‘Surplus Improvement’: A Qualitative Exploration of Student Attitudes Toward Transhumanism, Transhuman Technologies and Related Issues.

Adam Sinicki

www.the-biomatrix.net

CONTENTS

SUMMARY

This study focuses on the use of qualitative research methods to gather data regarding students' perceptions of 'transhumanism'. Transhumanism is a relatively new movement that deals with enhancing the human condition through the application of technology and there has been no previous research looking at public awareness/attitudes toward it. This study used focus groups to collect the data which was then subjected to thematic analysis in order to generate a series of themes (the exact methodology has been explained and reflected upon within the paper). An overview then summarises the findings and makes suggestions for future research. Word count: 8,796.

ABSTRACT

Transhumanism is a school of thought that promotes the use of new technologies to enhance the human condition mentally and physically. While many papers have been written outlining precisely the arguments for and against transhuman ideals, nothing has been done to establish what the layman's perception of them might be. This study then used focus group interviews of students to explore their views such a potentially life-altering concept. Students were chosen as the sample due to their eligibility for transhuman procedures and for practical reason. The focus groups were transcribed and analysed using thematic analysis revealing five major themes relating to prior knowledge, emotional reactions, individual concerns, socio-economic concerns and moral concerns. Generally participants were found to be against the movement, though some saw it as permissible to certain degrees and under certain circumstances. It is suggested that further work needs to be done to raise awareness of the issue, discover exactly under what circumstances it would be considered permissible and to clarify some of the more cloudy definitions within the subject.

INTRODUCTION

'Transhumanism' is characterised as a movement that promotes the use of technological means to improve the human condition - extending life spans, or increasing strength, speed and IQ among other modifications (Naam, 2005). It is a school of thought that has grown out of humanism and the enlightenment which states that humanity can and should begin to redesign itself; that a state of 'posthumanism' (where we can be considered to be superior to the 'natural human' in at least one capacity (Böstrom, 2006)), is both possible and desirable. At the same time they place great emphasis on examining the major challenges and dangers of such meta-evolution.

Public perception of transhuman technologies seems to be limited and few are aware that many of the technologies necessary for such enhancements are already close to realisation. It is speculated that gene doping techniques, a procedure that can permanently alter an individual's DNA, could be used to enhance performance as early as the 2012 Olympics (Andersen et al, 2000). Indeed genetic modifications have already been successful in studies using mice and other animals that have led to greatly and permanently increased musculature, tolerance to diseases, longer lifespans and even transparent skin (Naam, 2005). If such modifications are proven viable for humans and it seems likely that this will be the case, then they will have massive implications for athletes, bodybuilders, the military and the general public. Other technologies in development involve the use of implants, human-computer interfaces, drugs, nanotechnology and bionic attachments for similar ends. On an individual level it is hard to deny the appeal of running faster, living for longer, or thinking things through to a higher level and proponents hope that it could also bring about positive changes for society as a whole.

At the same time however there are many moral and psychological issues surrounding the topic. There are many schools of thought that directly oppose transhumanists, a stance often labelled 'bioconservativism', which campaigns for a ban on such technologies to prevent an 'inhuman' or 'godless' future society. Fukuyama (2002, 2004) is one such vocal bioconservative who argues against transhumanism on the grounds that it threatens the basis for moral equality among humans and that our complex nature makes 'improvement' in one area impossible

without causing harm to another. Such is Fukuyama's opposition to transhumanism that he once described it as 'the world's most dangerous idea' (2004). Similarly McKibben (2003) argues that transhuman technologies would be disproportionately available thereby creating a 'genetic divide' and Buchanan (2000) argues the possibility of a widened class divide. Other authors criticise specific technologies or aims as opposed to the movement as a whole; for example, in one paper Bergsma (2000) argues that a neurotechnological procedure to enhance 'happiness' would devaluate the emotion and sever an important tie between an individual's internal and external worlds leading to a sense of detachment and indifference. This recalls a paper by Van Deurzen (2009) that describes quest for 'happiness' as misplaced, as it is founded in our challenges and difficulties.

Many of these positions have been addressed in subsequent papers by transhumanists who continue to debate in favour of the technologies. Wilson (2007) for example, answers Fukuyama's concern about moral equality by attempting to outline exactly the criteria for 'equality' and demonstrate that transhumanism does not negate its core values. He does however acknowledge that facilitating justice and *perceived* equality between human and transhuman could present 'non-trivial' difficulties. Meanwhile, Boström (2004) argues against the use of 'speculative' criticisms in which opponents of transhumanism selectively illustrate negative outcomes where other positive ones are equally as likely. He claims that the potential benefits outweigh the potential costs, but that the latter receive more attention.

While the debate rages on between these two camps however, it seems that awareness of the topic is limited among the general public who perhaps will be most affected by these developments and no previous research has been done to establish what members of the public might make of this debate if it was introduced to them. Despite this lack of literature on public perceptions of transhuman technologies however, there have been several studies investigating public perceptions regarding similar (and thus comparable) technologies such as cloning, IVF and 'saviour siblings'. While the application here is different, in many cases the actual technology and some of the moral issues surrounding it are analogous. For this reason we may be able to estimate reactions to transhumanism by reviewing this literature.

In one paper dealing with public opinions regarding human cloning (Shepherd et al., 2007), opinions were measured using a series of qualitative and quantative methods. One objection was that human cloning involved 'interfering with nature'; its acceptability was also sometimes related to participants' views about the 'status of the embryo', although there was a lower-than-anticipated appeal to religion. It was also found that there was a correspondence between media coverage of the topic and the opinions expressed by participants, demonstrating the important role the media may have in shaping public opinions (or perhaps vice versa). One telephone poll conducted by Bates et al (2005), found that genetic research was considered permissible under certain circumstances, but that relevant key concerns were that it was interfering with nature/playing God and that the associated costs could cause divisions.

Another study (Burton et al, 2006) found that participants did not generally object to genetic screening for deafness and that any reluctance was based on a concern for the technique's effectiveness. Celnan et al (2005) similarly gathered data on public reactions to new health-care technologies using a survey and it was again found that there was not an opposition to such technologies in general. However, this perceived permissibility was strongly linked to the capacity of the technologies to control serious disease, which may be a key difference when assessing transhuman technologies (which deal with perfectly healthy candidates). Here a study by Kalfoglou et al (2008) is relevant as it looks at public attitudes towards 'preconception sex selection'. In this instance participants were found to support the technology where it is used to avoid x-related genetic disorders, but felt that non-medical use was 'selfish and inconsistent with parental love'. However they did not consider it dangerous enough to warrant governmental intrusion were the procedure to become widely marketed in the US.

How relevant these findings are to transhuman technologies remains to be seen and it is surprising that similar studies have not already been conducted on the subject. With transhuman technologies potentially close to realisation, these issues are likely to become relevant to the general public and it is therefore a cause for concern that no research has been done to establish what the public's reaction might be. It is important that public views on the topic are fully understood in advance of these technologies' dissemination. This study hopes to give a voice to members of a particular segment of the general public, that is, students. The reasoning behind

using students for such a study was that their generation would be the most likely to be forced to make choices regarding transhuman technologies. Practical limitations meant that a larger and more diverse sample could not be obtained (by selecting the qualitative method of focus groups the target is quality and depth of data rather than quantity and breadth). However, it is probable that members of this group will grow into the general public that will be dealing with the issues surrounding transhumanism.

In light of the above, this study aims to establish how (groups of) students respond to transhumanism and transhuman technologies in cognitive, emotional and intended behavioural terms; how they negotiate the (non) permissibility of these technologies; and how they make sense of the psychosocial and ethical issues associated with them. The study will be informed (but not driven) by theories of attitudes and social representations, where relevant.

METHOD

Design:

This study involved the qualitative analysis of interview data on transhumanism and relevant technologies generated by four focus groups (Millward, 2006) which aimed to get an idea for any prior awareness and to provoke an initial reaction to transhuman ideas and technologies. A qualitative approach was selected to give depth and insight to the data, so that as well as a binary 'yes/no' response the data could reveal the reasoning behind the acceptance or rejection, whether it applied to transhumanism as a whole or just elements and whether this response might change under various condition. Focus group discussions were chosen as the method of data generation in order to discern how students might respond to and interpersonally negotiate the acceptability of transhumanism and relevant technologies: individual interviews would not have permitted the researchers so readily to see how ideas were challenged and developed on an interpersonal basis. Additionally, if transhuman issues become relevant it is likely that decisions regarding them will be made interpersonally. Focus groups also enabled more participants to be interviewed in a shorter space of time.

Participants:

In total there were 19 participants (8 female, 11 male) spread across three groups of five and one group of four. The mean age was 21.5 with a range of 9 and a standard deviation of 1.9.

Participants were selected on the grounds that they were students currently in full time education. Lengths were taken to try and achieve as varied a sample as possible. This meant that the study invited students at any stage of their studies (first years to PHD students) and from a range of ethnic backgrounds (including British, Chinese, European, Kiwi and Sri Lankan). Social networks and clubs were used in obtaining the sample and chocolate was provided as extra incentive as was cash when necessary. Effort was made to ensure each group was varied and that no group consisted entirely of participants familiar with each other.

The participants had no particular investment or interest in the topic of transhumanism. Students were chosen in part for their age which makes them likely candidates for transhuman technologies in the future. As discussed earlier, a truly representative sample would have been hard to obtain for practical reasons. However, it is probable that members of this group will

graduate to become members of the general public who will likely be forced to deal with the issues surrounding transhumanism. Students are also accustomed to critically evaluating a topic which may add more insight to the data. Ultimately however these results will only truly be applicable to (British) students and so further research will be required. Participants' names have been changed for anonymity.

Procedure:

Upon agreeing to participate in the study each participant was sent an information sheet via e-mail detailing what the study would entail (see appendix 1) and were also presented with another once they had arrived for the focus group (see appendix 2). This was necessary both for ethical reasons and to prepare them for the study. Participants were then asked to read and sign a consent form (appendix 3) and to fill out a demographics questionnaire (appendix 4) in order to provide a detailed picture of the sample.

Once this was complete the technician would begin recording and the discussion would commence, with additional reading materials used to facilitate participants' understandings at various points throughout. Typically the groups lasted around 40 minutes, after which time participants were debriefed, thanked and given the opportunity to ask questions before leaving.

Development of the Interview Schedule:

The lack of prior awareness for the topic meant that it was necessary to present participants with a 'Transhumanism Information Sheet' (see appendix 5) during the course of the interviews. Additionally, as the idea was anticipated to be so alien for participants it was decided that the study would utilise vignettes (see appendix 6) to further facilitate this understanding and force the group to imagine real-life scenarios in which transhuman technologies might be used. These interventions created a time element within the transcripts where understanding was facilitated at certain points throughout the discussion. Questions throughout remained flexible and varied from group to group to allow the interviewer(s) to respond to participants' comments and to create the feeling of an informal 'relaxed conversation'.

Analytic Process and Strategy:

The focus groups were then transcribed (see appendix 7 for an example), content coded

and subjected to thematic analysis (Taylor & Bogdan, 1984), a method used to identify themes and sub themes existing in a data set which aim to organise and describe the points raised in the discussions. The process involved first familiarisation with the data, then note-taking which would begin to facilitate the emergence of recurring themes within the material, with these 'themes' constituting broad areas of discussion that hopefully capture some of the scope and detail of the data in a more succinct form. Smaller themes were narrowed down and grouped together under broader headings constituting the 'main themes' containing the more specific 'sub themes'. Thematic analysis has rarely been clearly defined or standardised however, possibly due to its highly flexible nature.

Thematic analysis was chosen for this aforementioned flexibility, as it is not bound by specific theories or epistemologies unlike other methods of qualitative analysis such as IPA or grounded theory (Braun & Clarke, 2006) and for its relative accessibility and simplicity. As thematic analysis is neither explicitly essentialist nor constructionist, this meant the data could be interpreted without being driven by theory although it should be noted that this study was partially informed by theories of by theories of attitudes and social representations to allow slightly more scope for interpretation within the analysis. In this sense it can be considered a contextualist analysis; acknowledging the possible origins behind the data while remaining focussed on the material, which hopefully results in a reflection of the data with interpretive elements. Analysis was also inductive as far as possible, that is selecting themes using a 'bottom up' approach (Patton, 1990). At the same time however it was intended that analysis examine themes existing at a latent level, to provide insight into the underlying concepts beneath the surface of the transcripts.

However, as the researcher should theoretically have a good understanding of the research questions and the issues surrounding the topic of discussion (transhumanism), this need not necessarily be viewed as an entirely negative scenario. Indeed there are benefits to be had from the researcher bringing their own experiences of a topic to the table (Coyle, 1996). What we should be left with is a dynamic interaction between the data reflecting participants' meaning-making and the researcher's interpretive framework.

