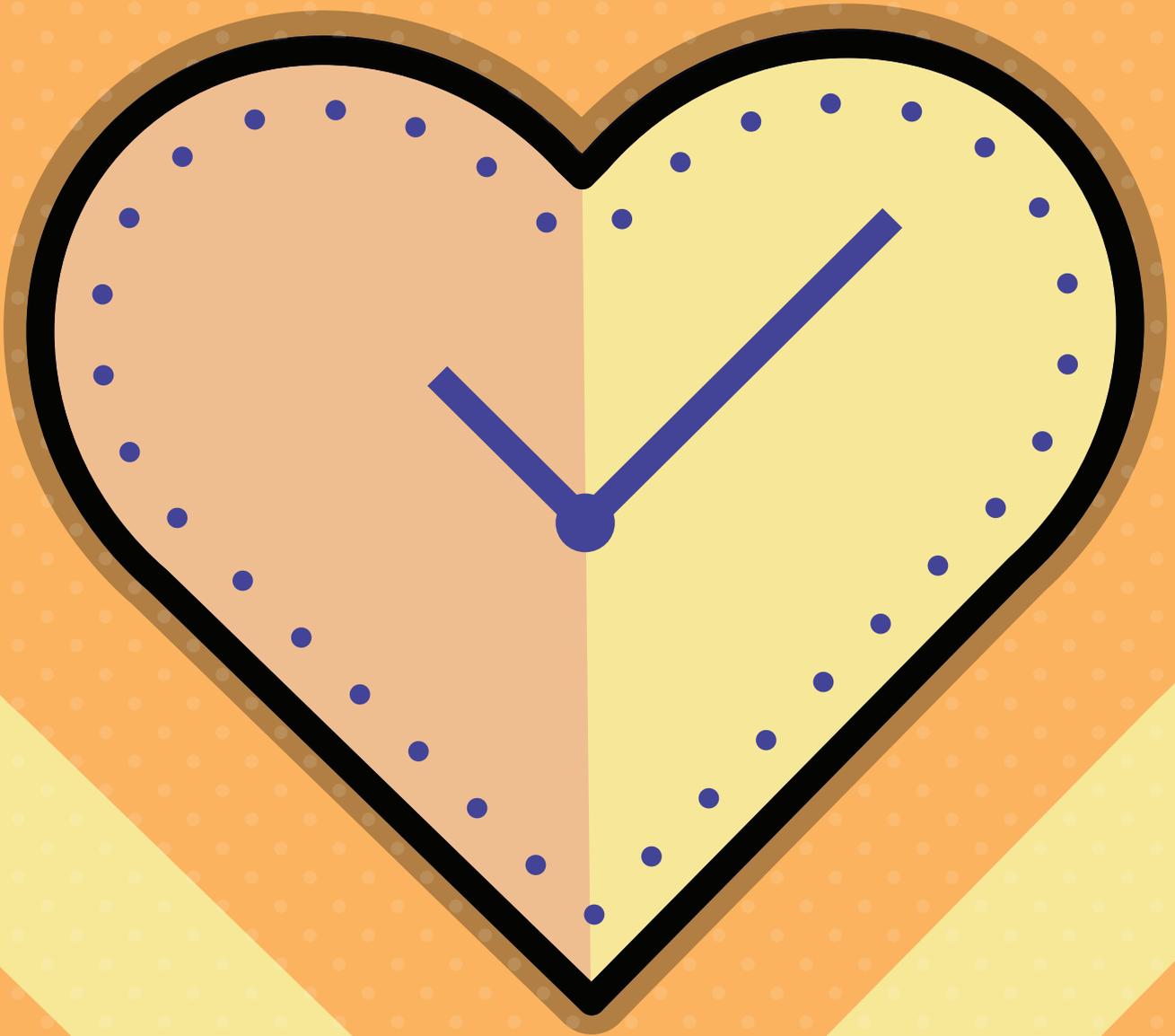


The Scholar

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***The secret to
living a long and
happy life***

+

Academic essays on how emotions
influence our financial behaviours
and fighting inequality in education
from Brilliant Club Scholars.

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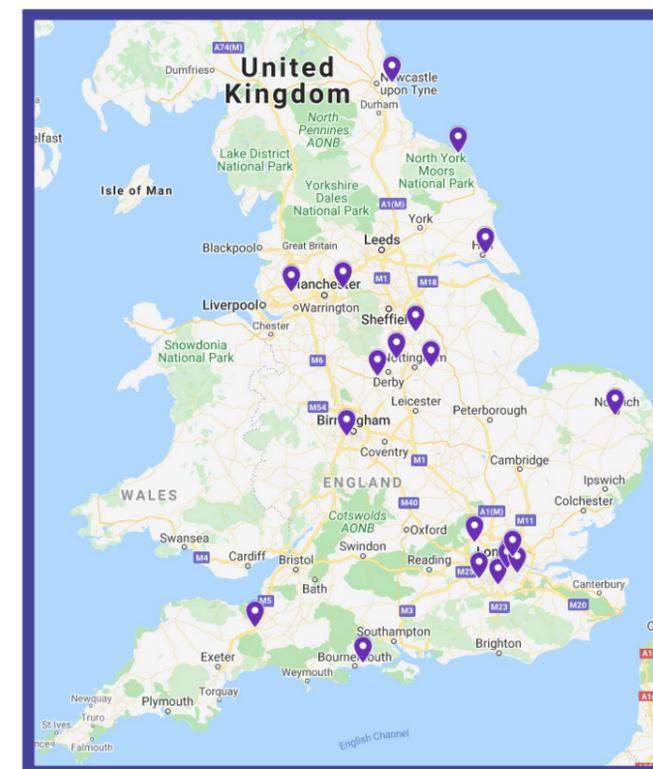
Welcome to the latest edition of The Scholar!

We are delighted to be celebrating the incredible work of pupils who have taken part in The Scholars Programme and Uni Pathways from schools across the UK.

In this edition, you will find 20 outstanding assignments with course titles ranging from 'Music with a message: Understanding America through song' to 'Can texts fight colonialism and inequality?'. This edition of The Scholar features some of the most outstanding articles ever produced by pupils who have taken part in The Scholars Programme and Uni Pathways.

The university-style learning that pupils are exposed to on our programmes is designed to provide pupils with the freedom to develop their own ideas and approaches. Not only will this help pupils who go on to study at university, but we believe these are crucial skills to develop in the adult world. The development of independent study skills and support with critical thinking provides young people with a platform to share their ideas. We hope it will empower these young people to engage in debates that shape our world, whether they concern climate change or evaluating social movements.

The Brilliant Club is passionate about exposing pupils on our programmes to these important aspects of university. We hope that these projects encourage pupils to dig a little deeper into subjects that matter to them and to seek opportunities to make unique contributions to their fields. In doing so, pupils can change their own lives by enriching them with opportunities for learning and being inspired by the topics they cover. This year, we had a record number of nominations for The Scholar, so we would like to say a huge congratulations to the pupils published in this edition and to the pupils who completed The Scholars Programme or Uni Pathways. All the pupils who graduate from the programmes should be very proud of themselves! On Page 4, we are delighted to have a guest article from Connor Long-Johnson, a Brilliant Club Ambassador, and tutor. Connor is also completing his thesis in English Literature at the University of Greenwich. We would like to say a massive thank you to Connor for taking the time to write his interesting perspective on the power of reading.



The map above shows the locations of all pupils featured.

In pursuit of our mission, to support pupils from less advantaged backgrounds to have fair access to university, we run two core programmes: The Scholars Programme and The Brilliant Tutoring Programme. The Scholars Programme allows researchers to share their subject expertise, delivering an academically challenging supra-curricular course; The Brilliant Tutoring Programme allows researchers to use their subject knowledge to support pupils to develop in key curriculum areas.

If you are a teacher who would like to find out how your school can get involved with either one of our programmes, we would love to hear from you! Please get in touch via our website: <https://thebrilliantclub.org/schools/>

We are building a network of Brilliant Club Scholars to create a community of like-minded alumni. If you have completed one of our programmes, and would like to join our alumni community, you can sign up via our website: thebrilliantclub.org/alumni/

Guest Article

Why is reading so important?

Connor Long-Johnson
Brilliant Club Ambassador

To many, this is a question that is easy to answer. Ask any book lover and they will tell you the wonders of reading Dickens, Austen or Shakespeare. However, what is never really discussed are the reasons why. Book lovers, myself included, tend to forget that the applicable skills we gained from studying literature are not always visible and tend to insist on reading simply because it's good.

A passion for reading is something that educators strive to engrain in children from the moment they enter the world of education. Children are taught to read such classics as *The Very Hungry Caterpillar* or *We're Going on a Bear Hunt* (both fantastic stories) and from there on in are provided with a plethora of opportunities to devour as many books as possible, going on to more challenging reads and more engaging stories such as Tolkien's classic *The Hobbit* and Phillip Pullman's *Northern Lights*.

This is a good thing, as many young children that I have worked with love to read. Yet when it comes to adolescents, that childhood wonder and passion can dwindle. It is diminished by years of daily English lessons in school and hours spent trawling over long, complicated passages of text from novels that are often difficult to read.

One factor that sees interest in reading lessen over time is one that can be placed at the feet of us as educators. Reading books can be an intimately private affair, we chose the books that we like from a variety of genres and authors, we may prefer drama or poetry over the novel, we may avoid romance while embracing realism and eschew science-fiction but fall in love with fantasy. However, in our formative years many books are thrust upon us; and teenage children are often made to read books that they not only may find difficult; but that they may also find little relevance in reading.

When young people ask me why they are learning about *Pride and Prejudice* or a Christmas Carol or the poetry of Carol Anne Duffy, I often struggle to answer them because technically, they don't need to have an in-depth understanding of the life and times of Elizabeth Bennet, or know what happens to Tiny Tim after Scrooge's epiphany. The minutiae of narratives are not particularly crucial to our futures and instead serve as sources of entertainment for readers. But the skills that are required to appreciate these novels are important.

As Ali Smith said in *The New Statesman*, 'The Novel matters because Donald Trump.' Now while she – nor I for that matter – are by no means suggesting that reading is a sole vehicle for political criticism, Smith is arguing that reading, and specifically for her,

the novel as an artform, is something that can not only give us pleasure but can also teach us to think critically, to evaluate and reconsider what we see and hear from our leaders.

This is just one of the key skills that reading can provide us with. The study of English Literature is not just about reading books, it is a means to equip us with essential skills and attributes that will benefit us long after we have put a book down or long after our students walk out of the school gates for the last time.

Getting young people to read can not only increase their comprehension, it can aid their understanding of the world, allow them to engage in complex theoretical and critical thinking, locate and utilise evidence in an argument and write concisely for a range of audiences and purposes. While I'm sure there are more skills that reading literature can give us, my overall point is that studying the English language through its literature is pivotal, not to force canonical texts onto a new generation or continue to propagate works the fit our own personal tastes, but to give young people a skillset that will help them navigate not only higher education as they progress through college and university, but also as they begin their careers.

So, if you are a tutor or a teacher of English, the next time you set a book or ask for an analysis of a piece of poetry make sure your students know why. If we can transmit the rationale for reading to students, they might be a little more receptive to our passions. No student should be made to do something simply because we tell them so, and if we can equip our young people with just a little more knowledge about why they must dive into centuries old Renaissance poetry or obscure Victorian literature, they may just find an appreciation for our subject.

Connor Long-Johnson,
Brilliant Club Ambassador



Arts and Humanities

How do popular American songs contribute to our understanding of American history and culture?

Year 7, Key Stage 3

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Supervised by: Y. Manyukhina
Tutor University: University College London
Course Title: Music with a message: Understanding America through song

The two songs I have chosen are, "Strange Fruit" by Billie Holiday and "What's going on" by Marvin Gaye. What drew me to these two songs was their ability to express a positive message about the challenges and difficulties that some people endured, problems that people still face today. Both the songs also inspired me to learn more about the incredible messages they shared and how much of a difference they made to society; aiding it to becoming a better world for all people to live in. The song's lyrics have such complexity, that it not only spreads a powerful message, but illustrates in my mind how hard it must have been for a lot of people in America. During this essay I will explain how each of these songs contribute to our understanding of American history and culture, and how, though these songs are quite different and spread awareness about different subjects they both standing for one thing- equality.

Abel Meerapol was a Jewish-American schoolteacher who wrote the song "Strange Fruit" and proclaimed, "I hate lynching, I hate injustice, and I hate the people who perpetuate it." [1] The expression "I hate lynching" suggests that she may have seen or heard something so repulsive about the act that she feels inspired to write a song about it and raise consciousness about the need to bring an end to it. Between 1882 and 1968, there were estimated to be 3446 lynchings of Black Americans [2]; thousands of black people have died as a result of being judged purely on the grounds of their skin tone. Meerapol channelled her anger at the act into her song. The suggestion that African Americans were a threat to America was unjustly pushed. This meant that white supremacy would have taken a massive toll on this society, black men would have been seen as a danger to white women, and if another racist white male said the same thing, it would have been enough to kill a man without clear evidence.

There are also meaningful lyrics in 'Strange Fruit' that make you feel incredibly sorry for the people that had been lynched. The song persistently explains what the lynched people around them were like to look at. Even within the powerful title 'Strange Fruit' and the line 'Southern trees bear extraordinary fruit' shows us how many trees were used for lynching and what it must have felt like to the people in America. The fact that the men who were hanged are identified as 'fruit', the typical and frequent thing you see on the trees, is sickening. Lives

have been lost so often that it probably soon became a minor normality; the normality that black people had to exist in fear of their acts in front of white people because of lynching. When explaining what the people once looked like lynched, she states, 'Bulging eyes and twisted mouths,' this was presumably in reference to the photograph taken by Lawrence Beitler, who captured two black men who were unlawfully dragged out of their jail cells by a mob of white people and lynched illegally while white men, women, and children watched.

Another symbolic lyric is, "Black bodies swinging in the southern breeze." The phrase "southern breeze" refers to the injustice that occurred in the southern states of America. Racial discrimination was on the rise in the southern states of America, and horrifying groups like that of the Ku Klux Klan (KKK) used public lynching's to demonstrate the power of being white. Strange fruit has revealed not only the hardships endured by these helpless black Americans, but also the heinous and despicable lengths to which people went to oppress the black community because they thought that they were better. When we hear about the numerous despicable acts that arose in the south, it helps people now see the terrible injustice and makes them want to change things, though there may not be lynching in our modern world it can still clearly be seen that racism still exists and needs to be stopped.

'What's Going On,' a song by Marvin Gaye made in 1971, is another hit that contributes to our understanding of American history and culture. Many experiences and people in his life influenced him to write this album, including his brother, Frankie, who was in the army and toured Vietnam (this inspired the title of the song). Around 1960 and 1970, America saw a great deal of social injustice, and tensions between black and white people.

The circumstance for black citizens in America was very frustrating, and they desperately needed change. But, even during civil rights movement, things did not improve. This song was released at the time the Vietnam War was still raging, America was in a terrible state and fury ran through crowds and protests against the war, which caused a widespread in violence and police brutality. The co-composer of the song was Obie Benson who had witnessed police brutality taking place in San Francisco. He described the scene he saw to music writer, Ben Edmonds in 2001. He said, 'The police was beatin' on them, but they weren't bothering anybody' [3], and then further questioned himself asking what was happening and why it was necessary. His questions soon developed into a song, but his fellow Four Tops members were uninterested. Gaye, on the other hand, was inspired by this and his younger brother's Vietnam War experiences and wrote his own song about these.

The protests are represented in the lyric "Picket lines and picket signs," and immediately after that line, another is sung "Don't punish me with brutality". The aggressive verb 'punish' illustrates to us that the people were being pushed down and abused because they were protesting. America was in turmoil and Marvin Gaye was

clearly talking about the police brutality that inspired part of the song. Even when people are just trying to stand up for what is right and what they believe in, American police still oppress, and people are getting hurt. It seems that in America's past, people who thought they were better, or when one group had more power than the other because of their status, like the police have over normal people, the more powerful would do anything to make the helpless feel weaker.

The lyrics such as 'For only love can conquer hate' and 'You see, war is not the answer' show that he felt there was a far more peaceful way to handle conflict than bloodshed. 'You see, war is not the answer' is a line that often conveys the message that there was no need for war and that it was thought to have more negative consequences than positive effects. Marvin Gaye had come back from being in the Air force, where he probably experienced the way that war has ruined so many lives. War is a destructive, foolish attempt to keep peace when all it does is end lives and create hatred between people, there would be no division if people saw each other as equal and showed each other love and respect when dealing with problems they face. Gaye has seen the effects of war and how they only lead from bad thing to another, such as the protests after the war, and the police brutality that followed after the protests.

