kitzinger et al, 2008a). (This is why the sample includes two films released in the mid 1990s, rather than simply focussing on 21st century releases). We also wanted to ensure that the sample included a *range* of SET sectors (e.g. engineering as well as computer science).

- The three feature films selected for analysis were *The Net*, *Hackers* (each featuring a woman as computer expert) and *Flightplan* (starring Jodie Foster as an aircraft propulsion engineer).^v
- The TV series we analysed were: *Silent Witness*, *Waking the Dead*, *Bones*, *Crime Scene Investigation (CSI)* and its spin-off series *CSI: Miami* and *CSI: New York*. We examined 46 TV episodes of these series.^{vi}

These films and programmes were highlighted as significant by our interviewees in our earlier research because they have key female protagonists. It is notable that the sub-genre of forensic crime fiction forms a sizeable part of our sample (e.g. *Silent Witness* and *CSI*). This genre has the advantage that it crosses over

two of the key human interest dramatic genres – crime fiction and medical fiction. In terms of SET it also brings together information and visualisation technologies with new genetic technologies so that the technology represented is novel and newsworthy in its own right as well as in the degree to which it serves a problem-solving plot. It is worth noting that the Medical Examiner drama (c.f. *Quincy*) has a relatively long history as a televisual representation of the intersection of (medical) science and criminal investigation. Because of the intersection with crime fiction, this sub-genre also benefits from the history of – relatively successful – efforts to increase the representation of women (c.f. *Cagney and Lacey*, *Juliet Bravo*, *The Gentle Touch*, *Prime Suspect*).

Selecting quite what to analyse from among our initial choice of outlet involved some further sampling. With feature films there is a single visual text to view, but in the case of the series selected for viewing there is an extensive corpus available. There have been ten series of *Silent Witness*, for example, and fifteen seasons of *CSI* (if you aggregate the three locations). We could not, therefore, simply watch one episode and then make meaningful statements about how '*Silent Witness*' or '*CSI*' represented women in SET.

We dealt with this with the forensic dramas (or crime procedurals) by analysing pilot episodes and then comparing them with later episodes, particularly those that show shifts in the format. For example, with *CSI* it was illuminating to compare the shows set in different locations with distinct identities. With *Silent Witness* we compared episodes from Series 1 (which launched the character of Sam Ryan played by Amanda Burton) with episodes from Series 8 (when Burton had left the show and been replaced by Emilia Fox playing Nikki Alexander). This casting was not a direct replacement, as the dynamics of the series had already changed to some extent from a star vehicle for Burton to a three-way ensemble with William Gaminara playing Dr Leo Dalton and Tom Ward playing Dr Harry Cunningham, so Fox became the third member of an ensemble rather than a replacement star. Table 2.1 summarises the material viewed.^{vii}

Table 2.1: List of Television Series and episodes viewed for analysis

<i>Waking the Dead</i>	Original Air Date (UK)	<i>Bones (con't)</i>	Original Air Date (USA)	<i>CSI</i>	Original Air Date (USA)
Pilot	4&5. 09.00	'The Man in the Fairway'	8.03.06	'Pilot'	6.10.00
'Burn Out'	18&19.09.01	'Two Bodies in the Lab'	15.03.06	'Cool Change'	13.10.00
'The Blind Beggar'	25&26.06.01	'The Woman in the Tunnel'	22.03.06	'Blood Drops'	17.11.00
'Deathwatch'	9&10.09.02	'The Skull in the Desert'	20.03.06	<i>CSI: Miami</i>	Original Air Date (USA)
'Life Sentence'	2&3.09.02	'The Man with the Bone'	5.04.06	'Golden Parachute'	23.09.02
<i>Bones</i>	Original Air Date (USA)	'The Man in the Morgue'	19.04.06	'Losing Face'	30.09.02
'The Man in the S.U.V'	20.09.05	'The Graft in the Girl'	26.04.06	'A Horrible Mind'	22.11.02
'The Boy in the Tree'	27.09.05	'The Soldier in the Grave'	10.05.06	<i>CSI: New York</i>	Original Air Date (USA)
'The Man in the Bear'	1.11.05	'The Woman in Limbo'	17.05.06	'Blink'	22.09.04
'A Boy in a Bush'	8.11.05	<i>Silent Witness</i>	Original Air Date (UK)	'Creatures of the Night'	29.09.04
'The Man in the Wall'	15.11.05	'Buried Lies'	21&22.02.96	'Grand Murder at Central Station'	5.10.05
'A Man on Death Row'	22.11.05	'Long Days Short Nights'	28.02.96	Films Viewed	Release date
'The Girl in the Fridge'	29.11.05	'Darkness Visible'	13&14.03.96	<i>The Net</i>	1995
'The Man in the Fallout Shelter'	13.12.05	'Sins of the Fathers'	27.03, 3.04.96	<i>Hackers</i>	1995 - USA, 1996 UK
'The Woman at the Airport'	25.01.06	'Nowhere Fast'	19&20.09.04	<i>Flightplan</i>	2005
'The Superhero in the Alley'	8.02.06	'Meaning of Death'	8&9.08.05		
'The Woman in the Garden'	15.02.06				

2.2.2 Textual analysis strategy

In order to ensure that the researchers taking primary responsibility for the film and TV drama analysis (JH and MC) integrated their approach with the other aspects of the research, all of the research team viewed some of the selected programmes together and discussed themes that emerged and how they related to evidence from questionnaires, interview material and the discussions in focus groups as well as to emerging data from our analysis of newspaper reporting (see Kitzinger et al., 2008a and 2008b). To obtain maximum benefit from this viewing, we chose to view one episode from a UK television series and one US feature film. This enabled us to compare genres, national context of production and – to some extent – reception, and ensemble casting versus star casting.

The UK television series we viewed collectively was *Waking the Dead*. This follows the working practices of a Cold Case Unit that uses up-to-date forensic and information technology to solve long unsolved crimes. The pilot we viewed was extremely rich as this set the scene for future dramas in terms of sketching out characters' professional roles, their modes of knowing and feeling, and their interrelationships.

The US feature film we all watched was *Flightplan*. This was a paranoid action-adventure thriller, the plot of which required the central female protagonist to be an aeronautic engineer. This was a less satisfying experience for the viewing team. The film in particular was selected as it was identified by a research respondent in a focus group as a particularly positive representation of a woman in SET. However, it took much discussion amongst the team members to draw out what might be considered positive about the representation of Jodie Foster's character.

Such collective viewing was extremely useful as it demonstrated in *micro*, what is true of the viewing audience in *macro*, namely that the same representations of women in SET could elicit a range of evaluations so that different viewers could see the same character as being a positive, negative or ambivalent representation of a woman scientist, particularly as regards to their potential to be viewed as role models. Viewing the television programmes on the same day as viewing the film enabled us to compare directly the effectiveness of representing one iconic woman scientist versus multiple women who embody different types of femininity and science.

We initially aimed to explore the material by building on typologies developed by Jocelyn Steinke, a US-based analyst of feature films with scientist characters. However, in practice we found that while this approach had some utility it did not fully meet the needs of this research. Steinke (2005) systematically categorised the way in which films represent the appearance of women in SET (e.g. as attractive or unattractive) and their characters (e.g. as professional or clumsy). She also categorised their professional role (e.g. project director or administrator) and their romantic role. Such categorisation of typologies is appropriate to the

large survey of popular films that she conducts for two key reasons. Firstly, with such a large sample, it is necessary to select discrete characteristics that can be coded in a quantitative content analysis as it would be impossible to discuss the nuance and ambiguity in every single film. Secondly, however, film portrayals lend themselves to such categorisation much more neatly than television drama series for a number of reasons:

- They tend to be star vehicles rather than ensemble pieces so a single primary character can be focused on.
- The plot is finite so a narrative journey for the character can be mapped.
- A feature film is generally only 90 -100 minutes in length and is therefore limited in the amount of character complexity and / or development that can be shown (compared to an on-going TV series)
- A feature film therefore deals in iconic shorthand to sketch in stereotypes and counter-stereotypes

In our study, typologies proved less useful for the following reasons:

- A large part of our sample is in the form of ensemble television drama and therefore features multiple primary women in SET characters.
- With television drama series, there is a layering of finite and open-ended plots; mysteries may be resolved within episodes, for example, but character development can extend over many episodes or even series.
- Thousands of minutes of story time are therefore available in which to develop characters: they can change and age in ways not available in a feature film.

Television series therefore have the leisure to represent character traits unfolding over time and do not necessarily have to resort to the shorthand of stereotypes to the same degree as feature films.^{viii}

From our discussions of the programmes viewed, and thinking about them in relation to material gathered from our research participants, we decided not only to attempt to use typologies (as developed by Steinke, 2005) but also, therefore, to develop thematic categories to organise our subsequent analysis of the wealth of material to be viewed and analysed. These categories were chosen to relate to key ideas about positive and negative representation raised by our research participants (see Chapter 1).

The themes were as follows: cast order; share of narrative time; represented hierarchies; relationships between scientists and non-scientists and the degree of focus on 'private' life (family, sexual, erotic, romantic relationships). We also examined the representation of appearance and the image of science itself.

Once these categories had been used to organise our analyses, we decided that cast order and share of narrative time could be collapsed into a single category, for reasons explained in the table below. Our discussion of gendered hierarchies

led us to identify a particular dramatic treatment of this potential source of on-screen conflict or off-screen anxiety: 'the battle of the sexes'. Cutting across the issue of gendered hierarchies and the relationships between scientists and non-scientists were some striking representations of the relationships between gender, profession and emotion, leading us to inductively develop this as a new category of analysis. With regard to the focus on 'private' life, our comparative discussions led us to treat this under the themes of 'battle of the sexes', 'gender, emotion and rationality' and 'gendered career and life-course issues', because these seemed to be the broad headings under which the relationships between women scientists professional and personal lives were organised. Table 2.2 outlines our selection and use of the categories.

2.2.3 Additional research

We supplemented our textual analyses of individual episodes with the following strategies:

- We read online plot synopses for each of the series discussed, both at official sites created by the various series producers and at internet databases and encyclopaedias such as the Internet Movie Database and Wikipedia.
- We reviewed audience reviews and fan commentary appended to official sites and in distinct locations. This has enabled us to supplement our own analyses with both supporting and dissenting analyses from viewers. Some of these viewers self-identify as scientists, although we have no way of substantiating these claims.
- We conducted telephone interviews with six members of the production teams of *Silent Witness* and *Waking the Dead*.

2.3 Findings from the thematic analysis of film and TV drama narrative texts

(a) Casting and share of narrative time

Although we have selected the films and television series analysed because of perceptions voiced by our research participants that they had key roles for women scientists, this does not necessarily mean that women are the lead actors. In fact, this is the exception rather than the rule. With regard to film and television programs imported from the USA, even in the eponymous *Bones* ('Bones' is Temperance Brennan's nickname in the show), the actor Emily Deschanel shares star billing with David Boreanaz who plays her FBI agent partner in crime-fighting. Further, his name appears higher up on the shared screen. The *CSI* dramas which are all based on the interactions of teams of forensic scientists nevertheless give star billing to the leading men who head up the fictional teams, and in the PR vehicle / documentary *CSI: The Inside Story* the writers and producers of the shows refer to the centrality of the leading men

Table 2.2 The coding themes used to analyse film and TV drama

	Category	Why and how did we select and apply category in analysis?
a	Casting and Share of Narrative Time	For each item screened we viewed and compared the screen credits with the share of narrative time taken up by key characters. The convention with screen credits is that the first actor credited has the largest share of narrative time and is the protagonist around whom plots are organised. Additional factors relating to professional hierarchies and actors' salaries also influence the use of credits. We investigated how this was split by gender and how it played out in the dramatic narratives.
b	Represented Hierarchies	There is a close relationship between this category and category 1. We analysed the social context in which the women scientists in each drama were situated to explore the level of expertise and seniority they were represented as possessing, in relation to male scientists or other professionals in the dramas. We examined whether these hierarchies were taken for granted or whether they formed explicit plot points in the dramas. We asked whether the hierarchies represented were plausible in relation to the infrastructure for 'real' women scientists.
c	Scientists and Non-scientists	Some of our research participants wanted women scientists to be portrayed as 'normal' or 'ordinary' whilst others wanted their distinctiveness highlighted. In analysing the representations of relationships between scientists and non-scientists we have attempted to investigate whether the relationships portrayed draw on stereotypes of scientists or whether other narrative rationales are provided for conflicts between scientists and non-scientists.
d	Battle of the Sexes	One of the ways in which the relationship of gender to power (gendered hierarchy) has been dramatised in film and television for many decades has been through the 'battle of the sexes' template. This template represents struggles for dominance and acknowledgment of expertise in the context of a potential romantic or erotic entanglement between male and female heterosexual protagonists. Often humour is used to stabilise the unease potentially caused to viewers in such questioning of gendered hierarchies. We were interested in the degree to which this might figure in dramas with 'powerful' women protagonists.
e	Gender Emotion and Rationality	Some feminists have criticised the relationship between the binary oppositions Man / Woman, Rational / Emotional (Irrational), Public / Private, and here we explored the ways in which these oppositions were deployed. We wanted to investigate whether they were used to underwrite equations of science with masculinity and / or rationality.
f	Gendered Career and Life course Issues	The focus of the cinematic or televisual gaze on young, glamorous women has been the subject of extensive feminist critique within the academy as well as a perennial source of discontent with mature women actors. With this category, we were interested in the degree to which the representation of women scientists – experts – appeared, of necessity to require more mature women actors, as well as providing dramatic opportunities to explore the costs and benefits to women of working in SET workplaces.

and represent the women as supporting cast. The casting does give some appearance of equality as the screen credits typically alternate between male and female actors in descending order of narrative centrality / star billing. As stars / key protagonists in *The Net* and *Flightplan*, Sandra Bullock and Jodie Foster are exceptional. They are two of the highest paid (female) actors in Hollywood, both with producing and directing credentials to underwrite their 'bankability'.

In the UK dramas examined, *Silent Witness* was created to be centred on a strong female protagonist, and Amanda Burton – cast as Sam Ryan a senior forensic pathologist – was the undoubted star of the show for five of the ten series aired to date. In the sixth and seventh series two new male forensic pathologist characters were introduced as lead characters, with the character of Leo gradually occupying a larger and larger share of narrative time. In the eighth series, Amanda Burton left and the character of Sam Ryan was written out. A new female lead character was introduced later in this series, but she is a junior member of the fictional team and the narrative is organised accordingly. In the case of *Waking the Dead*, the two women scientists, a psychologist and a pathologist (the character of Frankie played by Holly Aird was replaced in the laboratory by Esther Hall as Felix Gibson and more recently by the character of Eve played by Tara Fitzgerald), both act as foils to the lead character – and first credited cast member – Peter Boyd (Trevor Eve) and although represented as experts, their role in the narrative and share of narrative time is largely organised in subordinate relation to that of Boyd/Eve. However, there are important narrative interactions between the women scientists that do not include Boyd.

It is arguable that cast order and apportionment of narrative time is a plausible and responsible representation of the state of affairs that exist in the 'real world' as the characters of Temperance Brennan and Sam Ryan – both based on 'real life' senior forensic scientists – are exceptional in the degree to which they have become renowned experts. It is more likely that in 'real life' women in SET will occupy less senior niches in professional hierarchies, as we go on to discuss below. The feature films in our sample, as already discussed are star vehicles in the case of *The Net* and *Flightplan* and their heroines / female stars are central to the majority of the action, but in both cases the plots were dislocated from the SET workplace. Comparing US and UK televisual treatments of SET workplaces, it appears that US dramas are more effective in their representation of diversity and equity in casting and share of narrative time, but that white men are still largely in the lead, both in the fictional scenarios and in the credits.

(b) Represented hierarchies

We have outlined above the ways in which dramatic casting and narrative order embody both the economics of film and TV production and the 'reality' that women in SET who have become nationally or internationally renowned experts are exceptional. We discuss represented hierarchies to unpack these observations further. We note, however, that the procedural drama is much more

the province of television, with feature films requiring more 'high concept' plotting with more tightly compressed dramatic tension. In two of the feature films analysed by this team, *The Net* and *Flightplan* women were both the stars and the key protagonists of the drama. The suspense plots of both dramas required them to be socially isolated and outside their normal professional spheres so the issue of workplace hierarchies was, to a significant extent, avoided in relation to the careers of women in SET. In the third feature, *Hackers*, the film's address to an adolescent audience and its plot setting in a school also enabled some avoidance of these issues.

In the case of the *television* series analysed (*Silent Witness*, *Waking the Dead*, *CSI*, *CSI: Miami*, *CSI:New York* and *Bones*) the procedural nature of the dramas firmly located them in workplace settings as well as at the scene of crimes so represented hierarchies are both necessary for plausibility / verisimilitude and for dramatic tension. In *Waking the Dead*, and the three *CSI* franchises, the women characters, psychologist, pathologists and crime scene investigation technicians are all represented as competent, and often passionately committed, in relation to their work. They are represented as having significant expertise that is materially essential to the solving of crimes (and to the resolution of narratives) and yet the heads of their units are all men. This could be viewed as problematic or else as realistic, reflecting real world employment trends. Only in *CSI: Miami* is this made an explicit plot point.

Example of explicit narrative treatment of gendered hierarchy

From the outset of Season 1 of *CSI: Miami* there is explicit on-screen reference to problems with hierarchy as the character Megan Donner is struggling to reconcile herself to her role as a member of the unit that she formerly directed. This is exacerbated by her difference in approach from her successor, Horatio Caine. She repeatedly pulls him up on matters of procedure whilst he demonstrates a more maverick approach to solving cases. In the first episode, there are also a number of incidents when Caine puts Donner in her place, for example he stops her from delegating work insisting on the right to direct his team as he sees fit. He also resists her enquiries about how team members are coping with the crime scene which is exceptionally high stress, dismissing her concerns by saying 'They're fine, they're doing their job', implying that her focus is not adequate and that she is overly preoccupied with emotion rather than the task in hand. This is ironic as he is repeatedly represented as being so passionately driven to solve crimes as to flout professional protocol.

Although *CSI Miami* explicitly addresses gendered hierarchies at first, it appears that maintaining this as a point of narrative tension, or resolving it in favour of a senior woman scientist, was not feasible in the formula of this drama, as the character disappeared in the first season of the drama with no effective resolution of this point of conflict.

Silent Witness is renowned for introducing a female pathologist as its star and Amanda Burton played Sam Ryan as an authoritative and effective scientist for five series. For the latter two series in which she appeared throughout, however, the plot formula was changed to bring in two male scientists, shifting the formula from revolving around Sam/Amanda as the star and lead investigator and focussing more on the relationships and tensions between her and her colleagues, one of whom was battling for her job. In the eighth series, Sam Ryan was written out in the first episode, following some storylines which questioned the life and career choices she had made, and her character was replaced by that of Nikki Alexander, played by Emilia Fox, who was initially identified as a forensic anthropologist. Fox is a much younger actor, without the gravitas of Sam/Amanda and is taken on as a junior team member, significantly altering the dynamic of the represented hierarchies.

The series *Bones* is marketed as 'Inspired by the Life of Forensic Anthropologist and Author Kathy Reichs' and its central character Temperance Brennan is (like her real life model) an authoritative expert who directs a team of scientific specialists. Her line manager is a relatively minor character, and Brennan is represented as a genius and something of a maverick. Kathy Reichs is a renowned expert in her field and is a consultant on the series so this may account for the capacity of the series to maintain a woman scientist as an acknowledged authority.

The drama series provides writers with opportunities to use the development of interpersonal dynamics in fictional settings – crime solving workplaces in the case of the procedural dramas we explore – to emphasise or undercut the formulaic episodic narratives of crime discovery, investigation and (re)solution. This freedom is not available in the context of a feature film which must weave interpersonal dynamics and plot much more tightly because of time limitations.

We have suggested that the relationship between fact and fiction in the representation of gendered hierarchies may be perceived in a number of ways. We could celebrate that such dramas represent competent women in SET with reasonable degrees of seniority working in largely supportive mixed sex teams, potentially even statistically over-representing the effective penetration of women into such workplaces. Alternatively, we could bemoan the fact that, with the exception of *Bones* and the early *Silent Witness* series, women are not represented as the lead experts. We have already pointed out, however, that the fictional protagonists of these dramas echo the exceptional status and success of the women who inspired the dramas, both nationally renowned in their respective countries as expert witnesses with senior academic posts.

(c) *Battle of the sexes*

This research is motivated by a commitment to improving the representation of women in SET, both in terms of mediation and in terms of statistical representation in the workplace. This commitment is not about displacing men

from the SET workplace, but about enabling equal access for women. However equality-based objectives are often perceived as threatening and disruptive to a 'natural order' which views men as having primary responsibility for the public sphere of work and women as having primary responsibility for the private sphere of home and family. The 'battle of the sexes' template is a dramatic exploration and management of such threats to the 'natural order', albeit one that has been updated to recognise that women do occupy important places in the public world of work. This template uses heterosexual desire and the deferral of its consummation through verbal sparring and competition around professional achievement to displace struggles around gender and power (or hierarchy) to a more congenial register.

Bones is very overtly structured around a battle of the sexes with Temperance Brennan and the FBI agent Seeley Booth always struggling to gain the upper hand in dialogue and in professional achievement. It follows in a tradition of such television dramas including *Moonlighting* and *The X-Files* and the same power struggle dynamic (often with a strand of humour and/or acknowledged or unacknowledged erotic undercurrents) can be traced back to Hollywood films of the 1940s like *His Girl Friday* and *Adam's Rib*.

Even when the battle of the sexes is not an overt narrative motor, as is also the case in *Hackers*, it is an undercurrent. For example *The Net* and *Flightplan* where the anxiety is much more explicit as the battle is one with potentially fatal consequences. Again, this *could* be viewed through a deficit lens as shifting the focus from women's professionalism to their desirability, inappropriately. Alternatively, it could be viewed more positively as representing women in SET as 'ordinary' in the challenges they face. Such represented power struggles could also be understood as recognising that it is no longer possible or acceptable to take the assignment of women to inferior positions for granted. We would argue that the 'taken-for-grantedness' of women in the workplace is represented with subtle but significant differences between the UK and the USA. Further research would be required to fully analyse why this might be, but we would hypothesise that national differences in the operationalisation of equality legislation affect the structural conditions of both SET and the film and television industries in ways that can be illuminated by close readings of such fictional texts.

(d) Scientists and non-scientists

Our sample is heavily based on crime procedural dramas. This means that the key relationships between scientists and non-scientists that are represented on screen involve either the victims of crime or other professionals involved with the law and criminology more generally. Murder or violent death is generally at the heart of plots. This raises the stakes in the interpersonal relationships portrayed in ways that would be unlikely to arise if other areas of SET were being represented in such a procedural fashion.