ANALYSIS

Table 1: Themes and subthemes generated through data analysis

Themes	Constituent Subthemes
Uncertainty about what constitutes 'transhumanism' and related issues: working towards definitions	• Initial lack of awareness of 'transhumanism' • Representations of transhuman technologies: 'science fiction', 'far-fetched' and analogous current technologies (including laws/public attitudes relating to these) • Querying borders and definitions within and surrounding transhumanism
Consideration of potential individual implications of transhumanism at an individual level: weighing potential risks and benefits	• Initial emotional responses from the 'coolness' factor to reservation and fear • Interest or lack of interest based on subjective perceived usefulness/practicality of suggested enhancements • Consideration of psychological implications: identity, dependency and motivation
Concern for (more) global potential socio-economic impact of transhumanism	• Issues surrounding cost/allocation and the threat of greater social divisions • Anticipated problems in supporting a larger population both in terms of resources and physical space • The implications of understanding transhumanism in relation to 'nature' and 'balance' • Representation of progress and change as positive and/or inevitable
Mistrust concerning regulation and distribution by governing bodies as well as society, technology and humanity in general	• Potential for transhumanism to be used by government, military and others as a weapon or as a method of control • Wariness and mistrust of/dislike for technology: a desire to return to 'simpler' times
Moral concerns about transhumanism:	• Representation of performance

'fairness' and 'equality'	enhancing technologies as 'cheating' • Potential perceived implications of transhuman technologies for social equality: a 'level playing field'? • Transhumanism as an inappropriate priority in a world where there are more 'pressing' concerns

Over the subsequent pages, these themes have been analysed and described in detail. Due to restrictions in space however two themes have been explained in less detail. Reasons have been given for the reasoning behind selecting certain themes over others under the respective headings.

Uncertainty about what constitutes 'transhumanism' and related issues: working towards definitions

Before participants could engage in an informed discussion regarding the feasibility and acceptability of transhuman technologies, they first had to understand the term and conceptualise what precisely constituted 'transhumanism'.

Initial lack of awareness of 'transhumanism'

Initially participants demonstrated a general lack of awareness of the nature and potential content of the category of 'transhumanism'. Only one participant reported any prior experience of the word and its meaning, with this being derived from science fiction, although some others had heard of the idea under different names. Most however were unaware that these technologies were being developed and/or had not considered what their repercussions may be. All subsequent opinions then were based on the information sheets and the discussions themselves.

Representations of transhuman technologies: 'science fiction', 'far-fetched' and analogous current technologies (including laws/public attitudes relating to these)

Some participants, even when given detailed information on recent breakthroughs, still rejected the concept of transhumanism on the grounds that it seemed too 'far-fetched'. This was often also the case with individual technologies, particularly the idea of an integrated 'brain chip'. For example:

‘I think it's so far-fetched I can't imagine it ever happening.’ (Bethan, Group 1)

In order to conceptualise transhumanism and envision the potential implications of the technology, participants often seemed to draw on relatable ideas and themes. In particular their sources for comparison were analogous current technologies such as In Vitro Fertilisation (IVF) or cosmetic surgery and science fiction films, books and series. For example:

> [When asked if they agreed with the concept of enhancing humans] ‘No. Because I watch Heroes [a television series about super heroes, with the latest series dealing with the ability to ‘give’ powers to people] and it's not good.’ (Geoff, Group 3)

> ‘But, I'm not sure (.) I think I probably would have said a similar thing about IVF: these kids come out and they could be (.) err it might not have worked one hundred percent but they might have this benefit but they might have this drawback as well.’ (Heather, Group 1)

This helped them to imagine the technologies and to consider their implications. The processes that may be operating here could be those identified by social representations theory. Moscovici (1963) described people as using two main methods for rendering the unfamiliar more unfamiliar: anchoring and objectification. ‘Anchoring’ involves the process of integrating the new object or concept into existing frameworks – in this case science fiction or analogous current technologies – in order to take away the fear of the unknown and to provide real examples and comparisons to draw upon when evaluating the new concept. This meant that participants would often discuss the pros and cons of current procedures such as IVF in order to consider whether techniques such as gene doping would have similar consequences. This resulted in mixed opinions and debate regarding the technologies. Often, however, even these views of current technology were themselves heavily influenced by the media and perceived popular opinion. For example:

> ‘In America poor people will live less time because they don't have access to hospitals (.)

but there's not massive uproar about it.' (Michael, Group 3)

'But is this [gene doping to improve musculature] a bit like kind of (.) the guy's version of breast implants because basically it kind of seems to be similar to that and that is kind of allowed. As in it's legal to have it I'm not sure if it's right or not, um...' (Heather, Group 1)

Here it seems that social influence is playing a part in participants' decision making, i.e. if they cannot decide if something is acceptable, they will look to the law or what they perceive to be considered 'acceptable' (possibly as understood from the media). This social influence is demonstrated in the above quotations where a lack of 'uproar' about inequalities in health care makes it seem more acceptable, as does the legality of cosmetic surgery – that others have decided to accept these ideas may be reason enough to do the same. How this social influence affects their opinions is likely to have a knock-on effect on their perception of the related future transhuman technologies, as is suggested by the following quotation:

'It would definitely be majority influence I think. Um (.) if everyone else in the world is doing it it would then be acceptable because everyone else is and I wouldn't see anything wrong with it.' (Bethan, Group 1)

Where science fiction was used as an anchor however, its speculative nature meant that participants seemingly chose an unknown quantity to understand an unknown quantity. Such anchoring therefore fails to eliminate the 'fear of the unknown' and may have been partly responsible for some of the fear that was exhibited throughout the focus groups. For example:

'I remember seeing a TV show about this brain chip thing where they all had chips on their heads and it was all controlled by a massive computer, sort of keeping everyone alive.' (Daniel, Group 2)

This general sense of 'foreboding' is discussed more fully under the fourth major theme.

Querying borders and definitions within and surrounding transhumanism

Even when participants had grasped the concept of transhumanism and begun a discussion on its implications, they had difficulties in defining the issue. They found there was a 'fuzzy line' between transhumanism and other ideas such as training or using technology to help recovery from adverse health conditions/situations. For example:

> 'I think that's a bit different though because that depends on how much work you put into it. This transhumanism [gene doping] is just an injection then you get it. You don't have to try but the Nintendo DS [a hand-held games console with a popular 'brain training' game], the brain training or whatever, it depends on how much you try; it's like anything else it depends on how much you work.' (Anthony, Group 1)

This is an issue that is found in some of the literature on transhumanism (Miah, 2003; McNamee & Edwards, 2005) and so it is not surprising that the participants would find this to be a problem. This uncertainty seems to stem from cloudy definitions that already exist in day-to-day lexicon; transhumanism is the act of enhancing a human but what defines 'humanity'? What defines 'enhancing'? For example:

> '[After reading the transhumanism information sheet] What do you mean by the 'classical sense' of a human being? [...] But then what is 'classically human'? I mean, what's your definition?' (Aaron, Group 2)

> 'It's like beauty is in the eye of the beholder (.) everyone has a different idea of what is attractive, what is perfect, I think someone's idea of perfect could be completely different to mine.' (Harriette, Group 3)

Throughout the course of the discussions, participants came to a rough understanding and vague agreement as to what constituted transhumanism. With this being such a broad topic however they tended to respond more to individual technologies as opposed to transhumanism itself, i.e. while many would be for or against certain procedures, these views were not usually generalised to transhumanism as an idea. For example:

> ‘I think an increase um in intelligence would be quite handy at times. I don't know about being really muscley or super human but just thinking things through to a better level could be handy sometimes. It's the only one [of the transhuman technologies discussed] I'd personally consider.’ (Helen, Group 4)

It seems then that transhumanism is perhaps easier to evaluate when divided into sub-categories based on both the physical procedures themselves and their effects for the individual in question:

> ‘Maybe if it for some reason that sort of thing was classified as transhumanism then maybe a line should be drawn to say in some cases it's okay because you want to train for it and that would give you sort of the deciding factor of it and something you don't train for that wouldn't be acceptable (.) such as tea (.) or caffeine tablets (.) I don't know as you say it's very hard to draw the line.’ (Anthony, Group 1)

> ‘This one [a brain chip] seems different because it's improving himself like his psychological capabilities, his physical capabilities but it's not actually biologically changing him (.) it's in a way more acceptable because he's not got like a biological advancement in way (.) you know?’ (Bethan, Group 1)

It seems that by breaking down the umbrella term of transhumanism into smaller sub-categories it becomes more manageable. These hypothetical differentia or sub categories exist both within and across what is generally meant by the genus of transhumanism. Generally the sub categories that involve the smallest amount of change from the ‘norm’, the largest amount of work on the part of the person benefiting from the technology and the least invasive procedures were the ones that were considered more favourably. The bases for the acceptance or rejection of these are discussed in subsequent themes.

Consideration of potential individual implications of transhumanism at an individual level: weighing potential risks and benefits

This theme will not be analysed in detail due to restrictions regarding space. This theme was selected to be shortened due to its being relatively simple to summarise compared so some of the others. Essentially, after participants had grasped the concept of transhumanism they would have an initial, seemingly emotional reaction as they imagined using them themselves. This ranged from a 'coolness' response (often with reference to superheroes), a feeling that it was wrong or unnatural. This then developed into a weighing up of the individual pros and cons, with some seeing it as useful and others seeing it as uninteresting. Further discussion lead to considerations for the psychological implications of the technologies, in particular it was felt transhumanism could threaten individuality and motivation. It was this line of thought that progressed into the next major theme, the consideration of the larger socio-economic implications. See appendix 8.

Concern for (more) global potential socio-economic impact of transhumanism

As participants covered the potential negative implications of transhumanism on an individual basis it then became apparent among the groups that this would also create broader socio-economic issues if the technologies were made widely available. Once these issues were addressed they normally resulted in stronger opposition for transhumanism as a movement. For example:

> [When asked if they should stop developing transhuman technologies] 'I think if it's available to everyone (.) then no (.) but this is going to be something that's only available to really really rich people isn't it? To being with? [...] And then it's going to create a massive great big divide between all the people who have money and can live longer and people who don't have money. And then all the people who don't have money they're going to die out because they can't live longer. [...] It'll be massive there'll be riots there'll be wars there'll be all sorts of stuff going on. People nicking formulas (.) oh everything's going on! [...] Having said that (.) hadn't even thought about that, literally just came into my head. No it shouldn't be allowed.' (Harriette, Group 3)

Issues surrounding cost/allocation and the threat of greater social divisions

One potential difficulty that was raised a lot was the distribution of these technologies. Participants realised that it would be impossible to provide the entire population with identical

enhancements simultaneously and that they would probably be fairly expensive initially. As demonstrated in the quotation above, participants speculated that this could mean it eventually came down to who was wealthy enough to afford the procedures, potentially creating a larger class divide. For example:

> 'I assume there'd be a cost associated with it so then you could get a wider class division, where you'd just have a super human race and poor people? Then you'd have unfair advantages beyond the scope of what another person who can't afford that technology could ever achieve.' (Leona, Group 4)

This was one of the major arguments against transhumanism and was raised in all four groups. One participant even described the potential for different 'strands' of the human race, concerns that seem to echo those of Fukuyama (2002). Some participants however argued that already these divisions exist and are generally accepted and others felt it could also be unfair to deny something to everyone on the basis that some would be unable to afford it, again drawing parallels to current technological divides. For example:

> [When considering whether it would be fair for only the rich to have access to life extension for their children] 'If you go larger than that all of us in this room have grown up in a position of privilege, when you compare it to the rest of the world. Should you then have your kids go and live in rural Africa? Simply because it's fairer for the kids in rural Africa? Or should you have them continue to live here? No you continue to live here. So that's just one step further.' (Aaron, Group 2)

> 'Only really really rich people can go to space. Does that make it unfair?' (Michael, Group 3)

Anticipated problems in supporting a larger population both in terms of resources and physical space

Another key issue raised in opposition to transhumanism was the strain that life-extension technologies could put on resources, with physical space discussed as perhaps the most pressing

concern. The economy poised another problem. Participants felt that these issues existed already as a result of better health care and again that somewhere a ‘line’ has to be drawn. For example:

> ‘So pretty much the world would be too small (.) there wouldn't be enough space for everybody. [...] You've got more people living and living longer and (.) draining everything. Which isn't a nice way of putting it but you know (.) You know what I mean.’ (Craig, Group 2)

It was also considered how societal norms would be affected by having the older generations still around when in the past the youth would be coming in to take over. It was feared that this could lead to a lack of progress and stagnating ideas. For example:

> ‘Probably we'd also end up with very difficult social environments. Where currently we've got it where we've got the natural progression of the head of the family so to speak, head of the company moving on when they get too old (.) but if we did have an elongated life that wouldn't come about we'd get it where people come up from below who were capable of doing it but haven't been given the opportunity because their boss hasn't left yet.’ (Anthony, Group 1)

> ‘It could sort of stand in the way of things because of the traditional view of the older generation being opposed to change. So if you've got some old guy and then you've got the younger people with some new revolutionary ideas then the older people would go 'No we've always done it this way. We shouldn't change it if it's working.’ (Daniel, Group 2)

The implications of understanding transhumanism in relation to 'nature' and 'balance'

It was also considered that such progress, especially that which extended life-spans, would be tampering with nature ’and ‘balance and would be ‘put right’. For example:

> ‘You’d probably end up with mass destruction because it's got to reach a balance at some point. If history teaches us anything it's that we've got to reach a balance between err (.)