Even now, numerous events like the one Marvin Gaye were describing in his song, have unfortunately recurred in our modern, everyday lives. An example of this is the police brutality in America now, when George Floyd was sadly killed by a racist police officer who knelt on his neck and suffocated Floyd, even when he persistently said that he could not breathe. This led to BLM and a lot of protests. Even in these protests, especially in the US, people have been in the face of police brutality. The song teaches us about how much power was abused in America's past, but also causes us to reflect on the fact that this problem still exists today and needs to be dealt with. We should have learnt from past events and listened to the message of songs like "What's Going On" and realise that people have worked so hard for these difficulties to not exist, not for people now to make them happen again in the world that we live in.

As a final observation, we see that both songs teach us many significant things about America's history. We have learnt about the tragic event that is lynching, and about police brutality making it hard for people to stand up for what is right. Though these all happened in America's past and much has changed since then so that all people everywhere can live as who they are and not in fear just because of where they are from, what they look like, and their skin colour. Many influential movements have occurred so that people can live better lives, however, that does not mean the problems that the two songs were spreading awareness about are completely gone. There are unfortunate people in America, that still live-in fear because of who they are. We should learn about America's history so that we know what people did for our future, and so that we continue to fight for a better future too.

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Tutor comment:

"In his essay, E. has demonstrated robust knowledge of some important events in American history alongside thoughtful engagement with the message conveyed by the songs through lyrics and melody. His work is beautifully written and showcases E.'s potential to excel in academic writing. I very much hope E. will go on to realise and further develop this potential in a university setting."

Can texts fight colonialism and inequality?

Year 10, Key Stage 4

Pupil Name: **M. Hulton**

School Name: **Cansfield High School, Wigan**

Supervised by: **Dr L. Alterno**

Tutor University: **University of Manchester**

Course Title: **Can texts fight colonialism and inequality?**

Introduction

Colonialism describes control by a single power over another area or people, when one nation subjugates another and exploits its population and land, sometimes forcing its own culture upon its people¹. This has a lasting effect; it can result in the unequal treatment of people from the colonised country many years after the country itself has gained its independence. Inequality is the difference in status, opportunities or wealth between different people or groups², which can be related to race, gender, health, age and incomes³. Colonialism and inequality can be opposed through several different mediums, like poetry, theatre, writing and photography, by impacting an audience in a way that encourages empathy and the idea of responsibility. This essay explores the ways in which a text can positively influence and have an impact on its audience, and as a result can convey resistance against discrimination, prejudice, oppression, racism and the legacy of colonialism. It focuses on two pieces of work: a theatrical piece called *Lampedusa* by Anders Lustgarten⁴, and a poem called *Caged Bird* by Maya Angelou⁵, and discusses themes of immigration, inequality, prejudice and racism.

Analysis of *Lampedusa* by Anders Lustgarten

Lampedusa by Anders Lustgarten exposes the issue of mass migration and encourages an audience to understand that it is their joint responsibility. It also highlights some other relevant issues like attitudes towards the poor and racism⁶.

The narrative follows two characters: Stefano is an Italian ex-fisherman who is now tasked with collecting the bodies of drowned migrants off the shores of Lampedusa, and Denise is a mixed-race student in England who is studying for a degree whilst dealing with constant racial abuse.

There is much evidence in the play that illustrates the hardships and suffering refugees experience whilst seeking asylum and safety in Lampedusa.

Stefano states that the refugee centre "looks like Guantanamo"⁷. He is comparing it to a prison, suggesting the refugees staying there are being treated like criminals though they have not committed a crime or have been detained and imprisoned unfairly. No unfair detainment is one of the basic universal human rights, as is the right to asylum⁸. Firstly, this proves that these people are innocent because they have the right to leave their country to seek a safer place to live. Secondly, this emphasises the unfair treatment refugees experience; they are constantly denied basic human rights, for example some suffer abuse, inhumane treatment and neglect, are forcibly transferred to remote islands, denied health care and assaulted by locals⁹, as it has recently happened around the coast of Australia. As a result, the audience would relate this refugee centre to a prison and therefore an act against these people's human rights. Another example that shows the neglect of these people's human rights is the phrase "twelve hundred in a place built for two or three"¹⁰, which shows the extreme overcrowding. Connotations of overcrowding include the lack of privacy, unsafe or inadequate living space and standard of life. This opposes the right of social service, which means that everyone has the right to a standard of living adequate for the health and well-being of themselves and their family¹¹.

This makes an audience face their possible privilege and consider whether they have experienced this kind of treatment, which triggers an emotional response from an audience and causes them to feel empathy and compassion for these people, as well as feel encouraged to oppose the unfair treatment. The audience would not like to be treated how the refugees are in this text, so they feel encouraged to help stop this unjust treatment. This means that the text has successfully opposed inequality.

This is a relevant topic because it is happening in many countries across the world. For instance, in 2019, the number of international migrants globally was 272 million, which equals to 2.5% of the world's population. 52% of these migrants were male, and 48% were female, meaning that there is almost the same number of male and female migrants. In addition to this, the global refugee population in 2018 was 29.5 million, with 52% being under the age of 18¹². This shows that the situation is relevant to everyone regardless of gender or age.

In another section of the play, Stefano says "it's like an earthquake, you feel the tremors far away and you know the tidal wave is coming"¹³. The imagery used here creates the idea of destruction, which instantly brings forth sympathy from an audience because it reflects the disruption migrants face. "Tidal wave" describes the way migrants travel to Lampedusa, which is by boat. However, this metaphor has been used many times in the media to portray migrants in a negative way. This is because it creates a feeling of suffocation or drowning as a tidal wave is a large and overwhelming

occurrence which can be dangerous. Therefore, it links an immense and destructive thing with these people and immediately forms a bias against them since they are being shown as threatening. This metaphor is also an example of essentialism, as it is grouping together multiple people and deciding that they are part of this 'tidal wave', rather than highlighting their differences and individuality. It is this discard for the individuality of migrants that is common in the media. Nevertheless, Lampedusa follows the individual lives of two people facing the issues of mass migration, which directly opposes essentialism. As a result, it can give a more realistic insight into the lives of migrants and people dealing with the effects of the migration crisis, which gives the audience a better understanding of the situation and allows them to empathise with these people on a deeper level.

Immigration has been described countless times as a problem, therefore people begin to see it as a difficulty rather than a cultural and socio-economic improvement. Immigration helps many people to escape unsafe and inadequate environments to protect themselves and their families. By educating an audience about the truth of immigration and refugees, these harmful and biased messages from the media can be resisted. The piece is performed from a first-person perspective, which also helps the audience to be more well informed because it gives a personal approach, rather than an account made by someone who has most likely never experienced it first-hand. This makes it easier for an audience member to connect with the characters because they are not dehumanized or essentialised like in the press, but rather described as individual people with individual and valid feelings, making them more relatable. As a result, the text fights inequality very effectively.

Later on in the performance, Denise says that "middle class people think racism is free speech now"¹⁴. This relates to how social inequality can be caused by wealth and income as well as race. Middle class people are shown as prejudiced against Denise not only because of her race, but the fact that she is poorer than them. It suggests that racial discrimination and abuse happen to her on a regular basis: she compares it to free speech, which is a basic universal human right¹⁵. This suggests that people think they have the right to discriminate against and abuse people because of their race. This triggers an emotional response from the audience, forcing them to come to terms with issues in the world and to take responsibility or to have a deeper understanding of the hardships they face.

Another example of the hardships Denise faces is shown when she says "swore at me"¹⁶, "spat at on the bus this morning"¹⁷, "misplaced, thick, ignorant rage"¹⁸. These together show how difficult it was in everyday life for immigrants; they face racism, physical and verbal abuse, and overall prejudice. She describes the rage as misplaced, which shows that she does not deserve this treatment but still has aggression directed at her because of her race. This reinforces the idea of the audience reflecting on their possible privilege, which makes them understand more how people are oppressed and could possibly encourage them to fight for equality.

Overall, this text opposes inequality because of the effect it has on a viewer. It would cause an emotional response and encourage the audience to have empathy for the characters, which in turn persuades them to think and act against inequality, racism, oppression and discrimination.

Analysis of Caged Bird by Maya Angelou

Another writer who explores themes of discrimination and inequality in their work is Maya Angelou. She is an American poet who focuses specifically on economic, racial and sexual oppression. In this piece she uses the extended metaphor of the caged bird to present her own personal experiences of oppression and racism and how they confined her. Therefore, she is writing from her own experience, meaning the content of her work will be personal and based off the real emotions she went through in her lifetime.

Slavery was a large factor in the British Empire. In 1660, a company was created to trade in enslaved people and African goods. This Royal African Company transported enslaved people to British colonies. Africans who were trafficked by the company endured severe abuse, suffering and misery.¹⁹

This explains why African American people are still discriminated against, as a result of their subjugation over time and the constant colonial idea of racial inferiority that slavery in the British Empire created. Therefore, this piece can relate to the long-term effects and the legacy of colonialism and how they link to race.

This gives context for the poem and explains why she uses the metaphor of a caged bird to represent how racism and discrimination can trap a person, preventing him/her from having equal opportunities to white people who are not limited because of inequality and are personified by the free bird in this text. This is clear within many phrases in the poem, which will be analysed in the following paragraphs.

Angelou states that the free bird "dares to claim the sky"²⁰. This symbolises the opportunities white people have over black people because they are not subject to racism and prejudice which stunt their freedom. It shows the privileges white people have over black people, as it shows the free bird taking control of the skies, which could be relating to white people having more control and influence over the current world.

In another line of the poem, she writes "wings are clipped...feet are tied"²¹. This shows the extent of oppression that black people face. Even if this bird were not caged, it still would not be able to fly freely like the other bird. This symbolises the lasting effects of colonialism on these people, and how, as a result of the slave trade, they still do not have equal freedom and opportunities, even though slavery was abolished over a century ago. This shows that still experience the legacy of colonialism and have to face the impacts of it.

Finally, Angelou describes that the caged bird "opens his

throat to sing"²². This illustrates that, even in the face of injustice, oppression and limitation, the bird can still resist in some form. Freedom of speech is a basic human right, meaning people can now voice their resistance, much like the caged bird does in the text. It introduces the idea of hope into the piece, inferring that this bird will overcome the hardships it faces, showing strength, resilience, perseverance and power in the face of adversity. This forms an inspiration for people of all races and encourages them to be resourceful in order to oppose issues in the world, as the caged bird used one of the only things that someone cannot take away: freedom of speech. It creates an example for people and shows them that whatever their situation, no matter how bad, they can always persevere and fight back. In turn, this text can fight colonialism and its legacy by inspiring people to create change and advocate for what is right.

Altogether, a reader would feel empathetic towards the bird and as a result people who are discriminated against. This is one way this text fights inequality and colonialism, by presenting the lasting effects of the slave trade and how it has caused considerable inequalities between black and white people. This encourages readers to take responsibility for some of these issues and to fight for equality.

Conclusion

In conclusion, colonialism and inequality can be fought through many different mediums, by taking a problem and encouraging an audience to face it, to understand it, to take responsibility over it and to advocate for change because of it; the audience have to face the issue because it is being presented and explained before them. It is this explanation of the problem that then allows them to understand it and feel empathetic towards it. This makes it possible for the viewer to then accept some responsibility or to acquire a sense of responsibility towards the people these texts describe. This responsibility can then influence a person into acting against colonialism, inequality and discrimination.

The two texts that have been analysed have exemplified how forms of art can encourage change and progression, by conveying an argument which creates empathy and compassion in a viewer and pushes them to act on this.

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22 Maya Angelou, Shaker, Why Don't You Sing?, line 14, Random House [14 March 2021] <https://www.poetryfoundation.org/poems/48989/caged-bird>

Tutor comment:

"It was incredibly rewarding working with M. from Cansfield High School, particularly because of the great critical interest and intellectual acumen she showed in our virtual Tutorials during such a challenging period. Her final essay shows an excellent knowledge and understanding of the issues of colonialism and of the wider remit of post-colonial studies. It has abundant evidence of her enhanced research skills, particularly in the selection of secondary sources and in her excellent evaluation of post-colonial issues overall. Her efforts in tracing accurate online sources independently are reflected in this well-researched and documented essay. There is a very good sense of her independence of thought and depth of critical reasoning and I have rarely seen an essay use academic conventions to such a sophisticated level! I am very proud of M.'s work and wish her a successful academic future!"

To what extent was mythological identity beneficial, or otherwise, in intercultural interactions between different groups in Ancient Greece? What part did mythological authenticity play within this?

Year 12, Key Stage 5

Pupil Name: H. White

School Name: St Wilfred's RC College, South Tyneside

Supervised by: J. Ruddick

Tutor University: Newcastle University

Course Title: Argonauts and Gods: The power of mythological identity in Ancient Greece

Mythological identity relates to the myths that one associates their identity with and the myths belonging to a particular religious or cultural tradition. Arguably, it was very beneficial for groups in Ancient Greece, internally and externally. It was valuable for building culture within a community or an individual and providing fantastic origins. Additionally, it was very beneficial in intercultural interactions between different groups within Ancient Greece. This relates to when two different groups, each having a different culture, meet and interact with each other (for example, trading or fighting). To explore this question in more detail, it is necessary to develop our understanding of theories relating to identity in general and examine the case studies of Theseus and Heracles. This will demonstrate how mythological identity was highly beneficial for intercultural interactions between different groups before and during the Hellenistic period.

Firstly, mythological identity was instrumental in Ancient Greece for intercultural interactions as it was valuable for sculpting their culture. Evidence of the importance of this is the case study of Theseus and his significance to Athens. Theseus was a prominent figure in Classical Athens' society, and the tales of his deeds characterised the city. Theseus was renowned for slaying the Minotaur, who was the son of King Minos of Crete. Theseus not only became a hero for Athens (being the son of Aegeus, the King of Athens)¹ and other kingdoms of Greece, who now did not have to send young men to be fed to the Minotaur. Therefore, mythological identity was beneficial in crafting a community's culture because it demonstrates that whole regions were defined by the myths that had originated there and were connected to them. Culture was the foundation of Greek identity, showing how important and valuable their mythological identity was in Ancient Greece. The scholar Jonathon M. Hall discusses how Greek identity was initially created through ethnic traits but eventually came to be seen through cultural identifiers instead.² Hall's opinion is credible as the focus of his research is Greek history, throughout his many published books and reviews and articles of Classical Greece. This scholars' viewpoint is based on much research into Greek identity and therefore is reliable. Furthermore, this is a viewpoint that Joseph Skinner concurs with as he discusses how

negotiating cultural and political differences helps to create an identity.³ Mythological identity was particularly beneficial for Ancient Greek communities because it was an entertainment source, which enriched the culture. For example, Athens held yearly festivals to honour Theseus, which attracted people from all over the region and boosted morale in the city. Therefore, this portrays mythology as advantageous for different Greek groups. It provided leisure for communities because they would come together to celebrate the most acclaimed gods they had connections with. This benefited intercultural interactions because people from distinct regions would admire different gods, meaning that their relations were strengthened if they celebrated each others' cultures. As well as being very useful for an Ancient Greek community, there is no doubt that mythology was popular with a wide section of Greek society. Notably, the Greek historian Polybius used to say that mythology was only 'fit to amuse children'. Yet, he always included mythological stories in his work because he claimed that the Greek people relished the myths so much that he would have been unpopular if they were excluded. Therefore, once again showing how mythology functioned as an entertainment tool, it was beneficial and undeniably a vital element within Ancient Greece. Lastly, mythological identity was valued as justification for community expansion and control over a specific region. This is evident through the claim that Theseus was the son of Poseidon, the Greek god of the sea.⁴ Consequently, this gave Theseus' city divine ancestry and an explanation for Athens' control over the sea. Therefore, mythological identity was beneficial because it meant that different groups in Ancient Greece could extend their dominion, augmenting their power and allowing more trade and alliances opportunities due to their amplified influence. This could be useful for intercultural interactions if alliances were made, which would have increased the mutual appreciation for each other.

Alternatively, if one particular region uses their mythological identity to justify their expansion or control over another area, it could cause civil unrest if their claim is based on an incomplete or ambiguous myth. Therefore, this would damage intercultural interactions due to possible conflict. For example, Theseus' claim to the Attic territory as he was the son of Aegeus, the King of Athens.⁵ One criticism of mythological identity is that the stories are sometimes unreliable and adjusted to fit the community's needs (such as rationale for a regions' dominance of an area of Ancient Greece). Siapkis argued that people could assign their own identity to themselves through ethnic and cultural identity instead of mythological stories. As a result, this limits the benefits of mythical identity in intercultural interactions. It elucidates how people could create their own identity and entitle themselves to profits that aren't theirs, causing civil unrest due to the lack of true identity. In addition, two communities may have the same mythological history and links: they are both entitled to the same benefits, therefore causing territorial issues between them instead of creating collective communities and alliances (impairing intercultural interactions).