We have alluded already to the tension in the relationships between the scientists and non-scientists in the fictional Cold Case Squad in *Waking the Dead*. This does emerge in narrative conflict but it is generally represented as a creative tension that leads to results. A similar dynamic is in play in *Bones* although the tensions here are explored with much more humour. This humour, counterpoint to the gravity of the crimes investigated, is typically organised around two axes. These axes are: the general relationships between the forensic scientists or 'squints' and non-scientists (usually members of the FBI) and the specific relationship between Temperance Brennan, forensic anthropologist and Seeley Booth, FBI agent. This latter relationship – which stands in for the larger institutional relationships – is a competitive one with each character repeatedly trying to demonstrate that their method of fact-finding is superior. There is continual readjustment as one or other gets the upper hand, leading to a situation of mutual respect that is occasionally undermined by mutual incomprehension of different worldviews.

In the *CSI* franchise the relationship between the crime scene investigators and other legal professionals is generally represented as more harmonious than is the case in *Bones*, *Waking the Dead* or *Silent Witness*. This is possibly due to the institutional location of crime scene investigators who are represented as providing a service to other crime fighters. That said, different characters within the respective teams in *CSI*, *CSI Miami* and *CSI New York* occupy different positions on the spectrum of abstracted to socially embedded in relation to their degree of investment in the science and technology versus their investment in providing closure and solace to the families of murder victims.

In the feature films we analysed, relationships between the scientist protagonists and non-scientists are individualised to a much larger degree because the plots require them to be alienated from a social or institutional framework. This pattern is markedly more acute in *The Net* and *Flightplan* than it is in *Hackers*. For example, in *The Net*, Angela Bennet seems to have no friends and only takes time away from her computer to visit her mother who suffers from Alzheimer's and lives in a nursing home. Her portrayal in the film reinforces the popular stereotype of computer scientists as reclusive and lacking social skills. For example, Angela only knows one person in the town where she has lived for four years. In one of the scenes when Angela is collecting mail from a courier the neighbour looks at her and she does not acknowledge her. Later in the film when Angela's records are deleted from the system, erasing her identity and placing her in mortal danger, the same neighbour is unable to confirm that she lived at the property because '*she kept to herself, she didn't talk to anybody*'.

A similar alienation of the key female scientist from her social context is evident in *Flightplan*. Despite her professional expertise as an aircraft engineer, the narrative tension requires that all the other characters relate to Kyle Pratt as a woman whose recent bereavement has led to her becoming deranged and deluded. The action is located in an enclosed space that is paradoxically

anonymous and dislocated – the jumbo jet – a collection of strangers. This means that her character is devoid of a professional infrastructure to underwrite her competence.

In the above analysis we have argued that different generic and plotting strategies are implicated in the representations of relationships between scientists and non-scientists. We have also suggested that stereotypes about different worldviews and methods of gathering knowledge are deployed reflectively for dramatic purposes, and are not necessarily attributable to any inherent bias against science or women scientists on the part of the writers and producers of such dramas. We have reflected on the extent to which humorous treatments of the tensions in such relationships seem to be reach the screen with less constraint in the USA than the UK. We would further argue that the different knowledge cultures of scientists and non-scientists are represented as complementary and in creative tension with each other in a way that we feel locates SET and SET practitioners positively in networks of social and professional relationships. We would argue that rather than considering such dramas as ‘flawed’ or ‘deficient’ representations of ideal conditions in SET or idealised role models of women in SET, that they are recognised as plausibly representing and critiquing the social relations of SET and the ambivalent investments that women in SET have in their professional and personal lives.

(e) Gendered career and life course issues

As already discussed, our inductive categories for analysing our sample of screen dramas included the degree of focus on ‘private life’. However, the dramas analysed focused primarily on the public sphere and ‘private life’ was alluded to largely peripherally, either as a motivator for characters’ professional life, or to the degree to which it impacts on the performance of their professional roles. We would argue that motivations for, and impacts on, career are storied differently depending on the gender of the character.

One of the most interesting aspects of the *CSI* franchise is the number of central roles that it provides for women in their thirties and forties. Although the majority of the women represented are single, the first *CSI* introduced the character of Catherine Willows, a single mother and ex-stripper who has become a successful CSI technician with a degree in medical technology. Catherine’s desire to provide a good environment for her daughter to grow up in is represented as fuelling her desire to succeed, while the logistics of balancing a high-pressured job with raising a child are represented as posing risks to Catherine and her daughter. In the UK, *Silent Witness* was initially striking for its portrayal of Sam Ryan as a career woman, relatively content with her lot. In later series, however, this was undercut by representing her as regretting some of the choices she had made with regard to career and children. This could be viewed as reneging on the values that made the character so appealing to audiences, or as a realistic representation of the way social pressures force women to reconsider such choices. (The possibilities of such sideways moves or opportunities to enter SET

through indirect routes may offer important examples of job/career narratives and aspirations.)

The US television series do seem to offer a more liberatory approach to women in SET with Catherine Willows taking a degree in medical technology and becoming a CSI as a single mother and ex-stripper, and Angela Montenegro being employed in a publicly funded laboratory having no track record of stable employment.

In the UK television series, it appears as if careers in SET happen largely to the exclusion of parenthood or stable relationships and follow narrow institutional frameworks. In *Silent Witness*, for example, Sam Ryan's family is introduced in 'Buried Lies'. Sam's mother suffers from severe memory loss, her sister hates Sam and blames her for their father's death. Sam's sister thinks that she does not allocate sufficient time for the family, an issue that is raised repeatedly in subsequent episodes. In one scene Sam goes to visit her mother and is criticised by her sister for turning up late after her mother is asleep. When Sam tries to explain that she has been working, the sister responds sarcastically: 'Oh yes we all know you are a very important person'.

The narrative of the rift between Sam and her sister is maintained in later episodes. Her sister demonstrates considerable ambivalence about Sam with regard to the relationship between family and professional relationships. For example, although Sam Ryan does not have children of her own she is sometimes shown taking on a mothering role to her nephew Nicky who is going through a teenage crisis. In fact, the sister asks Sam to have the nephew for a few days because he thinks highly of her. However, in some instances the sister feels that Sam is a negative influence on the son Nicky. In 'Sins of the father' she warns Nicky to 'stay away from people like her who have no maternal instinct'.

The tension between profession and personal obligations is still structurally a much more pressing issue for women than men because of the ways in which childcare and other caring responsibilities are allocated privately and due to the lack of public provision of resources. The majority of the women in SET in the dramas we analysed are single and childless and this seems to be a realistic reflection of the situation whereby women who want to succeed in SET believe that this is likely to be at the cost of bearing and raising children.

(f) Gender, emotion and rationality

In the early twenty-first century, when so-called 'feminine' or 'soft' skills have started to become valued in the workplace, this battle sometimes is reworked through a reversal of binary gender stereotypes. This reworking is of particularly acute interest in the cast of the representation of women scientists, where the attributes of womanhood and scientist already destabilise conventional understandings of acceptable behaviour. For example, in one episode of *Silent Witness*, Sam Ryan reprimands the police surgeon for appearing on the crime

scene without the required attire. Her colleague, Stuart tells the police surgeon that:

“Dr Ryan is a fine woman and a brilliant pathologist, but sometimes she can be a bit blinkered, she is an A-Z girl. If something gets in her way she just tramples over it, including people’s feelings I am afraid.” (‘Long Days, Short Nights’, *Silent Witness* 1996)

Similar critiques are made of the pathologist, Frankie, in *Waking the Dead*, by both her male boss and a more junior male member of the team – both men are police officers rather than scientists. In the pilot episode Frankie is portrayed as lacking human skills and emotion when she refuses to release a locket on the request of the victim’s father as she fears this might lose or contaminate the DNA. This leads to a confrontation between Frankie and Spencer, a detective in the cold case unit, particularly when no DNA is found in the locket. He tells Frankie that: ‘maybe forensics is not the answer to everything ... You’ve got a great CV doctor...’ When Boyd intervenes in the confrontation between Frankie and Spencer he points out that she played like a ‘tight arsed prig’ and explains how difficult it is to be on the receiving end of the distress and anger expressed by the family members of murder victims. It is sometimes quite difficult in such scenes to determine whether it is a stereotype of the abstracted, analytical scientific personality that is being opposed to a stereotype of a grounded, interpersonally involved victim-identified detective personality, or whether there are particular critiques attached to the gender of the character embodying those personality traits.

In *Bones* and *Waking the Dead* as well as in the earlier series of *Silent Witness*, where primary scientific expertise is located in the women characters, with the detective characters generally being male, this leads to an attribution of hyper-rationality to women and empathy to men. This reverses conventional stereotypes about gender, at significant cost to the female characters, but generally to the benefit of male characters. The abstracted women scientists are harshly judged by characters within the narrative, when they demonstrate failures in empathy, and this judgement does seem to carry extra weight because of the role reversal. However, this is not always uncontested. For example, in *Bones* much is made of the ‘squints’ supposed inability to relate to other human beings appropriately, but the humour this stereotype offers is nuanced by dialogue exchanges in which Brennan, for example, points out that a degree of abstraction is essential to the maintenance of her composure in the face of some of the horrific crime she investigates in the course of her career.

Again, we would argue that the television drama series (in contrast to film) afford more opportunity to explore issues of expertise and emotion in relation to scientists and non-scientists. We would argue that writers of such drama use such explorations in ways that both deploy and undermine gendered stereotypes and stereotypes about science. Conflicts organised around the opposition

between emotion and reason, are viewed by screenwriters as opportunities to represent vivid, realistic characters in whom their audiences believe and with whom they can identify. The US based series *CSI* and *Bones* tend to use humour to a greater degree in the portrayal of such conflicts than do *Silent Witness* and *Waking the Dead*. A number of British screenwriters interviewed for this research did remark that they had wanted more 'gallows humour' in their portrayals of forensic science than eventually was screened.

(g) Appearance

Our analysis of films confirms earlier findings (Flicker, 2003:316) about the remarkable beauty and relative youth of female scientists portrayed in Hollywood film (which routinely employs such 'stars'). However, as far as TV drama is concerned more diversity seems possible, particularly with the portrayal of older women.

(h) The image of science

A clear difference is also evident in film and TV in the image of science. The 'star casting' of film is associated with a focus on the main character and her life-drama, rather than the science. TV drama follows this less rigidly – and includes some exploration of science as a career, the nature of team work and diverse motivations in pursuit of their professional as well as personal objectives (e.g. in *CSI* Catherine's desire to provide a good environment for her daughter is represented as fuelling her desire to succeed; while *Silent Witness* explicitly explores issues about being a woman in a 'man's world').

2.4 Reflections from the audience and the producers

Any analysis of texts can usefully be contextualised by reflection on the view from the audience and discussion of the perspective of those involved in producing the film or TV programme. In this section we draw on some supplementary research to bring these perspectives to bear on our previous discussion.

2.4.1 What do audiences make of series drama on television?

Two very different studies, one conducted in the USA and one in the UK (drawing on respondents from France and the UK) have provided evidence for the effects that series drama have on viewer knowledge (Brodie et al., 2001; Davin, 2003). One of these studies was based on a telephone survey conducted with more than 3,500 regular viewers of *ER*. The other study analysed approximately 200 letters from *ER* viewers discussing the show in their own terms. Both studies provide convincing accounts both of increases in factual knowledge and active viewing strategies that demonstrate the information-seeking behaviour and judgement strategies of viewers. A further study, comparing the reception of soap opera and documentary treatments of cancer narratives, similarly concluded that viewers operated sophisticated differentiation strategies when viewing such treatments. This sophisticated reception included expressing scepticism about what is edited out of documentaries, and pragmatism with regard to drama where they would expect some license to be taken with 'realism' but also take for

granted that false information about key health issues would not be represented (Davin 2003).

It is reasonable to assume that viewers of dramas such as *CSI*, *Bones*, *Silent Witness* and *Waking the Dead* would operate similar strategies in parsing out scientific storylines from relationship storylines and demanding plausibility rather than total documentary-like realism. In fact, we have viewed the 'Viewers' review forums' maintained on the BBC1 website for *Silent Witness* and *Waking the Dead* which demonstrate diverse and passionate engagements with storylines and characters. The pages for *Silent Witness* have been taken down from the current *Silent Witness* website, but they can be accessed using the Way Back Machine.^{ix} On Sam's departure, viewers had this to say:

"Sadly with the departure of Amanda Burton, I suspect Silent Witness will degenerate into another cop show for the boys! The attraction for many female viewers was watching Sam succeed in a man's world, at the top of her tree. Just watching the early episodes on satellite, one realises just how ground breaking the series was."

"The addition of two extra (male) characters, in my opinion, did little to enhance the show. They obviously begrudge being subordinate to a woman."

"Of course, we will soon have a token female character back in the cast, but at least this one will know her place, and have no uppity notions about being in charge!!! No, I for one will stick to the repeats and leave series eight to the boys."

"Goodbye Amanda, and Sam, and thank you for many years of inspiring must-see drama." (Julia, North Yorkshire)

"Sadly with the departure of Amanda Burton, I suspect Silent Witness will degenerate into another cop show for the boys"

"What an amazing finale to the life of Sam Ryan. Silent Witness returned to its roots in more ways than one. Not only in terms of the character's history but also in the plot and storyline. What appealed to the viewers when Silent Witness first appeared on our screens was seeing how Sam Ryan, a female forensic pathologist, coped in a male chauvinistic world. As the series progressed it lost this focus and became more of the 'run of the mill' crime/thriller genre. Congratulations to the writers and producers for seeing sense and returning it, if only briefly, to the original mould. And congratulations to Amanda for her superb acting, it moved me to tear (sic) on more than one occasion over the past two nights. I say a fond farewell to Sam Ryan and whilst I wish Emilia Fox all the best in the new role I will not be watching."

"Sam Ryan/Amanda Burton was Silent Witness and without her it cannot be the same." (Jo James, Liverpool)^x

"Sam Ryan/Amanda Burton was Silent Witness and without her it cannot be the same"

Such passionate audience responses echo remarks made by our own respondents for our earlier research (see Kitzinger et al., 2008a). For example *Silent Witness* received several mentions, with reference to its inspirational qualities and one respondent explicitly commented that this series had deteriorated over time and in particular, after the departure of Amanda Burton who played a senior forensic pathologist. Her replacement by Emilia Fox (whose character was introduced as a palaeontologist with a PhD in anthropology, and then incorporated into a team of pathologists) stretched credibility. *Waking the Dead*, another primetime BBC1 drama, was cited positively by interviewees. One, for example, suggested that the female pathologist in the show was 'a great sort of role model, another identified the female psychologist as 'incredibly strong'. Interestingly, one respondent mentioned *Prime Suspect* where the central character was in fact a woman *detective*, not a scientist. This drama was also referenced by one of our production interviewees as blazing a trail for primetime British television with female lead characters / actors.

In terms of television drama produced outside the UK but occupying primetime slots in UK analogue and digital channels,^{xi} *CSI* was mentioned both positively and negatively. One interviewee, for example, said 'there's so many strong women characters in that programme'. Another commented:

"There is Miami, Vegas and New York and each of them has got a powerful almost handsome man in charge with all of these very, very intelligent women working underneath him."

"each of them has got a powerful almost handsome man in charge with all of these very, very intelligent women working underneath him"

A third commented of a character in *CSI Miami*:

"I don't know maybe she has brains, but looking at her she just looks and acts like a blonde bimbo ... She should be on the catwalk and not really in film like that, because that is not real."

Bones was also referenced as unusual because it was a programme showing powerful women in SET. This respondent did not seem to think that television lacked representations of powerful women, but she did not think there were many TV programmes showing women in SET.

“she just looks and acts like a blonde bimbo ... She should be on the catwalk and not really in film like that, because that is not real”

2.4.2 The view from script writers

An additional way in which textual analysis can usefully be contextualised is by explaining how such texts are written and produced. In order to explore the production context of the television dramas analysed we conducted telephone interviews with six members of the production teams of *Silent Witness* and *Waking the Dead*. Interviewees included the original creators of both series, as well as writers who worked on episodes at various point in the respective series' lives. The interviews were semi-structured and explored the following issues:

- The contribution of research on SET and on women in SET to the writing of such dramas;
- The representation of the professional and personal lives of SET women protagonists;
- The extent to which writers and producers considered the issue of role models;
- The possibilities and constraints in the representation of women in SET in televisual drama.

Nigel McCrery was the originator of the character and setting which eventually became Sam Ryan and *Silent Witness*. However, once the BBC had decided to develop the series two other writers, Kevin Hood and Ashley Pharoah worked extensively on developing characters and scripts for the first series. We interviewed both Nigel McCrery and Kevin Hood. We also interviewed two other writers who were commissioned to write individual episodes. Stephen Brady had provided two *Silent Witness* episodes, one of which was the last episode in which the character of Sam Ryan appeared. John Wilsher (credited as JC Wilsher) wrote a single episode for the third series. At the point he delivered his script, it was not known whether a further series would be developed, so he felt he had more liberty with the character than would have been the case if he had had to bear continuity issues in mind. We also interviewed the creator of *Waking the Dead*, Barbara Machin, and a producer from that series, Victoria Fea.

(a) The contribution of research on SET and on women in SET to the writing of such dramas

Silent Witness was originally devised by an ex-policeman who was – at the time – training to be a drama writer. The character of Sam Ryan was based on a female forensic pathologist who the writer had engaged with during his police career. This senior forensic pathologist had impressed him with her combination of humour, professional competence and glamour and she provided his inspiration. She was also a vital source in the creation of the first series, providing advice and reading and commenting on script drafts. In effect, Nigel McCrery was fortunate enough to have the kind of briefing from a senior woman scientist that

PAWS organises for writers, although his connection came from personal contacts. The importance of personal contacts in drama research came up in an interview with another writer who wanted to research the work of medical artists who produce facial reconstruction sketches from skulls for an episode that focused on a natural disaster rather than a murder. The producer on that series of *Silent Witness* was able to contact an ex-neighbour who worked on the process at a university hospital.

The process of research was a little different for the creator of *Waking the Dead* whose goal was to develop an original mainstream series in the crime thriller genre. In discovering and researching the area of 'cold cases' it happened that all her main research contacts were women, including an eminent senior forensic scientist attached to Scotland Yard. Barbara Machin adds:

“Actually although my character Frankie was much younger than her, I very much modelled her attitude and her kind of strength and her feisty behaviour on the real woman. I suppose as much as possible I wanted science to be very credible and have integrity. Although of course for one scientist to do all that Frankie does is clearly poetic license which I am afraid is what television drama does quite a lot.”

“I very much modelled her attitude and her kind of strength and her feisty behaviour on the real woman.”

The production teams of both *Silent Witness* and *Waking the Dead* draw on the expertise of appropriate specialists, including pathologists, a criminal profiler and police officers. But all the writers we interviewed stressed that whilst they consulted and drew on this advice, for dramatic purposes it was sometimes necessary to push the bounds of plausibility. In the case of both series, the co-operation of eminent and personable women scientists of considerable seniority led the creators to establish representations of strong women scientists whom successive writers could work with, even if they did not necessarily continue to draw on the services of women advisers as the series developed.

All members of the production team represented this process of researching and writing scientific storylines – and associated characters – as a collective and dialogic rather than an individualist and linear process. This does not mean that writers are always happy with the outcome. For example, the creator of *Silent Witness* also wrote novels about the character of Sam Ryan. It was crucial to his characterisation that she had a love of gardening which was a way of managing her fear that her work in the path lab would lead to her losing her sense of smell – apparently an occupational hazard. However, this aspect of the character was dropped for the television series. He says:

“Some things that work in real life don’t work in books, things that work in books don’t work in television, decisions have to be taken and sometimes compromises are made [...] in the end the producers / directors tend to get the last say and you don’t always agree with them [...] in the television series they cut out the gardening, which I thought was a real stupid mistake; it’s such a fascinating part of the character, but that’s what they decided to do [...] at the end of the day, they’re paying for it.”

(b) The representation of the professional and personal lives of SET women protagonists

The writers interviewed were acutely aware of the challenges that professional women might face in a workplace imbued with a masculine culture, and were keen to represent those challenges. However, they also wanted to avoid any suggestions that they were being ‘politically correct’ or writing to an agenda. They stressed the importance of ‘realism’ and the need to represent characters as flawed and human. In fact, they felt that these flaws were important dramatic, and realistic, counterpoints to the expert nature and absolute focus of the work of the women scientist characters they created or inherited. As both the creator of *Silent Witness* and his collaborator Kevin Hood pointed out, creators and writers tend to establish characters and their settings and then move on leaving the field clear for freelance writers to develop stories using the framework they’ve provided. This means that writers on later series have less motivation or freedom to change characters’ traits. However, the writer who wrote the last episode in which Sam Ryan appeared did see this particular landmark as an opportunity to ‘prise open’ her character, rather than killing her off as often happens when actors leave series. He also noted that:

“The idea of Sam as a ‘woman in a man’s world’ had been explored earlier in the series so that wasn’t something I wanted to place at the centre of my episodes. However it is still an issue: in the episodes I wrote Sam’s professional integrity was questioned because she was having to deal with health issues or family issues which I don’t think would happen with a male pathologist. But I was also aware that she would also deal with men who would respect her professional opinion; she’s experienced, she’s a professor, her evidence would be accorded weight in court so I had to bear that in mind too.”

Barbara Machin, creator of *Waking the Dead* says:

*“I wanted to write a show about a team. Interestingly enough there are loads of teams now and CSI of course is the great team show. But CSI wasn’t invented when I invented *Waking the Dead* and so I wanted a team where actually the women were as strong as the men. So I created Frankie and I created Grace the profiler. And she too was modelled on a woman [who assisted in the research process], so they would be very strong leaders in the team.”*

***“I wanted a team where actually the women were as strong as the men.
So I created Frankie and I created Grace the profiler”***

“Now, in fact, Boyd the male policeman has become the strongest personality in the series. And that has just happened because of the actor’s performance which is very gutsy and distinct and it has evolved so that he and Grace are the pivotal members of team but he is kind of the leader.”

“Now, in fact, Boyd the male policeman has become the strongest personality in the series. And that has just happened because of the actor’s performance which is very gutsy and distinct”

(c) The extent to which writers and producers considered the issue of role models

Although the writers of *Silent Witness* interviewed were fairly resistant to the notion of characters in drama being written as role models, those interviewed – all men – expressed very strong commitments to doing justice to the representation of strong, professional women. Nigel McCrery’s admiration for the combination of expertise, humour and humanity in the female pathologist on whom Sam Ryan was based was palpable in interview. Stephen Brady, who wrote Sam’s final episode, spoke of her almost as if she were a ‘real’ person, emphasising his sense of her importance:

“The reason I didn’t kill her off was that I illogically like the idea of her being ‘out in the world’, a source of goodness, even if she wasn’t doing forensic pathology any more. I admired her as a character, her strength and her professionalism. I think I related to her as somebody who is maybe not very good with relationships, but who does an excellent job in her working life. I didn’t see that as about her being a woman scientist – that’s not my experience of professional women; quite the opposite really.”