> that everyone is able to survive at. So if you've got overpopulation you'll end up either with some genetic or some disease coming through, that would wipe most of the population out, or you would end up with self destruction.' (Aaron, Group 2)

Here there is a belief that 'nature' and 'balance' can rectify problems so that humans shouldn't interfere. Interestingly, while some participants expressed an expectation for religion to present an issue for some, it was not actually used as a basis for objection by anyone within the focus groups themselves. Both these findings agree with the results by Shepherd et al (2007) when studying public attitudes towards human cloning, where participants appealed to 'nature' rather than religion. There were no objections to 'playing God' as opposed to the findings of Bates et al (2005) and others. For example:

> 'Yeah I couldn't see a problem with it personally. Because even though people say it's against God well then wearing clothes is against God and having extra-marital sex is against God and everyone does that so I guess, I don't know what do you think guys?' (Harriette, Group 3)

Representation of progress and change as positive and/or inevitable

Not all socio-economic implications were considered to be negative however and in some cases participants seemed to view it as the 'next step'. While this was not necessarily positive, it was certainly considered inevitable and it was presumed we would adapt in a way similar to that seen during the introduction of new technologies in the past. Here it was acknowledged that some of the concerns currently held might seem irrational once the technologies were in place. For example:

> 'It seems almost inevitable really. Just natural progression really as technology becomes more advanced so I don't see how you could stop it.' (Leona, Group 4)

> 'I think in 20 years we'll all think brain chips are a great idea. We'll have this conversation again but in 20 different countries.' (Charles, Group 4)

This sense of inevitability came from a feeling that 'progress' cannot be halted, as well as an awareness that once the technology exists it will be fairly easy to develop even if not legally. For example:

> 'To a certain extent all this discussion and our opinion is superfluous, because although the UK and the states may regulate it's not going to stop countries like China and India where allot of the research takes place now. Errm. And anyone who wants it could probably go there and get it. If it's undetectable...' (Aaron, Group 2)

It was even argued that the potential for the technologies to be driven underground could be reason enough to legalise them, thus ensuring they are at least monitored and controlled.

Mistrust concerning regulation and distribution by governing bodies as well as society, technology and humanity in general

The concern for socio-economic implications seemed to expose a general pessimism or sense of mistrust for the government, technology and mankind. It was widely feared that transhumanism could be used as either a weapon or as a means of control and many dystopian futures were imagined that again bore resemblance to works of science fiction such as *1984, The Machine Stops* and *Brave New World*. Again this seems to be a result of participants anchoring their understanding in science fiction, but also seems to stem from a general dissatisfaction with current systems and governments.

Potential for transhumanism to be used by government, military and others as a weapon or as a method of control

Many participants saw transhumanism as a weapon that would be used by the military and generally saw this as a negative outcome, predicting an arms race, bloodier wars and abuse of power on the part of the governments.

> 'Yeah because if this technology is already in existence whether or not it become available for mainstream use it will be used secretly by military operations especially in

more powerful countries I imagine. [...] I think it's equivalent to say like the cold war with the nuclear arms race I think you just get the most powerful nations whoever they are now or in the future to see who can get the most powerful army fast enough and um you just get that point where it's total annihilation.' (Leona, Group 4)

'You'd end up with more violent wars. Just be more nasty basically because people would be beat up at...' (Alan, Group 4)

It was seen as an even bigger problem where 'undesirables' might get hold of the technologies. For example:

'Then you've got idiots in charge of compa (.) err countries who have absolutely no connection with reality and err you expect it to work in their country? In Zimbabwe you'd end up with Mugabe having a 30% longer life you'd have the same issue going on for another 40 odd years (.) 20 odd years...' (Aaron, Group 2)

'Um (.) it's like people that, it's a bit of an exaggeration, but people like terrorists if they got suddenly got hold of this and then could run ridiculously fast ad then be able to get in places blow places up and I dunno (.) but yeah if it did get into the wrong hands it could like make an unstoppable people that you can't fight against.' (Norris, Group 1)

This above quotation demonstrates these feelings could be the result of current Western fears about terrorism etc. As well as imagining transhumanism as a weapon, participants also saw its potential as a tool for governments to control their own people. For example it was thought that a 'brain chip' for communication purposes could hypothetically be reverse engineered to be used for mind control or mind reading and so to control soldiers, prisoners or even civilians. Whether this might ever become feasible is unknown but it still presented a concern for the participants who felt this was a real threat. This seems to demonstrate a general mistrust in government and perhaps figures of authority in general. A general sense of conspiracy was unearthed. For example:

> [Referring to possibility of the above mentioned 'mind control'] 'It is, I mean imagine how easy would would be to have a err (.) a nationalistic government in power who controls your every move (.) it would be ultimate for them.' (Aaron, Group 2)

This general mistrust of government is also partly the reason for the concerns regarding distribution of these technologies, with participants feeling that the government would be unable to regulate its use properly within or between countries.

> 'Well if it wasn't controlled by money it would then become like part of the postcode lottery probably' (Heather, Group 1)

> 'Yeah that's the thing isn't it and it could be gradual couldn't it? People keep pushing the boundaries further and further. Oh ok, we'll just let all babies be a little bit more muscular yeah and then all babies can run faster this year and and now it's acceptable to let them yeah swim fast as well.' (Anthony, Group 1)

This second quotation is an example of the 'slippery slope' argument (Schauer, 1985), that even if the technologies are introduced in a limited capacity they will still eventually grow in their use and prevalence. Further it was argued that even if able, governments might not be trustworthy enough to regulate such technology:

> 'The problem is who will regulate it? Um cos fair enough you've got the heads of each country, the governments of each countries (.) but clearly throughout the world a lot of those have proven themselves to be completely incapable so um [...] and who's going to stop everyone else from having. It's a bit of a power trip thing isn't it like for instance. Um I'm not sure whatev-, but I know whatever regulations are in place will be abused. For instance with like the nuclear weapons you've got like the USA going in and saying no you're not allowed nuclear weapons but we're allowed them. So it doesn't matter what regulations are in place whoever takes the position of power assumes that position will just abuse them anyway and use them for their own good.' (Anthony, Group 1)

Here nuclear weapons are being used as the analogous technology and the quotation also seems to harbour some hostility towards current policies used in America. In particular it seems there is a belief that the US has been hypocritical in its attitudes toward nuclear weapons which may be linked to the war in Iraq. This is another example of current issues colouring participants' views and perhaps leading to more cynicism than they might otherwise have had. It is possible that issues such as the economic crisis (also raised in relation to these technologies), terrorism and the war in Iraq have made people more weary of the government's integrity and competence than they might otherwise have been.

Wariness and mistrust of/dislike for technology: a desire to return to 'simpler' times

It seemed that a fair proportion of the participants also disliked technology itself, or at least felt it was unreliable and perhaps already too pervasive in day-to-day life. Drawing comparisons to cars and computers that can break down and crash, or to current medications some of which come with a host of unpleasant side effects; participants were sceptical of the reliability of these new technologies. As these would be integrated into the individuals themselves, it was thought to be an even bigger problem should they malfunction. For example:

> 'Thing is though like technology constantly goes wrong like the computer crashes all the time. Surely if it's in your head then the effects are going to be massively disastrous.' (Leona, Group 4)

It was also discussed that the problem would be exacerbated if we had become dependent on these transhuman technologies and then were no longer able to use them.

> 'So if that's what it's like now, which I reckon is worse than it was in the 1950s but that's just my way of looking at things, but if it goes past that then there's if something goes wrong it's going to cause even more problems; you know if one stock exchange crashes half the world's brains stop working, the population of China dies.' (Craig, Group 2)

For this reason, among others, some participants seemed to feel that we already are too dependent on technology and expressed a desire to return to 'simpler' times. They began to

question whether the progress we've already made has necessarily been entirely positive.

> 'Yeah well for me personally I thought it was a better way of life when you had little villages you had one butcher and one thing and one this.' (Craig, Group 2)

> 'It's only because it's there that we consider using it. I suppose in the past we'd never have had like half the things that we had now. Then it's like surplus improvement, sometimes if we're like using technology to make things better that don't necessarily need to be made better and (.) if we (.) like if we didn't know about tummy tucks we would be like you've had a baby that's normal. And it should be like that. It shouldn't be kind of get rid of that kind of thing I think it should just be normal. I think the way things are today that's just a bit wrong.' (Rachel, Group 1)

Moral concerns about transhumanism: 'fairness' and 'equality'

Due to space limitations and because of its high degree of overlap with other themes, this final theme and its related sub themes will not be discussed in detail. In broad terms this theme dealt with the concept of 'fairness' and a 'level playing field'. Participants objected to transhumanism here on the basis that it gave users an 'advantage' over non-users; particularly in sport where there was unanimous opposition but also in other contexts such as education and careers. It was noted however that in some cases enhancement could bring everyone up to the same level so creating a 'level playing field', a scenario that was seen by some to be positive and to detract from what it means to be human. However it was also established that most participants would use transhuman technologies if 'everyone else was' so that it was not they who were at a disadvantage. It was also felt that this would make it 'feel' more acceptable. See appendix 9.

Reflective Box

In keeping with the recognition of the inevitable role played by the researcher in the qualitative research process, I decided to include some personal reflections on this process in the report.

Conducting the focus groups proved challenging for several reasons (other than initial

nerves). One problem was the disparity between my experience of the topic and theirs and they would often raise points or arguments that were perhaps irrelevant, or to which I knew the counter-argument. I had to try to find a balance between providing them with the information they needed to fully understand the issue while at the same time being careful not to influence their decision in any way or run over what they had to say. Continually pointing out errors could also be counter-productive if it made other participants afraid to speak up.

Another problem I found was getting participants to speak (more of a problem at the start of the groups) and again here I had to try and provoke them into a reaction without heavily influencing their opinions. Again presenting a counter-argument could stimulate debate but I had to be careful not to forcibly affect their decisions. One way to do this was to distance myself from the arguments with phrases such as 'it has been suggested that…'

My own pre-existing knowledge and opinions of transhumanism will also have likely coloured my selection of data to include in the themes and sub-themes. Indeed it often felt unnatural going against my own beliefs and reporting arguments against transhumanism that did not make sense to me. Hopefully this is a sign of a balanced interpretation.

OVERVIEW

The first major finding of this study was that transhumanism is not a subject that the students in these focus groups are not fully aware of and nor are they aware of the technologies currently being developed. Once the concept had been fully explained, a general assessment of the themes and subthemes raised in the discussion gives the impression that participants are opposed to the movement. This opposition seems to stem from several issues.

In particular participants were wary of the socio-economic implications of transhuman technologies and repeated many of the concerns voiced by bioconservatives such as Fukayame (2004). The two biggest concerns here were regarding the population and a potential 'divide' between posthumans and 'ordinary' non users. This latter idea was particularly unacceptable to participants who expressed a need for equality and a 'level playing field'. Other threats included a potential lack of motivation to improve oneself (and so society as a whole) naturally and the moral consideration of 'fairness', with most objections mirroring those voiced previously by bioconservative authors. Others were mindful of transhumanism being used as a weapon by governments, criminals or terrorists. Partly this might be a result of current issues colouring their perceptions. Some of these fears also seemed to stem from participants anchoring their understanding in science fiction which commonly portrays similar technologies going wrong or leading to dystopian futures.

Understanding also came from analogous current technologies however such as IVF and human cloning and this led to more acceptance although reluctance still came from the perception of transhuman technologies as 'unnecessary' and therefore unacceptable. That is to say that in cases where a patient was injured or under threat of disease (as is the case with much of the analogous technology) the very same procedures would be considered permissible. For this reason comparison was also drawn to cosmetic surgery and performance enhancing drugs which are also medical techniques that serve to enhance rather than heal. Here participants sometimes expressed the view that as these technologies are acceptable (at least legally) and have so far proven relatively harmless, then maybe similar transhuman technologies should be

too. In keeping with this concept, most participants stated that they would consider using transhuman technologies if 'everyone else was'.