Contrastingly, a flexible identity demonstrates how mythological identity was helpful as it provided formidable origins. Theseus was a high-powered and admired hero. Placing him as a former King of Athens who created democracy meant that the city was tying the hero to themselves- theoretically, Theseus became the exclusive property of Athens. The easily assigned connections to influential gods incontestably made regions more prosperous evidenced with Athens, which was successful because it endowed with 'useful gods'.⁶ Given names could act as definitions of identities. However, the same person/groups given that name could use it to their advantage.⁷ For example, in Greece, Spartans were named that by other cities. But they used the name later as a symbol of their might. If someone said they were a Spartan, you would think twice about crossing them because that name and attached identity now carried a fierce reputation. Furthermore, mythological identity gave them individuality, which could extend as their identity evolved. This takes an instrumentalist perspective within the identity debate. It argues that an attribute or action is a tool for a more prominent reason, and so aspects of identity change to fulfil different things. This contradicts an essentialist view that proposes that everything has a set of necessary attributes to its function (static identity). In Ancient Greece, the unique personas of gods developed with their mythological identity. Cultural identities can encompass different viewpoints and be adapted because of this.⁸ Theseus fathered different children in Asia Minor, so this adapted Theseus' cultural identity by giving him ties (through children) to the land's culture. Therefore, this allowed Athens, as the holder of the Theseus myth, to also claim those same cultural roots for whatever purposes (alliances, imperialism) and, as a result being beneficial in Ancient Greece. For intercultural interactions, mythological identity was constructive if different regions formed a collective identity. This concept corresponds to the idea of sharing characteristics or origins. These may include if descendants of gods have connections over which they can bond over (like Theseus' children in Asia Minor). These can be valuable for intercultural interactions because areas can form alliances. Unique stories like Theseus' were shared around and so the localised version of the myth was just enough for two groups to establish a working partnership based on shared cultural stories. These alliances offered protection and enhanced trade, elevating their relationship. On the one hand, identity connects individuals as a community and provides motivation and rationale for continued engagement.⁹ However, if we look at the impact on individual identity within this collective identity, it is evident that one may lose their personal identity and gain a new collective identity to replace it.¹⁰ Hogg and Abrams may offer a refuting point because their work is focused on psychology. In particular, Hogg's research is concentrated on how identities affect peoples' perceptions, attitudes and behaviours. Therefore, they are offering their view from a psychological viewpoint, in which they convey the personal impact rather than the collective impact.

Another reason why mythological identity is beneficial in Ancient Greece, can be outlined using the hybridity

theory and discussing Heracles' role within this concept. Hybridity is a term that refers to when two cultures meet up, join, and as a result, their culture becomes a mixed hybrid culture, which contains components of each other and forms their mythological identity. This theory can provide us with great insight into what was occurring in Ancient Greece, relating to intercultural interactions. Heracles plays a role as an example of how these hybrid cultures would form. He was the son of Zeus, King of the Gods and significant for his travelling nature. This Greek god was used to connect and unite different groups even as far as Asia Minor, and because he moved around the Greek region so often, it meant that disparate communities could easily assign their own identity (as mentioned before) and place him as an ancestor within their mythology. A hybrid culture could be argued as beneficial because it allowed for greater status and access to more potent gods who were more influential on the world stage when the regions amalgamated. Also, a fused culture would offer trade and protection. One example of this culture is the Phoenicians and the city of Tyre. They already possessed their individualistic mythology, but because Greece had become extremely powerful during the Hellenistic period, many independent communities were flocking to join the 'Greek identity' (otherwise referred to as a 'seductive identity.'¹¹ as everyone wanted to possess it). Therefore, a hybrid culture formed between Heracles and Melqart (Phoenician god). In archaeology, hybridity is identified in simple morphological distinctions between the two cultures.¹² Between Melqart and Heracles, this is evident in their congruent headwear (a leopard). However, this idea could be argued as reductive and oversimplified for such a compound theory. Other scholars propose a more descriptive analysis which argues that the negative or positive perception of "hybridity" depends on the perception of borders and border crossing, and the hybrid self may be considered dangerous or degenerative.¹³ Moreover, hybridity can be criticised for the loss of cultural roots.¹⁴ This may suggest that although hybridity can be beneficial for greater status and alliances, it causes critical cultural elements to be abandoned. Other scholars agree on the loss of identity as the process of cultures becoming hybrid leads to an 'in-between' place as they transform, an area where they do not belong to either culture anymore¹⁵, which links to Bhabha's 'middle ground' part of his hybridity theory. This is because their visual images are starting to show some parallelism but not distinctively part of one defined culture, suggesting a loss of individuality and mythological identity. So although there are some intercultural interaction benefits, it depends on the regions within the hybrid culture, determining the extent of loss of identity.

In such changing environments, material culture was significant for making these new hybrid mythologies integrated within society. Material culture is the aspect of a community grounded in the architecture and objects surrounding people and was necessary to reinforce new mythology. By combining features from Heracles and Melqart, the Phoenicians were assimilating the idea of Heracles into their culture. Heracles was readily accepted in Tyre as it was hard to reject with Heracles

appearing on temples, coins and frescoes. Material culture links with the role of authenticity, which questions why the Greeks still had faith in mythology that was being openly changed in front of them. This is because mythology was a persistent part of life, where every rock had a story linked with it and so was hard to question. Furthermore, the state and faith were very infused, such as through festivals. In Tyre, material culture was likely created by the state and the steered mythology expanded as the state grew, as a simultaneous creation (therefore weaving Heracles into their culture). The Greek religion gave meaning and explanation to life; even at times, they were sources to blame natural disasters.¹⁶ This indicates how believing in the gods allowed the Greeks to understand their world, so the Greeks didn't question their manipulated mythology.

In conclusion, it can be argued to a large extent that mythological identity was beneficial for individuals in providing remarkable origins (such as Theseus or Heracles) but also for different regions in Ancient Greece and their intercultural interactions. Collective identities could form, enhancing trade and sculpting alliances, and hybrid cultures could offer mutual protection despite there being such a loss of individuality. There is no doubt that an individual could easily modify their mythological identity, whether this was positive or negative, and new narratives were bled into Greek society through the role of authenticity and material culture.

Endnotes

- 1 Plutarch. Life of Theseus. 4.
- 2 Hall, J. 2002.
- 3 Skinner, 2012: 28.
- 4 Bacchylides, Dithyrambs. 17.
- 5 Plutarch. Life of Theseus. 4.
- 6 Herodotus, Histories. 8. 111.
- 7 Abramson, 2011: 156.
- 8 Dougherty and Kurke 1993, 2003; but also Malkin 2004
- 9 Friedman and McAdam cited by Rohlinger et al. 2015: 177.
- 10 Maslach 1974: 234 cited by Hogg and Abrams 1988: 145.
- 11 Kaldellis, A. 2009
- 12 Meyers 2013: 306-7
- 13 Feldman 2006, 61
- 14 Burke, P. 2013
- 15 Sørensen, Friedrich and Søholm 2019: 48
- 16 Bremmer 1994: 2

Tutor comment:

"Teaching at St. Wilfred's was fantastic, but a standout would be H.'s commitment to the assignments and ability to grasp what was a complex topic! Her work on mythological identities displayed a keen insight for how identities were clashing and bouncing off of each other in Hellenistic Greece and her sophisticated analysis on items of material culture was a joy to read. One can hope she would continue with Classics but I'm certain whatever she decides to turn her hand to will be successful!"

To what extent should the Victorians be celebrated for their achievements?

Year 10, Key Stage 4

Pupil Name: A. Lindoe

School Name: Caedmon College, North Yorkshire

Supervised by: T. Hayes

Tutor University: The Open University

Course Title: The Victorians: Awful or awesome?

I believe that we should celebrate the Victorians for their contributions to modern society as there are many Victorian inventions that the people of today take for granted. The focal point of my essay will be the railway line. I am focusing on this invention because I feel this invention was revolutionary at the time and is a vital part of today's lifestyle, utilised widely in modern leisure, goods transportation and daily commuting. To strengthen my opinion, I will be utilising rail freight and travel statistics provided by the government and other sources, these will illustrate how this invention continues to have a large impact on today's society and I also believe will continue to do so in the future.

The first railway line was built between Stockton and Darlington in 1825 and since then more railway lines have been built to expand the links between large cities and towns. Originally this first railway line was made to transport coal in between Darlington and Stockton. At the opening of the line the locomotive named "Locomotion" was driven by the inventor George Stephenson. Following the success of the Darlington to Stockton line, Stephenson was requested to further expand these links and create the Liverpool and Manchester railway. When the line was nearly completed in 1829 a competition was held, the Rainhill locomotive trials, to find the best locomotive to run on the line. Stephenson's new engine "The Rocket" won, it travelled at 36 miles per hour (1). From this time onwards the building of railways spread rapidly through Britain and abroad with Stephenson being a main adviser.

The creation of railways had a massive impact on the Victorians. Firstly railroads gave cheaper and more efficient ways to transport manufactured goods from industrial Manchester to the docks at Liverpool for export to other countries, or other cities and towns which were linked to Manchester. Jobs were also created by the creation of the railway system, it opened up new areas of employment for the Victorians as jobs such as: locomotive and track guards, station staff, builders, drivers and waiters were needed in order for the locomotives to function properly. The railway system also allowed dairy, fish and agricultural products to be transported more efficiently and further whilst still remaining fresh, this opened up a new market for the producers of these products. Railways revolutionised the postal service. Trains were speedy, and much more reliable compared to previously used mail coaches. As the 19th century advanced, work became easier as the railway allowed easy travel for people allowing them to work further away from homes in order to bring

in a larger income. This helped boost the economy and began Britain's transformation from a newly emerging economy to a high income country.

Isambard Kingdom Brunel was a famous engineer in the Victorian times. He famously worked on many different projects building tunnels, bridges, ships and railway lines. His use of tunnels and bridges enabled railways to cover great distances. Brunel was appointed chief engineer of the Great Western railway in 1833. He designed the London to Bristol railway, including all the tunnels, bridges, viaducts and also the Temple Meads railway station in Bristol, and the impressive Paddington station in London (2). This fast railway link to London ensured Bristol was a key port, shipping goods to the United States of America.

According to Nick Smith (theengineer.co.uk), Isambard Kingdom Brunel was "one of the best-known engineers of the 19th Century - if not the best known engineer of all time". With the impact that Brunel had on so many different areas of engineering I would tend to agree with this statement. However, relating specifically to railways in my opinion George Stephenson was also a great engineer, as it was Stephenson who first started developing key railways, and opened up industrial northern England with his railway lines and locomotives.

By the mid 19th century towns near the seaside became popular seaside resorts. The expansion of the railway lines made it much easier for people of all social classes to access these resorts. The Victorians had little interest in the seaside areas until a man called Richard Russell claimed that sea waters had minerals rich enough to cure any human diseases. This influenced many people to want to go and visit the seaside.

In 1871 bank holidays were introduced for the first time which saw people go on day trips out to the seaside. Around the same time fish and chips shops started to become popular, particularly in northern England. The railway system influenced the popularity of seaside holidays as it allowed people to visit the seaside with no major problems. These seaside towns became architecturally shaped for their Victorian visitors with imposing buildings, piers for promenading and band stands for communal entertainment. Seaside resorts such as Blackpool, Margate, Weymouth and Scarborough thrived with the visiting Victorian tourists. The Victorian rail travellers gained new cultural experiences and had opportunity to socialise.

The rapid changes brought about by the expansion of the railways were often reflected in Victorian literature. Victorian writers frequently tended to set their writing a number of years earlier than the date at which they were written, so rail travel didn't start to feature straight away when railways first started to be built. Dickens however had observed the building of Euston station from his family home in 1837 (3). He uses the destruction of a community that he saw within his novel "Dombey and Son", and paints a very dark picture of railway building. However, he does also show the positive impact the railway brought to a community once it was finished within the same novel. Professor Stephen Gill (Dickens

and the Railways (4)) notes how "Dickens' stories were littered with references to the positive impacts of the infrastructure: giving a nod to both the engineering feats required, and the more human elements too." I think this shows how railways had a great influence on Victorian literature. Railways continued to feature in Dickens' later writing, in his novels, short stories and writing of his personal experiences. The experience however, that had the biggest impact on him was in 1865 when he was involved in the Staplehurst railway crash whilst travelling back from France. Ten people were killed and forty injured. Dickens' son thought that his father never really recovered from the crash, and Dickens died exactly five years later from when crash occurred.

A negative the invention of railways brought to Victorian times was the increase of crime. The railway Mafia were a group in the 1840s that would steal from people in the corridors of the carriages. The first railway murder took place in 1864 on a train in London which initially caused a vast concern for railway users (5). A further negative point was that locomotives on the railway line would produce sooty steam and smoke, this made areas near the railway track dirty and unhealthy and neighbourhoods never recovered from this. This is said to be the beginning of global warming which as of today is a massive problem.

By 1950 trains could travel from Newcastle to London in 6-7 hours. This speedy travel made holidays in the United Kingdom much easier to access and also allowed people to visit relatives and friends readily. The railway line system also increased the popularity in sporting events as special trains and trips were run to take people to cricket, rugby and football matches. Football clubs benefited from this as this allowed them to travel to play other teams from other cities (6).

The railway system continues to have a huge impact on modern life today and will continue to have an impact on the future. Today the railway system is more important than it ever has been before with trains in the United Kingdom reaching speeds of up to 140 mph. These trains travel between a massive number of 2,566 stations scattered across the United Kingdom. This means that almost all parts of the United Kingdom can be accessed via train.

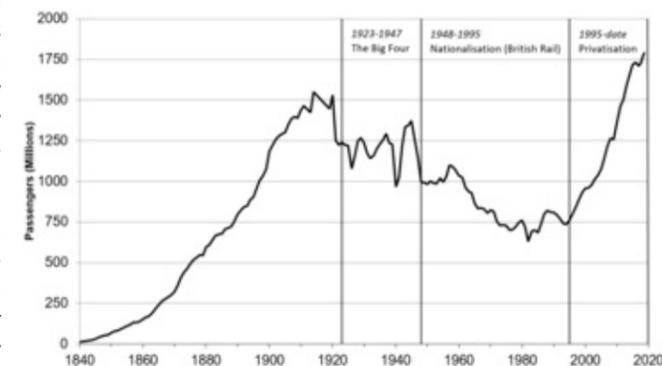
Current railway lines in Ireland, the United Kingdom and the Isle of Man are shown in black, heritage (tourist) lines in green, metro lines in red and former routes in light blue (7).

The source above shows the extensive coverage of the railway network in Modern times. It also illustrates the international expansion of the railway line to France via the Eurostar train which utilises the channel tunnel and allows travelers to travel further into Europe.

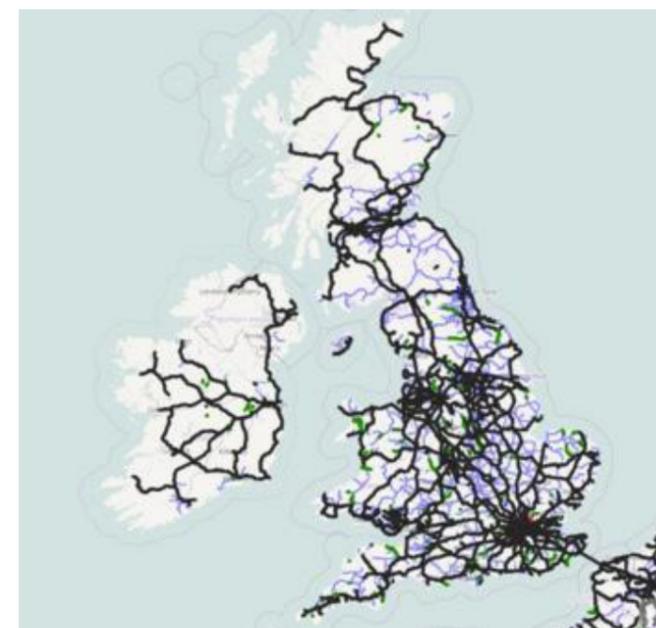
Below, the source shows rail passengers in Great Britain from 1829 to 2019, showing the early era of small railway companies, the amalgamation into the "Big Four", nationalisation and finally the current era of privatisation (7).

The decline in passenger numbers which can be seen

in around the 1920-30's was a result of road transport becoming much more accessible than before. Following the privatisation of the rail services in 1994 and onwards there was a rapid incline of passengers due to improved services and more cost efficient rail travel. Passenger numbers doubled within a 10 year period to their current peak levels.



Today as in Victorian times rail freight is vital to Britain's economy, and currently also helps reduce congestion and carbon emissions. Every year, freight trains transport goods that as a total amount add up to being worth 30 billion pounds, some of the items transported are: televisions, clothes, whiskey, steel and cars. One in four sea containers arriving at United Kingdom ports is carried by rail, these trains achieve over 95% reliability in on-time performance whereas HGV lorries can be delayed by heavy traffic, bad weather and road accidents. From the environmental aspect, rail freight reduces carbon dioxide emissions by up to 76% compared to road. This helps combat the effects of transport emissions on global warming. The use of rail freight also saves lives as it takes around 76 lorries off the roads per train resulting in a reduction of casualties on the road. This number is estimated to be around 600 casualties per year (8).