“The reason I didn’t kill her off was that I illogically like the idea of her being ‘out in the world’, a source of goodness”

Barbara Machin was the one interviewee who raised the issue of role models without prompting during the telephone interview. She had this to say:

“To be a woman driving that field [forensic science] is also interesting because in a sense the public almost don’t expect it because they have so many male role models; it is a much more provoking way to look at your science [...] at the way a practitioner works.”

She added that she was delighted that ‘Grace’ and ‘Frankie’ might have become important ‘role models’ having a positive impact on recruitment to the profession.

“And to hear that Grace and Frankie are role models [...] I think that is fantastic, because these professions demand such dedication and such education and academic ability and the ability to juggle your life with the inevitability of family life etc. To think women are being encouraged by these role models is fantastic. And [it] is obviously having some effect on the climate on which these professions perceive women and hopefully make it easier for women to actually survive in that climate [...] I think that these shows do have a responsibility, they have an implicit responsibility to portray society, and portray society in a positive way like this is something I am happy to do.”

“To think women are being encouraged by these role models is fantastic... I think that these shows do have a responsibility, they have an implicit responsibility to portray society, and portray society in a positive way like this is something I am happy to do.”

Nigel McCrery expressed similar satisfaction at the thought that Sam Ryan might have inspired women to follow her career path, although he was adamant that that had not been his goal.

(d) The possibilities and constraints in the representation of women in SET in television drama series

As discussed above, the professional ethos of the male writers we interviewed seemed to lead them to resist the idea of setting out to create characters who might act as role models. However, they took it for granted that women should be represented as competent professionals and that it was important to represent the challenges they faced. John Wilsher for example said that he hoped that young female viewers of *Silent Witness* might take away the idea that such a career was a possibility open to them, but that there may be costs to pursuing it.

Our interviewees made explicit reference to the fact that the economics and professional routines of television drama production imposed constraints on decisions made about character representations, as well as on character development. They discussed their perception that television drama production in the USA was far better resourced with writers paid much higher salaries and institutional commitments to representing diversity. However, it was also clear that when – often for contingent reasons – writers and producers engaged with female scientists they found them inspiring and co-operative in the production process. This suggests that the work in which PAWS is currently engaged is a very important factor in the process of increasing the representation of science and women scientists in drama (e.g. see www.hrsu.mrc.ac.uk/news/paws2/item.php). Such work will be required on an *ongoing basis* because of the iterations of the scriptwriting process which might lead to this important research being written out of the eventual programmes.

2.5 Conclusion

The global distribution of, and audience for, long running science-based dramas like the *CSI* franchise - as well as the dedicated following enjoyed by *Silent Witness* and *Waking the Dead* - demonstrates that there is a huge appetite for dramatic fiction that visualises science, engineering and technology in compelling ways. The setting of such procedural dramas (as with *Silent Witness*, *Waking the Dead* and *Bones*) in the workplace (however atypical that workplace might be) provides writers with ample opportunity to represent science and women scientists as both *exceptional* and *ordinary*. They are *exceptional* in their performance of SET tasks, often in life or death situations; they are *ordinary*, in their navigation of workplace relationships and tensions, and the balance of work lives and private lives.

It seems, therefore, that such series provide both an opportunity and a template for the representation of women and SET. They make science and technology both visually striking and relevant to the solution of life and death problems. They provide narrative opportunities to represent women in SET in both personal and professional settings. It would be worth considering applying such a template to other professions. It must be noted however, that the budget of a programme like *CSI* is about \$3 million per episode, and equivalent longevity of a new series could not be guaranteed. As our interviews with the production teams of the British television dramas reveal, the structural support for drama in the UK, even within public broadcasting, is paradoxically much less secure than is the case in the competitive commercial marketplace of US television production. Nonetheless, *Silent Witness* was commissioned and re-commissioned for ten series, while *Waking the Dead* is currently in production on its seventh series.

The initiatives pursued by PAWS are an interesting and potentially highly productive way to capitalise on the potential of TV drama to create interesting and diverse representation of SET (PAWS, 2004). We hope that the analysis presented in this chapter may help further some of their suggestions. Our recommendations are discussed in chapter 5.

Chapter 3: The representation of women in SET in a drama-documentary

3.1 Introduction

In this chapter we turn our attention to how women in SET are represented in a relatively novel, but potentially radical form – the ‘drama-documentary’ (or ‘dramadoc’ for short). The dramadoc genre is an important area of study because its fact/fiction blend creates opportunities for innovative representations of science and of scientists. The dramadoc also presents the opportunity to represent both real-life scientists and fictional scientists in the same programme.

This chapter presents a case study focusing on the BBC dramadoc - *If...Cloning Could Cure Us*. This programme was short-listed for ‘best factually based drama’ at the European Public Awareness of Science and Engineering (EuroPAWS) TV Drama Festival in 2005. The programme uses a combination of documentary interviews and fictionalised courtroom drama to explore potential uses of human cloning in stem cell research. It also examines the ethical and legal concerns surrounding this scientific research or potential medical treatment. One of the main characters in the programme is a woman stem cell scientist and, as such, this drama-documentary presents an important vehicle for examining the ways in which women scientists can be portrayed in the dramadoc genre.

This chapter is structured as follows:

- Firstly, we define what constitutes a drama-documentary.
- Secondly, we offer a detailed description of *If...Cloning Could Cure Us*.
- Thirdly, we outline the research methods used to analyse the programme as well as exploring how it was produced and how it was received by viewers.
- We then present the findings of this case study examining key themes such as: the share of narrative time allocated to women, how hierarchies are represented, the portrayal of relationships between scientists and non-scientists and the degree of focus on ‘private’ life. We also examine how the programme presents the image of science.
- We conclude by reflecting on what these findings mean for improving representations of women scientists in future dramadocs.

3.2 The drama-documentary genre

The drama-documentary (dramadoc) and documentary-drama (docudrama) fuse different genre of programming. Paget (1998) writes:

Frequently portrayed as a bad documentary, bad drama or both of these things simultaneously, dramadoc/docudrama is best understood first of all as itself – a form in its own right rather than some kind of ‘mongrel’, ‘hybrid’ or even bastard form (as it has been labelled in the past) (3).

The terms dramadoc and docudrama are sometimes used interchangeably; however, several academics (e.g. Corner, 1999; Paget, 1998) argue that the dramadoc and docudrama are two distinct forms, which emphasise different documentary and dramatic priorities. It is the second word, in the compound of these two forms, which signals the genre's priority. The first word acts merely as an adjective describing and calling attention to the second word which acts as a noun (Paget, 1998: 93).

The dramadoc tends to be the more serious of the two because it places emphasis on the *documentary* rather than the drama. This means that while dramadocs sometimes follow a dramatic narrative, documentary material often radically interrupts this narrative (Paget, 1998: 83).

In comparison, the docudrama is seen as more light-hearted than the dramadoc because it prioritises the drama. In the docudrama, documentary material acts behind the scenes to inform the drama; it is rarely overtly present in the dramatic narrative. If documentary material is present, however, it tends to cause minimal disruption to the narrative (Paget, 1998: 82). Examples of this form include historical blockbusters, such as *Elizabeth* (Shekhar, 1998) or *JFK* (Stone, 1991), which dramatise the stories of prominent figures in history.

Drama - documentary is a genre that fuses documentary and dramatic conventions, but prioritises documentary elements over dramatic elements.

The different priorities of the two forms can be seen as a product of the distinct cultural and institutional practices from which they emerged. The dramadoc form has its roots in Britain's strong tradition of public service broadcasting and investigative journalism (Paget, 1998: 141, 156). It is therefore more concerned with bringing facts, truth and social consciousness to the general public, rather than entertainment exclusively. The docudrama form, on the other hand, was heavily influenced by Hollywood film narratives and the more commercially-driven media environment in the United States. For this reason, the docudrama tends to be a more entertainment-led genre (Paget, 1998: 141, 151). The programme examined in this chapter, *If...Cloning Could Cure Us* constitutes a dramadoc as opposed to a docudrama.

3.3 Programme description

If...Cloning Could Cure Us is part of the BBC2 drama-documentary series called *IF*, which explores how important societal issues might play out in the future. The creators of each episode select a timely topic, gather existing data on the topic and then extrapolate this data to create a drama which is set 10-15 years in the future. Throughout the drama, interviews with real-life experts intercede to offer expert commentary on the chosen topic. The series was produced by the BBC Current Affairs Department with support of several freelance drama directors,

writers and camera people. *IF* ran for two seasons, airing 12 dramadocs between March 2004 and May 2006.

If...Cloning Could Cure Us was the first programme to air in the second season of *IF*. It was shown on BBC2 on Thursday, 16 December, 2004. According to the Executive Producer of the second season, the *If...Cloning Could Cure Us* episode only had 750,000 viewers (a 3.1% share of the total television audience). Those who did watch the programme, however, enjoyed it. The audience index for enjoyment of this programme was 78, which is slightly above average for this type of genre.

The *If Cloning Can Cure Us* programme is set in the Old Bailey, in the year 2014. The story revolves around the court case of Dr. Alex Douglas, an American woman scientist. She is charged under UK legislation with the 'illegal experimentation on human embryos.' This law states that it is illegal to conduct research on embryos older than 14 days, but Alex Douglas used 19-day embryos for her therapeutic cloning research. (In the *drama* portion of the programme the relevant legislation is said to have been enacted in the imagined future of 2008, but as the *documentary* portion of the programme explains, the legislation is already in operation in the UK).

So-called 'therapeutic cloning' is one branch of stem cell research. It involves creating a human embryo (involving cloned DNA) in order to extract stem cells, which, scientists hope, may then grow into organs or cells to treat diseases and injuries. This research has been a real field of exploration in the UK (where a Newcastle team succeeded in creating a cloned human embryo in 2005). In the programme, Alex Douglas undertook therapeutic cloning research in hopes that it would generate stem cells to repair the spinal cord of her paraplegic patient, Andrew Holland.

At first, it seems like a clear-cut case because Alex Douglas admits to breaking the 2008 legislation. However, the defence argues that Dr. Douglas should be acquitted under the defence of necessity because she needed to use 19-day embryos (which, unlike 14-day embryos, have begun to differentiate into spinal cord tissues) in order to save the life of her patient. The prosecution, on the other hand, maintains that Dr. Douglas should be found guilty and sentenced to 10 years in prison. The prosecution argues that Dr. Douglas was not motivated, as the defence claims, by the desire to save Mr. Holland's life. The prosecution suggests that Dr. Douglas's motives were 'fame and money.'

Throughout the trial, several witnesses are called to testify. These include Alex Douglas's colleague/former lover who exposed her illegal research, and a maverick scientist who conducted unsuccessful human baby cloning experiments that led to tumour formations in his patients. The jury also hears from a Chechen woman who was allegedly exploited when she donated her eggs to similar research (i.e. she was paid very little to donate her eggs and she also had

medical complications following the procedure to remove her eggs). Alex Douglas and the patient, Andrew Holland, also testify.

Inside and outside of the courtroom, audiences also witness the dramatised actions of pro-life groups that engage in extreme activities (e.g. throwing eggs at Dr. Douglas and spraying Mr. Holland with red paint). In direct opposition to the pro-life's action, however, audiences also observe a mother who is grateful that Mr. Holland has agreed to take part in this controversial new research because the procedure might have saved the life of her 8-year-old daughter who died of diabetes.

Throughout this dramatic narrative, documentary material explicitly interrupts the narrative. The documentary material includes news footage such as President George Bush speaking out against embryonic stem cell research, as well as celebrities such as Christopher Reeves and Michael J. Fox lobbying in favour of embryonic stem cell research. It also includes numerous factual statements that appear, typed in white font on black screens, directly addressing the television viewers. These statements reinforce or clarify information given in the drama.

The most prominent documentary material, used in the programme, is interviews with real-life experts. These experts consist of:

- Dr. Stephen Minger (King's College London Stem Cell Scientist);
- Dr. Simon Fishel (Embryologist and IVF Doctor);
- Professor Richard Gardner (Royal Society Researcher);
- Professor Geoffrey Raisman (University College London Spinal Injury Researcher);
- Dr. Tom Shakespeare (University of Newcastle Bioethicist);
- Professor John Harris (Manchester University Medical Ethicist)
- Suzi Leather (Chair of the Human Fertilisation and Embryology Authority);
- Josephine Quintavalle ('Pro-life' Campaigner who represents a group called 'Comment on Reproductive Ethics').

Throughout the programme, these experts: 1) provide scientific information that helps audiences interpret the drama; 2) comment on how they think the drama compares to real-life; 3) offer their opinions on the case.

At the end of *If...Cloning Could Cure Us*, the programme encourages viewers to take part in a phone poll to determine whether Alex Douglas should be found guilty or innocent. The cost of voting was 10p per call and the votes were calculated during a 30 minute *Newsnight* debate that consists of four experts talking about therapeutic cloning with Jeremy Paxman. None of these experts are natural scientists. There is a bioethicist, a spokesperson for a non-government organisation (NGO) called GeneWatch, a representative for the Church of Scotland, and a journalist who is a paraplegic. Only the NGO spokesperson is a woman.^{xii}

Following the debate, the results of the *If...Cloning Could Cure Us* phone vote were aired. An overwhelming 81% (9,381 votes) were in favour of seeing Alex Douglas go free. Only 19% (2,235 votes) were in favour of Alex Douglas being found guilty. Consequently, the BBC ran the 'innocent' story ending for the dramadoc, which the programme creators prepared in advance (the creators had also prepared a 'guilty' ending in the event of a guilty phone verdict). However, the innocent ending has a dramatic twist. The jury foreman declares Alex Douglas not guilty, but as Alex Douglas exits the courthouse an FBI agent approaches her. He says, 'As an American abroad, your actions here have broken U.S. laws and a warrant has been issued for your extradition.'

3.4 Research methods

This part of the research used a combination of programme analysis, interview and focus group methods to examine representations of women scientists in the *If ...Cloning Could Cure Us* programme.^{xiii}

(a) *Analysing the programme:* Our thematic discourse analysis of the dramadoc uses the coding sheet developed for our analysis of film and television drama series (see previous chapter). Thus we examine: cast order and share of narrative time; represented hierarchies; battle of the sexes; relationships between scientists and non-scientists; emotion and rationality; career and life-course issues. In addition to these categories, our analysis of the dramadoc also explores the themes of appearance, scientific motivations and character identification. Finally, we reflect on the overall image of science that is promoted in the programme. To complement this thematic analysis, we also draw on interview and focus group data.

(b) *Interviews with the production team:* Interviews were conducted with nine members of the *If...Cloning Can Cure Us* production team. The writer of the programme and the actor who played Dr. Douglas were recruited through their respective agents. The writer, Jason Sutton, then provided us with the contact details for the remaining production team members. Appendix 3(a) provides a complete list of people who participated in the interviews, as well as the role each person played in creating the *If... Cloning Could Cure Us* programme.

Seven out of nine of the interviews took place in person, while the remaining two were telephone interviews. The interviews lasted between 45 minutes and three hours. Whenever possible, the interviewees were encouraged to watch the dramadoc again prior to participating in the interviews. This allowed the interviewees to remind themselves of the programme, which they had produced three years prior to the interview. In some cases, the interviewer had the opportunity to watch the dramadoc with the interviewees, while they explained how the programme was put together. For the purposes of this report, two follow-up interviews were also conducted to pursue questions about representations of female scientists in the programme. All of the interview participants agreed to have their names and comments identified in this report.

(c) *Focus groups with viewers:* In addition to the interviews with those involved in producing the programme, 20 focus group discussions had already been conducted in the UK and in Canada exploring how diverse audiences relate to the *If...Cloning Could Cure Us* dramadoc. (These focus groups were conducted for Grace Reid's PhD – see footnote no xiv. They were then reanalysed for the purpose of the research presented in this report). In the focus groups, participants were asked to view the programme together at the start of the research session and then spend an hour discussing it. The focus groups had an average of six people in each session.

The composition and range of groups involved in the research were designed to reflect a diverse range of opinions, rather than to be statistically representative of the population. There were six 'general public' focus groups with people who had no vested interest in therapeutic cloning. There were also 12 homogenous groups composed of stakeholders in the therapeutic cloning debate. Stakeholder groups included Catholics, scientific experts (i.e. medical doctors and research scientists), and patients who are often addressed as potential beneficiaries of therapeutic cloning (i.e. people with spinal cord injuries and Parkinson's disease). Finally a further two groups were conducted involving a mixture of the above groupings. (See Reid, 2008 for a full list of focus group participants and their demographic details.)

All of the interview and focus group discussions were recorded, transcribed and systematically coded according to the same thematic categories that we used in the programme analysis. The systematic coding was necessary to ensure that we could make meaningful comparisons across the interview and focus group data. Our analysis identifies patterns and themes, but it also uses Frankland and Bloor's (1999) deviant case analysis to identify examples of opposing views being expressed. The focus group analysis also highlights group interaction wherever possible, by offering excerpts of the groups' discussions, rather than individual comments (See Kitzinger, 1994).

The following sections present the findings of our programme analysis, interviews and focus groups research. These sections have been organised according to the thematic categories listed above. *Note:* in order to protect the anonymity of focus group participants, pseudonyms are used in place of participants' real names.

3.5 Findings

(a) Cast order and share of narrative time

This theme allows for the exploration of the number of women scientists represented in *If...Cloning Could Cure Us*, as well as the amount of narrative time that these scientists receive. The combination of fact and fiction in the dramadoc creates the potential for both fictional and real-life scientists to be represented in the same programme. However, it is striking that in the case of

If...Cloning Could Cure Us, the drama portion of the programme presents an in-depth portrayal of a character who is a woman scientist, while the documentary interviews do not include any real-life women scientists.

The fictional scientist is played by the actor Jennifer Calvert. Jennifer Calvert received second billing in the programme because the cast was listed in order of appearance. Her character shares the role of lead protagonist alongside the paraplegic character, Andrew Holland.

In addition to Alex Douglas, eight other natural and social scientists feature in the programme (although all eight have relatively minor roles). Two of the other scientists appear in the 'drama' portion of the programme, and six in the 'documentary' portion of the programme. All eight are men. This thus presents stem cell research as a field dominated by male experts 8:1. In fact, this vastly under-represents the number of women in this area. Although we do not have access to exact figures we would note that this is a field populated by a large number of women. The scientific adviser to the programme, himself a leading scientist in the field, remarked that his own colleagues included more women than men (albeit not necessarily at the same level of seniority as their male colleagues). We would also note that more than half the PhD graduates in life sciences are women (European Commission, 2006: 35, 41).

John Hay, the associate producer of *If...Cloning Could cure Us*, was largely responsible for pre-interviewing and selecting the experts for the programme. When we asked about the gender-balance of the selection of experts he said the creators of the programme made a conscious effort to involve real-life women scientists in the programme. 'We talked to women scientists who we'd have very much liked to take part and they didn't want to for various reasons,' he commented. He went on to stress that the reasons why women scientists refused to take part had nothing to do with gender, but had more to do with time constraints and whether they wanted to be involved with a drama-documentary programme or not. John Hay explained:

"In general most of the people we approached to take part in the programme fell into one of two camps. Half thought the futuristic scenario was a great way of engaging people who wouldn't normally sit down to read a newspaper article on the issue, and the other half felt it was dangerous to speculate. So they either liked it and wanted to participate, or they weren't interested in taking part. And this largely determined who we could and couldn't interview for the programme" (Hay, 2007, Interview).

"Half [the scientists] thought the futuristic scenario was a great way of engaging people who wouldn't normally sit down to read a newspaper article on the issue, and the other half felt it was dangerous to speculate"

The women scientists who were approached (and we do not know how many *were* approached), fell into the latter category – they were suspicious of the speculation involved in a dramadoc representation of stem cell science. The same was also true for a number of male scientists. It is hard to know whether it ‘just happened’ this way, or whether, in fact there is a gender element to this reluctance among female experts in the field to participate in such a programme. Our other interviews with female scientists certainly identified some hesitancy about how, and whether, to be involved in media representations and an awareness of some of the associated risks (see Kitzinger et al., 2008a). Further research, however, would be needed to unpack this issue – although it would be worth reflecting on this in future initiatives with female scientists.

In order to compensate for the lack of women scientists, the production team ensured that there were at least two strong real-life women participating in the expert portion of the programme: Suzi Leather (Chair of the Human Fertilisation and Embryology Authority) and Josephine Quintavalle (Pro-life Campaigner). These are two women who routinely appear in television news reports about stem cell research and therapeutic cloning. Both speak with considerable knowledge and confidence about stem cell research and the moral and legislative issues involved. Neither, however, is usually framed as a ‘scientist’ per se. Having women appear as commentators on the science, but not necessarily as scientists, can have both pros and cons in representing women in relation to SET (See Reports 1, 2 and 4 for further discussion of this issue).

(b) Represented hierarchies

The ‘hierarchy’ theme is designed to explore the level of expertise and seniority that female scientists are afforded, in relation to their male colleagues. In the programme, audiences are told that Alex Douglas works for a private company called VIVACORP, but her exact position within the company is not mentioned. The programme does, however, allude to the fact that Alex Douglas is accountable to a higher power in the VIVACORP organisation. This occurs when the jury is shown an illegal video made by Alex Douglas’s colleague (and we discover, former lover) Rob McVeigh. He made the video in order to entrap Alex Douglas into admitting her guilt. During the video, Rob McVeigh asks Alex Douglas, ‘Does anyone on the third floor know about it yet?’ and Alex Douglas replies, ‘Not yet, plausible deniability and all that.’ This scene indicates that Alex Douglas is not the head of VIVACORP.

Audiences, however, must assume that Alex Douglas is a senior scientist who runs her own stem cell lab within the VIVACORP company, in order to believe that she was able to conduct illegal research and avert the regulative authority for such a long period of time. Alex Douglas is also American, which implies that she is part of the growing trend of successful American scientists, who come to the UK to conduct stem cell research because UK legislation is more liberal in this area. Alex Douglas’s senior reputation is further acknowledged when even the

prosecutor and Rob McVeigh (one of the scientists who testifies against Alex Douglas) admit that Alex Douglas is a respected scientist in her field.

The tendency for main characters, who are women scientists, to be presented in very senior positions has been documented in previous research on films. Steinke (2005) examines 23 films with female scientist as the protagonist and finds that 11 are shown as project directors, nine as equal members of a team, two as administrators and one as a research assistant (44). However, Weingart et al. (2003) look at all characters, not just the protagonists, in 222 films and find that overall characters who are women scientists tend to be 'lower on the career ladder' than their male counterparts (382). This is more reflective of reality where, for example only 11% of the most senior positions in natural sciences within academia are held by women (European Commission, 2006: 60).