Transhumanism was also considered acceptable under certain other conditions: where users still had to put work in to improve their abilities, or where it seemed as though a small alteration could greatly improve a user's happiness. Some procedures/techniques were discussed favorably that could only loosely be defined as transhumanism but that were nevertheless related. These included the Nintendo DS 'Brain Training' game and Oscar Pistorius, the athlete who tried to compete in the Olympics using bionic legs (Wolbring, 2008). Through discussion it was discovered that transhumanism was subject to 'fuzzy' definitions and that plastic surgery or caffeine could be considered forms transhumanism. This seems to stem from deeper issues surrounding definitions of commonly used terms such as 'humanness' or 'enhancement', both of which are subjective to a degree. A similar observation was made by McNamee and Edwards (2005) who distinguish between 'strong and moderate conceptions' of transhumanism. These unclear definitions made it harder to assess the topic as a whole which suggests that dividing transhuman technologies into more manageable categories could make it easier for the general public to assess. This may also help consumers come to terms with the concept if it became mainstream and perhaps governments' law-making.

This study is not without limitations however, one of the biggest being the relatively small sample and its relative homogeneity. Students were chosen for practical reasons and because their generation is currently most likely to be affected by the technologies. However it would be interesting to see whether non-students, or older or younger participants would respond in similar or different ways. Specifically students may be more accustomed to critically assessing such issues, while older participants may have more experience to draw on and may find it easier to imagine being in the position to make decisions involving children or careers.

Further evaluation of the study and its findings can be made in light of Elliott et al.'s guidelines for qualitative research (1999). It is important to note here how the researcher might have affected the direction of the focus groups and the selection of material for the themes (see the reflection box). Likewise, personal opinions and experience will have coloured the views of

the participants and it is limiting that few explained the experiences that shaped their opinions. This effect is likely to have been minimal however as only one reported any previous knowledge of transhumanism. No attempt was made to assess the credibility of the themes and sub-themes, again due to restrictions of time and space. They make intuitive sense to this author and do appear to concur with the papers and studies mentioned in the introduction but would benefit from future review.

From here it seems the first step is to raise awareness of transhumanism, (particularly if it is as inevitable as was suspected within the groups), as this would allow individuals to make more informed decisions regarding the technologies and would lead to further research and preparation. One participant specifically stated a need for these technologies to be explained if they are to become accepted. Future studies could look at public opinions using a larger and more varied sample, perhaps through a survey or poll. It would also be beneficial to try and outline exactly which technologies are considered permissible and which are not and what regulations can be put in place to make sure they're controlled in a manner that pleases the most people. This could further be facilitated by coming to an agreement on exactly what constitutes 'transhumanism' and whether there are distinctions to be made within this category. Such categorisation would be most useful if based on data gathered from similar qualitative research. Generally more discussion and preparation is needed if transhuman technologies are going to be successfully handled when the time comes.

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APPENDICES

Appendix 1: Initial E-mail

Thank you for agreeing to participate in my dissertation study. The study will be looking into students' reactions to 'Transhumanism' and 'Transhuman' technology and will ask you to take part in a supervised and loosely structured group discussion (of roughly eight participants). Here you will be asked to discuss your views on the subject and to consider several hypothetical scenarios in which someone might have to make a decision regarding a specific procedure. The content of these discussions will be recorded and analysed to identify recurring themes and behavioural intentions.

This discussion will be taking place on Wednesday the 10th of December at 10am in 16AD04**.**

The study will be confidential and all names of people and places etc will be changed. You are invited to contact me via this e-mail address (ps51as@surrey.ac.uk) if you have any questions regarding the study or would like to see a copy of the results and write up once completed (March 2009).

Many thanks and I look forward to seeing you at the discussion,

Adam Sinicki

Appendix 2: Information Sheet

Welcome and thank you for agreeing to participate in this study. My name is Adam Sinicki and I am doing this research for my dissertation under the supervision of Dr Adrian Coyle. The study will be looking into students' reactions to 'Transhumanism' and 'Transhuman' technology.

Transhumanism is a school of thought that promotes the use of technology to enhance physical abilities, eliminate aging and disease and generally improve the human condition through science. The issue is fairly controversial and there are many arguments for and against the development and implementation of such technology. It could become a key social issue in the near future, yet there has so far been very little research into how the general population will view these ideas and whether such 'enhancements' would be generally accepted.

The purpose of this study then is to look at how the public, and specifically students (for whom these issues may well become relevant in later life), will perceive the movement and some of the technologies currently being developed. This will be achieved using supervised and loosely structured group discussions (of roughly eight participants) where you will be asked to discuss your views on the matter and to consider several hypothetical scenarios in which someone might have to make a decision regarding a specific procedure. The content of these discussions will be recorded and analysed.

The study will be confidential and all names of people and places etc will be changed. You are invited to contact Adam via e-mail (at ps51as@surrey.ac.uk) if you have any questions regarding the study or would like to see a copy of the results and write up once completed (March **2009).**

Appendix 3: Consent Form

Consent Form

- I, the undersigned, voluntarily agree to take part in the study on Transhumanism.
- I have read and understood the information sheet provided. I have been given a full explanation by the investigators of the nature, purpose, location and likely duration of the study, and of what I will be expected to do. I have been given the opportunity to ask questions on all aspects of the study and have understood the advice and information given as a result.
- I understand that all personal data relating to volunteers is held and processed in the strictest confidence and in accordance with the Data Protection Act (1998). I agree that I will not seek to restrict the use of the results of the study on the understanding that my confidentiality is preserved.
- I understand that I am free to withdraw from the study at any time without needing to justify my decision and without prejudice.

I confirm that I have read and understood the above and freely consent to participate in ths study. I have been given adequate time to consider my participation and agree to comply with the instructions and restrictions of the study.

Name of volunteer:
(BLOCK CAPITALS)

Signed:

Date:

Name of investigator/person taking consent:
(BLOCK CAPITALS)

Signed:

Date:

Appendix 4: Demographic Questionnaire

BACKGROUND INFORMATION

To begin, I'd like to get some basic information about you (such as your age, education, occupation etc). This information will be used to demonstrate that a range of participants took part in this study. This information will never be used to identify you in any way. However, feel free to skip questions that you would prefer not to answer.

1. Are you
(tick the appropriate answer)

   Male __ Female __

2. How old are you? [ ] years

3. How would you describe your ethnic origins?

   Choose one section from (a) to (e) and then tick the appropriate category to indicate your ethnic background.

(a) White

British __

Irish __

Any other White background, please write in below

_____

(b) Mixed

White and Black Caribbean __

White and Black African __

White and Asian __

Any other mixed background, please write in below

_____

(c) Asian or Asian British

Indian __

Pakistani __

Bangladeshi __

Any other Asian background, please write in below

_____

(d) **Black or Black British**

Caribbean __

African __

Any other Black background, please write in below

_____

(e) Chinese or Other ethnic group

Chinese __

Any other, please write below

_____

4. What is your highest educational qualification?
(tick the appropriate answer)

None __
GCSE(s)/O-level(s)/CSE(s) __
A-level(s)/AS-level(s) __
Diploma (HND, SRN, etc.) __
Degree __
Postgraduate degree/diploma __

5. What is your current occupation (or, if you are no longer working, what was your last occupation?)

_____

6. What is your current *legal* marital status?
(tick the appropriate answer)

Single __

Married __
Civil partnership __
Divorced/separated __
Widowed __

7. a) Do you have any children?
(tick the appropriate answer)

Yes __ *(go to part b)* No __ *(end of questionnaire: thank you)*

b) How many children do you have?

[ ]

Appendix 5: Transhumanism Information Sheet

Transhumanism Information Sheet

'Transhumanism' as defined by the World Transhumanist Association is 'The intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through applied reason, especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities… The study of the ramifications, promises, and potential dangers of technologies that will enable us to overcome fundamental human limitations, and the related study of the ethical matters involved in developing and using such technologies.'

In other words, it is a school of thought that promotes the use of technologies that aim to enhance human ability and that could eventually lead to 'posthumanism'; a condition where an individual has been altered to such an extent that he/she may no longer be considered human in the classic sense. To this end transhumanists devote time and energy to considering the technological and ethical challenges involved in such a transition. It is seen by some as the natural extension of humanism.

Though these technologies might seem a long way away, many are actually already in development. For instance scientists already know how to permanently alter DNA for a variety of purposes including increased speed and strength. The procedure involves a single injection for permanent results and there have been several successful studies done on animals. It is suggested that we may see this technique used by humans as soon as the 2012 Olympics.
Meanwhile, in an attempt to help paralyzed patients, researchers have already developed computer/human interfaces that can be controlled by the power of thought alone - an area that the military has shown interest in.

Other examples of transhuman technologies include: gene doping; implanting microchips; the use of drugs to extend life spans or increase cognitive ability; methods to remove pain, illness or old age; or further in the future even the 'uploading' of human consciousness. To an extent

human cloning, designer babies and other technologies are also examples of transhumanism and even some currently available procedures have a decidedly transhuman bent such as cosmetic surgery and performance enhancing drugs.

All these technologies have large implications in a range of fields and it is likely transhumanism will be a hot topic over the coming decades. Obviously there are many ethical issues surrounding such procedures and a surprisingly limited amount of literature for such a controversial and contemporary topic.

Appendix 6: The Vignettes

Vignettes

1. J is a university student who excels in his studies but is socially withdrawn. Partly J lacks the confidence to socialise due to his slight fram but he finds it very hard to put on muscle and has little time to get to the gym due to his time-consuming studies.
Through a friend however he has recently become aware of a form of gene doping that can permanently block the production of myostatin in his body. This in turn would cause him to develop far more muscle tissue with no extra work on his part which he believes would bring him greater confidence and also more success in attracting partners. The process requires a single injection, is entirely safe, within J's budget, and such mutations have been known to occur naturally in humans.

2. T is an Olympic athlete whose ambition it is to run the 100 metres at the London Olympics in 2012. He has recently come into contact with a geneticist who can provide him with a non-permanent form of gene doping that will cause his DNA to express an extra type of muscle fibre found in many mammals but currently dormant in humans. This type of fibre is faster than the fast twitch muscle fibres that we normally use when sprinting and it will give him a considerable edge over the competition. The procedure is banned by the Olympic committee but is entirely safe and undetectable.

Should T consider using such a technique? What are some of the ethical issues surrounding the method?

3. N is a middle aged business man who is normally at the cutting edge of technological advances that can improve productivity in the workplace. Recently his colleagues and friends outside of work have been upgrading themselves with 'brain chips' that allow them to interface with machines via the power of thought alone, communicate with one another, store information and more. The chip requires a small keyhole surgery but is fairly affordable for N.

Should N embrace or reject such technology? Why?

4. K has just learned she is pregnant with a baby boy. In a position of privilege she is able to afford a procedure for the child that would alter the expression of several genes (specifically age-1, daf-2 among others) responsible for regulating Insulin-like Growth Factor (IGF-1). This would result in cells less sensitive to insulin which in turn could increase the child's life-span by as much as 30% as well as having the side effect of improving its resistance to heat, toxins and other environmental stressors. K wants to give her child the best life possible but her husband M is against the idea.

Should K and M go ahead with the treatment? What arguments are there for and against such a procedure?

Appendix 7: Example of a Transcript

Interviewer: Okay, um, I guess we might as well get started as quickly as possible. I'd just like to say thanks again to everyone for coming; because I know you're all very busy but this has really (.) saved my life. I had like, two hours, and I didn't have enough people (.) but I managed to do it in the end. If you could just read the top sheet - the about the study sheet - that'll tell you what we're hoping to do.

Interviewer: Okay, if you're happy with that perhaps you could sign the consent form. If you need a pen I've got one here. Done? Yeah. Okay basically we're talking about Transhumanism, which err, there's not as far as I'm aware anything like this been done before. Aaron are you reading the Transhumanism information sheet? You're not meant to be doing that. Sorry I should have said that. You've got an advantage over everyone else now. So it's just kind of like a laid back discussion on what your views are on the subject (.) so (.) it's cool.
Okay first of all have any of you heard of the term Transhumanism before? Or before I introduced you to it?

Aaron: Yes.

Interviewer: Oh you have? Where did you hear about it?

Aaron: Just general Sci-fi stuff.

Interviewer: Oh Sci-fi, we get that allot. Um and err (.) anyone else?