In conclusion, I believe that we should celebrate the Victorians for their inventions in general as they have massively shaped how modern society lives today. The specific invention of the railway line that I have focused

on has had many beneficial impacts on society through various means such as: employment, opportunities for leisure and work travel, accessibility to cultural events and freight transport. For the Victorians it opened up the country to them, for the first time they had easy access to coastal resorts where they were able to relax and experience different cultural activities. It enabled families and friends to communicate more readily via railway travel to meet in person, and via the improved rail postal service. Today the railway continues to expand and uses faster and more efficient trains. The rail links to cities allow people to live a better quality of life in more rural locations, yet easily work in city centres. In this current climate where global warming is such a threat, I believe that railway lines and other means of public transport have a significant part to play in decreasing the effects carbon dioxide has on the world. For all these reasons I believe we should thank the Victorians for their ingenious inventions especially the railway line as it is still as important today as it was when it was first invented.

- (1) <https://www.britannica.com/technology/railroad/The-Liverpool-and-Manchester-Railway>
- (2) https://www.bbc.co.uk/history/historic_figures/brunel_kingdom_isambard.shtm
- (3) dickensmuseum.com
- (4) www.ox.ac.uk/culture/videos-podcasts-galleries/dickens-and-railways
- (5) <https://www.nationalarchives.gov.uk/UnitedKingdom/education/resources/victorian-railways/>
- (6) <https://www.nationalarchives.gov.uk/UnitedKingdom/education/victorianbritain/happy/default.htm>
- (7) https://en.m.wikipedia.org/wiki/Rail_transport_in_Great_Britain
- (8) <http://www.rfg.org.uk/rail-freight/>

Tutor comment:

"A. was an absolute pleasure to teach, from start to finish! He always had relevant contributions to make to each tutorial, his participation was excellent, and all work submitted was outstanding. It was obvious from the beginning that A. is an exceptional student, and he will be a valuable asset to any university he decides to attend!"

Produce a piece of writing that describes a (natural) setting as an introduction to a story

Year 5, Key Stage 2

Pupil Name: U. Maheshwari
School Name: Woodcote Primary School, Croydon
Supervised by: S. Bankes
Tutor University: The Open University
Course Title: Literature and nature

I was lost. There was no doubt in that. However, how I got there was a complete and utter mystery.

A sharp tingling in my feet was beginning to form, as if I was being pricked by a thousand razor-like fragments of a broken window. My heart drummed a rapid rhythm as I skittishly stepped forward, trembling.

Every uneasy sniff I took, I inhaled the nightmarish odor of stale milk, so comprehensive I could literally see it, hanging low in the air like droopy fairy lights flickering wickedly with a tint of purple, layering over the crimson bloodmoon I could distinguish hovering above my head. The strange clash of colours gave me a bit of a headache. Confused, I gaped up at the sky, my eyes widening to miniature

replicas of the moon itself. In the distance, I heard a shrill howl, tainting the air with its malicious echoes. A heavy trickling noise followed, and a soft rustling behind the coarse hills and mountains. Close to despair, I remembered my house - cosy and comforting - and I longed to lounge on the sofa with a book in my hand. Although I believed it impossible, my trepidation increased. What was I doing here? Where was this place?

Through the murky mess of barren oak trees, a chilling trail of blackness squirmed through the daunting landscape, shifting and writhing, almost like ink, as if the letters of every horror story I had ever read had peeled off their musty pages to gather in my nightmares. To my already elephantine dread, when I tried to make my way towards the river, my legs felt like lead - stuck to the ground like glue. As I glanced down, I saw the soles of my feet had been embedded into the ground, the pain building and building. Struck with nausea, I stood there, wriggling like a worm whilst trying to tromp forward. The ground was glass. The air was so pungent it made my nostrils throb. The trees were deadly sharp looking. Everything was designed to hurt me in any way possible.

In the distance, an ear-splitting rumble blasted. When I, struggling as I did so, turned a 180o, I caught sight of a literal volcano, bubbling and bawling like a baby. Scarlet lava steamed and crackled hysterically, oozing down the mountain's ragged surface in a leisurely motion, inching towards me like it had all the time in the world. Honestly, it felt like the lava was taunting me, slowly moving as if aware I was stuck and struggling to free myself.

From over the river, I heard the deafening howl again; it seemed nearer now, and the source was starting to become clearer... Werewolves. The fog thickened steadily, beginning to veil fractions of the barren scenery from my hazy vision, but increasing the swelling fear growing within me. I was almost half-submerged in the ground, now. The earth was the colour of plums, but unlike plums, it prickled and sparked with miniscule black flames, waltzing before me. The howls grew steadily louder and louder, followed by more uneasy rustlings. I had to be the only human to have stumbled across this nightmare, or, I shuddered to think, the only human remaining?

Commentary analysing my creative writing

Every novel is set somewhere, whether it be a tranquil lake or a bustling street. However, why is a setting so vital to make a story shine? To start, a character's environment can truly reflect on the character in question's interests. A character may look at ease in a kitchen, mountain, forest etc., which can give the reader some insight that they like baking, eating, climbing or something else. This can be utilised to subtly describe an individual without clouding the story with description which is why I wrote how my narrator usually enjoys a quiet life reading at home. A setting can be used to enhance the story through contrast and variety. Twigs, rivers, houses and paths are all sections of the character's background and can be applied to a story's plot to make it just that little more engrossing as I show here when the landscape seems intent on giving pain to my narrator.

Figurative writing is one means by which writers can help describe a setting by conveying more than we usually

expect when we use more literal language. There are many examples of descriptive techniques, for example: similes, metaphors, oxymorons and juxtaposition. I believe I have used numerous figurative devices inside my description of my imaginary setting in order to make it as perfect as possible. In this analysis, I plan to explain in depth what these tools are and how I have used them effectively.

To begin, there is the simile I used in the first paragraph: 'as if I was being pricked by a thousand razor-like fragments of a broken window'. Similes are exquisite to use as they help to 'show, not tell' by comparing something unknown with something more familiar by accentuating a particular feature of the entity. Instead of telling the audience how painful the ground felt against the anonymous narrator's feet, I have compared the pain to being stabbed by thousands of fragments of broken glass, which, obviously, would be excruciating and suggests malevolent intent. Similes commonly use the phrases 'as ___ as' or 'like a/an' to compare two articles that are similar, for example a blanket and a cloud: the blanket was as soft as a cloud.

Similes also share a degree of comparison with metaphors, which is when you describe an entity as something, which I have used to add interesting associations and emotions to my description. An example of a metaphor from my passage could be: 'my eyes widened to beachballs'. I compared the size of the narrator's eyes to beachballs to show how huge they have enlarged to from fear. However, metaphors can prove quite difficult to use and make your text sound cohesive simultaneously, unlike similes.

Another descriptive technique I used is in the third paragraph, and that is juxtaposition. This is when the writer compares the situation, place, etc. with something contrasting the previous point. This can make the first seem worse, better, scarier, than it really is by putting these two opposite points beside each other. In my descriptive piece, I compared the nightmarish setting to the comfort of the main protagonist's own house, which not only proves how uncomfortable they feel in the situation, but because I used the phrase 'lounge on the sofa with a book in my hand', gives the reader insight into the character's interests.

In my description, I have utilised figurative devices to show the terror and despair felt by the narrator when waking up in my nightmarish landscape in hopes to make it more enjoyable, entertaining, and powerful to read. I attempted to make the reader 'see' and 'feel' the scene, instead of literally telling them what happens. I have contributed to the sense of horror I intended by describing a clashing, violent colour scape, acrid smells and painful feelings, introducing rhetorical questions to prevent the reader from feeling the satisfaction of finding answers. The reader is left with mystery, as I aspired for.

Tutor comment:

"I am delighted that U.'s work is being shared in 'The Scholar', so others can enjoy her wonderfully creepy atmospheric writing. She is an exceptional scholar within a group of highly talented, hard working and creative pupils. It was not easy selecting a piece of work to submit, but U.'s response to the final task displays a degree of imaginative engagement with the course which really stands out combined with clarity of expression and excellent understanding. She worked consistently hard throughout the course and was always ready to have a go at answering questions in class with a thoughtful and intelligent response. I am so grateful to Ms C. and the staff at Woodcote Primary School for their warm welcome to this lovely school and to the class of able, enthusiastic and talented scholars who worked so hard and were so much fun to teach. I wish them all the very best in the future."

Myth or Reality? To what extent can wartime portrayals of the soldier-horse relationship be trusted?

Year 10, Key Stage 4

Pupil Name: J. Pounder
School Name: Heanor Gate Science College, Derbyshire
Supervised by: J. Flynn
Tutor University: University of Derby
Course Title: Myth versus reality: Soldiers and horses and The Great War

Although over the years the soldier-horse relationship has been mythologised, there is no doubt about the reliance that the war effort had on the horses and the essential part they played. Not only were horses depended upon in the war, but they were also heavily relied upon prior to this time for farming and transportation of goods and people. This is clearly expressed through the National Archives Census of 1901 where around three and a quarter million horses were at work in Britain.

As time has passed, the relationship between man and horse has been romanticised, much in the same way as 'a man's best friend'. Even though these bonds have been mythologized, they are based loosely around some kind of truth, meaning you just have to search harder to build up a bigger picture of what's myth and what's reality. In the wartime effort, horses were an integral part within the soldier's survival and therefore needed to be nurtured by their handlers. This is proven through the fact that horses build up a relationship through trust and actions, instead of looks - like a human would. This is clearly expressed in War Horse when the horse 'could see at once that he meant no harm'. [i] Many of these horses were requisitioned and taken away from loving families in order to contribute to the war effort. There was a need for these people to believe that their pets would be used in a humane way as opposed to a 'machine'. Michael Morpurgo accurately depicts the key duties and facts of a war horse's role and some of the hardship they faced. However, throughout the novel there is an undeniable mythological theme of an eternal bond between a boy and his horse. This is illustrated through the instant connection between the boy and the horse in the initial chapter of his novel. This connection is further emphasised when the boy (Albert) is discussing the relationship between them with

Captain Nicholls. Albert states that 'he's my horse and he always will be, no matter who buys him', [ii] showing the irreversible and inseparable connection between the pair. Not only did Albert express this bond through what he discussed with the Captain, but he also illustrated it through his actions - his willingness to go to war and risk his life to stay with his horse despite being underage. This draws the reader in and raises their hopes that they will be reunited. As opposed to other depictions of the soldier-horse relationship, Morpurgo bases his novel from the viewpoint of the horse. By doing this it strengthens the belief that a bond is mutual and something that was a reality during the war. Even after several years, the horse (Joey) picks out Albert's voice through the hordes of soldiers after Albert takes an order from his superior, 'a reply that sent a sudden shiver of recognition through me' [iii]. Furthermore, the horse, which is in agony due to an injury, is soothed by the reunion and instantly forgets the pain that he is in. This relates back to the mythologisation of the power of a relationship to remove even the worst physical pain. The horse states that 'suddenly there was no longer any pain in my leg, and I trotted easily over towards him and buried my nose in his shoulder' [iv]. Some people may argue that this is a reliable source as it is a fictional novel, however in his acknowledgements Morpurgo makes reference to the 'octogenarians in the parish of Iddesleigh'. [v] This is significant because as the novel was published in 1982, it implies that these were people that would have lived through the Great War and were sources of information for his novel. This would mean that Morpurgo would have used first-hand accounts about the feeling and actions that these people carried throughout the war, and therefore the soldier-horse relationship. This implies that Morpurgo didn't mythologise the relationship and in fact, was present during these brutal years.

The reality of war for some soldiers was in stark contrast to Morpurgo's portrayal of the soldier-horse relationship. This is highlighted through Reid's account of day-to-day activities after a long day on the front line. He expresses the challenges of being a mounted soldier and the added responsibility of having to look after a horse and putting their needs before his. Before being able to tend to his own needs on 'arriving wet, cold and tired after a thirty-mile ride' [vi], he was also expected to secure an area in the dark followed by the removal of its tack, which was 'the plight of the driver with a pair of wet, hungry horses' [vi]. This is supported further by Hopwood's account of the implication of not caring for your mount adequately. He describes the lack of food provided for soldiers compared to the amount of food provided for the horses. This clearly expresses how horses were well looked after, respected and were essential in the war. Nevertheless, many soldiers reported having a close bond with their horses and relied on them to get them through the day. This is due to the fact that not only were horses used as assets to war, but they also boosted the morale of each soldier. They were a constant companion and a link to home and humanity in a desperate and brutal situation. Johnston is a prime example of how horses were an indispensable support within the war, when he states that 'it is one of the reasons why I lasted as long as I did. He took care of me'. [vii] Both of these men's accounts show the differing effects on mounted soldiers and build up a more rounded picture of

the realities they faced; some saw it as an honour to serve with these animals whilst others saw it as a burden.

These accounts give the impression that horses were privileged, but the reality is that horses underwent great hardship during these times. It is estimated that 8 million horses, donkeys and mules died during the Great War, with over three-quarters dying from the extreme conditions that they were exposed to. Horses were primarily taken to war to transport artillery - limbered wagons and GS wagons were used. They spent a significant length of time on the front-line recovering soldiers that had been injured in the battle and transporting them quickly over rough terrain (something that would not have been possible if the newly motorised vehicles had been used). Horses were also vital in aiding communication across the front lines. Packhorses would transport large quantities of cable, which is attached to their rear, and would lay it as they moved on. Without these animals, the front lines would have been disjointed due to communication being impeded. In order for the horses to continually carry out these essential and demanding tasks, the army needed to ensure they had experienced farriers and veterinary assistance. Without the horses, the wartime effort would have been considerably harder due to the physically demanding jobs they carried out. This further confirms that the horse's life was far from 'privileged' and is again backed up by Morpurgo's account of the veterinary officer's statement over Topthorn's death, 'too much work on short rations and living out all winter / we should not treat horses like this - we treat our machines better'. [viii] This shows a snapshot of the horse's predicament and the harsh conditions that lead to so many of their deaths. Even though, this hints at the fact that horses were poorly treated, this is not a reflection on their individual handlers, but on the situation that they found themselves in. Food, water, and rest was limited for both soldiers and horses, which could have brought them closer together as it unites man and horse. Due to the soldier's being able to relate to the poor conditions, they may have felt empathy towards the horses, which would have strengthened their bond and solidarity between them.

During the war, people back at home received news of the events in various ways. The popular methods were letters directly from loved ones, newsreels on the radio and at the cinema or newspapers. As the war progressed and conditions deteriorated without much progress, the government's view on propaganda and news reporting changed. They regularly withheld information from the public, which led to many believing that there was a more positive outlook on the current situation. They instructed the army to censor the reports to the media, as well as letters home from loved ones. This censorship gave a warped view of reality and gave people the opportunity to create their own versions of events - leading to the mythologisation of the war events. Badsey backs up this theory, when he is quoted, 'was nothing like 'reality' but rather an illusion of reality'. [ix] His theory suggests that something that may be viewed as reality is in fact just something that people want to believe to be true. This could be through the way that the news is depicted or because the war effort had been going for several years, and people needed the hope of a positive outcome. This

is similar to the portrayal of 'Goodbye Old Man' which depicts a soldier that is seemingly comforting a wounded horse during its final moments. However, taking Kirby's account into consideration, he states that his 'order was if we could bring any harness back, bring your harness back you see'. [x] Therefore the soldier depicted could simply be retrieving the headgear before returning to the rest of the battalion and leaving the horse behind to die. This is not something that many people back home would want to believe is happening, if they had signed their horse over. Were these relationships inferred in the hope to relieve the guilt of relinquishing a horse and in truth were they just seen as a means of transportation? Although War Horse is a fictional text, it refers to a similar situation in the portrayal of Topthorn's death. His mount Friedrich is clearly distressed by Topthorn's death and only removes the headgear once the vet has confirmed his suspicions. He announces 'he was a friend' [xi] and the rest of the soldiers 'stood around in complete silence looking down at the prostrate form of Topthorn in a moment of spontaneous respect and sadness' [xi]. These quotes clearly depict a caring relationship between the soldiers and the horse even if it is not the one that they work with. It shows a period of mourning, which is what could have been being depicting in 'Goodbye Old Man'. None of these theories can be fully proven due to the fact that many depictions of these relationships were paintings or drawings not actual pictures that could prove these bonds. In Kirby's statement he describes carnage where animals were left without limbs. In a humane situation surely, these horses should not have been left to suffer but immediately shot to end their pain. His statement would lead you to believe that, if the horse is unable to continue, then the harness is the main priority and 'cleaning up the mess' is secondary. The use of this term does not represent the emotional connection but more of a desensitised view of the situation.

When considering whether the wartime portrayals can be trusted, it is essential that you account for more than one source in order to increase the reliability of the hypothesis that you come up with. This is because when using a source like a memoir or a transcribed interview, they can be less reliable than something like a diary. Memoirs are always written after an event, which increases the chance of outside influences on the author and transcribed interviews may be interpreted differently to what is meant. By using these in combination with letters and diaries you build up a more rounded picture of the events. It may not be the intention to deceive the reader, but memories fade overtime and details are lost or added. A variety of texts being reviewed gives a more credible outlook on your viewpoint. I feel that human behaviour can also be assessed when considering the relationship between soldier and horse; and even though mythologisation may occur there is a strong underlying link between all the different sources.