The creators of *If...Cloning Could Cure Us* seemed either unaware of this gender gap, or they believed that the gap will have substantially diminished by 2014. We asked several members of the production team whether they felt it was realistic that a woman, like Alex Douglas, would be running her own a lab in 2014. In response to this question, the script writer replied, 'Oh yes! Women do now, don't they?' (Sutton 2007, Interview). The *IF* series editor answered this question by saying:

"Well why not really? There's absolutely no reason why not. It's a fifty-fifty chance of choosing a man or a woman, especially since it's about the future. One thing we know about the future is that women are becoming more powerful". (Downes, 2007, Interview)

"One thing we know about the future is that women are becoming more powerful"

The programme's scientific consultant concurred with this view. He said, 'I'll give you some idea of why I think a female scientist as a stem cell researcher makes perfect sense.' He then went to his computer and pulled up a picture of the researchers from his stem cell lab. The photo featured a handful of men sprinkled among a crowd of women. He said, 'There are three other women who are not even part of this picture....So yeah, I think it's entirely plausible. There are certainly a couple of women in my group who will be professors and have their own lab in 15 years. I mean they are really good' (Minger, 2007, Interview).

It is wonderful that the creators of *If... Cloning Could Cure Us* are so optimistic about the future of women in science. However, the European Commission (2006) report on women in science presents a bleaker picture for the future of women in science and engineering. In terms of the gender gap for those in positions of seniority, the authors write 'the gender differences are so persistent that they will not self-correct in the foreseeable future' (European Commission, 2006: 53).

This image of the future, however, is often downplayed by television programmes and films that depict women scientists in positions of high authority, without any mention of gender disparities or the challenges that women face in the field. On the one hand it is important to show images of powerful women of the future, these are aspirational and could be inspirational. On the other hand, simply assuming that equality will 'just happen' obscures the action needed to make this future come into being. In our first UKRC report, we discuss this dilemma - highlighting the ambivalence that some scientists feel about whether the media should reflect the reality of gender disparities in science, or present a more utopian vision of women in science (Kitzinger et al., 2008a).

(c) Battle of the sexes

This theme examines the ways in which men and women scientists struggle for expertise in their professional relationships, and power in their personal relationships. In *If...Cloning Could Cure Us*, there is one significant battle of the sexes that plays out between the protagonist, Alex Douglas, and her male colleague, Rob McVeigh. Rob McVeigh works for the same research company as Alex Douglas, but it is unclear whether they are at the same level of authority in their field. Rob McVeigh is the person responsible for exposing Alex Douglas's illegal research on 19-day embryos. During the trial, Dr. McVeigh takes the stand to testify against Dr. Douglas and, in doing so, he questions Dr. Douglas's authority and reputation. According to Steinke (2005), male scientists undermining their female colleagues is a popular theme in film. She writes:

"In the films in which female scientist and engineer primary characters were shown as project directors, the female directors are questioned or challenged many times by their male colleagues or peers. Also, they find themselves explaining their credentials and professional experience, defending the value of their research projects or research ideas, and justifying the decisions they make about their research". (Steinke, 2005: 45)

This was very much the situation in *If...Cloning Could Cure Us* where both Rob McVeigh and the human cloning scientist, Golam Yama, testify against Alex Douglas. However, this challenge is in the context of a court case in which Rob McVeigh and Golam Yama are questioning Alex Douglas's authority because she 'allegedly' broke the law.

Alex Douglas and Rob McVeigh's relationship in the dramadoc is further complicated, by the fact that the two are former lovers. Research on film shows that woman scientists are more likely to be shown in romantic relationships than male scientists. In Weingart et al.'s (2003) analysis of scientists across 222 films, two-thirds of the scientist characters (82% male) are either identified as being single, or there is no discussion of their relationship status in the film (282).

In comparison, Steinke's (2005) study of exclusively women scientists, finds that 20 out of the 23 films show the female protagonist involved in a heterosexual, romantic relationship. In 16 of these films the woman is, or has been, in a relationship with a male scientist (Steinke, 2005: 49-50). However, Steinke stresses, 'The female scientists and engineers are rarely shown compromising their professional positions for romance' (Steinke, 2005: 53).

Consistent with the findings of this film research, *If...Cloning Could Cure* emphasises Alex Douglas's romantic relationship with her male colleague. However, there is one significant departure from the romantic stereotype – Alex Douglas is depicted as the dominant partner in the relationship. This is best illustrated through the conversation Alex Douglas has with her lawyer about her relationship with Rob McVeigh:

Alex Douglas: I guess I should warn you that I slept with him.

Defence Lawyer: What? Well, why didn't you warn me earlier? He's only the chief prosecution witness.

Alex Douglas: Because it's embarrassing! I used to work late, what can I say? It was only for a month until I found out how needy he is.

In this scene, Alex Douglas, somewhat callously, indicates that she ended the relationship because Rob McVeigh was too 'needy'. This reverses the more common and stereotypical scenario of a man ending the relationship because a woman is too needy. It also goes against Flicker's (2003) observation that, female scientists 'remain dependent on male characters' at the end of films (316). Alex Douglas is presented as independent throughout the entire *If...Cloning Could Cure Us* programme.

The affair plot-line undoubtedly adds an edge of sex and excitement to the programme, but it also advances the dramatic narrative. The affair is relevant to the plot because it causes audiences to question Rob McVeigh's credibility as a witness, especially when a video shows that he used his relationship with Alex Douglas to get her to admit that she was conducting illegal embryonic research.

It could also, however, be argued that the affair undermines Alex Douglas's professionalism and her 'liability'. Several focus group participants saw it this way and a group of scientists joked about this image of female scientists and suggested the affair plot line (and reference to her expensive shoes) were a deliberate effort to discredit her:

Victoria (F-36): ... they were deliberately trying to make her look pretty immoral anyway in the beginning with the whole business of "Here's this predatory single woman who's out to get men."

[group laughs]

Judy (F-54): Married men are not safe!

Victoria (F-36): Married men are not safe from her vintage Jimmy Choos! [high fashion shoes which cost between £300 and £600]

[group laughs]

Victoria (F-36): And anyone who happens to be working late with her in lab is prey.

(Focus Group 15, Scientists)

**“... they were deliberately trying to make her look pretty immoral
...Here’s this predatory single woman who’s out to get men”**

Other research participants, however, felt that the affair was Alex Douglas’s one redeeming moment. This was because she refuses to use the affair to discredit Rob McVeigh on the stand. Alex Douglas says, ‘I might disagree with his science and his motives, but he’s not a bad man. I can’t sacrifice his marriage. He doesn’t deserve that.’ This comment depicts Alex Douglas as principled because she is unwilling to sacrifice the marriage of a man (even one that is about to betray her with his testimony) in order to save herself. The affair also shows that scientists are not infallible and that they are just as human as other people.

In the focus groups, the affair plot-line generated a significant amount of discussion across the various groups. Most participants described the affair as ‘unnecessary’ or ‘irrelevant.’ Later in the focus groups, however, these same participants would often explain that the affair was included in the programme to make audiences question the credibility of the two scientists. This suggests that what participants meant by their earlier comments, is not that the affair plot-line is irrelevant to the *drama*, but that it is irrelevant to their *learning* about therapeutic cloning. Several focus group participants said this explicitly. For example, Tim (Male, age 23)^{xiv} said, ‘He had a relationship with the scientist, which I thought was just totally irrelevant to anything to do with embryonic research’ (Focus Group 6, General Public). In another focus group, Lily said, ‘I don’t know how useful that was to help me make up my mind’ (Focus Group 13, F-53, Parkinson’s Patients). Cameron, in another group, echoed this sentiment: ‘They could have left out the sleeping together part and put more of the science in’ (Focus Group 12, M-49, Spinal Injury Patients). These comments show that some participants disliked the affair plot-line because it interfered with their ability to form an unbiased opinion regarding therapeutic cloning.

Many of these participants wanted to see the affair plot-line disappear completely, but others thought it was over-dramatised and just wanted to see it subdued. For example Adam (M-34) said, ‘You’d hate to see stick figures talking to one another, but you certainly don’t need, ‘I slept with the researcher while he was there in my office’ (Focus Group 12, Spinal Injury Patients).

Although most people did not like the affair plot-line, there were also quite few focus group participants who enjoyed it:

Genevieve (F-26): I think I liked the soap bits actually. The more you guys are dissing it, the more I am liking it.

[co-participants laugh]

Kate (F-23): Why? Because you want to take a minority stance?

Genevieve (F-26): No

Roxy (F-24): You're trying to be subversive?

Genevieve (F-26): No, I think it drew me in and I liked the little gossipy bits.

Roxy (F-24): Did you care about the people?

Genevieve (F-26): No, but I liked the little gossipy bits.

Roxy (F-24): Oh, okay. You wanted to find out about her affair and ...

Genevieve (F-26): Yeah I was like dying for her to announce the affair in court and say, "You didn't see that coming when you were kissing me, did you?"

[group laughs]

Genevieve (F-26): I quite liked it.

(Focus group 1, General Public)

"I think I liked the soap bits actually. ...I think it drew me in and I liked the little gossipy bits"

Genevieve may have been in the minority, but her opinion was shared by others, men and women alike. According to Paget (1998), many academics believe that women are more likely than men to engage with the dramatic elements in the dramadoc/docudrama genre. Men, on the other hand, are supposed to prefer the documentary elements (198-199). In the case of *If... Cloning Could Cure Us*, however, men and women in the focus groups did not live up to these stereotypes. In fact, it was a focus group of men (Focus Group 6, General Public) that spent the most amount of time discussing how the drama elements made the programme more interesting and engaging.

In our interviews with women in SET some complained that female scientists were sometimes only introduced as 'love interest'. This accusation could certainly not be made against the producers of *If... Cloning Could Cure Us*. The female scientist was the key protagonist. The plot line about the affair introduced some complexity and some interest for some viewers. Whether or not the plot line about the affair was 'gratuitous' or undermined the image of the female scientists seems to depend on the eyes of the beholder.

(d) Scientists and non-scientists

The theme of 'scientists and non-scientists' is designed to examine relationships between scientists and non-scientists, in order to establish whether they reinforce the stereotype of scientists as reclusive and lacking in social skills. In our first UKRC report, we indicate that most of the women scientists we interviewed disapproved of media representations that portray female scientists as socially incompetent (Kitzinger et al., 2008a).

At several points in the *If...Cloning Could Cure us*, Alex Douglas is shown working alone in her lab; she is never pictured working with others. Outside of the lab however, Alex Douglas is shown interacting with her lawyer and her patient on several occasions. Throughout most of these interactions, Alex Douglas is presented as a ruthless career woman, who is aggressive, detached and unkind in her dealings with others. Some of these characteristics could be explained by the stereotype of scientists having inadequate social skills; however it seems more likely that Alex Douglas is familiar with the rules of social etiquette, but deliberately chooses to ignore them.

The first time audiences are introduced to Dr. Douglas, Dr. Douglas's lawyer politely asks her how she is feeling and Dr. Douglas responds, 'I could say fine or we could be here all day!' These abrupt comments continue throughout the programme and Dr. Douglas's interactions with others are typified in the scene below.

[Andrew Holland approaches Alex Douglas in his wheelchair]

Andrew Holland: I'd give you a hug if I didn't think you'd stab me through the heart with your pencil.

Alex Douglas: Morning mouth.

Andrew Holland: Your time in the sun then...

[Andrew Holland runs over her foot with his wheelchair]

Alex Douglas: Watch what the hell you're doing! That's my foot!

[Alex Douglas looks around and notices that others are watching]

Alex Douglas: [softer voice] Sorry it's just these are my vintage Jimmy Choos.

[Both Andrew Holland and Alex Douglas laugh]

This scene was very memorable for participants in six focus groups. They used it to illustrate the fact that Dr. Douglas is more concerned with herself than others. Participants emphasized that it is only after Dr. Douglas notices other people have heard her reprimand Mr. Holland, that she becomes kind.

According to the woman who played Alex Douglas in *'If'*, the decision to make Alex Douglas's interactions with others cold and unfeeling was intentional. Jennifer Calvert says:

"I wanted her [Alex Douglas] to be likeable for the right reasons, in the sense that she was very bright, absolutely committed to her research and thought that she could do something good in the world. I didn't want her to go about being liked using traditionally feminine modes of persuasion. So therefore there wasn't a lot of smiling, soft gentle looks and understanding chats...she wasn't trying to be liked, she wanted people to respect her and let her do the research that she thought she could succeed at doing. So...we chose not to do all those little subtle gestures of appeasement that women often use unconsciously in our society. We tried to eradicate those from the way I played the part." (Calvert 2007, Interview)

“I didn’t want her to go about ... using traditionally feminine modes of persuasion. So therefore there wasn’t a lot of smiling, soft gentle looks and understanding chats”

It is very interesting to understand the intentions of the producers here. However, our audience research also introduces a different perspective on this. There may be a double-standard at work in the reception process. A female character who does not offer the ‘little subtle gestures of appeasement that women often use unconsciously in our society’ may be seen as a bit of a bitch. Despite Jennifer Calvert’s intentions to make audiences like Alex Douglas for her brains and ambition, the eradication of Alex Douglas’s more ‘feminine’ traits (e.g. caring and sociability) made focus group participants dislike the character. This is discussed further in the next section. It is interesting to note here that our other research also found that a character who is glamorous (perhaps as a deliberate effort to combat the ‘dowdy’ stereotype) may then be ‘read’ as a ‘bimbo’. Similarly we found that a character who pays attention to dress (again perhaps in efforts to reaffirm an image of female scientists as ‘normal’ or attractive) may be ‘read’ as self-consciously manipulative and ‘evil’ (linked to the femme fatale stereotype) (see Kitzinger et al., 2008a and b).

(e) Gender, emotion and rationality

Several academics argue that media representations of women scientists portray them engaging in a more ‘feminised’ science that is guided by intuition and emotion. Flicker (2003) writes, ‘At the professional level of science they bring intuition, emotional elements, love affairs and feelings. They do not represent the rational scientific system of their male colleagues.’ (316). In the television series *Star Trek Voyager*, the use of women’s intuition and emotion in science is embraced, and presented in a positive light. These more feminine characteristics are seen to offer something that is important to, and missing from, the more rational and traditional science (Roberts, 2000: 277). However, women’s intuition and emotion can also be shown as a negative addition to science when it’s presented in excess. The question of how female scientist relationship with ‘emotion’ and ‘rationality’ played out was one of the issues that concerned the scientists we interviewed (Kitzinger et al., 2008a). This section explores how emotion and rationality play out in the *If...Cloning Could Cure Us* programme.

We have already established that Alex Douglas does not embrace feminine attributes when interacting with others. For a large portion of the narrative, Alex Douglas is presented as cold and detached. There are at least two instances in the courtroom where audiences would expect Alex Douglas to react to controversial statements made against her, but Alex Douglas responds with indifference. The first time occurs when the human cloning scientist, Golam Yama, makes the following dramatic declaration in his testimony, ‘I’m afraid Dr. Alex Douglas’s work will not result as she intends in the undoing of this man’s paraplegia, but in the undoing of us all!’ On the second occasion, a pro-lifer interrupts the court proceedings by yelling ‘Dr. Dead’ at Alex Douglas. In both

instances, the camera cuts to Alex Douglas whose facial expression does not change. Alex Douglas's ability to control her emotions and detach herself from upsetting situations are characteristics typically associated with more traditional or masculine scientists.

However, Dr. Douglas is not always presented as disengaged and objective in the *If Cloning Could Cure Us* programme. She is either overtly cold or at the other extreme, excessively emotional (although this could be read as her being passionate about the science she was pursuing and its potential benefits). There are several examples when Dr. Douglas lets her guard down and becomes emotional. We have already described the occasion when she overreacts to Mr. Holland running over her foot. In addition to this, Dr. Douglas also becomes emotional while she is testifying. Here is an excerpt from the scene:

Prosecution Lawyer: [aggressive tone] Are you right about your treatment of Andrew Holland or is he one of your mistakes?

Alex Douglas: Okay, hang on! Andrew Holland is a man who wants to walk again. Using a tiny ball of cells the size of a full stop, cloned from his own body, [voice softens] I can offer him a chance.

Prosecution Lawyer: Dr. Douglas...

Alex Douglas: [voice is high-pitched and aggressive] There are thousands of people alive who are already here because of the last big advance in this field – IVF. Would you call all those people mistakes Mr. Rowling?

Judge: Dr. Douglas, I understand you are feeling emotional, but you will not use this courtroom as a platform for your campaign.

Alex Douglas: Everybody else seems to be!

Judge: Dr. Douglas you are displaying contempt towards this court.

Alex Douglas: I apologize. It won't happen again.

The emotional scenes were noticeable to Jennifer Calvert, the actor who played Dr. Douglas, when she watched the programme again in preparation for our interview. During the interview, Jennifer Calvert reflected on how she might play the role differently today.

"There were times when she was very emotional. I mean she was on trial so I suppose emotions were running high, but I might have tried to have taken just a little bit more emotion out of it...I might have chosen one or two moments where I played it emotionally, to play it a little more rationally...but the more we talk about it, I remember we did do various versions with different levels of emotion. So the director and the editor together probably chose the version that would heighten the drama slightly. And that's fair enough because it was a drama. I mean it was a docudrama, so we tried to be as realistic as we could, but you still need to have some drama in there to keep the audience engaged." (Calvert 2007, Interview).

“I might have chosen one or two moments where I played it emotionally, to play it a little more rationally”

Despite the emotional element in Dr. Douglas’s character, the focus group participants overlooked this aspect of Dr. Douglas’s personality. They remembered the cold and unsympathetic part of her character instead. For example, Gareth said, ‘They did put her across to be a bit cold-hearted in the case and a bit too stone-faced in everything that was around her really’ (Focus Group 11, M-24, Spinal Injury Patients). Another focus group participant, Cindy attributed Dr. Douglas’s ‘clinical’ personality to the fact that she was a scientist (Focus Group 4, F-51, General Public). However, this conclusion was rejected by scientists who participated in our focus group discussions of the programme. For example, Rebecca said, ‘I thought she came across as quite harsh, quite hardnosed, and again I don’t think it is highly representative of the profession’ (Focus Group 15, F-29, Scientists).

“They did put her across to be a bit cold-hearted...”

Images of women scientists, such as Alex Douglas, who are perceived by audiences as strong and emotionally detached, could potentially send the message that sex does not determine whether a scientist will take a more traditional (masculine) or alternative (feminine) approach to science. Alternatively it could be interpreted as showing women scientists as surrendering their ‘femininity.’

In the interviews, we asked both the actor and the scriptwriter if they did anything to distinguish Alex Douglas from her male colleagues. The actor, Jennifer Calvert, replied, ‘No, we didn’t consider that. If anything, I tried to make her more like them!’ (Calvert 2007, Interview). The writer, Jason Sutton, agreed with this assessment. He said, ‘No...because if you think about it all of those scenes could have been played by a man. We didn’t dwell on the fact that she was a woman at all’ (Sutton 2007, Interview). The irony is that while this may be a ‘gender-equality’ approach it can confront a double-standard at the point of consumption – our focus group work showed that a woman who behaves ‘like a man’ is seen by some viewers as ‘cold-hearted’ and a ‘bitch’.

(f) Gendered career and life-course issues

The purpose of this theme is to examine whether the *If...Cloning Can Cure Us* acknowledges any of the challenges that women, in particular, might face during their scientific career (e.g. the glass ceiling for positions of seniority, the challenge of balancing careers and family, sexual harassment, etc.). In the *If...Cloning Could Cure Us* dramadoc, there is one particular line that alludes to the difficulties that women might encounter while trying to succeed in the field of science. Alex Douglas says to Andrew Holland, ‘You keep hearing what a bitch I

am, and perhaps I am. Do you have any idea what it takes to succeed in this field?’

The writer, Jason Sutton, says that he did not intend this line to be gender specific.

“Oh, it’s not specifically female that line. Remember this is set 10 years in the future, so you’d expect by then they’ll be even less of a residual chauvinism. It will be removed by then. So, I didn’t mean to imply that really. I just meant that it is hard to succeed in the field because you have to do an enormous amount of work to stand out and do anything original because everyone’s working on the same thing.” (Sutton 2007, Interview).

“Remember this is set 10 years in the future, so you’d expect by then they’ll be even less of a residual chauvinism. It will be removed by then”

Despite Jason Sutton’s intentions however, this line can also imply that female scientists, in particular have to be aggressive and work even harder than men to succeed in a male-dominated field. It seems Alex Douglas cannot afford time spent displaying emotions such as empathy and kindness, if she wants to get ahead. In fact, Alex Douglas has even shortened her name from its more feminine form, Alexandra, to the more masculine form, Alex – perhaps in an effort to fit into the male-dominated field of science.

In order to be successful in the field, Alex Douglas has also given up any chance of a work-life balance. Throughout the programme, Alex Douglas is pictured working alone in her lab late at night and Jason Sutton said that her brief affair with a colleague ‘was a device to show that she was very driven and didn’t have time for a relationship. Stem cell research was her entire life’ (Sutton 2007, Interview). This message is clearly conveyed to audiences when Alex Douglas ‘explains’ the affair by the casual comment: ‘I used to work late, what can I say’. It is also illustrated by her subsequent comment that she ended the affair because her colleague was too needy.

The idea that scientific careers come at great personal sacrifice is a common theme in films (Steinke, 2005: 50). In Steinke’s (2005) film analysis, most of the women scientists may have been involved in relationships but they ‘were single, and if they were married or later married, most did not have children’ (51). The message that scientists must relinquish their personal lives to succeed may not be gender specific. Weingart et al. (2003) note that male scientists in film also tend to be single too. The notion that science conflicts with family life, however, is potentially more problematic for women scientists who are still often expected to be the primary caregivers who bear more of the burden of housework.

The message that women scientists in films must give up their personal lives seems to be mirroring a real-life problem in science. Several studies have documented the challenge that women scientists face balancing their career and family life. According to Hanson (2000), 'A critical element in the culture of science occupations involves ideas about having to be wedded to one's work – making it difficult for women with families (spouses and/or children), but not men with families to succeed' (170, as cited in Steinke, 2005: 54). In homes with two working parents, women still tend to do the majority of the housework and childcare compared to their male partners. The question is should media programmes reflect this reality, or should they present an ideal version of the future where women scientists can have both a successful career and family – and where men are modelled taking their share of the domestic work.

