

# **Genetics and Society - Student Devised Assessment**

## **Accompanying piece**

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For my Student Devised Assessment, I decided to produce a piece that addresses the topic of genome editing and more specifically 'designer' babies. Most research papers and articles that are being published today seem to portray genetic research and gene editing technology in a very optimistic fashion. What they tend to overshadow is the ethical and social implications that our actions could have on society with such technologies. My work, which is in the form of a drawing, aims to demonstrate a possible scenario of the future in regards to eugenics and gene editing. It shows a computer screen with a program called "Gene Select", where several options are available for parents to order specific traits they would like on their future baby. My goal by drawing this picture was to make the observer consider the consequences, both positive and negative, that gene editing technology could have on our future, not just in the field of science and research, but also in other disciplines such as ethics, religion and in society.

I chose to express myself in the form of a drawing rather than any other form because I felt like a picture is a much more engaging way to communicate information compared to a written piece. In the words of Frederick R. Barnard, "a picture is worth one thousand words" [1]. The observer can interpret the drawing in their own way and come up with their own opinions on the matter. I did not want to express my personal opinion on 'designer' babies but rather produce a work that would get people to think about the subject and spark a conversation that maybe they would not have done before. I was also influenced to create this picture after looking at previous Student Devised Assessments, I realised that not many of them showed a scenario of what the future could look like as a result of gene editing technology such as CRISPR, but focused mainly on the actual editing of the genome. My piece takes into account the 'slippery slope' hypothesis, which states that one action such as permitting gene editing for curing genetic disease may slowly lead scientists to other uses such as non therapeutic gene enhancement for traits such as looks or personality [2].

The drawing shows a computer program where the parent are able to customize their own 'designer' baby in many ways in order to create their ideal child. I chose to show a computer program because it represents the future and how everything is becoming digital in our society. The program looks similar to one which a customer would use to design and order a pizza, implying that designing a baby could become as easy as ordering a pizza online. Other factors that show that the drawing is set in the future is the use of bitcoin as the currency and also the date in the corner shows the year 2070. According to the MIT researcher Guoping Feng, with the way that germline editing technology is advancing, something like this could become a reality in as little as the next 20 years [3].

The name of the program found at the top left corner is 'GENE SELECT'. This was chosen just to make sure the viewer understands what is happening in this picture and that the genotype of the child is ultimately what will mostly determine the traits that are available to

choose on the program [4]. The slogan next to the title reads 'Design your own child using CRISPR/Cas9 technology'. CRISPR is one of the leading technologies today when it comes to genome editing and has been in the public eye lately. It is a tool that allows scientists to make precise changes to genomes with relative ease. In 2017, reproductive biologist Shoukhrat Mitalipov and his team managed to successfully correct a gene in human embryos that leads to a fatal heart condition, using CRISPR technology [5]. This, of course, is an example of just how beneficial CRISPR and gene editing technology could be for medicine and healthcare in the future. In the drawing, we can see the option on the right that reads 'Remove disease'. There are many genetic diseases that CRISPR could potentially cure, such as Huntington's and Cystic Fibrosis. Removing these genes from the germline means that they will not be able to be passed on to further generations either.

But, of course, these sort of technologies could also be used for gene enhancement rather than gene therapy, as described in the 'slippery slope' hypothesis [2]. In the centre I drew a baby because the main subject of the drawing is 'designer' babies. The baby has bright blue eyes, blonde hair, white skin and is male. These traits are quite rare and are a symbol of beauty in most cultures therefore parents may choose such traits in order to have an attractive child, which some believe will lead to the child having a better life. Being male in today's society also unfortunately correlates with an 8% higher salary on average than women [6]. This could potentially lead to rise in 'more attractive' people and also more intelligent people in our society. Behind the baby I drew a DNA double helix. DNA (deoxyribonucleic acid) is the carrier of the genetic information and is what makes up the genes in all living organisms. I placed the double helix behind the baby because DNA is 'behind' the traits that we see in people, including how we look.