Collective: No

Interviewer: Okay, what would you think the term meant, based on what you know, and if the rest of you would just like to hazard a guess (.) what do you understand by the term 'Transhumanism'? Well that little about bit does cover some of it as well (.) So could you maybe just put it into words?

Craig: Pumping humans with drugs to make them stronger, more intelligent and better age span

Fiona: Changing genetic structures maybe?

Interviewer: Yeah

Aaron: I'd have said also the use of technology to enhance...

Long Pause

Interviewer: Yeah well that's basically right except it's err not just like you say - drugs - it's all of those things. Well yeah there is a Transhumanism information sheet in there, as you already know Aaron, could you just have a look it is quite long so (.) They're not in order okay (.) keep you on your toes. And you don't need to read the vignettes page yet.

Long Pause

Is that everyone? Okay, so how has that changed your perception of Transhumanism? Or has it?

Head shake

Fiona: I didn't think it was (.) as (.) wide ranging as that.

Interviewer: Aaron - when you said you heard of it through Sci-fi was there anything specific? Any books

or…

Aaron: Umm (.) Well it's definitely not a hidden topic if you look at a lot of the movies coming out recently (.) errm (.) no not specifically, I've read a number of books that cover the issue.

Interviewer: And use the actual term 'Transhumanism'?

Aaron: Some (.) I've also come across terms like 'Posthumanism' before. And things like X-men don't mention it at all, but it's still a form of Transhumanism

Interviewer: Yeah, Heroes has dealt with it a lot recently (.) Posthumanism is interesting as well. Are there any examples you can think of specifically?

Aaron: The only author I can think of that (.) I think Arthur C. Clarke used it once (.) but the other author I can think of is errm Dan Simmons.

Interviewer: Okay, I haven't heard of him that's interesting. And would you say it's been portrayed in a positive light or a negative light?

Aaron: Very much depends on the author.

Interviewer: Okay so fairly balanced so far (.) Okay well knowing what you know now what do you guys think of that? I mean generally do you think it's moral to enhance an individual's performance?

Daniel: Sort of depends on the circumstances really doesn't it? Because if someone's been sort of an injury and they need something better then I don't see a problem with it. But if it's just because you could be a bit better - it's not really why.

Interviewer: Yeah see that wouldn't really be an example of Transhumanism if you were repairing them up to an 'ordinary' standard - it's when

Daniel: Yeah well beyond that is to make them better so...

Craig: Well if you had that then you'd just have all the rich buggers making themselves faster, stronger (.) and they'd all just be err (.) designer thing then wouldn't it?

Fiona: It takes out the whole effort thing doesn't it, like you admire people who are really great or have really great abilities don't you because of all the work and the effort they've put into it as well and it takes that element out of it.

Jack: Something like the Olympics would be a write off...

Fiona: Yeah

Aaron: Yeah I think all sporting would be a write off if you could change yourself to -

Craig: There is that whole thing that we're only using something stupid like 5% of our brain or something - I don't know what it is - and so to get past that. Which would be handy, but then if it doesn't get past for everyone, if they only do it for people who can afford it then...

Aaron: What do you mean by the 'classical sense' of a human being?

Interviewer: Well um, when they say 'beyond human' I don't want you to think of like (.) spiders with eight arms (.) Just because you know - because it's kind of a blurred line isn't it. I mean when you've changed your DNA are you still human?

Aaron: Because when you're talking here about injecting with err (.) an altered DNA (.) but that alterred DNA could come about naturally as well (.) so to what extent is Transhumanism talking about producing something artificially which could occur naturally?

Interviewer: Um, yeah it can be - just I guess the chances of it occurring naturally are very, very slim. Transhumanism is just working towards the goal of something that heads in the direction of heading away from being 'classically human', but each individual technology doesn't necessarily take you that far.

Aaron: But then what is 'classically human'? I mean, what's your definition?

Interviewer: I don't know, I suppose that's quite subjective (.) I mean what's your guys' definition of classically human?

laughter

Interviewer: That's an interesting point - it's something that comes up quite a lot because it's something that no-one knows I suppose. That myostatin example - there is actually a boy who's been born with that mutation he's only young at the moment though so it will be interesting to see what comes of it.

Craig: What mutation?

Interviewer: You know that myostatin example where you can get strong without doing anything? There's a kid like that who's been born like it. So it's more a problem with regulation you're saying?

Craig: Yeah well if everyone had it it would be (.) well I suppose it would be a good thing because if the whole world was more intelligent then you're going to get better technologies, you're going to be able to develop things to fight against the global warming and all that shit and stuff like that and I don't know develop fission instead of fusion - but if only a handful of people have got it, then eventually it's going to end up corrupting them and crushing the rest of us - and you're going to end up with an elite group of people with superior brain power who are controlling everything and everyone else is going to be (.) well worthless. It's probably going to end up like Russia. Well (.) old Russia. China (.) whatever.

Interviewer: So do you guys agree that if it was available to everyone then it wouldn't be a bad thing?

Jack: It probably would be...

Craig: But it couldn't be available to everyone though...

Aaron: It couldn't be available to everyone (.) but even if it is available to everyone I wouldn't see it as being (.) uniformly good.

Craig: No.

Fiona: Well it, it would, if it, you know age, and (.) what am I trying to say (.) if you can live for a ridiculously long length of time it would cause a lot of population problems. So you know what's the solution to that going to be?

Aaron: Probably we'd also end up with very difficult social environments. Where currently we've got it where we've got the natural progression of the head of the family so to speak, head of the company moving on when they get too old (.) but if we did have an elongated life that wouldn't come about we'd get it where people come up from below who were capable of doing it but haven't been given the opportunity because there boss hasn't left yet.

Daniel: It could sort of stand in the way of things because of the traditional view of the older generation being opposed to change. So if you've got some old guy and then you've got the younger people with some new revolutionary ideas then the older people would go 'no we've always done it this way' - we

shouldn't change it if it's working.

Craig: So pretty much the world would be too small (.) there wouldn't be enough space for everybody and ideas...

Aaron: I guess if it goes hand-in-hand with space exploration then we might have an answer.

Craig: Yeah - that would be okay - increasing intelligence so we can go into space and create new colonies and then (.) spread (.) with everyone living to a million.

Interviewer: So do you think that would be a desirable scenario?

Craig: It's not going to happen is it?

Interviewer: Well I don't know (.) we're talking like (.) you know 200 years away...

Aaron: Are you? Because you're talking about having the ability to increase certain (.) errmm (.) abilities through DNA alterations now - that's now, that's today, that's not...

Interviewer: Yeah - you could in theory try it on a human today, I just don't see it as catching on that massively that quickly - but I could be wrong. The soonest I expect to see it, and a lot of people expect to see it, is kind of in the Olympics. But you know, not legally.
Would you say there's any individual elements of it that you would say are acceptable?

Craig: I suppose it could prevent against disease couldn't it?

Interviewer: Certain vaccines could be considered Transhumanism in a way.

Craig: That would be a handy thing (.) but then again you'd have the same problem with too many people. Because you've got the same problem now - of you can cure so many diseases that you've got more people living and living longer and (.) draining everything. Which isn't a nice way of putting it but you know (.) You know what I mean.

Interviewer: Yeah I know your views on...

Craig: Yeah...

Fiona: Yeah on an individual level though, I mean I'm an atheist so I believe once your dead that's the end kind of, so it would be nice if you could live as long as possible (.) so from that point of view I think it's a good thing.

Craig: But would you live like you're living now or would you live dribbling in an old people's home for another 20 years?

Interviewer: Um, well in theory the idea is that you don't age, not that you just live forever because yeah that would suck...

Craig: You don't age at all?

Interviewer: Um yeah, they haven't actually built that one yet (.) but yeah there are technologies that are showing promise.

Jack: So you don't age from the point of...

Craig: So you don't age from taking it?

Interviewer: Well what we'll see later is that they're working on one that could increase your lifespan by about thirty percent, and you just age more slowly.

Jack: Which is more natural I guess.

Interviewer: So would you think something like that would be okay?

Jack: Even then I would have issues like what we talked about.

Craig: It would need to go hand-in-hand with space really. Otherwise you're just going to run out of space on Earth.

Aaron: You probably wouldn't, you'd probably end up with mass destruction because it's got to reach a balance at some point. If history teaches us anything it's that we've got to reach a balance between err... that everyone is able to survive at. So if you've got overpopulation you'll end up either with some genetic or some disease coming through, that would wipe most of the population out, or you would end up with self destruction.

Craig: Basically it would come down to people fighting over food.

Aaron: Or social injustice.

Craig: Yeah.

Aaron: Because effectively if you had people who were able to extend their life and also enhance their ability almost certainly they'd up in a position of power at which point we've got the mass population of the world as you do today, with 90% of the world living below the poverty line or something ridiculous, um (.) they wouldn't stand for it.

Jack: Which would create another divide, a bigger divide.

Aaron: But one based on longevity and ability.

Jack: It's almost a way of exaggerating the kind of problems that we do.

Aaron: Yeah.

Interviewer: Yeah because a lot of these issues already exist with technology available only to certain people. I mean how do you see this as different?

Fiona: Um, I just think - you know - there's so many issues in the world which haven't properly been addressed in developing countries and stuff, that putting time and effort and money into research to, you know, into stuff that's not important yet, we should solve the problems that we have got first before, you know, trying to advance anywhere near perfect.

Interviewer: You don't think maybe Transhumanism could solve some of those problems?

Fiona: Yeah (.) um, but, it's more um, you know a social level I think, a lot of the problems and then it doesn't really apply so. There's loads of economic and political injustices and things like that. I think they need to be addressed before.

Aaron: I guess theoretically in an ideal world, you would already have, this would be introduced as he says - across the population - but we don't live in an ideal world. So it wouldn't be. So we would end up exacerbating the problem we currently have.

Interviewer: So it's more of a practical problem? Do any of you an objection to it on any other basis?

Craig: Morally?

Interviewer: Yeah

Craig: No.

Aaron: I don't think you can hold it back really.

Interviewer: Yeah.

Daniel: I'm sure you would get moral arguments from people about it but I don't really see why, because if you've got the ability to make stuff there's not really any reason to stop - the same with stem cell things - there's the moral thing, but if you can make people live, and make them better and healthier from broken and paralyzed legs then there's not really any argument to say 'no you shouldn't'.

Craig: You're bound to get a load of religious fanatics who'll start going that's not the way that God created them, whichever God they happen to believe in - I dunno, the one of sixty hundred that there are - but they're bound to turn round at some point and say 'they didn't create us this way' and blow up the labs and shit as they usually do.

Interviewer: I haven't had anyone like that yet which is unfortunate.

Craig: No? They'd probably try and rip the camera apart. But err (.) it's bound to happen if you start altering humans.

Interviewer: Do you guys still think you'd be kind of 'yourselves'? I mean are there any identity problems with it?

Jack: Umm (.) inherently I think it will change you. If you are smarter and you are stronger you'll become a different person because you'll be doing things you don't usually do, you'll be acting in ways you don't usually act.

Craig: I suppose it might depend really though, it's all relative to the people around you isn't it? You only base your intelligence really on how you compare yourself to everyone else. Like people now, like bin men - not saying anything against bin men - but bin men now know more about the world and are more intelligent than someone living in the 1800s but they probably don't consider themselves particularly brainy...

Aaron: Mmm.

Craig: So it's all relative. If everyone was more intelligent then it probably wouldn't make a lot of difference to sort of how you view yourself.

Daniel: I don't know, it still could, because if you're sort of making yourself stronger and faster it could sort of take the element out of getting there so it could sort of inherently make you lazier despite the fact you've got stronger and faster.

Craig: Wouldn't you just change the goals? As in if you're stronger and faster you can I dunno whatever, climb around whatever, you just pick harder routes don't you?

Daniel: But then you still, the result of doing that might be to think 'hmmm I could train or I could get another injection and make myself a bit stronger and then I'd be able to do it.

Craig: I suppose then it would only come up against the limits of what they can do wouldn't it?

Jack: Well it, it's already a bit that way with kind of drug doping and things in sports, it's almost heading down that route. If you're going to say 'I'll just inject myself and become stronger'. Forget the training.

Interviewer: Yeah because to an extent that already kind of exists.

Jack: Exactly.

Daniel: Pretty sure that's the result it would go down.

Jack: So people would abuse that (.) Well there's the strong possibility that people would abuse that.

Interviewer: Well err (.) thanks for that that's good so far, um if you pick up your piles of paper we have some vignettes - these are kind of hypothetical scenarios um, in which a technology could be used by an individual - if you could just read the first one and then we'll uh, discuss the implications of that.