(g) Appearance

Research on representations of women scientists in film suggests that characters that are women scientists tend to be more attractive than their male counterparts (e.g. Flicker, 2003; Weingart et al., 2003). Flicker (2003) writes, 'The woman scientist tends to differ greatly from her male colleagues in her outer appearance: she is remarkably beautiful and compared with her qualifications, unbelievably young (316). Steinke (2005) examines 23 films with women scientists as the primary character and finds that none of these characters are unattractive (or at least that none remain unattractive throughout the whole film). She classifies 18 of the women scientists as attractive, two as sexy and glamorous, and three as unattractive at the start of the film, but transformed to attractive, sexy and/or glamorous by the end (Steinke, 2005: 38). The depiction of Alex Douglas in the *If...Cloning Could Cure us* drama-documentary is consistent with this emphasis on female appearance.

Alex Douglas is played by an attractive actor who was 40-years-old when she played the part. The costume designer emphasises Dr. Douglas's looks by dressing the actor in clothing, which although professional, is both form-fitting and feminine. Dr. Douglas's outfits change several times throughout the narrative to indicate that it is a new day in the trial. Each time, Dr. Douglas appears in clothing that is carefully accessorised with jewellery, scarves, handbags and new hairstyles. The programme's dialogue makes explicit reference to Dr. Douglas's taste for high fashion when she tells Mr. Holland that he ran over her Jimmy Choo shoes.

Quite a few focus group participants acknowledged Alex Douglas's attractiveness in the focus groups and a minority admitted that the level of Alex Douglas's attractiveness challenged their expectations for what a scientist should look like. Here is an excerpt of a discussion about Alex Douglas from one of the focus groups:

Sally (F-67): She was made to be artificially glamorous.

Ginny (F-31): She was *too* pretty. I didn't like her.

[group laughs]

Ginny (F-31): I think she should be a bit nicer looking, average looking.
(Focus Group 3, General Public)

“She was made to be artificially glamorous”

“She was too pretty, I didn’t like her”

Focus group participants, who were themselves women scientists, didn’t believe that a real scientist could afford the expense necessary to look as glamorous as Alex Douglas. When the moderator asked for initial reactions to the programme, Victoria (F-36) exclaimed, ‘First of all, I’d like to know, is anybody aware of any female scientists who can afford vintage Jimmy Choos because it’s unrealistic, especially given the pay levels in this country!’ The other members of the focus group laughed at this comment, but quickly moved on to other topics. Later in the focus group, however, another scientist returned to this point. Judy (F-54) said ‘I think the programme is what I expected, but I think that it fell into the usual hum-drum trap of trying to sensationalize something, certainly some aspect being very unrealistic. I mean, you made the point about the Jimmy Choo shoes’ (Focus Group 15, Scientists). Rachel, a clinical geneticist in another group, also raised this point. She rhetorically asked ‘What scientist can afford Jimmy Choos?’ (Focus Group 17, F-30, Clinical Geneticists).

“I’d like to know, is anybody aware of any female scientists who can afford vintage Jimmy Choos because it’s unrealistic, especially given the pay levels in this country”

While some focus group participants felt the emphasis on Alex Douglas’s appearance and her expensive shoes was unrealistic, a few others thought that Alex Douglas’s appearance was representative of women scientists. Ross (M-55) said ‘The only way the show was close to reality was the fact that she wasn’t a 50-year-old homely matron being prosecuted’ (Focus Group 6, General Public). In another group a scientist named Lilah agreed that Alex Douglas’s appearance could be realistic for a scientist, although she felt other aspects of Alex Douglas’s character were less than representative of women in the profession:

Lilah (F-25): The scientist wasn’t very much like many of the scientists I’ve known.

Marilyn (F-53): No, that’s true.

Lilah (F-25): Although she reminded of someone I work with very close because she’s very pretty and very well dressed and she’s on her way to being a successful scientist, but she’s still very level-headed and not quite [she pauses mid-sentence]

Moderator: Not quite?

Lilah (F-25): Not quite as tenacious. I don't see her putting her career on the line for this thing or even going against the regulations in trying to find a cure. You get those kind of people one in every how many thousand? Or even less than.
(Focus Group 20, Mixed Participants)

The actor who was chosen to play Alex Douglas acknowledged that she might be seen as attractive, but said it was a different kind of attractive – an attractiveness that tends to get her cast as the villain. Jennifer Calvert said:

"I tend mostly to play quite strong women; I don't tend to play soft squishy characters very often...Which is hilarious of course because, as most people in the business know, people who usually play the bitches or the femme fatales are quite often the opposites in real life."

"I tend mostly to play quite strong women; I don't tend to play soft squishy characters very often"

When asked why she is cast in these roles, Jennifer Calvert replied:

"I accept that some people might think I was an attractive woman, but they wouldn't say I was a softly, pretty waif-like creature. I have quite strong features and I don't have a tiny, little waist. So, I think it's a combination of physical characteristics and probably a certain amount of some steely core that comes across. I don't know. I've spent my whole career wondering why I am cast in some roles and not in others, so I don't think I have any answers for you."
(Calvert 2007, Interview)

The lighting in *If...Cloning Could Cure Us* accentuated Jennifer Calvert's strong features by casting a harsh, yellow light on her face throughout most of the trial. This lighting downplayed Alex Douglas's attractiveness and caused a few focus participants to see her as 'evil':

Carla (F-52): I think the way they lit Alex throughout the programme made her look like a demon - the devil. The way she was lit up, she had that kind of look every time I saw her in the court building. And then they would show her as a sex symbol with her legs. That's what I picked up on. I really felt that they played up her character as...

Sandra (F-54): The villain.

Carla (F-52): The villain.

(Focus Group 8, Catholics)

Despite the glaring lighting that shines on Dr. Douglas throughout the programme, focus group participants could not help but recognize that the actor who played Dr. Douglas is a beautiful woman. Glamour and attractiveness is a double-edged sword for representations of women in science. As our earlier

report identified, showing female scientists as 'feminine' and 'attractive' could be seen as a positive challenge to 'manly'/'frumpy' stereotypes, or it could be seen as a way of undermining their professionalism and imposing an ideal of female scientists about appearance from which their male colleagues are free. It could also be argued that the emphasis on looks also takes the attention away from women's intellectual capabilities. There may also be a subtle interplay between representing 'good' and 'evil' female scientists, and how their femininity and sexuality is framed. We have noted in other research, for example, how journalists have drawn attention to the dress of an 'evil' 'pseudo' scientists by highlighting her dyed hair, 'excessive' make up and fishnet stockings, (Haran et al., 2008).

(h) Motivations

This theme explores the motivations of Alex Douglas in *If...Cloning Could Cure Us*. The issue of motivation is central to this drama-documentary's plot-line. The lawyers' opening statements ask audiences to consider Alex Douglas's motivations when determining her guilt or innocence. The prosecution argues that Alex Douglas should be found guilty because she undertook therapeutic cloning research to gain fame and fortune. However, the defence maintains that Alex Douglas should be found innocent because she was acting, out of necessity, to save the life of her patient, Andrew Holland (and, as noted earlier, she was at moments shown as passionate about her science and its potential benefits).

The creators of *If...Cloning Could Cure Us* said they tried to ensure that arguments supporting both motivations were equally weighted throughout the dramadoc. Most of the production team members said that they, themselves, believed Dr. Douglas had conducted the research influenced by multiple motivations. She wanted to gain notoriety and wealth, *and* she wanted to save the patient.

Despite the creators' effort to achieve balance, we would argue that the motivation of fame and money is more heavily emphasised throughout the programme. As we have discussed, Alex Douglas came across as cold and uncaring in her interactions with Andrew Holland, and this made it difficult for audiences to believe that Alex Douglas was acting in his best interests. As a result, the majority of focus group participants believed she was doing the research for fame, money or both:

Angela (F-56): ...I could see her wanting to win the Nobel Prize.

Marilyn (F-53): Yeah, I agree.

Lawrence (M-70+): She was considering herself!

Marilyn (F-53): And even when he bumped into her shoe, she had this special pair of shoes that were so...

Angela (F-56): Expensive. That's right.

Marilyn (F-53): So, it was showing she was very materialistic and you wondered whether there was material gain for her in the research.

Lawrence (M-70+): She needed a new BMW.

(Focus Group 20, Mixed Participants)

“it was showing she was very materialistic and you wondered whether there was material gain for her in the research”

Although the majority of participants believed that Dr. Douglas was undertaking the research for personal gain, there were also a substantial number of participants who resisted this theory. Some felt it was unlikely that Dr. Douglas was doing it for fame and money, but they did not specify other reasons for why they thought she was doing it. Other participants not only rejected the notion that Dr. Douglas was doing it for personal gain, they chose to believe the defence’s argument that Dr. Douglas was doing it to save her patient’s life. One man (who, himself had Parkinson’s) asserted: ‘Her motives were altruistic and genuine as far as I could see from the evidence that was presented’ (Focus Group 13). Another, himself a doctor, commented ‘they showed her as being truly passionate about helping her patient (Focus Group 18, M-56, Doctors). In fact most of the participants who made such comments were patients or doctors/scientists. This is probably because these groups of people have had positive personal experiences interacting with real-life scientists and doctors. However, it may also be because these groups of people have a vested interest in believing that Alex Douglas carried out the research for the right reasons. If patients believed that Alex Douglas was doing the research for altruistic reasons, they could support her, and thereby justify supporting therapeutic cloning that could potentially benefit them. Doctors and scientists also had an interest in supporting Alex Douglas because she acts as a fictional spokesperson for their profession.

Although the majority of focus group participants felt that Alex Douglas’s motives were exclusively for personal gain or exclusively altruistic, there were also a few participants who felt that it was a combination of both. These participants were usually doctors and scientists, who were speaking from personal experience – or, in one case, a research participant whose family included scientists. This participant, ‘Neil’, was a Catholic and whose sister is a scientist. He commented as follows.

“I think she was in a position that many people could find themselves, certainly in the medical profession, where they want to do what is absolutely right for the patient, but there’s also personal ambition to be successful. And it’s sometimes difficult to separate those two things because they are both driving forces within somebody in that profession. One needs the other to an extent and I think she was split between the two.”

He concluded:

“She was a very strong personality, so I think she wanted the research to be a success and the glory that went with it. On the other hand, I think she was probably a very genuine person and she wanted to do good things for people as well.” (Focus Group 7, M-60, Catholics).

Further to the motives offered in the programme, two participants introduced an alternative motive for Alex Douglas’s work, scientific curiosity. Both of the participants who suggested this motive were scientists and it was clear that they were attributing their own motives, for practising science, to Alex Douglas:

Charlie (M-61): *“I didn’t believe that her primary motive was to cure her patient...because I looked upon her as a scientist who’s working in the field that she’s passionate about. As scientists, we’re mostly passionate about the work that we do and I don’t think we’re looking for fame. I think we’re interested in solving problems.”* (Focus Group 16, Scientists).

Judy (F-54): *“I also think that she fell into the ‘bad scientist’ stereotype. This notion that we’re all megalomaniacs and that the only thing we want is fame and fortune, when in fact most of us are just plain nosy and inquisitive. And from that point of view, it was not a very realistic personification of a scientist I didn’t think.”* (Focus Group 15, Scientists).

“she fell into the ‘bad scientist’ stereotype. This notion that we’re all megalomaniacs and that the only thing we want is fame and fortune”

Focus group participants were therefore divided about the reasons why Dr. Douglas carried out therapeutic cloning research. The majority of participants believed that she was conducting the research for fame and/or money. However, participants who were patients, doctors and scientists were more likely to believe her motives were altruistic. This suggests that personal experience within the science or medical profession is an important variable in determining whether a viewer will accept the scientific motivations offered in a fictional scenario.

Our interviews with women scientists in our earlier research suggested that they wanted a range of motivation to be shown. *If...Cloning Could Cure Us* could certainly be read as showing some diverse motivations, depending on the audience. For some viewers, however, there was a danger of reinforcing the stereotype that that ‘we’re all megalomaniacs and that the only thing we want is fame and fortune.’

(i) Character identification

According to Smith (1995), character identification (or what he calls levels of engagement) can be broken into three processes: recognition, alignment and

allegiance. *Recognition* is when audiences perceive the body of a character and can identify it as belonging to a specific character (Smith, 1995: 82-83). *Alignment* is the way a programme provides audiences with access to the actions, thoughts and emotions of a character (Smith, 1995: 83-84). *Allegiance* is when audiences evaluate the characteristics of a character (e.g. actions, thoughts and emotions) that have been attained through alignment, and declares their sympathies either for or against the character (Smith, 1995: 84-85).

Most of the literature on identification focuses on third phase allegiance, but Smith (1995) argues that all three processes are necessary for identification to occur. The three levels of engagement differ from traditional definitions of identification (e.g. Cohen, 2001; Maccoby and Wilson, 1957) because they do not require that audiences replicate a character's actions, thoughts or feelings, only that audiences understand and evaluate the character's actions, thoughts or feelings. Having established Smith's (1995) definition of identification, we use his concepts to evaluate the ways in which *If...Cloning Could Cure Us* does, and does not, encourage audiences to identify with the woman scientist character.

In the dramadoc, it is easy for the audience to recognize the character Alex Douglas. The programme also allows for unproblematic alignment, during which the audience gains insight into Alex Douglas's actions, thoughts and feelings. For example, we have already discussed how the show renders Alex Douglas as detached and unkind in her dealings with others; these interactions with others then provide insight into Alex Douglas's motives. Using this alignment information, focus group participants were able to evaluate Alex Douglas and decide whether or not they were in allegiance with her.

The majority of focus group participants did not feel allegiance with Alex Douglas:

Luke (M-60): She came across as a bit of a bitch I thought.

Fred (M-65): The word is feisty, Luke.

[group laughs]

Luke (M-60): Is it? I thought she'd sell you down the river you know. There was the mention of the shoes and that sort of thing.

(Focus Group 7, Catholics)

"She came across as a bit of a bitch..."

Rachel (F-30): ...I don't think the scientist came across as a particularly likeable person ...

William (M-51): I think she got less likeable as time went by.

Rachel (F-30): Yeah.

William (M-51): You saw the hard, determined-to-get-publicity scientist after a while.

Moderator: What aspect of the programme brought that out for you?

William (M-51): I can't remember.

Thomas (M-46): The way she reacted to her shoe being damaged after he rode over it.

(Focus Group 17, Clinical Geneticists)

Both of these excerpts (as well as several used earlier in this chapter) suggest that the scene, where Andrew Holland runs over Alex Douglas's shoe with his wheelchair, acts as a crucial piece of alignment information. In six focus groups, participants indicated that that this scene prevented them from identifying with Alex Douglas. While other focus groups discussed how Alex Douglas's uncaring personality prevented them from identifying with her, but did not mention the shoe scene explicitly.

One focus group participant acknowledged that her group's anti-identification with Alex Douglas was particularly marked because Alex Douglas is a woman that is unkind, ruthless and ambitious. Ginny (F31) said, '...if the doctor was a man I can see that we'd be different then. We're judging her because she is a woman...' (Focus Group 3, General Public). This comment triggered a couple of participants in Ginny's group to discuss a moment in the dramadoc where they briefly identified with Alex Douglas.

Linda (F-59): She wasn't *completely* ruthless, because she wouldn't go as far as to bring in the fact that she'd had an affair with that man. She obviously had some scruples because she wouldn't put his marriage at risk in that respect.

Abigail (F-52): That was the one sort of redeeming thing that seems to stick out in my mind. I thought she was built up to be very unsympathetic and they just chucked in that one part (Focus Group 3, General Public).

“She wasn't completely ruthless...”

In this example, the key piece of alignment information is the scene where Alex Douglas refuses to expose Rob McVeigh's extra-marital affair in order to undermine his credibility on the witness stand. This triggered Linda and Abigail's temporary allegiance to Alex Douglas. However, these two participants' allegiance to Alex Douglas was the exception, rather than the rule. Most participants did not identify with Alex Douglas.

Jason Sutton, the writer of *If... Cloning Could Cure Us*, said that he purposely wrote the script in a way that would *prevent* audiences from forming an allegiance with the character. He believed that audiences' inability to identify with Alex Douglas would add balance to the programme:

“It was deliberate...I didn't want to be accused of swaying the argument. I could have made her wonderful, but then I would have been accused by the 'no' camp of trying to emotionally manipulate the audience and I didn't want to do that. I

wanted the arguments to speak for themselves...I wanted people to address the argument, not the characters.” (Sutton 2007, Interview).

As already discussed, the actor Jennifer Calvert also deliberately downplayed the character’s ‘feminine’ attributes (e.g. caring and sociability), in an attempt to ensure that Alex Douglas’s personality would not unduly influence the audience (Calvert 2007, Interview).

Despite Jason Sutton and Jennifer Calvert’s best efforts, however, focus group participants felt that Dr. Douglas’s depiction biased the programme. In trying to ensure that audiences would not overly identify with Dr. Douglas, the creators of the programme may have gone too far in the opposite direction and created a character that was perceived as ruthless. Several focus group participants felt that this portrayal biased the drama portion of the programme against therapeutic cloning, or against an innocent vote:

Joshua (M-31): *“The programme was quite heavily stacked against therapeutic cloning; I mean the doctor didn’t come across as a particularly sympathetic character.”* (Focus Group 5, General Public).

Alyssa (F-19): *“I think generally it was quite evenly balanced, but...if there was any kind of swaying it would probably be through the doctor character. I think they portrayed her as very much the sort of business woman, possibly out for her own gain. I thought this came across a bit in either the way the actor played the character, or the way the script was written. I’m not quite sure, but that’s something that occurred to me.”* (Focus Group 9, Catholics).

***“...they portrayed her as very much the sort of business woman,
possibly out for her own gain”***

These comments illustrate that character identification is an important device in maintaining balance throughout a drama-documentary. Too much identification with a character can potentially sway the programme one way, while too little can sway the programme in the opposite direction.

(j) The image of science

So far we have focussed on how the female scientist was portrayed in the programme. However, our earlier research showed that women in SET were also concerned about how science itself was portrayed. The goal of this section is to explore how the in-depth portrayal of Alex Douglas, in *If...Cloning Could Cure Us*, might contribute to some of the images and myths surrounding science. Flicker (2003) writes:

“The cliché description of ‘mad scientists’ does not apply to women scientists. They do not work in hidden laboratories on dubious projects but rather, remain

solid 'with their feet on the ground.' Female characters in feature film do not contribute to the build up of negative myths surrounding science" (316).

This description does not apply to the female scientist in the programme *If...Cloning Could Cure Us*. Although Alex Douglas is not necessarily a mad scientist, she is a maverick scientist whose characterisation can be connected with both negative and positive images of science.

We have already discussed how the programme emphasises personal gain as one of Alex Douglas's motives. This presents an image of science as opportunistic, where the main goal is to achieve wealth and notoriety. For the minority of focus group participants who chose to believe that Alex Douglas's motivations were altruistic, however, science can be seen as a noble profession with the main goal being to help others.

Another image of science that is strongly depicted in the programme is the notion that science is out of control. Several focus group participants acknowledged this image of science. Linda (F-59) said:

"... I think the programme was about the advancement of science. Scientists and medical people get tangled up in wanting to go further and push the boundaries of science. So even if the law says 'no', there is always someone who wants to go that one step further." (Focus Group 3, General Public).

A few participants saw pushing boundaries as a good thing, while others strongly disagreed. Interestingly, this discussion became particularly heated in a discussion between scientists:

Ed (M-55): The expert at the end said, "I agree she was guilty and that was the law, but I think she was a great pioneer of science." And I think many of us would probably feel that way...I think it's the people that push the boundaries that make science work.

Victoria (F-36): Yeah, I totally agree with that....I think her actions were absolutely essential.

Gregory (M): That's interesting. I vehemently disagree with that!

Judy (F-54): Me too!

Gregory (M): I think you would absolutely undermine the whole of science if you did that...

Victoria (F-36): Oh, I wouldn't do it myself, at all. I completely agree.

Gregory (M-44): I think just condoning it is just deplorable!

(Focus Group 15, General Public)

In the interviews, when the creators of *If...Cloning Could Cure Us* reflected on the programme, several of them said that the idea of scientists taking the law into their own hands is probably an unrealistic representation of the profession. The programme's researcher, who has a degree in life science, said:

"I wonder whether the programme was slightly far-fetched [laughs]. I don't think a real scientist would probably push it that far. They wouldn't break the rules to that extreme because they would risk their whole career and the rest of their research. I think it would have to be quite a maverick scientist to do that." (McCall 2007, Interview).

Dr. Stephen Minger, a highly respected stem cell scientist and scientific advisor for the programme, said he would have a difficult time breaking the law and risking his career like the female scientist in the programme. However, he did list a few female scientists who have pushed the boundaries of science:

"Hui Sheng is my friend from Shanghai who created a huge uproar a few years ago when she did the rabbit-human interspecies work. She is a woman and she has run into shed-loads of trouble in Shanghai because she's not Chinese; she's not playing 'the game' in the appropriate Chinese fashion. Yet when you meet her, she's very small, very quiet and does not seem like a maverick, but she is... I'd say it's probably not the norm, but there are scientists out there like that." (Minger 2007, Interview).

If...Cloning Could Cure Us reminds audiences that there are maverick scientists who are willing to 'push the boundaries' of science at all costs. However, as a few focus group participants pointed out, it also reminds audiences that science is heavily regulated and that there are consequences for taking science too far.

Further to the image of science pushing boundaries, this drama-documentary also presents the idea that science can be in direct conflict with ethics. The scientific argument that human cloning is necessary to treat incurable diseases, is at odds with the ethical argument that it is unacceptable to kill a human embryo in order to save a life. According to Weingart et al. (2003), the image of science pitted against ethics is a common theme in film. They write, 'In just more than one-half of the films (51%), ethical values are challenged and undermined and are in direct conflict with the science portrayed in the respective storylines' (Weingart et al., 2003: 258). Weingart et al. (2003) says that films about medical research are the most likely to pit science against ethics (283, 285).

A final image of science in *If Cloning Could Cure Us* is that scientific knowledge is gained through experimentation on humans. The programme does not give any indication that Dr. Douglas has undertaken extensive research on animals prior to carrying out a controversial new procedure on a human patient. A couple of focus group participants, who were scientists and doctors, had a problem with this image of science. Allison (F-26) said:

"One thing I found a bit unbelievable is the lack of animal testing. In research you generally go through a number of different mechanisms, like animal trials. Here it was like they were going from the Petri dish to the patient, with no sort of testing

of this treatment. I think it gives the public an unrealistic idea of how research works and how we come up with treatments." (Focus Group 18, Doctors).

According to Weingart et al. (2003), this is a common image of science in film. Weingart et al. (2003) look at ways scientists gain their knowledge in film (e.g. field research, animal testing, experimentation on humans, accidental discovery, genius, etc.). They say that medical research is most likely to be associated with experimentation on living objects and genius (Weingart et al., 2003: 284). In the case of *If... Cloning Could Cure Us*, however, Dr. Douglas's knowledge was gained through human experimentation and ambition.