There are several accounts of the Great War and the horse's involvement, with both positive and negative views of working side-by-side with animals. I believe that although some of these accounts have been mythologised, there is an undoubtable bond between these soldiers and their horses. Could you really spend these long periods

of time and rely on them without forming some kind of connection? These depictions of these relationships may not be entirely accurate but human nature would suggest that there would be some level of compassion for these creatures. For thousands of years, humans have formed bonds with animals, and this is not likely to have stopped within a conflict situation. I believe if anything this would have heightened these relationships.

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Tutor comment:

"J. is a conscientious student who was an absolute pleasure to teach. She really engaged with the primary material, and with the concept of myth and reality. J. not only developed a convincing argument in her final assignment, but also brought in her own reading and research. Well done J.!"

Identify and analyse a human rights challenge under the current COVID-19 pandemic, paying close attention to the actors involved.

Year 12, Key Stage 5

Pupil Name: A. Parker

School Name: Chislehurst School for Girls, Bromley

Supervised by: A. Grimaldi

Tutor University: King's College London

Course Title: Whose right is it anyway? Human Rights in the age of globalisation

In this essay I will argue that the focus on the physical health threats of COVID have hidden several other health-related issues relating to human rights. These are women's health, cancer patients, and physical and mental disabilities.

Human rights are the moral principles protected usually by international law. These moral principles set standards of human behaviour; they define the people we should be. People who have the ability to healthcare. People who have a right to education. People who have freedom and justice and all that's important to live their life. This all comes from the United Declaration of Human Rights which was declared by the United Nations General Assembly in Paris on the 10th of December 1948 (United Nations, 2021). These human rights range from Article 1 which states that "All human beings are born free and equal in dignity and rights", it's the state of being equal to one another, it's about fairness, justice, and non-discrimination. To Article 30 which states that nothing in this declaration may be interpreted by any groups or individuals, as a way for them to participate in an act of destruction against any of these rights. During this COVID pandemic, people have felt, and there is evidence for this, that they have had their individual rights violated.

Women of all ages have been vastly affected by the challenge of being under a pandemic. 1 in 3 women already suffer from domestic and/or sexual violence (UN Women, 2021), but because of COVID the cases have both increased and intensified. In a number of countries, reports of domestic violence have surged by a 25 percent and prior to the pandemic, less than 40 per cent of these women reached out for any sort of help (UN Women, 2021). Therefore, unloading restrictions and lockdowns will further add to that statistic, isolating women from receiving support and escaping their abusers. The ones who manage to speak out for help are usually silenced by the strain on social, health and police services. Specifically, in New York City, there was a 10% increase in domestic violence reports in March 2020 compared to March 2019 (Boserup, McKenney & Elkbuli 2020). In the UK, there's a project tracking violence against women and during the time frame of March 23rd and April 12th, 2020, deaths from domestic violence had more than doubled, this is comparing to the average rates for the past 10 years (Roesch et al. 2020). All in all, it remains vital that health care providers do not lose sight of the substantial violence while battling this pandemic, due to how they may be survivors first hope of

contact. Having said that, it's not just domestic violence that has been a villain during these difficult times. The social distancing measures and quarantine have created a new source of stress for pregnant and postpartum women. Self-reported rates in China of anxiety and depression were higher among pregnant women during this pandemic compared to their pre-pandemic levels (Kotlar et al. 2021). It's found that the increase in perinatal stress is due to the social deprivation, unpredictability of the coronavirus and the lack of family support given to them. Despite the negative impact's lockdown has caused, it's also given mothers time to spend with their family which can easily become something worthwhile.

The unprecedented burden of COVID-19 on global health systems has had heavy implications for cancer patients. Not only are they the most vulnerable, but there is a greater need for ventilator support which is not always possible. Alas, diagnosing people with cancer has come to a halt in a range of countries from having screening programs and diagnostic services suspended (Richards et al. 2020). Not only that but certain ongoing treatments have been deprioritised to allow health services to focus on this pandemic. There's reasons of risk in every possible way for cancer patients, staying at home could increase the tumour progression however going to the hospital increases the COVID-19 infection risk (Ciazynska et al. 2020). These people have the right to healthcare. Yet these people aren't being prioritised. These people are battling two threats at once. We know that in the UK, there's been a 37% drop in the number of cancer patients starting or receiving treatment since April 2020 compared to May in the previous year. In May 2020, a survey was conducted by the cancer research team in the UK and the results are as stated here: 1 in 3 cancer patients have had their treatment impacted, 4 in 10 people have had their tests affected, even those who are testing to see if their cancer is either returning or spreading. And lastly, 7 in 10 people experiencing delays have become more anxious and frustrated, impacting their mental health (Cancer Research UK, 2020). Many individuals were not even present for their cancer care holding misplaced beliefs that it was only COVID-19 patients that healthcare was available for. Therefore, clearer communication is needed when it comes to cancer treatment and support in order for a sense of understanding (Neal et al 2020). The COVID-19 pandemic shed a new light on our cancer control, being aware on the limitations and how urgent it is to resolve them. The response of healthcare systems to all these new challenges will leave an everlasting legacy of this pandemic.

With schools being suspended nationwide in 189 countries since April 2020, there has been major impacts on the mental health of children with disabilities. A lot of schooling became online and the control over a routine was lost on a number of people, routines create a sense of security and safety which is important for children's psychological and emotional development (Patel, K 2020). The ones most at risk are those with pre-existing mental and physical disabilities, one way this is shown is how most online teaching platforms do not have assistive methods when it comes to visual impairments or those hard of hearing. A key issue is the lack of social interaction which can negatively impact

one's developing social skills, especially for children with Autism Spectrum Disorder (ASD). Autism Spectrum Disorder is defined as a serious neurodevelopmental disorder that impairs a child's ability to communicate and interact with others (Mayo Clinic, 2017). Social distancing measures and not having the access to outdoor activities deteriorates their development, not only this but the level of uncertainty in the world right now brings anxious, frustrated and even angry feelings. Having these experiences of negative emotions, mood changes and interruptive sleep puts children at a greater risk of experiencing a relapse of mental illness or in some cases, developing one. Due to medical care being prioritised for COVID-19, there's also been closures of mental health clinics, which again is that key source of stress, anxiety, and fear. A case of this, for example, would be in India, 7.8 million children between the ages of 0-19 years old have either a mental or physical disability, one fourth of these kids do not attend any educational institute (Patel, K 2020). There is already a lack of support when it comes to education and assistance in countries like India, having this linked with the current standards of home confinement, that brings whole new levels of helplessness within such children. Nonetheless, there have been positive developments for children in the United States, seeing as 7 million between the ages of 3-21 have been receiving special education classes at school (Patel, K 2020). It's safe to say that the lives of children with mental and/or physical disabilities need to have some level of priority within the planning involved for this pandemic.

Nevertheless, this global pandemic has given an opportunity for Non-Governmental Organisations (NGOs) to step up and take it upon themselves to address the human rights violations. A specific one called Cure Violence has continued to maintain their goal, while also focusing on COVID-19 response and ways to help their community. Cure Violence is a global NGO stationed in the US, and their main goal is the approach to violence prevention. Their proposed definition of violence is situations that can escalate to violent acts, such as shootings, group conflict, major arrests, and genuinely a simple act of violence that could lead to hurt, damage or death of another being (Cure Violence Global, 2021). Particularly in New York City where they have managed to prevent shootings by a 63% reduction rate. And just because we are in the middle of a pandemic does not mean they have stopped, they in fact have continued and took the next step of COVID-19 response. They have responded to community needs by distributing materials and information needed about this pandemic, and offering out food and masks to keep people safe and healthy. Considering, us as individual citizens, have the right to a standard of living adequate for the health and well-being of ourselves including food, housing, and medical care (United Nations, 2021) yet we are stuck in a pandemic, its not always plausible. Knowing that NGOs like Cure Violence are making that one step closer to a change in a community that may not have a standard living adequate for themselves, is proof it's not always the government that can address certain issues. Article 29 of the Universal Declaration of Human Rights – Everyone has duties to the community in which alone the free and full development of his personality is possible. For Cure Violence, their duty was for the community and it still is.

In conclusion, the COVID-19 pandemic has impacted and still is impacting a range of individuals and violating a range of human rights. There are certain COVID safe procedures in place, yet those who put them in action don't think of everything nor everyone therefore not benefiting certain individuals, just like these women, children, cancer patients and NGOs. Everything stated here links back to how this affects our human rights. We have the right to healthcare – yet cancer patients are having delayed and impacted treatment. We have the right to live our life without the threat of violence – yet women's domestic violence reports are increasing. We have the right to health – yet children's mental health is being allowed to fall behind. We have the right to communities – and we have NGOs. 1 in 3 women experience domestic and/or sexual violence. Anxiety and Depression is higher in pregnant women now more than ever comparing statistics to times before pandemic levels. 1 in 3 cancer patients have had their treatment impacted. In India, 7.8 million children between the ages of 0-19 years old have either a mental or physical disability. Cure Violence have reduced shootings in New York City by 63% and continue to aid during these COVID times. The world is so fixated on COVID-19 that society has hidden the rest of the threat's certain individuals face every day. We have the right to life; in which case our human rights should be no less than guaranteed.

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The Brilliant Club comment:

"It was an absolute joy to read A.'s final assignment. I was particularly impressed with her outstanding level of engagement with the content, the ability to examine a variety of groups, with a variety of opinions on the subject, and her comprehensive essay writing skills. No doubt A. would be an invaluable presence to any undergraduate programme, a massive well done on behalf of The Brilliant Club!"

To what extent did the media impact the image of George III?

Year 12, Key Stage 5

Pupil Name: L. Wilson

School Name: John Porf Spencer Academy, Derbyshire

Supervised by: P. Emerick

Tutor University: University of Leicester

Course Title: Monarchy and the media: Royal image in Georgian Britain

King George III was born on the 4th of June 1738, in London and was the eldest son of Prince Frederick. George III was the first British monarch to be born in England and speak English as their first language. Many different elements have contributed to shape George III's image over the centuries including artefacts, historical events, his illnesses, and contemporary people. Artefacts include portraits, prints and sculptures. Portraits and sculptures depict him as a loving father and husband, whilst the prints tend to be satirical, such as mocking George III's interest in farming. Historical events, both in Great Britain and overseas, including possible abdication, and the American War of Independence and the aftermath of these upon him both politically and personally. There are physical and mental illnesses George III was speculated to have had. Also, to be considered are contemporary people, including artists, writers and diarists have also contributed to the historical image of George III, as well as his modern image. These artefacts, events, illnesses, and people will be investigated by looking at a variety of primary and secondary sources and to identify the points these sources are trying to convey to their audience and then explain what these sources mean as well as any hidden meanings behind them. This essay argues that George III's image was affected by the media, and that this image became more positive during his life, but then becomes more negative closer to the present day.

Most portraits of George III show him to be very gentlemanly, making him seem noble and powerful. For example, in McArdell's portrait George III is seen as handsome and adorned with finery. [1] His clothes are of the highest quality and suggests wealth, prestige and taste. His stance with his chest puffed out makes him look aggressive, and somewhat arrogant, therefore acts as a warning to potential enemies as well as reassuring allies. Also, a painted plaster statuette [2] shows him to be younger and healthy, even though he was deceased when the statuette was commissioned, proving George III was respected after his death. This portrait and statuette impacted his image because they put him in a positive light, making him seem not only charming, but also healthy. Also, this statuette could be showing the fact that even though George III was deceased when this statuette was created, people still cared about him and wanted people to see that he was a good king and a good person. This shows that he has a lasting image of him as a younger man, because the statuette was showing George III as a younger version of himself. Also, the fact that one of George III's daughters gifted this statuette shows that she is proud of who he was and that she would like everyone else to share this image of him.

These portraits show George III to be popular among the people, bringing out his best features and generally showing he is respectable, wealthy and important.

One way that satirical prints impacted the image of the George III was because they made him more of a fallible human, especially in the later years of his reign. This can be seen in the quote, 'A gradually more indulgent, if not necessarily more sympathetic, treatment of the king as a flawed, fallible human being – yet one who is nevertheless the living embodiment of the state itself: a veritable 'John Bull gone to seed', as it were.' [3] The very humane adjectives 'flawed' and 'fallible' are used by David Morgan to make George III appear to not be what many people thought of when they talked about the ruler of Great Britain (an almost immortal leader who is incredibly rich and cannot mix with 'peasants'). By showing George III can be subject to illnesses and personal issues of his own, Morgan is showing George III subverts expectations as a King and be relatable to ordinary people, within the Great Britain, increasing his popularity. However, in the early years of his reign, satirical prints were more often used to mock the Royal Family, for example in this print [4], George III is not presented as regal (he does not wear a crown), nor well-mannered (he is shown to be drinking tea straight out of the cup, whilst holding the saucer) – how could he be a proper a leader, and father of the nation when he cannot get his own children to follow his requests? Queen Charlotte is missing several teeth, and looks incredibly bony, as if she is malnourished, implying George III doesn't care about her health, if he saves money as the king was perceived to be frugal with his money, as Charlotte states in the speech bubble in the print. Or Charlotte's lack of teeth could show hypocrisy as the missing teeth could be due to over-indulgence in sugar. The six royal daughters are being encouraged by George III and Charlotte to give up sugar from the Caribbean and West Indies as a gesture of protest against the slave trade (as Charlotte states in her speech bubble in the print), which they do not look happy about, as they would much prefer the sweetness which the sugar provides over the sweetness that a group of slaves are not being forced to harvest that sugar. This satirical print had a negative impact on George III and Charlotte's public image, but possibly a positive hidden meaning it could indicate a changing attitude to slavery within the Royal Family [5]. Satirical prints show George III show him as imperfect and that people liked to be critical of the Royal Family, however, they got less critical during his reign, showing George III in a more positive light.

The fact that he was known as a family man has also shaped his image. Some portraits show George III to be with his family [6] and in this portrait, George III is seen with his, in 1770, six eldest children. All his children are wearing different clothes, showing that George not only has a lot of money he is willing to spend it on luxurious clothing items. This portrait acknowledges each of his children are different, with different personalities and different needs. This is contrary to Gillray's print 'Anti-Saccharites' in which George III's daughters appear to be dressed the same. This shows that prints try to find the worst in his family, whilst portraits find the best in his family. The fact he was known as a family man shows him to be a caring man and a devoted husband and father and the fact he did not

have any affairs, unlike his father, George II and his son, George IV.

Representations of George III also reflect major historical events during his reign. One of these events was the American War of Independence. In 1783, David Hartley, representative of George III and Great Britain and Benjamin Franklin, John Adams and John Jay, from the American Colonies signed the Treaty of Paris, meaning Great Britain formally recognised its former colonies as an independent nation. The first instance of the on-going war affecting George III is seen during 1782 in which he drafts an abdication speech [7]. This is done because of the loss of the Battle of Yorktown in October 1781 and 'a motion against the further prosecution of the war on the 27th February 1782' [8], initiating the failure of Lord North's (Prime Minister) administration. In George III's draft abdication speech, he mentions how this was the, 'most painful moment of My Life.' The superlative 'most' and adjective 'painful' shows that he is very emotional about this decision and that he would rather not do it; it is a last resort. This shows that he cares about Great Britain and that he does not want to leave it and go to live in Germany. Due to him being known as 'the King who lost America,' he has been put in a negative image to modern people, and even a tyrannical leader to modern Americans.

George III's health was often scrutinised as he is said to have suffered from a range of illnesses. This is reflected in representations of him with his supporters stressing his vigour, and his critics depicting his frailties. George III's illnesses have been speculated upon for centuries. One illness which he has been speculated to have had was porphyria. One symptom of porphyria is blue/purple urine, due to porphyrin being excreted in the urine. George III had blue urine once, making people believe he may have had this illness. Also, other symptoms of porphyria include anxiety, restlessness and insomnia, all which George III was speculated to have had. This would have made people believe he had porphyria. Also, the fact that many of George III's descendants had porphyria, including Princess Victoria (Queen Victoria's daughter), George III's two-greats granddaughter, her daughter, Princess Charlotte, and others [9] all had porphyria. Porphyria is a genetic condition; it is feasible that George III could have had the condition as well. The speculation that George III may have had porphyria has been dismissed because the blue urine was a one-off case instead of being a continual problem. It was much likely something George ate, some medicine that caused it or even a urinary tract infection caused by *Pseudomonas aeruginosa* bacteria [10]. According to T.J. Peters [11], he may have suffered from some sort of bi-polar disorder, as well as dementia, chronic mania, blindness and possibly deafness, in his later years. To a modern-day person, George III is well-known as 'the mad King,' showing that his main image now is quite negative, however, at the end of his reign, in 1820, he was well-respected, showing a very positive image.