Interviewer: Err (.) so what do you guys think 'P' should do? Do you think it's okay for him to use an injection like that?

Aaron: I would object on a err moral stance, simply because, I don't think his um (.) body structure is his issue. I'd say his err...

Fiona: Confidence?

Aaron: Confidence. His social outlook is is more of an issue right, his self esteem. His self esteem is more of an issue than his ability to look one way or the other.

Jack: It's like he's sort of gone for the quick fix option.

Aaron: It's err (.) it's err (.) believing something that isn't necessarily going to make a difference.

Fiona: Yeah I completely agree with that actually, I don't think, I don't think it would achieve what he wanted at all. I don't think having more muscles is going to attract more women.

Interviewer: Do you guys agree with that?

Craig: Yeah it's sort of like the reverse of bulimia...

Interviewer: Yeah it sort of is isn't it? It does exist in a...

Craig: Yeah

Interviewer: Um, would you say it's any worse than if you were to turn to steroids?

Daniel: It's sort of the same thing isn't it?

Interviewer: It kind of is. So you don't think it's any worse than steroids or any better?

Fiona: Well if it's safer (.) it's probably better just in that term.

Daniel: Yeah, just to the extent of self injury from doing it, not from...

Jack: It's just a risk factor, but it's inherently the same process.

Craig: Strikes me as a bit of a dozey vein thing to do really...

Interviewer: Okay, if we were to repaint it, if say he was a climber but he wasn't very good and wanted to

be better.

Daniel: Tell him to climb more.

Craig: Practice more.

Interviewer: Some people though, you know, don't have the genetic capability to be as good as others...

Craig: Do something else. Go and find something else...

Aaron: Incidentally um, climbing is less about your genetic makeup and how much you actually train to climb a certain way. So errm, more muscle yeah great, but it also makes you heavier so you also need to be able to move with that muscle and climbing makes you use not just your strength but also your balance and your head. So you may not be any better simply because you've got more muscle...
Um (.) it says with no (.) it's entirely safe so with no side effects (.) I would find that hard to believe (.) Um changing your, the way your body works, is bound to have other effects other than simply producing more muscle.

Interviewer: Yeah it is fairly hypothetical at the moment so (.) At the moment as it is there is a slight risk of them erasing a gene that you currently have (.) which obviously can result in any kind of terrible thing but this is a hypothetical scenario where they've perfected it. And they have got a lot of ways that they're working on to improve that. Um, in the studies on mice and things they've been completely healthy other than added muscle.

Aaron: A bunch of bulky mice walking around! *Laughs*

Interviewer: Yeah I've got a few photos if you want to see them (.) they're quite weird (.) they look like Mighty Mice. So there's no circumstances? Maybe even if he was a power lifter you still wouldn't...

Jack: Doesn't change it. It's no different to climbing is it?

Interviewer: I guess it's kind of cheating isn't it?

Jack: Pretty much.

Interviewer: So that's a no for that one then? Okay, does anyone have anything to add on that?

Craig: I've got Pinky and the Brain jammed in my head now...

Interviewer: Thank you (.) I'll take that into consideration (.) *Laughter* Maybe that's a mouse who's you know, enhanced his intelligence? It's possible. And the other mouse is quite intelligent too (.) he comes across as stupid but he can talk...

Craig: True that's fairly smart for a mouse.

Interviewer: Yeah. Um okay, if we could move onto the next vignette in that case.
Okay, how does everyone feel about 'T'?

Laughter

Daniel: He's cheating

Jack: It's just basically asking if he should cheat...

Interviewer: Yeah (.) I've generally got a quite negative response to that one. You can't see any reason why that would be okay?

Fiona: No

Craig: No

Aaron: No

Interviewer: Um, would you guys think it would ever be okay if it was introduced to the sport?

Aaron: If they all had it?

Interviewer: Yeah.

Fiona: If they all had it then what's the point? You might as well no one have it.

Interviewer: Yeah. Well some parallels have been drawn to kind of shoes and things - in that in a way you already have a way to enhance performance through money. It can come down to who's got the best equipment...

Aaron: So you're saying that an American team's going to be at an advantage to a central African team because they have the ability to buy - except that, that's been shown not to be true

Fiona: Yeah

Aaron: Because this year a Jamaican won it by a long way. And he doesn't necessarily have the financial backing the Americans are used to.

Fiona: Studies have shown that the black athletes are a lot better at the hundred metres.

Aaron: Yeah genetically...

Interviewer: Yeah well that's actually due to their muscle twitch fibres which is what that one's about - in a way you see that could close a gap that already exists... it's okay because it's natural - is that what you guys believe?

Jack: Well yeah, that's a natural gap, and you would be trying to close that unnaturally.

Aaron: I think if you started introducing this eventually you would move away from sports, you would end up with designer sports, so effectively what you would end up with is someone being genetically modified to be a formula one car without needing the driver as such, so it would change sports entirely. I personally would disagree with it but...

Interviewer: Err what would you guys think if we kind of reached a limit where we weren't breaking records any more? Naturally?

Daniel: Well that actually happened, some of the shot-put stuff, javelin I think. There was some of the records from the 1970s which some people were sceptical about so they just changed the weights and used that instead. Started it again.

Interviewer: I suppose that's another solution. But in a way it's kind of a shame isn't it not to ever improve?

Daniel: It's kind of a shame.

Aaron: I guess though if you take it further naturally you'll end up at a point where you cannot physically - I mean you've reached a physical limit of the materials you're working with. So your bone structure and

your muscle structure cannot physically work any faster.

Interviewer: Yeah there's a maximum speed.

Aaron: And to my mind genetic modification wouldn't change that because you're not going to be changing the limitations of the materials you're working with.

Interviewer: Yeah you could end up breaking bones or tearing ligaments.

Aaron: Unless you go, you know technologies, and they had the South African runner this year trying to get into the Olympics with bionic legs. Not bionic but, non natural limbs, and I guess I mean he didn't make the time that was needed but in a way he had advantage because he had less weight and he had less of the issues that the normal leg structure has that could go wrong so I mean that would be... that's a step further than gene modification though.

Interviewer: Would you disagree with him being in the Olympics?

Aaron: I'm not sure.

Daniel: Because I thought some of the issue was that he was using less energy to run, wasn't that the main debate why they didn't let him in?

Aaron: Um, yeah

Jack: Yeah and there was something like the actual legs he was using, their shape - apparently they do have an extra bounce that you don't get from, you know your legs absorb anything but these would give him an edge.

Interviewer: So do you guys think that would be wrong?

Aaron: I think it would be unfair on the other people he was racing against if he were to win. So he could never win a victory and be seen as having done it off his own back.

Fiona: Mmm

Interviewer: So what about a separate event for Transhumans?

Aaron: Well they've got Paralympics.

Interviewer: Yeah so do you think such an idea for maybe Transhumans would be okay?

Aaron: So what you come up with a Transhuman Olympics? I think you'd eventually see the way the Paralympics have err less err attention as the Olympics, you'd end up with the Olympics not having as much attention as the 'Transolympics'.

Interviewer: So would you guys object to that?

Craig: It's seems like a bit of a waste of time, if you're going on about humans they can't break records anymore (.) why do you want to? Why do you always have to get better and better? Reach a limit and stop there.

Jack: I think it's that whole concept of someone set the standard, you know fairly realistic, I think it's Usain Bolt set the record something 9,66 was it? Something crazy (.) what's the world record?

Aaron: 9,69 I think...

Interviewer: He kind of cheered at the end so he could probably have been quicker.

Aaron: Yeah he's obviously capable of going faster.

Jack: Yeah but there's the concept that whilst it's extremely fast it's a realistic target that we can try and aim towards.

Aaron: And it's still a, one you can achieve simply by being born in a certain way and training very very hard whereas if you bring in the modifications that goes out of the window. I think you destroy the whole basis of all sport, all business, all social standing as we've got now...

Interviewer: It's quite massive...

Aaron: Because it's all based on, in a sense the American dream. I mean you work hard, you get to a certain point. But you'd end up with something like Gattaca, it would be harder for everyone.

Interviewer: On the other hand though I guess you could say then anyone could do it.

Aaron: Anyone could do it but I don't think (.) the race the human race would survive as a social being if anybody could do it.

Interviewer: Yeah, just out of interest for you guys to know, Usain Bolt he smashed what they previously thought was possible - the biomechanics for someone that height, they didn't think he could run at that speed. Apparently it's to do with his feet touching the ground for a short amount of time but putting in enough energy at the same time. Quite interesting (.) Um, if you guys would like to move onto the next vignette please...
Um so what do you guys think of 'N'?

Craig: Brain chips?

Interviewer: Yeah, not like the chips that you eat.

Craig: Yeah no I get it. Brain chips. Riiight, that's a bit crazy.

Interviewer: Yeah it's not actually (.) I'll give you some background information because I had this problem last time. There is um some precursors to this technology they've already created a human-computer interface for paralyzed people where they can move a mouse with just their mind and type on the keys. They've also made a brain implant where you can send an image to another person, so err, who's also got the brain implant and they'll see it in their line of vision.

Craig: Yeah that's a bad idea.

Interviewer: That's a bad idea?

Craig: Yeah

Aaron: Takes a lot of mental power at this stage doesn't it - it takes a lot of training moving a mouse around the screen. Are you saying that's involved in this or are you saying it's been perfected where it's just natural?

Interviewer: Um I imagine as the technology improves it'll become easier as you go on. The way it works at the moment is that err - he's paralyzed and the err firing in his brain that would normally correspond to moving his finger they've just made the chip pick up on that and move the mouse instead. So for this you'd probably have to - but obviously it takes time to learn to move it in that way.

Jack: But beyond the whole work place scenario the chances are that people might start using this for

general living. And that in itself - if you're communicating without speaking it takes away a huge human process. Just walking around thinking and not talking.

Aaron: What control would you have on it? Would you be able to control your thought process or would you just be broadcasting everywhere?

Fiona: Exactly it would be horrible! If everyone could know exactly what you were thinking, you know, there's a reason why you don't express it all (.) you don't want everyone to know.

Aaron: You'd end up with everyone killing each other!

Craig: It does seem like it's going to be a fucked up place doesn't it?

Jack: If you just really hate someone you send them a horrible image...

Laughter

Aaron: Stop it! You get, you know, with a computer people hacking into computers to access stuff could you get people hacking into your brain?

Interviewer: I imagine in theory that they could hack into the chip so they'd have access to as much information as that had access to...

Aaron: But is it vice versa? Actually that's a serious problem - if you could control something through your thought process through the chip, could someone then reverse it?

Craig: Control you...

Interviewer: Um I imagine that's (.) maybe possible (.) I don't know it would only be able to affect the neurons that were connected to the chip...

Aaron: In which case it's like a serious identity card issue...

Daniel: Well like you say the guy controlling the mouse by firing the chip you could surely indirectly cut in between that so making the mouse do stuff without him doing it.

Interviewer: Sure and then I guess that would (.) you could frame him or something...

Daniel: Yeah...

Interviewer: Well they've already actually created a technology where they can control mice with a remote control, which is pretty wrong.

Laughter

Aaron: Right!

Daniel: Not good!

Interviewer: But that is a completely different technology that wouldn't even come under the heading of Transhumanism necessarily.

Craig: It's coming up to Craigtmas here's a remote kids.

Interviewer: Mouse control! That would be amazing though.

Jack: Why?

Interviewer: I don't know why...

Aaron: Well imagine what you could do with it (.) would you have any issue with prisoners anymore? Overcrowded in one place? If you could control them all?

Jack: It's crazy (.)

Craig: Yeah. What if they're stuck in there for the wrong reason? And you're doing it to someone who doesn't deserve it.

Aaron: It is, I mean imagine how easy would would be to have a err (.) a nationalistic government in power who controls your every move (.) it would be ultimate for them.

Jack: You could just like use that for military purposes (.) sending people out onto a battlefield without their own choice. If they were to.

Craig: Go down to the trenches. Run over now! No.

Jack: And you know, who decides who has that power as well?

Craig: Well that will be the ones with the enhanced brain power from earlier, who we made smarter then put brain chips in us, and they'll control us. This is a great new world you're inventing here.

Interviewer: *Laughs* I'm not inventing it!

Craig: I really like this place!

Daniel: I remember seeing a TV show about this brain chip thing where they all had chips on their heads and it was all controlled by a massive computer, sort of keeping everyone alive.

Interviewer: Like Star-Treck

Daniel: It might have been Star-Treck actually, no it wasn't, and basically the computer told them if they took these attachments off their heads then they would die and it had all been programmed into their head just because the computer that if they took this off their heads they would die and it was sort of controlling their lives and making them change their memories and things which sort of brings up the same issue again.