3.6 Conclusion

The goal of this chapter was to examine the way *If...Cloning Could Cure Us* represents women scientists. To do this, we examined the programme itself, spoke to those involved in producing it, and held 'showings' of the programme followed by group discussions.

This three level analysis highlights the complexity of how meanings and representations are produced and consumed. Those involved in producing a programme may intend one (or several conflicting) things. The text itself may include competing ideas and tensions. Different audiences may then consume and construct the representations in diverse ways. Any discussion of the 'meaning' of a programme needs to take into account these complexities. Simplistic talk about the 'real' meaning of a programme is not necessarily a useful way to review a programme or critically engage with either producers or consumers.

Our analysis has highlighted the complex levels of meaning (negotiated by the production team, encouraged by the text, and created in the interaction between text and audience). We would highlight three points.

Firstly, this case study draws attention to the absence of images of female scientists in the programme we examined, apart from the main dramatic character of Dr. Alex Douglas. The production team told us that the real-life women scientists they approached did not want to take part in *If... Cloning Could Cure Us*. These women, along with some of their male colleagues, had concerns about the speculative nature of a programme that blends fact and fiction. The relative absence of women scientists from the dramadoc, apart from the central role, is a pity. As the previous chapter on film and TV drama indicates, having more than one scientist is particularly useful in *Silent Witness* (see also the importance of different female SET characters in *Star Trek Voyager*, Roberts, 2000).

Secondly, this case study highlights some of the dilemmas around representing women in positions of seniority and as operating in a 'man's world'. In *If...Cloning Could Cure Us*, Alex Douglas is presented as a highly respected stem cell

scientist. This is a positive representation for women scientists in so far as it shows that women can be just as successful as men in science. However, the way in which this success was represented was perhaps rather utopian, rather than reflective. As the *IF* series editor said 'It's a fifty-fifty chance of choosing a man or a woman, especially since it's about the future. One thing we know about the future is that women are becoming more powerful (Downes 2007).^{xv} The idea that we 'know' women are becoming more powerful in the future fits with some other research conducted for the *IF* series. However, it does not fit with much of the evidence collected around SET in general. Even 'futuristic' media imaginings could usefully engage with the challenges that might still face women in the field.

Thirdly, this case study raises some interesting issues in relation to the debate about portraying 'feminine' characteristics. Our earlier research indicates that women scientists disagree about the extent to which the media should emphasize the feminine attributes of women scientists (Kitzinger et al., 2008a: 31-34). Some felt it was important to show female scientists as feminine, other felt that this reinforced sexism and imposed a double-burden on career women. There was also some debate about the extent to which media producers should play up the idea that women are on the 'emotional' and 'caring' side of science. In this case study various key players involved in the creations of the programme opted to downplay the feminine attributes of the woman scientist, Alex Douglas – at least as far as 'feminine' attributes such as 'caring' were concerned. This approach is applauded by some campaigners for equality in SET. In one discussion with campaigners in this field, for example, a proposal was made to encourage script-writers to experiment by simply reversing the gender of all their characters after a script had been completed. Unconscious sexism in the text might then be challenged.

However, our audience work reveals the unexpected consequences of such a 'gender-neutral' or 'gender-inversion' approach. Sexist assumptions are not simply 'carried' in scripts, they may be 'introduced' by audiences. A double-standard can come into play whereby a man who behaves in a particular way, for example, is seen as powerful and assertive. A female character, cast in the same role, with exactly the same speeches, might be seen as 'aggressive' and 'a bitch.'

In *If...Cloning Can Cure Us* the decisions to remove Alex Douglas's feminine characteristics (e.g. sociability and caring) came at significant cost to sympathy with the character. Alex Douglas was perceived by the majority of focus group participants as a ruthless career woman, who was only concerned with personal gain. Alex Douglas's cold and detached personality tended to overshadow her more positive traits, such as intelligence. Focus group participants rarely mentioned her intellect or described her ambition in a positive light. These findings present some complex challenges for how to portray women in SET in fiction.

Any recommendations have to bear the above points in mind, however, it is still possible to reflect broadly on a few key points and offer our recommendations for future representations of women scientists. Our overall recommendations are presented in Chapter 5.

Chapter 4: Representing women in SET in documentary

4.1 Introduction

In this chapter we turn our attention to how women in SET are represented in documentary television. Documentary is an important area of study because it represents one of the most traditional and high-prestige formats for science on television. Documentaries were also one type of programme identified by our interviews with scientists as particularly important and potentially inspiring and encouraging (see Kitzinger et al., 2008a). One scientist we interviewed, for example, said she most enjoyed; ‘Something that is non-fiction, and is factual and documentary [...] and not something dramatic and made up’ (Interviewee 13). Another, a young undergraduate, simply said she found documentaries inspiring to watch because: ‘I like real people’ (FG3,P2) while a third commented: that documentary formats: ‘tend to portray the women more as *people* as opposed to characterisations that have flaws’ (Interviewee 2). Documentaries, therefore, could be an important source of role models. They might encourage women training and working in SET and help to ensure that women in SET are taken seriously.

Our case study focuses on *Horizon* - BBC2's flagship 50-minute science documentary series launched in 1964. We chose to study *Horizon* because it is a classic and long established programme with international reach. It is shown on BBC2 weekly during the series run, usually at 9pm on Thursdays. It is also then shown on BBC World (abroad) and cable (UK Horizons). Although it focuses heavily on science is aimed toward a general audience, not a scientific community.

Our analysis of this programme is presented as follows:

- Firstly, we briefly define what constitutes documentary and reflect on some key characteristics.
- Secondly, we outline the research methods used to analyse the programme and also present a basic overview of the *Horizon* series - highlighting and the number of male and female scientists represented in the series.
- We then present detailed findings based on a close reading of 10 episodes featuring female scientists. We present a basic *quantitative* introduction, examining the gender of scientists involved, the narrators and the programme producers. Then we turn to analysing *key themes* such as the share of narrative time allocated to women, how hierarchies are represented, the portrayal of relationships between scientists and non-scientists. We also reflect on the issue of appearance and the representation of science in general.
- We conclude by reflecting on what these findings mean for the representation of SET and gender in documentaries such as *Horizon* and

how the documentary genre compares to other types of media representation.

4.2 A reflection on the status and form of documentary

The television genre of documentary has long been a popular television form dealing with social concerns (Corner, 1996), and has consistently included science topics. It holds a privileged position within society, a position maintained by documentary's claim that it can present the most accurate and truthful portrayal of the world. Documentary has a dual status as a medium of artistic expression and a means of recording reality, and representing authority, which allows for claims to truth.

However, the medium's inherent tension between image and reality still remains troubling for documentary makers and critics. At the very least the documentary offers a highly selective and edited version of the world. Few documentary commentators subscribe to the idea that programmes are simply neutral windows through which viewers are presented with contemporary concerns (Corner, 1996). The 'window of the world', which documentaries provide are not transparent but tinted (mediated) and provide specific fields of vision.

The 'drama' of many contemporary documentaries is evident in narrative devices, such as the way a story is often told as a detective drama or adventure narrative of science. It is also evident in the use of special effects, dramatic reconstructions or even cuts from movies (e.g. a documentary about dinosaurs using clips from *Jurassic Park*). However, even the most 'straight-forward' documentary is not pure 'fact' and must construct certain versions of reality which presents a particular version of 'scientists' and tells a story about 'Science'

The selection of experts to appear on the programme, for example, is one key way in which the documentary reflects, and represents, ideas about authority. The documentary conveys messages about the nature of relevant expertise, and tells us *who* the appropriate experts are in any given field (including messages about gender). The documentary producers also make choices about how these experts are portrayed, and how their interviews edited and inter-cut with each other and framed by the narrative.

The role of the narrator-presented is also significant. The narrator may present a strong initial exposition, introducing the topic, highlighting its worthiness and indicating the direction in which the programme will proceed as well as leading viewers through the programme and summarising the conclusion (Nichols, 1991; Corner, 1996). Often invisible on screen, the narrator none-the-less is an important voice of authority in the documentary acting as a 'detective' or 'guide' in the narrative and introducing the diverse experts who appear.^{xvi}

4.3 Method

This chapter is based on a narrower research approach than the two previous chapters. We focussed on analysing the programmes (10 episodes); we did not have the time or resources to examine the audience reception of the programme, although we were able to learn a little about the production process through interviewing Andrew Cohen, Editor of *Horizon*.

4.3.1 Sampling strategy

We identified all *Horizon* episodes broadcast in a six month period (January to June 2006). We selected this time period to match the time period for which we already conducted an analysis of press coverage.^{xvii} We identified 47 programmes which had been broadcast during this time period and, in 33 cases, full transcripts of the programme were available.

- We started by doing a basic *quantitative* analysis of the 33 transcripts of *Horizon* programmes broadcast from January to June 2006 in order to identify when male and female scientists were used.
- We then focussed in on ten episodes for detailed analysis.

The ten programmes in the qualitative sample include eight which had transcripts and two without. The ten episodes chosen detailed analysis were selected on the following basis:

- They had to include at least one female scientist (and preferably more than one) thereby allowing for as much analysis as possible about how gender played out in the programme
- They fell into one of a range SET categories which had been the focus of our press analysis because they covered one of a range of SET areas related to science (stem cells and human health care), engineering (space and transport) or technology (computer and interconnectivity)

In practice there were no *Horizon* programmes about computing – so our final sample consisted of the ten programmes in various areas of SET indicated in Table 4.1.

Table 4.1 Basic details of the 10 *Horizon* documentaries analysed

Title	Area of SET	Date	Time	Channel	Original air date
Who's Afraid of Designer Babies?	Human health care	01/01/06	21:00	UK Horizons	24/02/05
Waiting for a Heartbeat	Human health care	19/01/06	21:00	BBC2	19/01/06
Parallel Universes	Space	31/03/06	16:00	UK Horizons	14/02/02
What Really Killed the Dinosaurs?	Palaeontology	31/03/06	17:00	UK Horizons	*
The Mystery of the Jurassic	Palaeontology	25/04/06	11:10	BBC 2	28/03/02
Earthquake Storms	Seismology	03/05/06	10:40	BBC 2	01/04/03
The Woman who thinks like a Cow	Human health care	08/06/06	21:00	BBC 2	08/06/06
The Secret Life of Caves	Geology	13/06/06	11:00	BBC 2	03/04/03
Secrets of the Star Disc	Archaeology	20/06/06	11:10	BBC 2	29/01/04
The Mystery of Easter Island	Archaeology	27/06/06	10:30	BBC 2	09/01/03

* We were unable to trace the original date on which the programme was aired.

4.3.2 Analysis method

A basic analysis of the 33 episodes of *Horizon* was pursued in order to establish how many men and women were used as experts in the programme. This simply involved identifying the speakers in each transcript (and, if necessary, Googling their names to confirm their gender).

Our more detailed analysis of *Horizon* focused on the selected 10 episodes in which female scientists featured. We began with a basic examination of the gender profile of the 10 episodes – not only examining the gender of the different scientists involved, but also recording the gender of the *narrator* and the *producer* of the programme. We also recorded the *area of SET* in which each female scientist worked.

Having mapped out the basic parameters of the 10 episodes of *Horizon* we then proceeded to conduct an in-depth *qualitative* analysis. This involved repeated viewings of programmes, note taking, the identification of main themes and writing a plot synopsis. Material viewed was then analysed according to thematic categories developed earlier in the research to study television dramas and

feature films (see Chapter 2, for a full description of how these thematic categories were developed).

The themes analysed were as follows:

- casting and share of narrative time;
- represented hierarchies;
- the 'battle of the sexes';
- scientists and non-scientists;
- gender, emotion and rationality;
- gendered career and life course issues.

In addition to these categories, our analysis also explores the themes of appearance and the overall image of science presented in the series.

4.4 Findings

4.4.1 The quantitative analysis of 33 episodes: the gender-balance of experts used

Our basic quantitative analysis of the 33 transcripts of episodes broadcast in the first six months of 2006 showed that 13 programmes exclusively used *male* scientists on screen; 18 included both male and female scientists; *none* of the programmes had only female scientists.

There were 13 *Horizon* programmes which exclusively used *male* scientists, 18 included both male and female scientists; *none* exclusively used female scientists

Overall *Horizon* used 221 male scientists on screen and just 37 female scientists – i.e. six male scientists appeared for every one female scientist.

Six male scientists appeared on *Horizon* for every one female scientist

The male-domination evident in documentaries was noted by some of our research participants for our earlier research. As one trainee commented:

“I like watching documentaries [but...] they do all seem to be male professors. It would be nice to see women professors in these documentaries, and I wonder if there are not in them because people take men more seriously.” (FG 4: P2)

“I like watching documentaries [but...] they do all seem to be male professors. It would be nice to see women professors in these documentaries”

We were able to ask Andrew Cohen – Editor BBC *Horizon* – about our findings. He was not surprised by the figures. He commented:

"I am not surprised by that at all. [...] . You know it's our job to tell the story the best way that we possibly can. [...] we have to find the best people to tell the story, the people who have made the most interesting discoveries, the most interesting work."

If an area of science is dominated by men, then, he argued, this will be reflected in the programme: 'we can't balance out male and female scientists purely for the sake of it. We have to put the best people on screen.'

He added, however, that the *Horizon* team were very aware that they also:

"want to put positive sort of images of women in science on screen and it is important for us to keep a balance as much as we possibly can. So we push ourselves if we can, but it is not always as easy as we would like."

His comments echo closely the remarks made by press officers whereby the 'best person for the job' criteria explains the predominance of male experts used by the media, and this is seen as a fairly intractable barrier to achieving a more 'balanced' representation of gender. (See Boyce and Kitzinger, 2008).

One way forward here, of course, is to ensure that there are more women in top jobs and recognised as having made 'interesting discoveries' (and hence of interest to the media).

Another way forward would be to look at the nature of programmes (e.g. could the media make interesting programmes about those lower down the hierarchy, which would open up a pool of more diverse people).

A third way forward might be to examine the topic of programmes. Some topics, might lead to more women (both in front of, and behind, the camera). For example, Andrew Cohen noted:

"For instance we've made a film about miscarriage in the past, that it was felt (in discussion with the doctors that we were making it with) that potentially having a female team may be easier for the contributors than having a male person."

Selection of topics for programmes for *Horizon* was based on two criteria: 'Is this an *important* science story' or is it 'a *relevant* science story' – i.e. of interest to viewers. It is a mix of those two criteria that I am looking at for commissioning films'. He added that this had influenced *Horizon* making a film about the cosmetics industry, a film, which involved female scientists and attracted a larger than usual female audience. 'Some would say maybe it's unimportant' science, comment Cohen, but it was certainly judged as 'relevant'.

We would conclude this section by noting that, given the express interest many press officers and producers assert to take note of 'gender balance' it would be good for media producers and press officers to share the strategies they have developed to 'push' for more positive representation of women in the face of gender-imbalances within SET and to think laterally around this issue. Organisations seeking to promote women in science could also think about the kind of creative ideas they might offer up to documentary makers and the networks and liaisons that might be built for the future.

4.4.2 A basic quantitative profile of the 10 episodes

In this section we now focus on our more in-depth analysis of the 10 selected episodes featuring female scientist. Our quantitative analysis produces a basic profile of our sample. It shows that 77 scientists made expert comment in the 10 *Horizon* documentaries: 21 were female and 56 were male. Three of the episodes were narrated by women, seven by men. Four of the programmes were produced by women, five by men, and one by a male and female producer.

This analysis also highlights an interesting pattern (consistent with our findings from work on newspaper journalists too): female media workers are more likely than their male counterparts to involve female scientists.

Table 4.2 shows that women producers in this sample were more likely than their male counterparts to use female experts. Two of the programmes produced by female producers '*Secret life of caves*' and '*The woman who thinks like a cow*' have the greatest number of female scientists (6 and 3). The 4 women producers used 12 female scientists and 19 male scientists, the 5 male producers used just 8 female scientists and 31 male scientists. (We have excluded the one programme produced by a male-female team from this analysis).

We also recorded the area of SET in which each female scientist worked. Table 4.3 is the list of names and titles of female scientists who made expert comments in the programmes. The women shown in *Horizon* – in the 10 we analysed – had a range of specialisms including: Biology, Geology, Archaeology, Palaeontology, Plant ecology, Seismology, Physics, Biochemistry, Neurology, Psychology and Reproductive health. Although this displayed a diverse range of fields, most women who appeared on *Horizon* worked in areas more commonly understood as 'feminised' areas of SET. This finding is in line with other studies of women in SET which found that women in science are more likely to work in (and be represented as working in) certain areas such as medical sciences, biology, biochemistry and not physics, engineering (Kitzinger et al., 2008b; Women and Work Commission, 2006). Even in these fields, however, the men are better represented than women, in spite of the fact that their may be little gender imbalance in the fields as a whole (although men are still better represented at senior level – a fact which may, in turn, impact on representation in outlets such as documentaries which value senior figures) (See Kitzinger and Boyce, 2008).

Table 4.2 Number and gender of scientists and media producers

Title of programme	No. of female scientists	No. of male scientists	Gender of presenter/narrator	Gender of producer
Who's Afraid of Designer Babies?	2	9	F	F
Waiting for a Heartbeat	1	4	M	F
Parallel Universes	1	7	F	M
What Really Killed the Dinosaurs?	2	5	M	M
The Mystery of the Jurassic	2	6	M	M
Earthquake Storms	1	6	M	F and M
The Woman who thinks like a Cow	3	3	F	F
The Secret Life of Caves	6	3	M	F
Secrets of the Star Disc	1	7	F	M
The Mystery of Easter Island	2	6	M	M
Total	21	56		

Table 4.3 Name, title and field of female scientists appearing in documentaries

Title of documentary	Area of SET of scientist
Secret life of caves	
Professor Diana Northup	Biology
Professor Penny Boston	Biology
Professor Carol Hill	Geology
Dr Anna-Louise Reysenbach	Biology
Professor Louise Hose	Geology
Dr Annette Summers	Geological/biological science
Secret of the Star Disc	
Professor Miranda Aldhouse-Green	Archaeology
The Mystery of the Jurassic	
Dr Adriana Lopez-Arbello	Palaeontologist
Professor Judy Parrish	Plant ecology
The mystery of Easter Island	
Dr Jo Anne Van Tilburg	Archaeologist
Professor Erika Hagelberg	Biology
Earthquake storms	
Dr Susan Hough	seismology
Parallel Universe	
Lisa Randall	Physics
Who's afraid of designer babies?	
Dr Joyce Harper	Biochemistry/genetics
Professor Alison Murdoch	Reproductive medicine
What really killed the dinosaurs?	
Professor Gerta Keller	Geology
Claire Belcher	Geology
The woman who thinks like a cow	
Dr Temple Grandin	Animal science
Professor Nancy Minshew	Neurologist
Dr Francesca Happe	Psychology
Waiting for a heartbeat	
Professor Lesley Regan	Clinical professor

4.4.3 Qualitative analysis by theme

The quantitative analysis summarised above gives an overall impression of the gender-balance in representations. However, only qualitative analysis can reveal how women were represented. Our qualitative analysis allows us to discuss *Horizon* in relation to the following themes.

(a) Casting and share of narrative time

It is arguable that the order in which people appear and the amount of time they are allocated to speak in a programme can be utilised to give a sense of their place in the real world. For instance leading scientists tend to give expert comment first in a programme whilst others speak much later. In our study we looked at how this was played out in documentaries by analysing how male and female scientists were cast and their share of narrative time in the programme. 'Casting' is a concept taken from analysing film or drama. It was adapted for documentaries to analyse the order in which the scientists spoke in the programme. This adaptation is necessary as there were no credits shown at the beginning of the programme indicating the lead character (as is normally the case with dramas and feature films). The analysis revealed that – once they are included in a documentary - women scientists were just as likely as their male counterparts to speak first. Female scientists gave expert comment first in five of the programmes and male scientists were introduced first in the other five.

There was also no significant difference in the number of words spoken by individual female and male scientists. However, male scientists overall were apportioned more narrative time than their female counterparts in almost all the documentaries, because there were only 21 female scientists from a total of 77. In most of the programmes men outnumbered women scientists except in the programme entitled '*Secret life of caves*' which had six female scientists and only three men (the only *Horizon* episode in our entire sample with this sort of gender ratio).

(b) Represented hierarchies

The approach to analysing 'represented hierarchies' was adapted from the approach used in our drama/film analysis to accommodate the usual mode of presentation of a topic in science which is narrative, linear, expository and didactic. The course of the programme alternates between voice-over and 'talking head'. Although sometimes drama conventions are used, a talking head is a way of saying 'this is brought directly to you without distortion or mediation'. This form of presentation is usually reinforced by racks of test tubes, a white lab coat or other apparel, or an impressive piece of apparatus directly behind the talking head. Hierarchies represented in *Horizon* were firstly analysed by assessing the order in which the scientists made expert comment in the programme as well as the length of time they spoke. The hierarchies presented in the *Horizon* episodes were quite varied as both men and women scientists are presented in senior positions such as professors and leading experts in their fields of science. In some instances the language used by the narrator to describe scientists explicitly endorses the fact that they are leading figures in the area. In '*Waiting for a heartbeat*' the key female scientist, Dr Regan is referred to as 'the world's leading expert' in the field. In the documentary '*The woman who thinks like a cow*', Dr. Temple Grandin is described as 'the king' in a man's world and is said to have 'rock star' audience in the area of animal science.

However, in some instances there were some interesting gendered divisions of labour between male and female scientists. Women scientists are mostly shown *explaining* the science whilst their male counterparts are more hands-on and leading projects. Men were filmed either working in the lab or in the field more often than female scientists (there were 2 men to every 1 woman portrayed working in the lab and field). Women scientists were more likely than their male counterparts to be depicted as ‘talking heads’ (26% vs. 14%). In the episodes ‘*Who’s afraid of designer babies?*’ and ‘*Waiting for a heartbeat*’ male scientists are shown conducting experiments or engaging with patients whilst women mainly made comment direct to camera. This could be interpreted as positioning women as experts. Alternatively it might be seen as reflective of the current trend in science where women have taken the lead in communicating science to the general public – with all the dilemmas that might involve (See Reports 1 and 2, Kitzinger et al., 2008a and b).