Another theme that I incorporated in my drawing is the one of colour. Our emotions, behaviours and mood are all influenced by colour from a psychological perspective [7]. As mentioned above, the blue eyes and blonde hair represent beauty in the child that would make it more 'attractive' and superior compared to other children that have not had gene editing done to them. The colour wheel to the left consists of all the colours and represents the vast amount of choices that parents have and can make for their child. The background behind the child is black. This was chosen to represent the darkness that such technology could bring to society. There are a number of issues that could arise including ethical, legal, health and in society. An example can be seen in the film 'GATTACA' (1997) where children born with genetic manipulation technology are seen as superior in society and are treated in a much better way compared to children who are born without any genetic intervention [8]. Although it is a science fiction film, genetic discrimination could well become a reality in the near future with developing technologies such as CRISPR. Other issues of course include the views of many religious groups, which are negative as gene editing is not natural and is like 'playing God' [9]. Also, when it comes to the scientific side of things, CRISPR technology is not perfect. There is a chance that during the gene editing process, an unwanted mutation could occur in the genome, leading to diseases in the embryo or failure to develop normally [5].

One more concept that is presented in the drawing is the one of price. The price of several procedures such as genetic screening and in vitro fertilisation in the USA soar upwards of

\$20,000 [3]. In the drawing the price for two orders of gene editing add up to 4 bitcoin, which is the equivalent of around \$50,000. It may be that such technologies could be available to only the rich, which creates ethical implications and social challenges. It could lead to an unfair separation of social classes based on genetics, which is greatly unfair on the people who cannot afford such procedures.

By drawing this picture, I aimed to present the concept of 'designer' babies in a neutral way that would lead to a varied number of thoughts in the observers mind. I chose to use different themes in the drawing, such as the choice of words, colours, the blue-eyed baby and the DNA double helix, to inspire the viewer to come up with their own opinion, rather than me directly putting my opinion out there for people to read. Hopefully, I have been successful in achieving this and was able to help spark a conversation within the public, about the benefits and the problems that gene editing technology could bring to our future.

## Bibliography

1. Martin, G. (n.d.). 'A picture is worth a thousand words' - the meaning and origin of this phrase. [online] Phrasefinder. Available at: <https://www.phrases.org.uk/meanings/a-picture-is-worth-a-thousand-words.html> [Accessed 30 Mar. 2018].
2. Zhang, A. (2016). Human Genome Editing: A Slippery Slope. [online] Harvard Science Review. Available at: <https://harvardsciencereview.com/2016/05/16/genome-editing-a-slippery-slope/> [Accessed 30 Mar. 2018].
3. Regalado, A. (2015). We Uncovered the Plan to Engineer the Human Species. [online] MIT Technology Review. Available at: <https://www.technologyreview.com/s/535661/engineering-the-perfect-baby/> [Accessed 31 Mar. 2018].
4. Biomed.brown.edu. (n.d.). Genotype & Phenotype. [online] Available at: <https://biomed.brown.edu/Courses/BIO48/5.Geno.Pheno.HTML> [Accessed 31 Mar. 2018].
5. Ledford, H. (2017). CRISPR fixes disease gene in viable human embryos. *Nature*, 548(7665), pp.13-14.
6. BBC News. (2018). Most firms pay men more than women. [online] Available at: <http://www.bbc.co.uk/news/business-43129339> [Accessed 31 Mar. 2018].
7. Jalil, N., Yunus, R. and Said, N. (2012). Environmental Colour Impact upon Human Behaviour: A Review. *Procedia - Social and Behavioral Sciences*, 35, pp.54-62.
8. GATTACA. (1997). [film] Directed by A. Niccol. USA: Jersey Films.
9. Andrew Joseph, S. (2016). Gene-editing, religion and one scientist's quest to reconcile the two. [online] PBS NewsHour. Available at: <https://www.pbs.org/newshour/science/gene-editing-religion-scientist> [Accessed 31 Mar. 2018].