Craig: It was on Doctor Who as well with ear people as well or something...

Daniel: Was it?

Craig: Yeah the whole world stopped for five minutes to have a download or something stupid.

Interviewer: Like the i-Phone!

Craig: Yeah you're turning everyone into i-Phones. I hate i-Phones.

Interviewer: That's the dream!

Craig: I hate iPhones. I hate phones.

Interviewer: Um it is interesting to wonder why they're even building (.) doing tests on controlling mice.

Craig: Military

Aaron: Military

Jack: Military, you'd think.

Interviewer: I'd like to think they wouldn't...

Jack: Usually the most technically advanced situation, people, you know military had the first computer I think.

Interviewer: Well they invented the internet didn't they?

Jack: Exactly it was a military construction.

Aaron: SERN invented the internet.

Interviewer: But was he...

Aaron: That's the Scientific Research Centre in Switzerland.

Interviewer: It was used very early on by the military wasn't it?

Aaron: I believe the military initially disregarded it said it wasn't of interest.

Craig: The trouble we'll get is the military will get onto it then we'll have drones controlled by some dude sat in that chair somewhere and it'll cost no life to go and attack things and they'll just go and blow the shit out of everything and destroy the world. Brilliant.

Interviewer: Presuming, it doesn't errm, it isn't, reverse engineered and that it's used as it's intended what are your views on the brain chip?

Craig: Still a shit idea.

Jack: Still...

Daniel: It just seems to be cutting out the middle man, but then allot of the things you said at this point - communicating with people over a distance, storing information, it's just sort of taking out a middle step.

Aaron: It is a natural step though isn't it? It is the next natural step. If you can get to this point then you know, what's the point in having a social network like Facebook when you can do it straight away?

Interviewer: And it is heading that way isn't it when you consider...

Aaron: And if you're going to start losing out on business opportunities as a result of not being able to connect so quickly, then I think you'll see it being taken up in a big way.

Craig: You say it's kind of heading that way already with you know increased business links and Facebook, different to how it was in the 1950s, but is it better now then it was in the 1950s? More people are stressed, more people are murdered... is it a better world than it was before the technology?

Aaron: It's putting demands on people.

Craig: Like like businesses now, say like, okay from my point of view, when I was working, you'd have a mobile phone now, so whenever you go out somewhere your boss can onto you 24 hours a day, just phone you up scream down the phone to you for whatever reason, but years ago you would never get

that you'd be sent out for the day and left alone and then you'd come back, but now he can phone you all the time you're permanently under stress, you're permanently being watched. You know? And things like that and then obviously with um proper big business like Tokyo where everyone's always phoning you all the time with Stock Exchanges and things like that it's just one big mess and then all you need is one thing to go wrong, one stock exchange to crash and then you go into recession. So if that's what it's like now, which I reckon is worse than it was in the 1950s but that's just my way of looking at things, but if it goes past that then there's if something goes wrong it's going to cause even more problems; you know if one stock exchange crashes half the world's brains stop working, the population of China dies.

Interviewer: I guess we'd be more dependent on technology as well at that point.

Craig: Yeah well for me personally I thought it was a better way of life when you had little villages you had one butcher and one thing and one this. But now that's gone if you go past that...

Aaron: If you go back to the 1930s with the crash in the states, great depression, through natural causes (.) essentially through natural causes with the draught how different is that from today with your current...

Craig: Well the only thing is if it happened again today it would probably cause more disruption and that because it's all, I mean that happened because all the stock exchanges were linked and the rest of it, same as they are today, but with more people today and greater you know technological demand on it it's probably going to cause more damage and more destruction than it did at the time. I don't mind a lot but it seems the more technology increases and the more it's incorporated into people's lives the more devastating...

Aaron: I think we're more vulnerable...

Jack: The more reliant we become on it...

Fiona: Yeah...

Daniel: We've still got the recession at the minute and personally I haven't felt anything different, there's been the massive crash all we've got is I can get a cup of tea for 2p cheaper because of VAT. And I don't really know anyone who's going 'Oh God I've got such a massive issue with this crisis at the minute' just everything seems to be going along as normal.

Interviewer: Partly because we're students though.

Aaron: I can't do a weekly shop under £25.

Interviewer: Oh yeah it has gone up a lot hasn't it?

Aaron: It's gone up a huge amount if you look at Tesco's prices.

Craig: Well I haven't felt anything because I'm essentially living in a bubble living on campus I don't really see the outside world but I know four people now who've lost their jobs because of it.

Aaron: It is affecting everyone.

Aaron: But I agree with you we're much more vulnerable because of this (.) errm because if you look at this issue with the current crisis I would suggest that most of it comes from perception of issues rather than an actual physical issues, and if you've got that much greater connectivity and it's still rumour driven then yeah what could be the consequences?

Craig: It's like Northern Rock really isn't it? There wasn't really anything major going wrong with it but someone said yeah they're going to lose their money, everyone withdraws their money and they go bust. You know if they didn't have the mass communication then it would have carried on and people wouldn't

have lost homes and...

Aaron: But I don't think we're going to go backwards in time (.) I think we're going to naturally get, bring this in. I think this is going to come in.

Interviewer: They've already designed a mobile phone that you integrate into your hand apparently, this is what I learned in the last focus group (.) which is (.) horrible.

Daniel: It seems a bit like an unnecessary risk; it's like key-hole surgery on the brain there's always going to be risks involved in it and a lot more problems than I can see the benefits from it.

Interviewer: I suppose there are other technologies such as um (.) what do you call them it stops you getting a disease...

Aaron: Vaccines?

Interviewer: Vaccines and things.

Daniel: M yeah but they're more, they've got more general benefits than cutting out the middle man I think with this.

Interviewer: Yeah. Going back to what you said Craig about um, you know, how you preferred the 1950s; in retrospect then would you have ceased a lot of the advances we have today if you could?

Craig: I don't think you can stop them really...

Interviewer: But hypothetically, do you think we'd have been better off then if we hadn't have invented say the internet?

Craig: Probably, well pretty much yeah. Well people were generally nicer to each other that's the way I see it. I mean obviously it depends where you go I mean if you went to a little village or if you went to the city where people were getting down trodden, well if you go back even further when their were work houses and that, but essentially it seems the more you sandwich people together and the more you put people into contact with each other the more bad you see, the more negatively impacted people are (.) it's like America for example. America and Canada, they've got the same amount of weapons and what have you but every night on American TV you get bombarded with murders and kidnappings etc and as a result everybody's paranoid and scared. In Canada they don't show so much of that and everybody's, well, you've still got murders and the rest of it, but people generally feel happier and safer, it's just because in America they've been shown so much more of it because of the communication and that?

Interviewer: Do you guys agree with those statements?

Aaron: No

Jack: Not really no.

Interviewer: You think progress is a good thing?

Aaron: Err (.) progress is irrespective to what he's saying, I think, I think people are people whether they lived 200 years ago or today...

Fiona: I think if you look at like measures of happiness and things I think people are just as happy now as they were because I think it's all relative...

Craig: It's just I think the more people get subjected to the bad in the world, the more sort of reclusive and scared they become. They won't talk to the person on the street. I mean even where I live back home you

can talk to the person on the street and say hello to someone and they say hello. You walk through, go on the tube or something say hello to someone and they think you're going to kill them. You know? You can tell difference in where you come from and that and people are just generally more scared when they're subjected to more images of violence. I could be wrong but...

Interviewer: Be interesting wouldn't it to test it, how happy people were then and now (.) someone should do that now then do it again in 50 years (.) be interesting. But yeah um I imagine that many people would have had similar objections to the internet as they have to these technologies. When you imagine how massive it's become it probably would have scared a lot of people. But um, I'm aware of the time so err shall we move on to err the final vignette?
Great okay so what do you guys think of 'K's situation?

Craig: Don't do it?

Interviewer: Don't do it?

Daniel: No.

Fiona: It depends on how long the technologies been around, if lots of people have already used it for a hundred odd years and it's been shown that it's safe and you know...

Jack: I don't know seems like something (.) 30% longer if they got it you know you've got kids outliving their parents (.) wait hang on (.) no that's not right...

Aaron: Parents outliving their kids.

Jack: Sorry yeah. If let's say the child went on to have kids but didn't do the same procedure on their children, the child would live longer than its own kids (.) and that just seems so wrong.

Interviewer: That could happen anyways.

Jack: This is true but you're definitely increasing the likelihood.

Craig: It's back to what you started with though because if you could have therapy an injection or whatever to make yourself bigger faster and stronger well that's exactly the same thing except the kid doesn't have a choice in it because it's just having it done to it.

Daniel: Yeah it's sort of picking and choosing your children you know do you want blue eyes? Do you want them to live longer? Be a boy or a girl? Have blonde hair brown hair (.) whatever.

Aaron: Yeah you would end up with a Gattaca situation.

Interviewer: What's a Gattaca situation?

Jack: You need to watch that film if you're doing this topic.

Aaron: Yeah. But essentially you can pick from birth what you want the person to be. Errm, but then again, 30% extra longer life (.) is there any reason not to?

Daniel: But is there any reason to?

Aaron: Yeah - 30% extra longer life

Daniel: Well, what's just living a little bit long.

Aaron: Resistance to heat! Toxins and other environmental stressors (.) which has just been thrown in

there hasn't it?

Interviewer: No, no it is (.) it's to do with strengthening the actual cells so apparently they'd be strengthened against all things.

Aaron: As a parent I don't think you would you would have a choice - you would go 'okay yes this will give him the best in life' and that's what you aim to do as a parent.

Interviewer: Yeah that's the thing

Daniel: But is there still limits to how much you want them to have the best in life sort of forcing things on them all the time and how much you want them to have their own choice in things?

Aaron: Mmm?

Craig: Is it going to create another divide where only rich will be able to afford it?

Aaron: Yes. Absolutely. But as a parent - you would be sitting there going 'what's the best for my kid?' and if you believe that's the best for your kid, then you'll probably go and do it.

Craig: I suppose they would but I don't think they (.) should. If you look at it from the outside then...

Aaron: Mmm.

Daniel: It's the same as we've seen in lots of different scales. If you've got two school at the end of the road one of them's lots of stabbing knives and shit - and the other end's sort of really nice and everyone gets straight As, you know no-brainer which one you send them to.

Aaron: If you go larger than that all of us in this room have grown up in a position of privilege, when you compare it to the rest of the world. Should you then have your kids go and live in rural Africa? Simply because it's fairer for the kids in rural Africa? Or should you have them continue to live here? No you continue to live here. So that's just one step further.

Interviewer: What do you guys think of that?

Fiona: Yeah I agree, I think if you're thinking from the point of view of a parent then you are always going to want to do what's best for your children. But it would I think it would create another divide.

Interviewer: I find all these things; they're quite different when you think about it individually as to when you think of it, as a whole.

Daniel: As an outside person you're thinking it's a bit of a crazy idea but soon as it was your child and your situation you'd be a lot more inclined to say yes.

Aaron: Mm hm.

Interviewer: Because it's not really - I mean it's the same the divide and the forcing the idea on the child, it's not that different from deciding whether to send them to private school. Really. How would you guys think that was different?

Craig: Well it's not it's just another problem.

Aaron: Less extreme but...

Craig: It's just introduced a whole new can of (.) you know problems. When you've already got all these problems going on already you know where you live what country and all the rest of it, then you, if you

just, if you're introducing all these variables as well then it's just more problems in life.

Interviewer: Do you guys think in that case you should take it away from everybody if only certain people can have it?

Fiona: You can't really do that though can you once the technology's out there you can't really say oh we'll take it back, we'll undo it.

Interviewer: Then do you think now that it shouldn't be invented in the first place?

Daniel: You can't really say you can't invent this and you can't not invent this (.) it's just one of the facts of life - people are going to try and push the boundaries.

Aaron: To a certain extent all this discussion, and our opinion is superfluous, because although the UK the states may regulate it's not going to stop countries like China and India where allot of the research takes place now. Errm. And anyone who wants it could probably go there and get it. If it's undetectable...

Interviewer: I have a zip file on my computer, that apparently (.) I haven't looked (.) but apparently it tells you everything you need to be able to modify yourself. I mean if you had the know how (.) apparently it's not even that expensive the equipment so if you had the know how conceivably anybody could do it.

Aaron: So yeah if you take it to the extreme what you're going to see in 50 years you're going to see two strains of the human being.

Interviewer: Yeah it could happen. That's why I think it's a very interesting topic. There doesn't seem to be enough done on it.

Fiona: Would it then (.) inevitably then it would speed up natural evolution. So you know, Transhumans would out compete the normal humans would die off.