Many different contemporary people helped to shape George III's image. One person who helped to positively shape his image was Fanny Burney. Burney was a member of the Royal Court who kept a diary and later published it. Fanny Burney writes about the journey to Weymouth as

well as the fact that when they passed through Salisbury, a 'magnificent arch was erected, of festoons of flowers' [12]. This shows that people all over the country respect King George III's recovery and want him to know they all support him and like the fact that he can be viewed as a normal, mortal person, not just as the leader of the country and someone who is viewed to be 'godlike'. Also, the sheer amount of people who support the King can be demonstrated by the fact that 'At Dorchester the crowd seemed still increased.' [12] This shows that as far as 114.1 miles away from London, an ever-increasing amount of people was showing up to welcome and congratulate the King on his recovery, showing that the King must have been received by the public, following his illness, with joyousness. Burney mentions a party which she and the rest of the Royal Family went to, in Exeter in which she uses a list of very much positive verbs, 'The rejoicings, the hallooing, and singing, garlanding, and decorating'. [13] These positive verbs give connotations of happiness to the reader and make the reader think these people were having fun and were enjoying the fact that the King had recovered from his illness and wanted to celebrate with him. Other people who helped to shape his image were the many artists who painted George III's portraits or drew the satirical prints based on him. The portraits of him capture him at his best, helping to preserve his best features and show modern people what he was like at his best, while satirical prints help to show modern people the politics at the time, why the Royal Family were mocked and bringing out the worst features of the people whom it captures. Contemporary people provided mixed images of George III however, most of these images were positive and were reflective of what George III was really like.

George III's image has changed drastically over the years; he had a more negative image during the early years of his reign; however, this image grew to be less negative the longer he reigned, although nowadays, his image is generally, negative. At the beginning of his reign, it was thought that his father, Frederick, Prince of Wales would have been King, however, due to his death nine years earlier, George would become King, which the people of Great Britain may not have liked, due to him being so young and inexperienced. Also, the fact that he was born two months premature may have made some people believe he is weak. He became ill in 1788 and a regency is proposed but not established as George III recovers. The people of Great Britain respect him for this and acknowledge him as an ordinary person and someone they can relate to; hence his popularity increases, and his historical image is improved. When word gets out that he enjoys agriculture and gains the nickname 'Farmer George' the noblemen are shocked, because this was not how a King was supposed to act, however the common people found this respectable as it gave them something in common with their King, again, improving his image at that time. However, to a modern person, George III is known for two events: how he lost the American War of Independence, and the fact that he was 'the mad King.' The fact these two events are what he is mainly remembered for, is a negative image of him and is not representative of who he was, due to the fact that he did a much greater variety of things than just what he is notorious for today. This shows that his

historical image is not only more representative, but more positive than his modern image. As the influence of the media increased over time, this could have played a vital role in shaping George III's image because more people believe the media and rely upon it for information, so if the media only ever covered him losing the American War of Independence and becoming mad in his later years, people now would only know about those two things.

The media has played a crucial role in shaping the image of George III. Portraits and sculptures show him to be a caring man and a devoted father and husband, giving him a positive image, whilst satirical prints made him seem unappealing and are critical of him, giving him a negative image. The fact he was a family man shows he cares about the people who were close to him, proving he can be trusted with every citizen of Great Britain. The image from the loss of the American War of Independence and the effects this had upon him is negative and is one thing he is infamous for. Illnesses he has been speculated to have had showed to his nation he was mortal and had weaknesses, putting him in a positive light within his nation. Contemporary people have mainly shown his image to be a positive one, partly because artists and sculptors were paid to bring out his best features, but also because they cared for him, because he was a good person. His historical image is a positive one because contemporary people knew what he was really like, however his modern image is more negative because people can only speculate based on primary sources and because most knowledge on him is about his most negative points, his poor health and the fact he lost the American War of Independence. Evidence presented shows that not only does the media greatly impact George III's image, but also that his image starts off as negative but gets more positive during his lifetime. Although George III is now remembered in a negative light it could be argued that the respected and relatable George III who was known throughout the media of the time began a way of thinking about the Royal Family that we still have today; our media coverage emphasises the Royals' relatability just as the media did with George III; his reign is remembered in a negative light, however, as a person, he is remembered in a more positive light. However, today, fewer people know about this side of him now and is only known for the two most negative points of his reign, hence his image is more negative now.

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Tutor comment:

"It was a joy to teach L. and watch his confidence with the subject matter and the university-style teaching grow over the duration course. His essay shows a sophisticated understanding of the primary source material and complex historical arguments, and I was highly impressed with his independent research skills. These are all valuable skills for undergraduate study!"

Social Sciences

Did World War I and World War II Really End? Defining war based on the outcomes

Year 8, Key Stage 3

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Supervised by: E. Amoateng

Tutor University: University of Warwick

Course Title: What is war?

Throughout this essay, war will be defined by using its outcomes and the state of peace which occurs after the physical war ends. The outcomes of World War I (WWI) and World War II (WW2) will be explored and an argument presented for why these wars never ended, despite the opinions of many. This essay will explain how these wars have influenced and evolved into current wars and conflict, such as the ongoing conflict between the Sunni and Shiites over Iraq, which is an indirect consequence of WWI. I will then begin to explore opposing perspectives from those who believe that wars can have a finite ending.

When a war is declared over and peace has been reached, often it is negative peace that occurs instead of positive peace. Negative peace is where there is an absence of physical violence, but the reasons for the war have not been resolved [1]. Whilst these reasons have not been resolved, positive peace cannot be obtained. This lack of resolution would mean that the war would not have officially ended. To achieve a state of positive peace there are a few factors that some believe must occur which include: 'Equitable distribution of resources, free flow of information, well-functioning government, low levels of corruption and good relations with neighbours.' [2] Demonstrated by these factors, 'positive peace is the attitudes, institutions and structures which create and sustain peaceful societies' [3] To further explore these concepts, WW1 and WW2 case studies will be considered.

An example of a war resulting in negative peace is arguably WWI, which was started due to the assassination of the Austro-Hungarian heir - Archduke Franz Ferdinand of Austria. His death was soon followed by Austria-Hungary declaring war against Serbia on 28 July 1914. Due to 'The submarine, the tank, chemical weapons and armed aircraft, appearing on the battle fields of WWI,' [4] millions of lives were lost; up until 11 November 1918 when the fighting stopped. Short of supplies and faced with invasion, Germany signed an armistice agreement [5]. This put an end to the physical war but not necessarily the issues that caused it, as there is still tension between many countries that fought in WWII.

The peace Treaty of Versailles that was signed was meant to bring positive peace. However, all it brought was resentment between Germany and the Allies. This was due to an article in the treaty known as Article 231 or by the German's term for it - War guilt. This article states that, 'Germany should take responsibility and

pay for the civilian damages its military had caused' [6]. Yet the Weimar Republic and then Hitler and the Nazis 'used the term war-guilt to demonize the treaty in their efforts to sidestep Germany's obligations' [7]. This is an example of the negative peace that occurred. To add to this, the statement, 'Peace treaties have always relied on compromise, even if there are clear winners or losers.' [8] shows that the treaty did not fulfil its role as Germany were unwilling to resolve the war by taking responsibility for it. This proves the conflict that remained after the treaty was signed and therefore suggests that World War I did not end.

Another reason that WWI did not end is because across the world there is conflict between governments, countries and groups that are influenced by the remnants of WWI. An example of recent conflict that has occurred due to the 'Great War' is the conflict between the Sunni and Shiite over Iraq. This conflict began to arise when, 'Britain forged a wartime alliance with the western edge of Saudi Arabia and in return promised independence for much of the Arab world.' [9] However, by the 'end' of the war, 'oil had been discovered in parts of northern Iraq.' [10]. This led to Britain ignoring their promises to Saudi Arabia and in fact fusing the provinces together under Great Britain's control [11]

On the other hand, some suggest that WWI did end as on the 29 September 1918, the Allies troops broke through the strongest German defence position, [12] therefore weakening Germany's chance of winning the war. To add to this, Germany gradually lost all its allies throughout the war, further minimising Germany's chance of success. This led to a German surrender and the end of the war. With a ceasefire signed many said this is where the 'Great War' ended.

However, the argument that WWI did not end can still be proved correct, due to the negative peace that occurred after the treaty was signed. It also can be proven not to have ended as the treaty was maligned and blamed for causing the political, economic, and military conditions that led to the 1939-45 global conflict [13]. The French Marshal Ferdinand Foch also claimed that: 'This is not a peace. It is an armistice for 20 years!' [14] Both pieces of evidence show that not only did WWI not end but it laid the ground works for WWII. This is because the disagreements and conflict caused by the treaty remained and so negative peace existed and so much so, that it was enough to transfer from negative peace to a violent war.

World War II was fought over the way the globe was to be run - totalitarianism (a dictatorship) or humanism (a democracy). With the two main groups fighting this war being the Allies (Britain, France, America, and China) and the Axis (Germany, Italy, and Japan) many of the countries were involved with the First World War and were therefore eager to succeed in this battle. Eventually, the Allies defeated the Nazis and the rest of the Axis on 2 September 1945 after six years of fighting.

However, WWII did not end in 1945 as the negative peace that came after the official end to the war is still arguably unresolved and affecting many lives

today. This is because of the continuous conflict many countries have between one another and the civil wars that are currently occurring influenced by dictatorships and opposing governments. This shows that positive peace has still not occurred after the physical battle of WWII ended. To add to this a quote states that 'because of active wars today, in some places we might as well have never fought WWII in the first place.' [15] From this comment, it can be inferred that there has been no change in the way some countries are run and led. Additionally, the statement, 'Putin repeatedly grandstanded on the sacrifices Soviet soldiers made defending the strategic Black Sea peninsula from invading Nazi forces.' [16] demonstrates the impacts WWII has had recently. This evidence shows that WWII has not ended.

On the other hand, from the moment, 'Hitler committed suicide on April 30, 1945 and his dictatorship reached an end, Hitler's successor – Karl Donitz – deputized Alfred Jodl to negotiate the surrender of all German forces.' [17] Many historians say that this was the end to WWII, simply because this series of actions put an end to the fighting and conflict in many countries and no further lives were lost, at that time.

Despite this, remnants of the war have influenced the ongoing wars that are currently or have recently taken place, supporting the argument for negative peace. Also, one article reads, 'in the two World Wars of the 20th century, after which thinkers and laypeople alike concluded that war ought to be forever removed from the tool chest of politics' [18]. This shows that as both the wars mentioned throughout this essay have not had an outcome where the 'harm far outweighs the benefits' [19], both these wars have not had an outcome of positive peace and therefore neither war has ended. War does not always have to be physical to be of existence and to affect millions of lives, it can be a physical war, a negative peace ridden conflict or a combination. Hence the reason war can be defined using the phrase: war is a state of conflict between two opposing groups that has a significant impact on many people's lives in a non-peaceful manner. Additionally, war does not end as the financial implications of war are usually far greater than predicted when the war starts and therefore there is often debt between countries which generally does not allow positive peace to exist. Therefore, wars do not end.

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Tutor comment:

"A.'s essay makes an excellent contribution to the conflict and peace literature. Using World War I and World War II as case studies, her paper makes a strong case to support the view that 'wars do not end'. It was a pleasure working with A."

Making the most of tourism: Discuss with reference to Sustainable Tourism Development and your chosen case study

Year 10, Key Stage 4

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 Course Title: **Sustainable tourism development in Cuba**

Dubai's Race For Excellence: Making the Most of Tourism

Dubai, a lively and vibrant city, located in the United Arab Emirates, is unarguably one of the most popular tourist destinations in the world, being named the 4th most internationally visited city of 2019 [1]. Whilst Abu Dhabi is the UAE's capital, "Dubai is the second largest and second most important and influential emirate" in the country [2]. The city advertises "modern skyscrapers, legendary nightlife, exotic landscapes, and desert safaris [3]", so it will be no surprise that millions of tourists are attracted to holiday in Dubai every year. As the years progress, the tourist figures escalate and in 2019, Dubai boasted a record of 16.73 million tourists [4]. With this substantial figure in mind, the city faces a multitude of benefits and drawbacks, both of which will be explored in this essay, in relation to Sustainable Tourism Development. A survey undertaken by Sayed, Y., 'Tourism in Dubai', for the purpose of this essay captures viewpoints from local residents to supplement the findings. As the survey's focal point is quite specific, a blanket view will be provided alongside, through means of secondary research to present a balanced view. Do the benefits of tourism outweigh the liabilities Dubai faces, and is tourism in Dubai truly sustainable?



Global Village Attraction, Dubai

To better understand the benefits and drawbacks of tourism for Dubai, it is paramount to define the meaning of Sustainable Tourism Development, that this essay will address. In order for a place to maintain sustainable tourism, it must cater to the tourists' needs, while sustaining its cultural roots and not depleting its resources for the

generations to come. The host location must also not damage its environment or affect the local wildlife, when satisfying the requirements of the tourists. Essentially, for a place to have sustainable tourism it must manage "all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems [5]".

Dubai has gained a world-renowned reputation for offering a multitude of popular tourist attractions that cater to every taste and desire. "Tourism has helped Dubai to showcase their heritage and culture to the world [3]" and features attractions such as the world's tallest building, the Burj Khalifa, Global Village, a tourism project that brings together cultural exhibits from over 90 countries, and Dubai's 7-star hotel, the Burj Al Arab. According to the Global Destination Cities Index 2019, "Dubai Leads In Overnight International Visitor Spending Globally", with the 'Total Spend' amounting to \$30.82B in 2018. This was projected to increase by an additional 4.18% in 2019 [6]. Based on these growth figures, we can infer a positive impact on Dubai's economy and gross domestic product. Dubai attracts a diverse array of visitors from around the globe – as of January to June 2019, the top 5 sources of visitors to Dubai were from India (997,000), KSA (756,000), UK (586,000), China (501,000) & Oman (499,000) [7]. The plethora of attractions available in Dubai are the reason why large numbers of tourists flock to the city every year. This leads to the aforementioned question, is the tourism in Dubai truly sustainable? What does Dubai's sustainable tourism scheme look like? What impact does tourism pose to the city as a whole, and what actions are required to address the drawbacks?

Various sources of secondary research have been referenced, to answer the questions raised above. Although the upcoming arguments posed would appear valid, some of the sources might contain bias, as they may have been tailored to suit a desired research purpose. However, care has been taken to eliminate bias, to provide general, fair arguments which will benefit the purpose of this essay. In addition to the secondary research, primary research, consisting of quantitative and qualitative questions, has also been conducted through a survey of 15 Dubai residents. A significant benefit of using this primary research methodology is that first-hand, personal results were obtained, ensuring that no bias could have been introduced from a potential third party. Due to the specific nature of primary research, a possible limitation is that an overarching view may not be clearly derived. This issue has been mitigated by broadening the arguments with information obtained from secondary sources.



Burj Al Arab Hotel, Dubai

The positive and negative effects of tourism in Dubai are ubiquitous. One of the positive outcomes of tourism is that more jobs have been created. According to an article from Emirates 24/7, the approximate number of people employed in the travel and tourism industry across the UAE in 2012, was 383,500, (11.3% of the country's total employment) and grew by 2.6% in 2013. The article further projected that "the sector is expected to create 245,000 jobs directly by 2023, registering average annual growth rate of about 4.1 per cent. This includes employment by hotels, travel agents, airlines and other passenger transportation services; it also includes the activities of the restaurant and leisure industries directly supported by tourists [8]". From this secondary source, it is clear that the employment rate in the city is increasing due to the new jobs created, benefitting the local economy and residents. Supporting this is a response from the survey conducted by Sayed, Y., which states that "tourism has benefited Dubai as the economy is improving which has created jobs for many locals and expats [3]". This comment highlights the noticeable increase in employment opportunities for both, the local and the expat residents, as a result of the improving economy. This leads to the conclusion that the growing tourism sector provides for sustainable employment and economic growth.

In juxtaposition to the positive impact mentioned, a negative effect of Dubai's heavy reliance on tourism was the major economic impact, due to the recent pandemic. The Dubai Expo 2020 was heavily advertised since 2013, however, it had to be postponed till October 1st, 2021 [9] as a result of the pandemic. This mega event was intended to attract visitors from all over the world.

Large investments of time and resources have been put towards it, amounting to construction costs of \$7B, impacting Dubai's real estate market, which has been declining for a number of years [10]. While the responses from the primary research highlight that tourism has positively impacted Dubai's economy, it must also be stated that excessive reliance on tourism could bring about massive challenges from unforeseeable events, such as the pandemic. One of the responses received from the survey corroborates this observation, that "the reliance of Dubai on tourism was acutely evident during the Covid 19 pandemic. The absence of tourists had a significant impact on the local economy [3]". Although the discovery of oil has helped in Dubai's development [11], the city has diversified its focus on the trade and tourism sectors to benefit the economy, but as previously demonstrated, the heavy reliance on one sector could bring about undesired consequences. Due to this fact, tourism does not appear to be extremely sustainable over long periods of time in Dubai, since it negatively impacts the host location's economy and local residents, despite the numerous opportunities created. The next section will focus on the pros and cons of tourism, allied with Dubai's sustainable tourism scheme, to truly fathom how the leading powers of the city will attempt to maintain Sustainable Tourism Development.