(c) Battle of the sexes

This theme is one of the ways in which relationship of gender to power are investigated – and is a prominent theme in fiction (See Chapter 2). In the ten *Horizon* programmes analysed, however, only two documentaries play out any scenes which might suggest a ‘battle of sexes’ – and both of these were debatable. The two scenes in question appeared in ‘*What really killed the dinosaurs*’ and ‘*Mystery of Easter island*’.^{xviii} In the documentary ‘what really killed the dinosaurs’ there is a disagreement between male and female professors about what drove dinosaurs to extinction. A female professor (Gerta Keller) makes a discovery that challenges all previous theories about what really killed the dinosaurs. Her discovery is not well received by male professor (Jan Smit) and is said to be ‘based on arguments which are barely scientific’. Gerta Keller is portrayed as a ‘maverick’ who is said to have ‘sparked one of the bitterest scientific controversies’ in the study of the Jurassic. The programme producers inter-spliced cut sections of interview with the male and female scientist in this case to create the sense of a face-to-face argument. They also used a scene of two dinosaurs engaged in battle (locking horns) immediately before the scientists’ confrontation and repeated again mid way through the argument.

Narrator: Gerta Keller’s work provoked a major scientific clash. Defenders of the old impact theory attacked her ideas. The argument quickly turned vicious.

Jan Smit: Gerta Keller’s totally wrong.

Gerta Keller: Jan Smit has an awful lot at stake.

Jan Smit: What she is doing with the evidence makes me totally mad.

Gerta Keller: Jan Smit says the things he does because he is desperate.

Jan Smit: Sometimes its not evidence, sometimes its not fact.

Gerta Keller: Desperate to rescue his impact Tsunami hypothesis.

It is notable that the male scientist working with Gerta Keller is not personalised in the same way – or placed in direct confrontation with the other male scientist - Jan Smit.

A similar editing device is employed in the documentary '*The mystery of Easter Island*' leading female scientist disagrees with a male professor on how statues were transported from the quarry to various parts of the island:

Narrator: And there's been no more fiery debate between archaeologists over the years than the question of how they did it.

Jo Anne Van Tilburg: Logic dictates that they were moved in a horizontal position. That's the easiest, the safest way.

Charlie Love: I think they moved these colossal statues upright.

Jo Anne Van Tilburg: The best way to move a figure is the way we did it.

Charlie Love: Legends say that they walked.

Jo Anne Van Tilburg: I don't see anything within a Polynesian tradition that would have suggested large, heavy objects moving upright.

Charlie Love: Moving them upright I think was the answer.

The result of such splicing was to create the impression of a bitter inter-personal battle and a 'his' and 'hers' science. We do not know, however, if similar splicing in other *Horizon* episodes presented men struggling with each other in this way too. Even if such devices are used to represent conflict between scientists regardless of gender such scenes might, however, be problematic. On the one hand, such scenes certainly produce an image of science involving uncertainty and disputes (possible a good thing). However, on the other hand, such representations of personalised and bitter fights create an image, and may reflect a reality, in science identified as disempowering and problematic by some of our interviewees in our earlier research (see Report 1, Kitzinger et al., 2008a).

(d) Scientists and non-scientists

This category was used to investigate whether the relationships portrayed draw on stereotypes of scientists or whether other narrative rationales are provided for conflicts between scientists and non scientists. In the case of documentaries this criterion was adapted and used for analysis in terms of the settings in which scientists were shown.

There was minimal interaction in the *Horizon* episodes between scientists and non-scientists except in health related programmes such as '*Waiting for a heartbeat*' and '*Who's afraid of designer babies?*'. In these programmes the interaction between scientists and non-scientists was mainly clinical. Real life patients share their experiences with the audience and take us through a journey in pursuit for explanations of their medical condition. Scientists are presented as caring professionals with skills and technology to intervene successfully. Patients are depicted as 'grateful' because they are able to understand their condition better and believe that scientists will make a positive intervention.

We also examined the setting in which scientists were shown. Most of the scientists were depicted in science work areas such as laboratories, clinical and in the field. However, female scientists were less likely than men to be shown

outside the work environment. Even when women scientists are shown in other environments they are either in an office, classroom, a public gathering such as a conference or it was not always possible to determine where as the setting was not clear. The only exception in the entire sample was of a female scientist in *'Parallel Universes'* who was shown outside a science environment. She is shown climbing a wall in a gym as she explains the theory of gravity.

Male scientists were more likely than women to be shown in places totally unrelated to work. For example, in the programme *'Who is afraid of designer babies'*, a male scientist is shown engaging in karate, whilst the narrator voiced over the challenge involved in gaining government endorsement to inject cells into an unborn child. In another entitled *'Parallel Universes?'* a male physicist is shown dancing on ice whilst he explains a physics phenomenon. In *'Earthquake storms'* a male seismologist is shown in his living room and in the city centre whilst he talks about the possibility of an earthquake in Istanbul.

Interpreting this finding raises some interesting questions. It may relate to our earlier findings that men do not have to prove either their masculinity or their status as experts in SET. Women, on the other hand, have to prove both their femininity and their expertise. The portrayal of men in diverse settings could suggest their (and the programme producers') comfort in the men's professional status to the extent that they need not be confined to a science setting for their expertise to be recognised. Perhaps, women on the other hand need to be in science settings to authenticate their status as scientists.^{xix}

(e) Gender, emotion and rationality

Some feminists have criticised the binary oppositions Man/Woman, Rational/Emotional, and in this category we were interested to explore the ways in which these oppositions were deployed. However, in *Horizon* there is little or no opportunity to play out emotion as most of the documentary is based in a work place. Science is the focus of the programme and not the scientist; therefore there are few opportunities to play out stereotypes around these dimensions.

It is worth mentioning that although there were limited opportunities to analyse how gender, emotion and rationality are played out in *Horizon*, one exception was in the episode: *'Secret life of the caves'*. In this documentary women are depicted as being very passionate about their work. One of the female scientists expresses how awesome it is to come across such territory deep under ground. She also becomes a bit emotional when discussing how challenging it was for her to go down the cave because she is afraid of heights.

(f) Gendered career and life-course Issues

There were no references to career or life-course issues in any of the *Horizon* episodes in our sample. Scientists were portrayed purely in their research, professional or clinical roles. Alternatively, as mentioned in Section (d) above,

they were shown pursuing leisure activities. Family and domestic life was invisible.

(g) Appearance

There is no direct focus on the appearance of scientists in the programmes. Narrators never commented (unlike in newspaper accounts, appearance on TV is 'self-explanatory'). None of the female scientists in the documentaries were depicted as unattractive, neither were they ultra glamorous. However, several female scientists wore notably stylish clothes and wore their hair in contemporary fashionable styles. Dr Regan in '*Waiting for a heartbeat*', for example, wore really fashionable attires (and was shown in various changes of clothing during the course of the programme). Dr Minshew in '*The woman who thinks like a cow*' had a stylish haircut and wore rather glamorous make-up.

When female scientists were shown conducting research out in the field, however, they are dressed in attire appropriate for the work they do. They appear in T-shirts, sweats, jeans and fleeces, just like their male colleagues.

There was one programme, however, in which the appearance of the female scientist stood out as an exception. This was in the depiction of Dr Temple Grandin, the key scientist in '*The woman who thinks like a cow*'. Dr Grandin wears a jacket and tie and her hair is rather unkempt compared to other female scientists in the series. She fails to display traditional 'feminine' traits in her dress or manner. Interestingly, a newspaper review of the *Horizon* programme at the time commented: 'Grandin dressed like KD Lang' (the famous Canadian lesbian singer) (Anthony, 2006).

During the course of this *Horizon* episode the narrator goes to lengths to engage into a discussion about this scientist's dress. Her appearance might be 'self-explanatory', but here the (out-of-sight) narrator, interviews Dr Grandin with specific questions about how she chooses to dress. Dr Grandin responds that clothes only matter in so far as they are new and itchy or well-worn. She volunteers that her underpants have to be repeatedly washed to be acceptable and that she does not like dresses.

The portrayal of Dr Grandin could be read as reinforcing stereotypes about scientists; she is unkempt, works in an untidy office and lacks social skills (e.g. she answers the phone in the middle of the interview without excusing herself). The questions pursued by the narrator could also be read as sexist (would similar questions have been posed to a male scientists one wonders).^{xx} On the other hand the presentation of Grandin (or her self-presentations) could be read as a radical challenge.

Temple Grandin is striking as a scientist who simply does not engage in any of the issues of being a Female Scientist. She stands outside normative assumptions about femininity. In many ways this was the most radical

representation seen across our sample - be it drama or documentary. Where other women may fight to resist or reclaim femininity in the context of being a scientist (as discussed in Kitzinger et al., 2008a and b), Grandin seems entirely unaware/disinterested in any of this. She seems impervious to (or simply unable to fulfil) expectations of her as a woman (although the interviewer frames her in relation to such expectations through her questions).

We were intrigued by how to interpret the representation of Temple Grandin and went beyond the *Horizon* text to pursue this question. We discovered that Grandin has co-written an interesting book which brings an added perspective to this issue. The book is called '*Unwritten Rules of Social Relationships - Decoding Social Mysteries Through the Unique Perspectives of Autism.*' In this text she, and her co-author Sean Barron (2005) explain the 'confusing and illogical' rule of 'normal' societal behaviour. Grandin also reflects on her own clothing choices. She explains she had an aversion to mirrors and is not 'tuned in' to how to dress. She has had to learn that 'normal' people judge by appearances. She then had to make choices about whether to be angry about that or try to conform. 'I adopted my Western themed shirts and pants style', she says, because it 'worked' for her. She does not own a dress and she alters her attire just slightly to adjust for different social settings e.g. being at a conference or on a construction site. 'It might be called eccentric', she writes, 'but I've learned to make it work within social boundaries'. She also comments on another 'Aspie' astronomy professor who dresses in similar jeans and t-shirt: 'a science nerd and proud of it' (Grandin and Barron, 2005: 313). Temple Grandin's perspective on this offers a radical addition to debates about how female scientists should dress, what it means to 'dress for myself', and what it might mean to truly reject (or have to learn by rote) the 'confusing and illogical' rule of 'normal' societal behaviour.

Above we have discussed the ways in which female scientists are represented in *Horizon*. We will conclude this section by reflecting on how *Horizon* represented science – drawing on the recommendations offered by the women in SET that we interviewed for our first report (See Kitzinger et al., 2008a).

(h) The image of science

In our first report (Kitzinger et al., 2008a) we showed that women working in SET wanted to see less macho representations of SET. They were interested in representation showing the diverse motivations which inform people's interest in SET; exploring diverse ways of explaining scientific principles; showing the team work involved in SET work; illustrating international and interdisciplinary co-operation: showing the *range* of careers that can be developed after training in SET. *Horizon* was very positive in this respect compared to many of the other media outlets we examined. Our review of the 10 *Horizon* documentaries highlighted the following points.

- In Report 1 we showed that women working in SET wanted to see the media represent the diverse motivations which inform people's interest in SET. The series of 10 episodes of *Horizon* that we examined presented the viewer with

a range of diverse motivations for pursuing SET research and practice. In *'The woman who thinks like cow'* both Dr Temple Grandin and a male scientist were moved by personal experience to research the field: she because of her own autism, and he because he had child with autism. In *'Waiting for heart beat'*, the lead scientist was motivated to research the cause of miscarriages through her clinical experience (she wanted to know what to say to couples who'd lost baby). Other scientists were shown motivated by curiosity and awe (*Secret life of Caves*) or wanting to prevent disaster (*Earthquake storms*). The programme about the *'Mystery of Easter Island'* also had scientists explicitly presenting an eco-message. Easter Island, one (male) scientist declared, provided a lesson for all inhabitants of 'planet earth'. 'Easter Island is isolated in the Pacific, just as the Earth is isolated in space.' He commented: 'They over-used what might have been renewable resources and the result was an ecological disaster which brought about the collapse of their civilisation'. He concluded with the rhetorical question: 'Is there not here a lesson for Planet Earth?' (John Flenley, *'Mystery of Easter Island'*).

- In Report 1 we showed that women working in SET wanted to see the use of more diverse metaphors in explaining science. One woman protested, for example, that centrifugal forces have been taught to her via the metaphor of motorcycles going round bends. She commented that using the metaphor of a washing machine would have been just as appropriate – but that explanations of SET tended to be filtered through a male-dominated set of metaphors. This criticism could probably be applied to some of the metaphors used in *Horizon*. However, the 10 episodes we examined also presented some diversity in explaining scientific principles. In *'The secret life of caves'*, for example, one female scientist used the metaphor of birthday cake melting to explain. Similarly, in the documentary *'The woman who thinks like a cow'* a female scientist uses a metaphor of corporate organisation when she explains how the brain functions.
- In Report 1 we showed that women working in SET wanted to see media representations which displayed the team work involved in science. Unlike films (in particular) *Horizon* did not display science as a solitary business. There were multiple references to the team work involved in the scientific enterprise. The word 'team' appears 14 times in the 10 documentaries we analysed in depth (and other equivalent words such as 'research group' also features). Viewers were also often shown teams at work.
- In Report 1 we showed that women working in SET wanted to see the media represent science as an international enterprise. *Horizon* succeeded in doing this. In most of the documentaries scientists from different parts of the world collaborated in solving the mystery. For example in *'Earthquake storms'* viewers were informed that: 'Italians, French, Turks and Americans set about making the fault at the bottom of the Marmara sea one of the best known on the planet'. In *'Secrets of the star disc'* scientists from Denmark, Germany and Wales collaborated to find out the origins of the nebra disc.

- Interdisciplinary co-operation was another aspect of science our interviewees wanted to see represented in the media. Again, *Horizon*, out of all the outlets we examined, was best at portraying this aspect of science. Certain science discoveries are shown as requiring the involvement of scientists from different fields. For example in '*Secret life of the caves*' it took a biologist not just a geologist to solve mystery. In the '*Earthquake Storm*' the scientific enquiry involved a historian, geologist and archaeologist. In '*Secrets of the star disc*' astronomers and archaeologists were involved, while '*The mystery of Easter Island*' had to be solved by archaeologists *and* geneticists.
- *Horizon* also showed the *range* of careers that could be developed after training in SET. These included not just the traditional disciplines but also novel careers, one female scientist, for example, was identified as a 'historical seismologist' (*Earthquake storm*).

4.5 Conclusion

Our analysis of how male and female scientists are represented in the documentary *Horizon* reveals the following findings.

- Male scientists are more likely than their female counterparts to appear as experts in *Horizon* documentaries (6:1).
- Female producers are more likely than their male colleagues to include women scientists as experts in the programmes.
- Women scientists are most likely to be consulted in programmes in some areas of science than others (i.e. medical science areas such as reproductive medicine, genetics, biochemistry, neurology, psychology also in biology and archaeology). However, women are still proportionately under-represented (although, this statement is complicated by the fact that men are more likely to occupy senior positions in this field, and more senior scientists tend to be preferred by documentary makers).
- Scientists in factual programmes such as documentaries are less likely to be portrayed stereotypically than they are in other genre, such as films or in some newspaper profiles.
- Science was also portrayed in more 'realistic', 'favourable' and less 'uni-dimensional' or 'masculine' ways in the documentary programmes we examined (compared to some other media outlets). In particular, the episodes we examined displayed science in a way which many of the women in SET that we interviewed wanted in so far as it showed: diverse motivations for working in SET, employed some diverse metaphors in explaining science, displayed team work, represented science as an international enterprise, showed interdisciplinary co-operation and demonstrated some of the *range* of careers that could be pursued.

- These 'positive' dimensions seems to be related to the fact that: (a) *Horizon*, as a documentary, is usually focused on the 'science' and not the individual (b) the scientists involved are 'real' rather than characters conjured up for dramatic purposes or vehicles for Hollywood 'stars' (c) they are usually included in the programme because of their expertise rather than because they are 'personalities' (e.g. leading 'celebrity' scientists or TV science communicators).
- Overall, stereotypes were challenged by *Horizon* simply because a *range* of female scientists were included in the series (ranging, for example, from the highly glamorous to the neutral or 'unkempt').
- There are some interesting differences in how male and female scientists were portrayed in the episodes we examined. However, these are suggestive rather than conclusive, and open to various interpretations. We would note, for example that women scientists are more likely to be portrayed in science/work settings than their male counterparts (who are shown in diverse settings). We would also note that women, on a couple of occasions, were framed in fierce conflict with male scientists. Further research would be needed to explore these issues.

The detailed analysis and key findings offered in this chapter suggest some pointers for how representations of women in SET might be improved in the future. These are discussed in our concluding chapter, Chapter 5.

Chapter 5: Conclusions and Recommendations

This report has examined how women scientists are represented in films, TV drama, drama-documentary and documentary. This textual analysis was complemented by interviews with those involved in producing some of the programmes and then contextualised with a reflection on audience responses. The overall findings highlight the following.

- It is important not to generalise about 'the media' as if it were a single homogenous entity. In order to talk meaningfully about how women in SET are represented 'in the media' it is vital to recognise differences between diverse outlets (e.g. film and television), genre (e.g. the documentary versus the crime drama), and production contexts (e.g. US versus UK produced TV series).
- Representation is influenced by a complex interplay between production values, practices and contexts (e.g. the desire for a 'bankable star' in a Hollywood film) and negotiation within production teams (including producers, script writers and actors).
- Both 'factual' and 'fictional' media are important sites of representation of women in SET, offering different challenges and opportunities. They are not, however, completely separate spheres (e.g. 'real life' scientists inspire drama writers).
- Some outlets/genre are more likely to produce relatively positive or non-stereotyped images than others. The TV drama series and documentary series, seem to be particularly flexible and accommodating in this regard, although this is not *determined* by the genre.
- The intentions of the producers do not *predefine* audience reactions. For example, a female character may be intended (by writer and actor) to be a strong and rational woman, and refusing to employ feminine wiles. However, there may be a double-standard at work in the *reception* process. A female character who does not display such traditional 'feminine' characteristics may be interpreted by some viewers as 'cold-hearted'.
- The multi-layered and complex nature of many fictional representations, combined with the complexity of audience responses (what they 'want' from the film/programme and what they 'take' from it) means that it is hard to generalise about what counts as a 'positive' representation.
- Nevertheless, it was clear that having female characters as 'leads' and shown in senior positions and as demonstrably strong individuals were all often welcomed (as long as they could not be cast as 'harridans' or 'bitches'). Additional positive comment focussed on issues such as demonstrating how a female scientist deals with working in a 'male chauvinist' work place, showing team work and demonstrating the

excitement of science. Some programmes (such as *Silent Witness*) have been strikingly successful in this way of portraying scientists. While other programmes (such as *Horizon*) have been relatively successful in portraying science in ways that are welcomed by some women in SET as less narrow, competitive and limiting that is sometimes true in other genres (e.g. news reporting).

Our research suggests:

- There is a continued need to ensure *more* representation of women in SET and more diverse, less stereotyped, representation, although (or especially *because*) some TV drama series are already helping to address this issue with striking success.
- Such representations are needed across *diverse* outlets and genre. It is important to ensure, for example, a higher profile for women scientists in documentary series such as *Horizon* as well as fictional outlets ranging from film to TV drama and drama-documentary.
- It is also important to encourage the representation of more women, in *diverse roles* within individual programmes, rather than an isolated key protagonist. In a drama-documentary such as *If*, for example, a wider range of women characters, or the inclusion of some real-life women scientists in the docu-sections of the programme, might have avoided placing the 'burden of representation' on a single character.
- Dramas set in the future could usefully present both a realistic and inspirational image of women in positions of seniority, and reflect on challenges and processes of social change. This might involve more than simply placing female characters in positions of power, as if such changes to gender inequalities are *inevitable*. Such programmes might usefully address the challenges that women scientists may face, and the strategies they adopt, to succeed in a male-dominated field and overcome obstacles.
- Documentary makers could usefully think about how to involve more female experts and share ideas and 'best practice' with each other. Reflecting about how they access 'the best people for the job' or select topics on which to focus could form part of this exercise.
- Scientists could be usefully encouraged to actively engage with media producers (and vice versa) to help develop 'better' representations (good examples of such engagement are already well established – e.g. by PAWS initiatives).
- Work with young people in schools might also usefully resource audience engagement with media representations

Working with the media: Recommendations from the PAWS (2004) seminar: 'Women in Science and Engineering and TV drama' are invaluable for anyone

seeking to improve the representation of women in SET. PAWS recommendations include, for example:

- Encouraging the commissioning of new long-running popular drama series such as *Silent Witness* but involving other groups of scientists, engineers and IT professionals.
- Developing better ways of supporting writers and producers in researching and developing suitable stories, whether financial (i.e. script development grants) or intellectual (i.e. advice and support from the scientific community).
- Staging events in which TV Commissioners can participate with scientists and engineers in order to highlight the opportunities offered by science and engineering for good drama.
- Creating a new level of dialogue between Writers and TV Producers (particularly in drama) and SET professionals in order to provide modern role models of scientists and engineers.
- Exploring ways of highlighting individual charismatic scientists and engineers and of promoting relevant expert databases.

(Recommendations from PAWS (2004) Women in Science and Engineering and TV drama : Sex, Lives and Videotape. Summary Report of a Seminar held at the IEE, London on 22 November 2004)

We hope some of the detailed analysis presented in this report might contribute to the realisation of such suggestions. We would also recommend that work with scientists and 'audiences' be developed or continued through two routes:

Working with the scientists: Media training for scientists, especially for female scientists, could encourage engagement with both traditional 'factual' media and more experimental or fictional genre: There may also be approaches which production teams could pursue in order to encourage female scientists to participate Alternatively general support strategies to encourage female scientists to engage with the media might have increased the potential of them becoming involved (see Report 4, Boyce and Kitzinger, 2008, for a detailed discussion of how this general goal might be achieved). In order to encourage women scientists to appear in drama-documentaries, the profile of drama-documentaries as a reputable genre could be raised and discussion of the pros and cons of programmes which fuse 'fact' and 'fiction' could be included in training events alongside more traditional media training.

Producing teaching packs for 'audiences': Our research suggests it might be useful to develop teaching packs/CD ROMs etc for schools and colleges in which diverse media representations of women in SET are used to prompt class debate, develop group projects and inspire individual reflection. These could, for example, include clips and 'work books' encouraging students to compare and

contrast the relative plausibility of dramas produced in the UK and the USA (such as *CSI* and *Silent Witness*). They could also draw out the range of focus on the balance of professional to personal life for women in SET. Extracts from some of the dramas analysed in this research could be used to provide diverse and multiple resources for students to compose their own role models or imagined career trajectories.

Collective viewing and discussion of the plausible and implausible (or 'good' and 'bad') aspects both of the science portrayed and of the social contexts in which it is represented could also prompt further reflection. It would provide the young people with opportunities to explore issues about life-course decisions, work/life balance, and gendered workplace interpersonal dynamics in a more richly textured way than would arise if they viewed them alone. As our previous discussion of audience use of television drama suggests, consumers of drama are sophisticated and media literate. However, providing young viewers with the tools to critique the gendered representations in the screen dramas we have discussed, as well as with information on the 'real life' penetration of women into such professions, would be a valuable intervention.

Further information:

Three other reports were produced as part of this research.

Report 1 (Kitzinger et al., 2008) examines the views and experiences of 86 women working or training in SET. It explores their own experiences of the media while they were growing up, and their views about the media representation of women in SET today.