Aaron: Normal humans would become slaves to those who had Transhuman technology.

Craig: The slave trade would come back. Beautiful world.

Interviewer: Everyone's always so negative!

Jack: All because parents want their kids to do a bit better.

Interviewer: Everyone's so suspicious of everyone else.

Aaron: It's human nature.

Interviewer: Yeah it is human nature.

Aaron: Hey well look at the world at the moment, if this is what we've got at the moment (.)

Interviewer: Is it so bad?

Aaron: Then what's it going to be when you can actually increase the divide? I meant the divide is getting huge already, even in the UK. You look at the population living on the border of poverty and you look at the upper levels and if you're going to exacerbate that through actual physical differences it's going to get a hell of a lot worse.

Interviewer: In a way though you could argue that you could actually help it.

Aaron: But you won't! You won't! I mean history teaches that if you've got something you're going to keep

it for yourself and do it for your own even if it's across the UK. It's not the Congo.

Daniel: But how would you feel if you could theoretically give it to everyone?

Aaron: You physically couldn't though (.) The practicality of it - six billion people in the world...

Daniel: Yeah six billion people in a line for an injection (.) I don't think that's going to work.

Fiona: Yeah we can't we can't we don't do it now with medication and stuff...

Aaron: Yeah we have a hard enough time getting vaccines out there, then you've got idiots in charge of compa (.) err countries who have absolutely no connection with reality and err you expect it to work in their country? In Zimbabwe you'd end up with Mugabe having a 30% longer life you'd have the same issue going on for another 40 odd years (.) 20 odd years...

Interviewer: Yeah that's quite a bleak outlook when you paint it like that.

Craig: Seems like a bit of a waste of time and if they were going to put all this time into developing it, then it goes straight into the world, why don't they distribute the vaccines and stuff they've got now and when they've done all that then start thinking about this.

Interviewer: I suppose theoretically you could think that once they became intelligent enough to think of how to you know distribute it somehow.

Aaron: No we're intelligent enough already (.) just not smart enough.

Fiona: Yeah you could kind of (.) you know (.) how far could it really go, if you look at the balance of the Earth of everything on it and how it's balanced and stuff. If we went on and made ourselves resistant to the damage we've done to the environment then we can just carry on doing whatever we want and at some point the earth will change. The environment is going to change so much and it does change quite quickly sometimes that you know, we could just wipe ourselves out by you know (.) ignoring the natural balance that should be there.

Interviewer: Hmm it could help with global warming couldn't it...

Aaron: You're into the realms of absolute Sci-Fi now, um and I guess they are possible. But yeah I guess we will probably wipe ourselves out at some point. But I don't think you can hold it back. I don't think there's any way you can stop this (.) if it's already in the reams of practical now.

Interviewer: Yeah, well I think it's getting to about half past (.) does anyone else have anything they'd like to add before we wrap up?

Fiona: I'm miserable now.

Aaron: Absolutely just all commit suicide.

Interviewer: It could work out really positively...

Craig: We're on the fourth floor...

Laughter

Aaron: No we'd all have to do it at the same time otherwise it won't be fair.

Laughter

Aaron: Give the world back to the animals, oh wait we are.

Interviewer: Quite deep isn't it (.) I haven't found anyone who's positive about it yet, all my groups are negative.

Craig: I'm going to have to go and watch Elf or something now.

Interviewer: *Laughs* To cheer yourself back up?

Daniel: Is this why we get the chocolates to cheer us all back up at the end?

Appendix 8: Analysis of Second Theme

<u>Consideration of potential individual implications of transhumanism at an individual level: weighing potential risks and benefits</u>

Once participants had grasped the concept of transhumanism and begun to imagine it as a real phenomenon, their initial consideration was often the potential costs and benefits that this could pose to themselves on an individual level before they considered the implications in a larger and larger social context.

Initial emotional responses from the 'coolness' factor to reservation and fear

Presented with such a new and radical idea, many participants tended to have an initial emotional response before they had time to logically consider the prospect from all angles. This response could be positive or negative or a mixture of both. One commonly occurring response was that enhanced abilities would be 'cool' (a predominantly male response) which again is possibly informed by science fiction, fantasy or comic books. For example:

> [After asking what they made of the transhumanism information sheet] 'I think it's cool, there'd be like superheroes and stuff!' (Martin, Group 3)

Alternatively (or additionally in some cases) there was an initial rejection that seemed to be based on a fear or repulsion at the idea of changing oneself at such a fundamental level:

> 'I mean past a natural point I don't agree with that [transhumanism] um (.) I dunno. I don't really, I'm not sure I really like the whole idea of it really.' (Rachel, Group 1)

It seems almost that these initial emotive reactions predict the problems and advantages considered later but before the participants had a chance to formulate cohesive arguments. In certain cases however the emotional response pervaded, affecting decision making later on in the discussions:

> [When asked if giving an unborn child life extension would create socio-economic

problems] ‘Yes. Absolutely. But as a parent - you would be sitting there going 'What's the best for my kid?' and if you believe that's the best for your kid, then you'll probably go and do it.’ [Aaron, Group 2)

Such empathy with parents has been demonstrated to be a strong deciding factor in previous papers (Coyle & Walton, 2005).

Interest or lack of interest based on subjective perceived usefulness/practicality of suggested enhancements

Another typical early response was to show an interest in the topic generally, ruminating aloud or asking questions stemming from the lack of prior understanding (see the first theme), particularly surrounding the individual technologies.

> [In reference to a life extension procedure] ‘If, sorry, if um the child could live for an extra 30% does that mean a really good 30% where the child would be kind of protected against illnesses or would it be they're really old they're still struggling but they've still got 30% extra on their life to live when people around them are still dying or something like that?’ (Helen, Group 4)

Often these questions seemed to be aimed at fully grasping the possible benefits and downsides of the procedures for personal use i.e. how such enhancements could affect the participant’s life. This could have been to inform their potential future behaviour, or in order that they be able to give a more balanced view for the purposes of the study. Others however did not see transhuman enhancements as interesting and instead wrote off elements as being of no interest to them personally. For example:

> ‘But do we really need it though? A chip in our head? I don't feel the need to have to interface with machines and to have to read somebody else’s thoughts’ (Carol, Group 4)

This again goes back to the idea of ‘improvement’ being a highly subjective concept. It was also considered that in many cases transhumanism was ‘not the answer’, that physical enhancement

would not necessarily bring with it greater life satisfaction. Here they also exhibited distaste for taking the 'easy route', which was repeated at other points too. For example:

> '[When considering vignette 1] I would object on a err moral stance, simply because, I don't think his um (.) body structure is his issue. I'd say his err (.) confidence. His social outlook is is more of an issue right, his self esteem. His self esteem is more of an issue than his ability to look one way or the other.' (Aaron, Group 2)

Again it tended to be the male participants who saw the advantages and so expressed interest in transhumanism (although this was not always the case).

Consideration of psychological implications: identity, dependency and motivation

One of the key considerations in participants' evaluations was the psychological implications of altering oneself so fundamentally. In particular it was suggested that an individual might have identity issues and lose their sense of self having changed aspects of their biology. For example:

> 'I like to think I am who I am and not (.) I don't know (.) you get what you're given.' (Michael, Group 3)

It was also suggested that the additional abilities themselves could cause an individual to act (or merely have the capability to act) in a way they wouldn't normally which in itself would have an effect on that person's psychology. For example:

> 'Umm (.) inherently I think it will change you. If you are smarter and you are stronger you'll become a different person because you'll be doing things you don't usually do, you'll be acting in ways you don't usually act.' (Jack, Group 2)

Additionally it was speculated that if everyone could change themselves in that way they might choose to conform to a shared 'ideal' and so lose their individuality which would have psychological implications in itself. For example:

> ‘It would mean everyone's the same because everyone would be perfect. So would you like a world full of perfect people Harriette? So everyone looks identical?’ (Michael, Group 3)

Reference was made here to ways in which the media already influences dress sense and physical ideals. Another cause for concern was that adopters of these technologies might lose their motivation having the ability to instantly improve themselves without needing to put in any work. This was compared to the ‘American dream’, that western society was based on the principal that work brings with it success; without this as its foundation, some participants wondered whether humanity could be drastically altered:

> ‘Because it's all based on, in a sense the American dream. I mean you work hard, you get to a certain point. But you'd end up with something like Gattacca [the science fiction film], it would be harder for everyone.’ (Aaron, Group 2)

> ‘Because if you're sort of making yourself stronger and faster it could sort of take the element out of getting there so it could sort of inherently make you lazier despite the fact you've got stronger and faster. [...] But then you still, the result of doing that might be to think 'Hmmm I could train or I could get another injection and make myself a bit stronger and then I'd be able to do it.’ (Daniel, Group 2)

Appendix 9: Analysis of Fifth Theme

Moral concerns about transhumanism: 'fairness' and 'equality'

A lot of these issues were discussed as being 'unfair' on certain parties, and throughout each group 'fairness' and 'equality' seemed to issues that were raised regularly.

Representation of performance enhancing technologies as 'cheating'

The second vignette, that suggested an athlete might surreptitiously use a transhuman injection to gain an advantage in the Olympics, was met with unanimous and unyielding opposition due to its nature as 'cheating' making it unfair on the other competitors. For example:

> 'I think that one's definitely more of a clear cut 'no'. I think it is because it's cheating and cheating's not acceptable. Like that's what you've been brought up with.' (Bethan, Group 1)

This concern was also expressed in relation to non competitive sports and even general life. Here it was seen as a form of 'cheating' whenever one person got an edge over their colleagues using unnatural means. For example:

> 'I was just thinking I'd be really angry with you [if her friend were to use a transhuman technology to enhance her intelligence] ! If you were like more intelligent then at university it would be just like the Olympics the fair play - if you got a high mark it would be it's not you it's your brain chip or whatever.' (Leona, Group 4)

Potential perceived implications of transhuman technologies for social equality: a 'level playing field'?

This idea of a desirable 'level playing field' came up fairly often and was used as an argument against these technologies as they could give adopters an unfair advantage. It was also used in support of transhumanism however, where it was considered that those who were naturally weaker or less intelligent might be raised to a 'level playing field'.

> [When considering whether a naturally thin student should be given access to a muscle building DNA alteration] 'I think with that one it kind of comes back to the equality (.) like errm it's not like he wants to become extra big and massive, well people do anyway, but it's like you said before that um you know to build muscle is like a genetic thing not everyone can do it, but this one would make him equal to people who can do it so it's not like he's going to be able to run 100 metres in 5 seconds this is going to make him normal.' (Norris, Group 1)

This desire for equality however was tempered by an understanding that differences between individual abilities were essential for society to function. This is particularly interesting as the two points seem to contradict each other.

> 'I suppose it would be quite boring if everyone was brought up to exactly the same level, even if everyone increased their ability by 100% you would still have those differences (.) which kind of (.) defeats the point of it. You'd think the point of it is that everyone could be better than everyone else around them but if you're still not going to be as good as the person next door then kind of what's the point of it? Errm...' (Bethan, Group 1)

This argument however was also considered reason enough to conform if the majority of the population were using these technologies, and several times participants said that though they rejected to the technologies, they would still be willing to use them so as not to be 'left out'.

> 'Exactly so you wouldn't be able to say no because then everyone else would have 30% longer and you wouldn't want to be the sod that died earlier with all your mates still living.' (Harriette, Group 3)

> 'I reckon if everyone else was doing it then (.) You'd just be the loser who's really slow and everyone else is really fast! […] It would definitely be majority influence I think. Um (.) if everyone else in the world is doing it it would then be acceptable because everyone else is and I wouldn't see anything wrong with it.' (Bethan, Group 1)

This also again shows an element of social influence which seems to play a large role in coming to terms with such new technologies.

Transhumanism as an inappropriate priority in a world where there are more 'pressing'

Transhumanism was sometimes considered not only dangerous, but unnecesary and was seen as creating further difficulties that didn't previously exist. For example:

> 'Then it's like surplus improvement, sometimes if we're like using technology to make things better that don't necesarily need to be made better.' (Rachel, Group 1)

> 'It's [the option of life extension] just introduced a whole new can of (.) you know problems. When you've already got all these problems going on already you know where you live what country and all the rest of it, then you, if you just, if you're introducing all these variables as well then it's just more problems in life.' (Craig, Group 3)

This was at least the case in comparison to other issues such as world hunger or war. Here it was considered immoral to be focusing energy and resources on technologies other than those to solve the pressing problems that already exist today. For example:

> 'Yeah (.) um, but, it's more um, you know a social level I think, a lot of the problems and then it doesn't really apply so. There's loads of economic and political injustices and things like that. I think they need to be addressed before.' (Fiona, Group 2)