The primary objective of this essay is to determine sustainability of tourism in Dubai – arguments will be provided in support and against this thesis. Sheikh Mohammed Bin Rashid Al Maktoum, the current ruler of Dubai, has set clear targets to transform the UAE into a 'Green Economy for Sustainable Development' [12]. "Dubai Sustainable Tourism (DST) is a public-private partnership, with the involvement of civil society, that aims to contribute to Dubai's broader clean energy and sustainable development targets by embedding the principles of sustainability into all aspects of the tourism sector [12]". Under the DST initiative, all stakeholders are working towards efficient energy utilisation, environmental protection, and education and awareness programs [12]. An example is the 12 Step Sustainability Guideline which is currently being used "to help reduce hotel's operational cost and improve sustainability practices and the guests' experience [13]". From this, it is understood that Dubai has set a clear vision and a defined path on how to transform its tourism industry into a sustainable one [12]. The responses for the survey question, "Do you feel that tourism is sustainable in Dubai?", were spread as follows: Yes (57.1%), No (35.7%), and Unsure (7.1%) [14]. This indicates that the people living in Dubai, feel that continued tourism would not have detrimental effects on future generations and can be done in an appropriate manner that does not impact the environment, people or culture of the city.



Street In Abu Hail Neighbourhood, Dubai

Qualitative data for responses of 'No', to the above question, suggests that "tourism in Dubai has created quite a lot of challenges for the local population in terms of extremely high costs of living and the community feeling of Dubai was replaced with the cold soulless presence of a large metropolis [3]". In this instance tourism is shown to have a negative effect on the local culture and living standards and cannot be deemed sustainable. An interesting response from the survey is that "Dubai has always been a melting pot for different nationalities, which makes it culturally diverse and rich [3]". This raises the question of whether modern Dubai has done enough to maintain its cultural roots when welcoming a diverse range of tourists, or if it is solely catering to the perception and stereotypical cultural views of the visitors, in an attempt to grow the tourism sector. In response to the overarching question on whether tourism in Dubai is truly sustainable or not, there are a fair number of arguments for both points of view. The sustainable tourism scheme created by Dubai's ruler [12] needs to be observed critically over the course of several years, to reach a clear and justified consensus to this question.

To further enhance the sustainability of the tourism sector in Dubai, and benefit everyone living there, many measures have to be put into practise. Firstly, the issues regarding the sustainability of tourism in Dubai need to be countered successfully through the DST initiative [12], however, there is no guarantee that tourism will be sustainable in all departments. In order to tackle the concern with Dubai's heavy economic dependency on tourism, diversification through new sectors could potentially reduce this overreliance. The solution has potential high risk, in terms of the economic and human capital cost associated in developing new sectors. If this experiment is unsuccessful, then Dubai may be at a bigger economic loss, so a balanced and pragmatic approach is highly recommended. These solutions need to be driven by the highest levels of authority to ensure that compliance and execution is delivered as planned. In addition to the large multi-year strategic initiatives, simple every-day improvements can be made with regards to the general sustainability of tourism in Dubai; for example, educating tourists and residents on the importance of maintaining a clean environment, using less resources if necessary, or simply spreading awareness of the negative impacts that tourism has on the city, and what could be

done to counter them. Micro-initiatives such as these will ensure that momentum is maintained while large scale initiatives are implemented, building towards sustainable tourism in Dubai.

To summarise, tourism has played a major role in the growth of Dubai's economy. It has provided the residents with various opportunities and improved living standards, whilst offering tourists a safe, diverse, and welcoming experience. Conversely, tourism has contributed to the numerous challenges that have impacted the city and reshaped its planned growth trajectory. While there are plans in place to increase the sustainability of tourism in Dubai, further interventions are needed in order for it to be classed as a truly sustainable tourist location, as explored in the essay. Dubai has built a reputation for consistently being adept at planning and executing initiatives at a seismic scale and this track record will hold it in good stead to deliver on the aspirations of its rulers, residents, and tourists alike.

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Tutor comment:

"Y.'s essay showed a clear understanding of the importance of Sustainable Tourism Development, and his work was given greater depth and meaning by the survey responses he obtained from Dubai. During the tutorials, he made some excellent and considered contributions."

What makes a social movement successful?

Year 12, Key Stage 5

Pupil: S. Booth
School: Meden School, Nottinghamshire
Supervised by: A. De Bruycker
Tutor University: University of Leicester
Course Title: Take the power back: Evaluating social movements

A social movement is a social campaign which aims to change the values or structure of society [1], and can be alternative, redemptive, reformative, or revolutionary, according to Aberle's Four Types of Social Movements. The Anti-Nuclear movement was reformative, being group-focused with a moderate scope whereas the Veganism movement was alternative, still with a moderate scope but more of an individual-based target. With such different targets, it is inevitable that both movements would require different resources to become successful – using the Resource Mobilisation Theory, comparisons can be made between the resources that these movements had access to, and how each movement used them to help them to coalesce. For example, being an alternative movement, the Veganism movement relied heavily on media to reach individual prospects and both increase their knowledge of the idea of Veganism, but also adapt their opinion on the subject. In contrast, the Anti-Nuclear movement, being reformative, needed more support from political power elites to give their movement more backing since it was in opposition to the very authoritative UK government. Using the Resource Mobilisation theory to compare the effectiveness of both the Anti-Nuclear movement and the Veganism movement, I will demonstrate that it is support from an appropriate power elite to the group you are targeting which is key to a social movement's success.

Legitimacy is key to a social movement – it is what gives the movement a purpose and hence is a huge part of what makes a movement successful. Legitimacy is defined as the “ability to be defended with logic or justification” [2], and for both the Veganism movement and the Anti-Nuclear movement, the historical context of the time of their establishment forms a large part of what gives them legitimacy; the Veganism movement emerged in 1944, [3] upon the formation of the Vegan Society by Donald Watson, which is significant because this means that the Veganism movement started to emerge around the same time as the end of World War 2 (WW2). This may have contributed to the legitimacy of the movement because after 6 years of warfare, the British public was suffering from war weariness and hence were more motivated to bring pro-peace sentiments into their lives and move away from the violence and destruction of the war. In this sense, the focus on animal-rights and peace among all species in the manifesto of the Veganism movement would have appeared particularly appealing to people post-war, thus giving the movement additional legitimacy. Furthermore, the war meant that the British public was forced to live off rations and a restricted diet, meaning that Veganism would have been less of a radical move from one restricted diet during the war to another restrictive diet

post-war. Alternatively, the vegan diet may have been viewed as a perfect non-extravagant diet which would both provide them with some variation from their ration-restricted wartime diet as well as some sort of peace by its lack of animal cruelty – the war meant Veganism was contextually legitimate.

Similarly, the Anti-Nuclear movement emerged in 1945, after the first nuclear bombing attacks on Hiroshima and Nagasaki in Japan by the USA, killing 340,000 people [4] spurred worldwide fears of a nuclear war. This, coupled with the 1948 announcement that the UK would develop its own nuclear weapons [4], spurred JB Priestley to write an article in the ‘New Statesman’ newspaper criticising the use of nuclear weapons and calling for a widespread disarmament movement [4], leading to the establishment of the Campaign for Nuclear Disarmament (CND) in 1958. [4] The impact of WW2 meant that peace was universally desired and consequently, the Anti-Nuclear movement was well-received by the public. However, being a reformative movement, the Anti-Nuclear movement's main target was the government, for whom the recent World War meant that the Anti-Nuclear movement lacked legitimacy because it aimed for unilateralism, meaning that the UK would have to abandon its nuclear weapons while other countries retained theirs, effectively leaving them defenceless immediately after a major war. It was almost inevitable that the campaign would be met apprehensively by the government when the movement proposed leaving them more vulnerable than other major powers. Perhaps, the movement required backing from a political power elite who could persuade the government to see that the implementation of nuclear disarmament in the UK may encourage other countries to disarm, paving the way for international disarmament. This would have given the movement legitimacy in the eyes of the government, its main target audience, making it more successful.

A power elite is defined as an individual or group who are “perceived as [being] the centre of wealth and political power” [5] and are integral to a social movement because they can be used as a persuasive force which gives the movement more support amongst its target audience if used correctly – what is considered to be a power elite differs between movements. An appropriate power elite is something that the Anti-Nuclear movement consistently lacked, despite it having the backing of a variety of powerful groups throughout its lifespan. At the time of its emergence, following the peaceful Aldermaston March in the mid-1960s [6], the Quakers, a pro-peace association, showed their support for the CND by producing posters which promoted peace and anti-war sentiments. [6] More recently, in 2010, the UK government announced 8 locations which would become nuclear power plants, in reaction to which Greenpeace expressed their concerns over the use of nuclear power because of its impact on the environment [7], echoing the Anti-Nuclear movement's stance. Although both of these power elites increased the support-base of the Anti-Nuclear movement by demonstrating that their anti-nuclear views were widely shared within the country, these power elites were not very successful in persuading the actual government to change their policies regarding

nuclearism hence meaning that they were minimally successful. Instead, what the movement needed was the support of a major political party or MP, for example the Labour or Conservative party - these parties were in government the most and would have had the greatest influence over government policy.

Given that the Veganism movement was alternative, their power elite needed to be someone regarded as influential to the majority of the public in order to be successful – they achieved this by use of celebrities who were seen to follow and advocate the vegan diet. For example, Serena Williams is a strong advocator of Veganism [8], and acts as an effective power elite for the Veganism movement not only because she is a celebrity, who have immense social power in today's society, but also because she is a professional athlete hence the pure existence of her as a vegan provides evidence for the health benefits of Veganism. This helps to quell some common myths about Veganism such as that it can cause protein deficiencies, consequently helping the movement to coalesce. However, power elites also hindered the coalesce of the Veganism movement even before it emerged properly, one notable example being Mahatma Gandhi who famously attempted a vegan diet yet had to convert back to vegetarianism after he experienced health issues because of his diet [9]. This may have discouraged individuals from converting to Veganism once it emerged, because of fears that they too could experience similar dietary issues if they converted. Throughout its lifespan, such opposition to Veganism has circulated and the movement relied on the use of media, rather than power elites, to ensure that these misconceptions were quelled which allowed them to continue gaining supporters. Thus, the support from power elites was arguably less significant in the Veganism movement's success than its utilisation of media.

Media is defined as “the means of communication [...] which reach or influence people widely” [10] and plays an important role in promoting and increasing support for a social movement. For both the Veganism movement and the Anti-Nuclear movement, media has been a consistently significant part of their campaign, despite the types of media used adapting over time. At the time of its coalesce, in the mid-1940s, the Veganism movement utilised a newspaper, the Vegan News, to reach its supporters. The newspaper promoted the vegan lifestyle and gave information on tips for prospective vegans, as well as informing readers of the latest revelations in the Veganism movement [11]. Despite not being a particularly modern form of communication at the time due to the proliferation of radio and cinema, the use of a newspaper was effective because it was an accessible, cheap form of media when wartime meant that many people lacked the funds to go to a cinema or own a radio, allowing the newspaper to reach the maximum amount of people. Furthermore, the newspaper, being printed and not broadcasted, could not be interrupted by conflict in the same way that a radio broadcast could be, enabling it to be consistently effective. As a consequence, the Veganism movement was able to reach people in a time when the focus was mainly on the war effort by using the newspaper to provide a distraction from the

ongoing conflict in peoples' lives, increasing its appeal and enabling it to coalesce quite quickly. Similarly, the Anti-Nuclear movement used a newspaper in its early lifespan, named Sanity, which ran from 1961-1991 [12]. The newspaper promoted CND accomplishments and upcoming demonstrations, which was effective because this both increased knowledge of the Anti-Nuclear movement and helped to increase labour turnout at their demonstrations by promoting them beforehand.

More recently, the Anti-Nuclear movement widened their use of media to include posters, one notable example being a poster which promoted the Easter March of 1966 because this had to be designed specifically to exclude political imagery so that it could be displayed on London public transport, maximising their reach [6]. This was an effective use of media because not only was it promoting their upcoming demonstrations, increasing their turnout, but also because posters are an accessible media source as they can reach anyone, regardless of their socio-economic status. Also around this time, films which promoted anti-nuclearism began to emerge, such as The War Game, 1966, which focused on a “hypothetical nuclear attack on Britain” [13] and would have increased fears of the effects of widespread nuclearism, helping the Anti-Nuclear movement to coalesce as it gave them more legitimacy. Similarly, vegan movies have been released in more recent years such as Food Inc, 2008, which is a documentary which criticises the meat industry, while also being informative about where our food comes from [14]; being a film, this was able to reach a large audience with minimal effort, increasing their knowledge of the negative impacts of a non-vegan diet whilst also bringing the inhumane methods of the meat industry to light, indirectly increasing support for the Vegan campaign. In particular, the shift away from newspaper use by both movements was a good decision, because in today's age, the increase of misinformation in the news has led to more people mistrusting traditional forms of media such as newspapers so people are moving towards online sources to gain information [15].

As a result of this, combined with the rise in popularity of social media in general, both movements have shifted to using social media in their campaign, with differing levels of success. Since social media is a platform mainly used by young people, the topics which are generally trending are progressive, such as equality for all, animal rights and climate change [15], and it is therefore the ideal media platform for both the Veganism & Anti-Nuclear movements. The Veganism movement is most prominent on Instagram, where #vegan has 108 million posts as of March 2021, in contrast to the Anti-Nuclear movement which has more presence on Twitter, where the CND page has 36.9k followers as of March 2021. This does not mean, however, that their use of social media is successful – for example, only 0.06% of the 2021 UK population follow the Campaign for Nuclear Disarmament on Twitter despite the CND citing that “72% of the UK public support total global ban on nuclear weapons”, and that “59% want the UK government to sign the UN nuclear ban treaty” [16], indicating that the Anti-Nuclear movement's social media platforms do not reach a large proportion of their potential supporters. This means, realistically, that

social media does not play a large role in the campaign's success. In comparison, pro-vegan hashtags reach millions on Instagram alone, despite the Vegan Society's Instagram page having only 59.1k followers. This indicates that their introduction onto social media has enabled the general public to essentially do the campaigning and promotion work for them, contributing largely to their success.

Whilst it is important to consider the resources involved in the coalescence of the Anti-Nuclear movement and the Veganism movement, it is imperative that the extent of each movement's success also be evaluated. While both movements are still ongoing, it is unequivocal that the Veganism movement has been more successful than the Anti-Nuclear movement, but perhaps this is because there is less opposition to Veganism than there is to anti-nuclearism; being alternative, the Veganism movement targeted individuals by providing them with a new lifestyle which they could easily implement themselves without interference from others, especially with the level of assimilation that Veganism has achieved today. In fact, it is estimated that 3% of the world population is vegan and 1/3 is following a diet which aims to reduce the animal produce consumed [17], indicating that the Veganism movement has been so far largely successful in its lifespan. The Anti-Nuclear movement has made strides in reducing nuclearism in the UK, but because it is in opposition to the government, it is possible to say that a lot of this success may be a result of government attempts to appease political activist groups like the CND, without committal to stick to these agreements or that anti-nuclearism is a goal only held by certain political groups. It could be argued that, once these parties are out of government, that the progress made by the Anti-Nuclear movement could be reversed. For example, despite the CND achieving the "Partial Test Ban Treaty, the nuclear Non-Proliferation Treaty and the Intermediate-Range Nuclear Forces Treaty" [4] as well as working to prevent the Neutron bomb from being made [4], the UK still possesses large amounts of nuclear weapons [18] and gains approximately 20% of its energy from nuclear power, as of February 2021 [19], indicating a lack of permanent success for the Anti-Nuclear movement.

So, what made the Veganism movement more successful than the Anti-Nuclear movement? To answer this fairly, both the resources of the movements using the Resource Mobilisation Theory and the categorisation of the movements under Aberle's Four Types of Social Movements must be considered. Ultimately, if the Veganism movement had been reformative, perhaps aiming to make Veganism the universal diet in the UK, then it would have been unequivocally less successful. With more ambitious aims comes the requirement of a more powerful support-base who are willing to turn these aims into reality - for this reason, an appropriate power elite is indisputably what makes a social movement successful. If the Anti-Nuclear movement had support from a popular political party who were willing to work to ensure that anti-nuclearism was implemented in the UK government, then the UK would likely be on its way to complete nuclear disarmament, provided that other governmental parties supported it enough to pass laws in

parliament. The Veganism movement had an appropriate power elite in the form of celebrities who helped to make Veganism trendy, transforming the Veganism movement into a popular topic of discussion both on and offline. Despite other resources playing an important role in the success of social movements, the preceding comparison between the Veganism movement and the Anti-Nuclear movement demonstrates that support from an appropriate power elite is undoubtedly what makes a social movement successful.