Report 2 (Kitzinger et al., 2008) compares how male and female scientists are presented in press coverage.

Report 4 (Boyce and Kitzinger, 2008) examines what science communications/P.R. professionals might be able to do to promote more positive representation of women in SET. It includes discussion of how to support women talking to the media.

These reports are available online at www.ukrc4setwomen.org or hard copies can be obtained from the UKRC: info@ukrc4setwomen.org

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Endnotes

ⁱ Inspiration can, however, also sometimes be found in unexpected places. Media studies research highlights how sometimes people can take pleasure from, or identify with, unexpected characters. For example, one study showed that some Native American fans of ‘Westerns’ could identify with the John Wayne character in the film (the Indian-killing cowboy) seeing him as a representation of Native American ideals of being free and in touch with the land (see Eldridge et al., 1997, 150-151). Similarly, another study found that young British Asians enjoyed the (exclusively white) Australian soap opera ‘*Neighbours*’ because it offered ‘a complex metaphor for their own social worlds (See Shively, 1992 and Gillespie, 1995 discussed in Eldridge et al., 1997: 150-152). Offering strong and positive role models of female scientists might be complemented by broader strategies which show science, engineering and technology as attractive to women in other ways. This is discussed in Report 1, Kitzinger et al., 2008a, section 5.3.

ⁱⁱ Joan Haran, lead author on this report, is based in *Cesagen - the ESRC centre The Centre for the Study of Economic and Social Aspects of Genetics*). Jenny Kitzinger, co-author on this report, is also affiliated to *Cesagen*.

ⁱⁱⁱ Although it is not ideal, we are using the term ‘woman scientist’ to denote women in Science, Engineering and Technology, in order to avoid extremely lengthy sentences. However, when we analyse particular representations, we will identify the profession and sector to which the characters identified belong.

^{iv} There are many interesting paradoxes in research on the representation of scientists and science in fact and fiction. Scientists want to be portrayed as both ordinary and exceptional; they want the excitement of science to be conveyed, but also the repetitive and often tedious nature of scientific practice; they want the cutting-edge of science to be represented, but they don’t want science to be seen as a sphere apart from the rest of social life. At the centre of these paradoxes is often the vexed relationship between fact and fiction. For the purposes of this research, the fictional treatments of women in SET we have considered have been dramatic ones in the form of Hollywood film or entertainment television series produced in both the UK and the USA. Scientifically literate viewers often judge the success of film and TV representations on criteria of scientific accuracy – the portrayal of scientific facts, without fully recognising that science is not the only casualty of producing a narrative that can be encapsulated on a screen in a discrete period of time. This encapsulation which requires selection and editing is more pronounced in programming that is avowedly fictional, but as seasoned science communicators will testify, it is also present in news and documentary programming which also require a visual narrative to be intelligible to viewers.

^v We chose not to perform primary analysis on the feature film *Contact* as it has been so extensively analysed by other researchers.

^{vi} One point of interest is that dramas related to criminal investigations formed a significant section of the sample – as they were frequently referenced in focus group, interviews and on questionnaires. It is worth noting that such dramas articulate the science and technology of genetics and information technology, as well as visualisation technology, linking them with high profile contemporary preoccupations about health, risk and surveillance.

^{vii} Because the films and TV series to which research participants referred had been screened or broadcast sometimes years apart (or over a number of years in case of the long-running series) we did not select our core sample based on a particular time period or television channel's output. We chose instead to source the material on DVD, and in the case of the TV series to select episodes from significant moments in their production history. This proved to be an easier matter with the US television series than with those made in the UK by the BBC. In some senses this is unsurprising, as the US shows are produced as commercial enterprises while the BBC is still a public broadcasting corporation. However, BBC Commercial Enterprises does market DVDs of popular series so it was a surprise to learn that only one series of *Silent Witness* had been issued on DVD, when ten have been broadcast. We had to source episodes from later series from the British Universities Film and Video Council. The issue is less acute with *Waking the Dead*. Four of its six series broadcast to date have been made available on DVD.

^{viii} In order to explore the potential, but also demonstrate the difficulty, in applying these typologies to series drama we have used the typologies that Steinke operationalises to produce tables referring to both the film and television we viewed and analysed. Although it was relatively feasible to apply the categories with the feature films, it was just not possible to apply them meaningfully to the television drama. We reproduce the tables in Appendix 2(a). What this exercise illustrates above all is the positive ways in which a TV drama series exceeds and escapes the neat categorisation make possible by the iconic address of cinema. For, example, a character like Sam Ryan can be represented for many series as content to be child-free, and then can be depicted as being haunted by this decision. This may be understood by audiences as a positive nuancing of the representation, or as a betrayal, depending on their point of view.

^{ix} This is an Internet-based archive which allows users to type in the current URL of a website and find earlier versions of the content posted on the respective website.

^x For further examples, see: <http://web.archive.org/web/20041109025211/www.bbc.co.uk/drama/crime/silentwitness/reviews_8_1_1.shtml> for viewers' responses to the departure of the character of Sam Ryan.

^{xi} Analogue is used as a shorthand to refer to the following television channels: BBC1, BBC2, ITV1, Channel 4 and 5. Although these channels are broadcast in both digital and analogue versions, they are still available to viewers equipped only with analogue receivers. The TV shows mentioned above are all viewable on analogue, with the exception of *Bones* which can be viewed on Sky3 which is provided to digital viewers free of charge through Freeview. The CSI franchise now additionally airs on 5 US, a digital supplement to 5.

^{xii} In the middle of the debate, there is a brief current affair segment examining the current state of legislation for therapeutic cloning. This segment is introduced by the *Newsnight* science editor who is a woman. The experts are all male and include: an MP, a former United Nation bioethics advisor, and a stem cell scientist. During the segment there is background footage of scientists doing lab work. This background footage shows six female scientists, four male scientists, and two scientists who cannot be identified as male or female.

^{xiii} Both the interviews and focus groups were carried out by Grace Reid for her PhD thesis, *Replicating opinions? Audience responses to a television dramadoc about human cloning*.

^{xiv} Focus group participants' names have been changed to protect their confidentiality, but the demographic details contained in the brackets are accurate. In subsequent references, focus group participants' demographic details will be listed using '(M-23)' or '(F-53)'. The 'M' and 'F' will indicate whether the participant is male or female, and the number will indicate the participant's age.

^{xv} One reason the series editor may have made this comment, however, is that *IF* series also did a dramadoc around the idea of *If...Women Ruled the World*. This dramadoc looked at how powerful women are becoming (although not in science specifically).

^{xvi} *Horizon* has developed a distinctive narrative form, typically employing an underlying 'detective' metaphor, to relate scientific issues and discoveries to the lives of its viewers. Its strength lies in an authoritative analysis of developments and stories in Technology, Science and Medicine. Scientific insight is relayed on a 'need to know' basis, so as to refrain from losing the audience concentration. Many episodes of *Horizon* are structured in a format that starts with a tease or menu laying out what the show has in store, followed by two 'acts' with a 'plot twist'. The twist frequently propels the story line from a focus on an individual scientist's human and intellectual journey of discovery through to explore the impact of that insight while, at the same time, providing a change of 'texture' and filmic pace. The programme gives the reasons behind the story so the viewer doesn't feel lost in the subject.

^{xvii} The *Horizon* programmes broadcast during these six months were identified by using the British Universities Film and Video Council database TRILT

(Television and Radio Index for Learning and Teaching) and cross checking this with *Horizon's* own website. This technique identified 261 programmes. However, after removing repeats this narrowed the sample down to 47.

^{xviii} Although this programme represented women *scientists* in positive ways its representation of women in general was disturbing. If the background reconstruction images were to be believed East Island seemed to have been colonised and populated entirely by men (men sail over in canoes, run ashore) and men carved statues and transported them over land. Women inhabitants of the island appear only twice – once as a crushed skull of an 'older female' held by an archaeologist, and once in an engraving showing a topless, large breasted women gazing into a mirror.

^{xix} Producers of science related programmes sometimes try to avoid filming scientists in their labs or offices. At a recent conference one of us attended, for example, a producer commented that he tried to find other activities that scientists did in the hope that they would provide props the scientists would draw on as useful visual metaphors to illustrate the science story.

^{xx} In fact we read the questioning as part of an effort to unpack idea about gender. Being female is addressed through: questions (and her answers) which say she is 'different'; through mention of harassment (the bulls' testicles scattered on her car by male co-workers); and the deconstruction of the mother-blaming account of autism (and the very positive platform given to Grandin's mother and her interactions with her daughter). Issues of gender are also addressed through comments such as 'In a man's world - she's the king'.

Appendices

Appendix 1: Typologies of Women in SET in Film and Television

These typologies are based on Steinke (2005).

Appearance of Female Scientist in Film

Film	Attractive	Unattractive	Unattractive to attractive, sexy and or glamorous	Sexy and Glamorous
<i>The Net</i>	Angela Bennett	This category is not suitable to describe the female science character	Angela maintains the same appearance throughout the film	This category is not suitable to describe Angela Bennett
<i>Hackers</i>	Kate Libby	This category is not suitable to describe the female science character	Kate Libby maintains the same appearance throughout the film	Kate Libby /Acid Burns is represented as being sexy and glamorous. There is much use of lingering photography of her body and face in kissing and sexual scenes.
<i>Flight Plan</i>	Jodie Foster, who plays Kyle, is generally regarded as attractive. Attractiveness / unattractiveness are beside the point in this thriller about a recently bereaved woman.		Jodie Foster maintains the same appearance throughout the film	This category is not suitable to describe Kyle Pratt

Appearance of Female Scientist in Television Series

Television Series	Attractive	Unattractive	Unattractive, sexy or glamorous	Sexy and Glamorous
<i>Silent Witness</i>	Sam Ryan is a mature, attractive woman who takes care with her appearance. Nikki Alexander is young and attractive	Sam Ryan dresses appropriately for the job	This category is not suitable to any of the female science characters	Nikki Alexander
<i>Waking the Dead</i>	These categories are of limited utility in pigeonholing psychologist Dr. Grace Foley or pathologist Frankie Wharton. They both dress appropriately for their respective roles. Grace appears to take slightly more care with her appearance but she is desk-bound. In the lab, Frankie puts functionality (tied back hair / hairnets) ahead of appearance.		This category is not suitable to any of the female science characters	Grace and Frankie appear ordinary
<i>Crime Scene Investigation</i>	Catherine Willows Sara Sidle	Catherine and Sara Sidle dress rather well for the job	This category is not suitable to any of the female science characters	Catherine Willows (has back story as an exotic dancer). It could be argued that what is sexy and glamorous across the <i>CSI</i> franchise is the forensic science and technology that is represented using cutting-edge visualisation technology and in problem-solving dialogue.

Appearance of Female Scientist in Television Series (con't)

Television Series	Attractive	Unattractive	Unattractive, sexy or glamorous	Sexy and Glamorous
<i>CSI: Miami</i>	Megan Donner Calleigh Duquesne Alexx Woods Whether Megan, Calleigh or Alexx are assigned to this category or the sexy and glamorous would depend on the eye of the beholder. Their attire does not seem as functional as is the case in the British drama <i>Waking the Dead</i> but it is what they look at – the forensic evidence – rather than what they look like that is the point of the series.	This category is not suitable to describe any of the female science characters	This category is not suitable to any of the female science characters	Megan Donner Calleigh Duquesne Alexx Woods
<i>CSI: New York</i>	Stella Bonasera			
<i>Bones</i>	Temperance Brennan is represented as being attractive to men, but not invested in being glamorous.			Angela Montenegro is represented as being both sexy and glamorous, in an off-beat way.

Characterisation of Female Scientist in Film

Film	Professional and realistic	Mad and maniacal	Clumsy and absent-minded	Nerdy and anti-social
<i>The Net</i>	Angela Bennett	Category can not be applied to Angela Bennett	Not applicable to female science character	Angela Bennett does seem to embody this stereotype.
<i>Hackers</i>	Kate Libby – she overlooks personal differences when there is need to collaborate with Zero Cool	Kate Libby is level-headed though on occasion she behaves eccentric	Not applicable to female science character	
<i>Flightplan</i>	Kyle Pratt is portrayed as knowledgeable of her area of engineering	It could be argued that Kyle's sabotage of (non-critical) of onboard technology verges on unbalanced.	Not applicable to female science character	

Characterisation of Female Scientist in Television Series

Television Series	Professional & realistic	Mad & Maniac-al	Clumsy and absent-minded	Nerdy and anti-social
<i>Silent Witness</i>	Sam Ryan Nikki Alexander	Sam & Nikki are rather sober and persistent in their research	This category is not applicable to female science character in the series	Both Sam and Nikki could be viewed as deficient, to some degree, in social skills, but nerdy and antisocial would be hugely overstating the case.
<i>Waking the Dead</i>	Grace Foley Frankie Wharton	Both Grace and Frankie are level-headed	This category is not applicable to female science character in the series	Frankie Wharton
<i>Crime Scene Investigation</i>	Catherine Willows Sara Sidle		This category is not applicable to female science character in the series	
<i>CSI: Miami</i>	Megan Donner Calleigh Duquesne Alexx Woods			
<i>CSI: New York</i>	Stella Bonasera Aiden Burn Lindsay Monroe			
<i>Bones</i>	Temperance Brennan Angela Montenegro			Much self-conscious play is made with this stereotype, with Temperance displaying some ignorance of popular culture, but this is undercut by her love of music and dancing and her awareness of other cultures than her own.

Professional Status of Female Scientist in Film

Film	Project or research director	Laboratory or research assist-ant	Equal member of a research team	Administrator
<i>The Net</i>	This category does not apply to Angela Bennett as she is a consultant who works from home	Category not applicable to science character	Category not applicable to science character	Category not applicable to science character
<i>Hackers</i>	This category does not apply to Kate Libby	Category not applicable to science character	Category not applicable to science character	Category not applicable to science character
<i>Flightplan</i>	We can infer that Kyle Pratt is reasonably senior, but this is all extra-diegetic. In the film she is just a maverick because of the circumstances in which she finds herself.	Category not applicable to science character	Category not applicable to science character	Category not applicable to science character

Professional Status of Female Scientist in Television Series

Television Series	Project or research Director	Laboratory or research assistant	Equal member of a research team	Administrator
<i>Silent Witness</i>	Sam Ryan has a supervisory role in the laboratory	Category not applicable to female science character	Nikki Alexander	Category not applicable to female science character
<i>Waking the Dead</i>	Both Grace Foley and Frankie Wharton direct their own lines of research, although they report to Detective Superintendent Boyd in his capacity as head of the Cold Case Unit	Category not applicable to female science character	Grace Foley Frankie Wharton	Category not applicable to female science character
<i>Crime Scene Investigation</i>	Catherine Willows moves from being a team member to being a team leader over the course of the series. Although Sara Sidle does not take on team leading responsibilities, she can be viewed as having equal seniority with many other team members, all of whom report to Grissom.			Category not applicable to female science character
<i>CSI: Miami</i>	Megan Donner is the former director of the crime lab now run by Horatio Caine	Megan Donner, Calleigh Duquesne and Alexx Woods all feed in their own specialist area of expertise to the overall team effort. Megan is acknowledged as having trained and mentored one of the male CSIs.		
<i>CSI: New York</i>	Stella Bonasera is co-director of the crime lab with Mack.			
<i>Bones</i>	Temperance Brennan		Angela Montenegro's expertise is represented as crucial to building up the picture (quite literally) of crime victims and crime scenes.	

'Female Scientist with Romantic Relationships in Television Series'

Film	Female Scientist and Engineer Primary character with Romantic Relationship	Female Scientist and Engineer Primary Characters with children
<i>The Net</i>	Angela Bennett	
<i>Hackers</i>	Kate Libby	
<i>Flightplan</i>	Kyle Pratt has been widowed immediately prior to the commencement of the film narrative.	The entire plot of Flightplan hinges on the kidnap of this aeronautic engineer's child.

'Female Scientist with Romantic Relationships in Television Series'

Television Series	Female Scientist and Engineer Primary Characters with Romantic Relationships	Female Scientist and Engineer Primary Characters with children
<i>Silent Witness</i>	Sam Ryan	Sam Ryan is portrayed in most of the early series as childless, this is largely a non-issue. In later series, this representation of a professional woman secure in her life decisions is undercut, as first Sam is represented as having regrets at remaining childless, and then is revealed to have given a child up for adoption.
<i>Waking the Dead</i>		
<i>Crime Scene Investigation</i>	Catherine Willow has a history of a broken down marriage Sarah Sidle and Grissom have some kind of romantic history	Catherine Willow has a daughter
<i>CSI: Miami</i>		
<i>CSI: New York</i>		
<i>Bones</i>	Both Temperance Brennan and Angela Montenegro are represented as having serial romantic relationships. The instability / fragility of these relationships are considered to be necessary to stimulating and maintaining audience interest in the characters.	

Appendix 2: Interview Participants

Interviewee	Role Producing in <i>If...Cloning Could Cure Us</i>	Type of Interview
Peter Barron	Editor for the first <i>IF</i> series	<ul style="list-style-type: none"> • Face-to-face interview (11.04.07)
Paul Woolwich	Executive Producer for the second <i>IF</i> series	<ul style="list-style-type: none"> • Face-to-face interview (10.05.07)
Mary Downes	Series Editor for the first and second <i>IF</i> series	<ul style="list-style-type: none"> • Face-to-face interview (13.05.07)
P.G. Morgan	Producer of <i>If...Cloning Could Cure Us</i>	<ul style="list-style-type: none"> • Telephone interview (28.05.07)
John Hay	Associate Producer of <i>If...Cloning Could Cure Us</i>	<ul style="list-style-type: none"> • Face-to-face interview (12.05.07) • Follow-up telephone interview (10.10.07)
Jason Sutton	Scriptwriter for <i>If...Cloning Could Cure Us</i>	<ul style="list-style-type: none"> • Face-to-face interview (29.03.07) • Follow-up telephone interview (15.10.07)
Becky McCall	Researcher for <i>If...Cloning Could Cure Us</i>	<ul style="list-style-type: none"> • Face-to-face interview (28.06.07)
Dr. Stephen Minger	King's College London stem cell researcher and scientific consultant for <i>If...Cloning Could Cure Us</i>	<ul style="list-style-type: none"> • Face-to-face interview (10.04.07)
Jennifer Calvert	Actress who played the part of Dr. Alex Douglas	<ul style="list-style-type: none"> • Telephone interview (24.10.07)

Appendix 3: Coding sheet for quantitative analysis of the documentary programme *Horizon*

Programme title:
Date aired:
Original air date:
Number of scientists in the programme:
Gender of scientists:
- Male/Female/Gender unclear*

Area of SET of scientist:
Title of scientist (i.e. professor, Dr, Mr/Mrs):

Order in which scientist appears in programme
- 1st/2nd/3rd/4th, 5th, 6th etc

Number of words spoken by scientist*
- less than 100 words
- 100 – 500 words
- 501 – 1000 words
- Over 1000 words

* In cases where the gender was not clear because the scientist had a name it was hard to identify, we googled it on the internet.

* Transcripts of programmes were used to count the number of words spoken by scientist.

Coding categories for qualitative analysis of the documentary programme *Horizon*

Close-up, no setting
Clearly lab setting
Clearly clinical setting
Not clearly lab or clinical setting
In the field
Other (domestic, library, on the streets etc)

Appendix 4: Synopsis of 10 programmes analysed in the study

Who's Afraid of Designer Babies?

Documentary investigating the controversial subject of designer babies. On the plus side, genetic mistakes could be corrected to avoid diseases, but the idea of creating Nazi-like master races and the possibility of mutants raises justified fears among many. Should we avoid 'playing God' in such a way, or is this simply an acceptable part of scientific progress?

Parallel Universes.

Series exploring topical scientific issues. This edition looks at the latest theories from some of the finest minds in science, which suggest that our universe may be just one of an infinite number of other universes in existence. Some scientists now think that the Big Bang was caused by the collision of two universes, and that other universes exist in 11th dimension - the same place that gravity comes from

Earthquake Storm.

Once thought to be unpredictable and random 'acts of God', earthquakes are now revealed in a new light due to a trail of clues from ancient ruins in Crete to the San Andreas Fault. Could it be possible that earthquakes spread out from each other like a storm blowing across a country? The idea seemed preposterous until geologist Geoff King successfully predicted the 1999 earthquake in Izmit that killed twenty five thousand people.

What Really Killed The Dinosaurs?

This eye-opening documentary investigates whether one of the best known and most glamorous scientific theories could be wrong. Until recently most scientists thought they knew what killed off the dinosaurs. It was a 10 km-wide meteorite which smashed into Yucatan in Mexico. But now there is increasing evidence the impact theory could indeed be incorrect. That suggestion has generated one of the bitterest scientific rows of recent times.

The Mystery of the Jurassic.

The series exploring current scientific issues asks whether a dinosaur graveyard in Patagonia could resolve previously unanswered questions about dinosaur evolution. The focus is on the little-known mid-Jurassic period, during which dinosaurs developed from being relatively small animals into the biggest creatures ever to walk the Earth

Secrets of the Star Disc.

How a Bronze-Age metal disc, found by grave robbers in Germany and retrieved by the police, suggests that civilisation reached Europe far earlier than had been thought. The design inscribed on it combines an advanced understanding of the stars with highly-sophisticated religious imagery.

Waiting for a Heartbeat.

Documentary about three women, Rachel, Joanne and Naomi, as they attempt to overcome the odds and give birth to a baby. With a history of miscarriages and heartbreak behind them, these three women are travelling to the largest recurrent miscarriage clinic in Europe, where Professor Lesley Regan offers her patients the hope of a precious new life.

The Woman Who Thinks Like a Cow.

Documentary about Dr Temple Grandin, who can talk to the animals, and has a legendary ability to read the animal mind and understand animal behaviour when no-one else can. She's convinced she experiences the world much as an animal does and that it's all down to her autistic brain. Though she didn't learn to speak until she was five, at nearly 60 she's an Associate Professor of Animal Science and the most famous autistic woman on the planet.

The Secret Life of Caves.

A journey into a subterranean landscape of dangerous gases and vast chasms, revealing new insights into the origins of life. The Carlsbad Caverns and Lechuguilla Canyon in New Mexico are two of the most magnificent rock formations in the world, currently being explored by teams of scientists.

The Mystery of Easter Island.

A look at the intriguing mysteries surrounding Easter Island, which is located in the south Pacific Ocean, and is one of the world's most isolated inhabited islands. Who were the original settlers? Why did they build such beautiful and mysterious statues? And why did the population die out in the 19th century, taking their secrets to the grave?

<http://library.digiguide.com/lib/episodes/Horizon-9595>

**UK Resource Centre for Women in Science,
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