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Tutor comment:

"It was an absolute pleasure to teach S., I was always impressed by her enthusiasm and her engagement in class discussions. The essay she wrote on the success of social movements is a culmination of her hard work and diligent, independent research. Her critical analysis went above and beyond what I expect from a KS5 pupil."

Climate has always been changing, so humans cannot possibly be responsible for the current climate change

Year 8, Key Stage 3

Pupil: **P. Johnson**
 School: **St Angela's Ursuline School, Newham**
 Supervised by: **T. Trapman**
 Tutor University: **University of Bath**
 Course Title: **Climate change - The anthropocene vs deep time**

Humans have been on the earth for years, endlessly creating and making new advances in inventions that solve huge problems humanity faces. Humans affect a lot of things like nature, nurturing it but also hindering their natural processes. Climate change is a phenomenon that has occurred for years and refers to the long-term changes in weather patterns regionally. It is closely associated with global warming, an aspect of climate change that currently is transforming the earth today. Global warming is no doubt having adverse effects on nature and is identified to be caused by the greenhouse effect which is a process that warms the Earth's surface through greenhouse gases trapped in its atmosphere. This is relevant as it allows for the argument that 'The climate has always been changing, so humans cannot possibly be responsible for the current climate change.'

In this essay, I plan to dispute this argument using evidence for both points of views and case studies related to climate change and these arguments.

To begin, the argument can be made in favour of climate change not being due to human activity as throughout history we can see dramatic fluctuations in climate during periods where human life wasn't present or advanced. Examples of this can be seen with the karoo ice age, well known for its large land-based ice-sheets and being the second major glacial period of the Phanerozoic. There were few signs of human activity and the climate still changed regardless of any human influence. It changed due to its natural properties,

'The evolution of land plants with the onset of the Devonian Period, began a long-term increase in planetary oxygen levels.' (Wikipedia, 2021).

Furthermore, periods such as 'Greenhouse earth' which have occurred from 4.6 to 2.4 billion years ago and other times also display how climate changes constantly and is natural. These 'Greenhouse earth' periods are defined by not having continental glaciers and having high levels of carbon dioxide and other greenhouse gases.

These case studies illustrate how the climate of the earth can change dramatically even without human influence, this can easily be adapted to the argument that humans are not responsible for the current change in climate as it is always changing, we see this in these case studies with varying climate types whilst having no human interference.

Another point in support of this is orbital changes, the Earth has natural warming and cooling periods caused by Milankovitch cycles. These cycles can be defined as,

'a cyclical movement related to the Earth's orbit around the Sun. There are three of them: eccentricity, axial tilt, and precession. According to the Milankovitch Theory, these three cycles combine to affect the amount of solar heat that's incident on the Earth's surface and subsequently influence climatic patterns.' (Villanueva, 2009).

By the logic of this theory, we can use this to back up the argument that the climate has always been changing as these are part of earth's natural course and that humans cannot possibly be responsible for the current climate change as this is part of the Milankovitch cycles and humans cannot alter it.

However, evidence from NASA, a source I have chosen to contradict this statement due to their well-cited and reliable information on climate change, as well as being a trusted organization, shows that Milankovitch cycles cannot be what's causing the recent climate change. This is as they operate on long time scales, ranging from tens of thousands to hundreds of thousands of years whilst Earth's current climate change has taken place over decades to centuries.

'Scientists say Earth's current orbital positions within the Milankovitch cycles predict our planet should be cooling, not warming, continuing a long-term cooling trend that began 6,000 years ago.' (Buis, 2020)

Another in-favour argument of this point is solar output, this refers to how there can be varying amounts of radiation emitted from the sun, if there are higher amounts from the sun the earth's temperatures will increase. An article by NASA, a source well versed in climate science and used by many scientists, talks about the Sun's magnetic fields flipping approximately every 11 years causing the north and south magnetic poles to switch and switch back again after another 11 years.

'In between flips, the total radiation from the Sun – known as total solar irradiance – waxes and wanes in a semi-regular cycle by up to 0.15%. The short-term changes in solar irradiance are not strong enough to have a long-term influence on Earth's climate' (Hatfield, 2020).

If these changes in solar radiance are continued (occurring over decades or centuries) it could affect the Earth's climate. This supports the argument as it displays a natural process and cycles that the earth already does, meaning the current warming is nothing but a product of the earth's natural course.

However, it must be noted that this same article states that the current warming of the earth is not largely driven by this, 'If the Sun were driving Earth's warming, one would expect to see that upper atmosphere getting increasingly hot. Instead, measurements show the lower atmosphere is getting hotter, while the upper atmosphere is getting cooler. Instead, this matches the fingerprint of changes driven by increases in carbon dioxide much more closely.' (Hatfield, 2020). As we can see, this statement is in favour of the idea that the current climate change is caused by

an increase in CO₂.

This quote brings me to the point, why is Carbon dioxide driving the current climate change? If this current warming trend has nothing to do with human activity, why are increasing temperatures so closely linked to an alien increase in CO₂?

Well, the answer is quite clear, burning fossil fuels are responsible for changing the earth as they release CO₂.

'Over the last century, the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO₂). This happens because the coal or oil burning process combines carbon with oxygen in the air to make CO₂.' (NASA, n.d.). The burning of fossil fuels is identified to be the main contributor to this warming of the earth, this increase in CO₂ adds to the other greenhouse gases and gets trapped in the atmosphere, as there is even more CO₂ than needed the earth exponentially increases in temperature. This fact completely disputes the current argument that climate is always changing so humans aren't responsible.

Humans are responsible for the current warnings as with the rise of the industrial age fossil fuel burning has increased, coal, oil and gas generate electricity, run transport and fuel manufacturing. These all link to human activity and fossil fuels are burnt to produce high demand things.

'Today's industrialised countries – including New Zealand – have built their economies on burning fossil fuels to provide electricity, transport and to develop industries. Developing countries are now beginning to do the same.' (Parker, 2017).

Another point that negates the argument that the climate has always been changing, so humans cannot possibly be responsible for the current climate change, is humanity's agricultural activity. The use of commercial and organic fertilizers releases nitrous oxide and methane, both powerful greenhouse gases. This contributes to global warming as it increases the number of greenhouse gases in the atmosphere, overloading the ones naturally there. The Wikipedia on agriculture displays well-sourced information on its environmental impacts, Wikipedia being an unbiased educational driven site is very reliable for this information,

'In 2010, the International Resource Panel of the United Nations Environment Programme assessed the environmental impacts of consumption and production. It found that agriculture and food consumption are two of the most important drivers of environmental pressures, particularly habitat change, climate change, water use and toxic emissions. Agriculture is the main source of toxins released into the environment, including insecticides, especially those used on cotton.' (Wikipedia, 2021a)

'Livestock production occupies 70% of all land used for agriculture, or 30% of the land surface of the planet. It is one of the largest sources of greenhouse gases, responsible for 18% of the world's greenhouse gas emissions as measured in CO₂ equivalents. By comparison, all transportation emits 13.5% of the CO₂. It produces 65% of human-related nitrous oxide (which has 296 times the

global warming potential of CO₂,) and 37% of all human-induced methane (which is 23 times as warming as CO₂.) It also generates 64% of the ammonia emission. Livestock expansion is cited as a key factor driving deforestation; in the Amazon basin 70% of previously forested area is now occupied by pastures and the remainder used for feed crops' (Wikipedia, 2021a)

Both of these largely contributing factors to the current climate change have human interference within them proving that the current warmings are absolutely a product of human activity, combined with evidence that the planet should be in a cooling cycle (Milankovitch cycles predict our planet should be cooling, not warming) also proves that this global warming is unnatural.

Whilst it is true that the climate is always changing, it is also true that this current change is not natural. The WWF states 'there is "unequivocal" evidence that the planet is warming and that the temperature increase is "very likely" due to human-made greenhouse gas emissions.' (Parker, 2017b).

To conclude, though many indulge in disputing claims that climate change is anthropogenic there are numerous factors and well-researched evidence to prove otherwise. The fact that climate change is anthropogenic no doubt aids in boosting the numbers of naysayers, as it puts the responsibility on humanity to combat it. To add, this objection to anthropogenic climate change can also seem like a large challenge to take which may be off-putting to many. However, all evidence in support of human-driven climate change also presents strong evidence in support of the ability to reverse, slow and halt its effects. So instead of rejecting truth due to insecurity, it should be embraced with hope.

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Tutor comment:

"Being a tutor at St Angela's Ursuline School was a great experience. All pupils did an excellent job throughout this course on climate change, and I was glad to see how engaged they were with the topic. P. showed outstanding research and writing skills in her assignments. Her final essay on the causes of the current climate change demonstrates that she is on the right track to enrol in a university programme of her choice. A job well done!"

Why does homophobia in sport exist and what is being done to stop it?

Year 10, Key Stage 4

Pupil: **H. Ridout**
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Supervised by: **R. House**
Tutor University: **University of Brighton**
Course Title: **Homophobia in sport: why does it exist and how can we stop it?**

Homophobia in world sport is "far too important an issue to be ignored" [1]. It is a massive problem in the UK specifically and needs to be tackled. There are several reasons why homophobia exists in sport which include the following: opposition due to religious beliefs, which have influenced traditional UK society attitudes, a lack of education on acceptance of sexual diversity, gender stereotypes and a lack of punishment for offenders. Several approaches to eliminate homophobia in sport are currently employed which include political, educational, campaign, leaflet and public events. Although others may choose to compose their assignment on female sports participants, their coaches or fans, this assignment will concentrate on two approaches to challenge homophobia in male UK sport, for the purpose of depth. This assignment firstly explains why homophobia exists in sport and secondly, will compare two of the above approaches to combating homophobia in sport. Following that, will be a clear and comprehensive conclusion, summarising the main points throughout the assignment.

Why does homophobia exist in UK sport?

Homophobia exists in UK sport as evidenced on the Stonewall.org.uk website (2017), which states that one in five LGBT people have experienced a hate crime due to their sexual orientation and/or gender identity in the last year [2]. The four main reasons homophobia exists in UK sport will be explored below.

Firstly, prior to The Reformation in the 16th century, traditional UK society was heavily influenced by the dominant religion: Catholic, whereby same sex relationships were not accepted. Recent surveys of UK religious beliefs reveal a major decline in the proportion of Catholics within the population since The Reformation: the WIN/Gallup Survey (2014) including "64,000 people in 65 countries revealed the UK to be one of the world's most irreligious countries" with only 30% having any religion, of which a proportion was Catholic [3]. Some may argue that this 2014 report is outdated however, the numbers in this study are large and the results supported by a later article from "Huffpost Religion" (2018) which supports that "fewer Catholics of all ages are attending mass" [4]. Despite this reduction of UK Catholicism, homophobia remains prevalent and suggests homophobia within UK sport is not entirely due to religious beliefs alone, but to the traditional society views that have stemmed from it.

Furthermore, a published paper "Legal Homophobia and the Christian Church" (1978) by Reverend Barratt, addresses the concept of 'Legal Homophobia' [5]. The

author acknowledges Christianity may be seen to legalize homophobia as homosexual relationships are forbidden in their law: "The long influence of the Christian Church on legalized homophobia should probably be analysed by a priest, who is also a lawyer and a sociologist, or perhaps through a collaboration between experts in the three fields." As some religions conflict with acceptance of homosexual relationships, it may not be possible to eliminate homophobia within UK sport however this paper demonstrates a willingness by some Christians to address the issue.

A second reason why homophobia exists in UK sport is due to a lack of education about sexual diversity. If children grow up without understanding Lesbian, Gay, Bisexual, Transsexual, Queer (LGBTQ) relationships, they could be afraid of the concept. Children can be fearful of what they cannot comprehend. Consequently, the children's aversion could develop into homophobic behaviour in childhood and into adulthood.

A third reason why homophobia exists in UK sport relates specifically to male sports participants: gender stereotypes. Eric Anderson, author of "I Used to Think Women Were Weak: Orthodox Masculinity, Gender Segregation, and Sport" (2008), wrote that "the complex reproduction of orthodox masculinity in men's team sports... are largely influenced by segregating males into a homophobic, sexist, antifeminine and misogynistic gender regime that only promotes those who aptly conform to the orthodox sporting ethos" [6]. This quote suggests that by segregating men and women into gender dominated sports, such as football and cheerleading, specific attitudes are being imparted to the participants. For example, the stereotype for males in rugby are that they must be brave and physically strong, while for women's cheerleading, they must be friendly and energetic. Gay males in society may be perceived as feminine, which conflicts with the traditional masculine image and qualities expected from players of a more masculine sport such as rugby. The perception of gay men as feminine within a perceived masculine sport is a specific aspect of homophobia that relates to male sports participants. This relates to the idea of hypermasculinity: a psychological term for the exaggeration of male stereotypical behaviour, such as an emphasis on physical strength, aggression and sexuality.

It could be argued that the Eric Anderson (2008) paper is outdated, however this theme is further supported by Eric Anderson (2011): "Masculinities and Sexualities in Sport and Physical Cultures" [7]. This paper shows that some sports have been masculinized deeming gay men inappropriate candidates to participate hence "men wishing to be perceived as straight can only play select sports or dance in masculinized ways." This more recent quote proves the validity of stereotypical feminine attributes of gay men affecting their ability to play masculine sports.

The last reason for the prevalence of homophobia in UK sport, is a lack of punishment for offenders. Without a penalty for their homophobic behaviour, perpetrators may not realise their homophobic actions do not conform to society's current acceptance of LGBTQ. In addition, those who are aware that their actions are homophobic, may continue their behaviour and actions as there are

no legal or other consequences. Moreover, some people may begin to behave in a homophobic way as they see others do so without punishment.

Two Approaches to Combating Homophobia

Reverend Barratt (1978) recognises a need for the Christian Church to address homophobia within a multidisciplinary approach and suggests a team comprising those with knowledge of Christian Church laws, state laws and of sociology [5]. This shows one approach to combat homophobia in general, however this assignment will focus on two current approaches used in the UK to combat homophobia in sport: Campaign and Education.

The Rainbow Laces Campaign

The Rainbow Laces Campaign is the chosen campaign of focus for this assignment. The Stonewall website (2017) explains that the Rainbow Laces Campaign aims to create equality in sport and to raise awareness about the issue by selling Rainbow Laces [8].

This campaign helps reduce homophobia in sport through the action of the public. By acquiring the rainbow laces and publicly wearing them, the public are spreading the message of the organisation. Attention to the campaign is further heightened when the media capture premier league sport players wearing the Rainbow Laces. Due to a combination of the public, sports participants and the media, the Rainbow Laces campaign is advertised to a wider audience and awareness of the campaign is raised, fulfilling one of their aims on their website [8].

On the other hand, a limitation of the Rainbow Laces campaign involves the issue of homophobia: the fear of being thought as gay. Some individuals may refrain from showing support for the campaign because they believe they could be perceived gay. Additionally, those in support of the campaign may also receive abuse from fans, coaches or teammates on the grounds that they are assumed to be gay. Confirmation of this abuse comes from The Guardian (2018): "Premier League clubs' Rainbow Laces posts draw homophobic responses" [9]. This article states that Premier League football teams had received thousands of homophobic comments after posting social media pictures of the teams wearing striped rainbow items of clothing. One comment, "Gaychester United", obtained over 10,000 likes. This backlash to a courageous act of equality from the sports participants could result in less people wearing the laces due to homophobia and the abuse that could follow.

This campaign could become more effective is by creating a way that the public and famous sports participants can help anonymously. Although this may receive less media attention and less acknowledgment, it would allow more people to help without fear of discrimination/abuse. This could be achieved by offering alternative ways for people to anonymously provide their opinions for public viewing. This would enable support for gay sports participants without abuse to supporters.

Education

Education is a recently introduced method of combating homophobia in sport. In the past, traditional society was

not in acceptance of sexual diversity and only recently, has teaching about different variants of relationships been introduced into schools or other educational institutions. Education can now teach all ages about the LGBTQ community. There are many ways people can be taught; public presentations, education in Personal, Social and Health Education (PSHE) lessons in schools, through leaflets and social media pages. A 2016 article from The Century Foundation, found "increased knowledge about LGBT people leads to lower levels of discomfort toward this community, and thus can reduce anti-LGBT discrimination" [10].

LGBTQ education in schools involves teaching children from a young age about sexual diversity and homosexual relationships which could prevent children's opposition to the issue. This could prevent homophobic actions in childhood and later into adulthood. Adults can also be educated on the different types of relationships, helping them to accept the LGTBQ community rather than oppose them.

Despite numerous advantages to education as a means of fighting homophobia in UK sport, some limitations are apparent. For example, a parent/guardian needs to give consent for teaching certain topics to children. If a parent does not wish their child to learn about diversity in sexuality, perhaps due to religious or other reasons, the child may be more likely develop homophobic attitudes. Not all children will learn about the LGTBQ community due to parental choice.

A controversial solution to extend teaching to all children would be to make education of sexuality compulsory in schools, however this would likely conflict with some religious beliefs.

The comparison of two approaches

The two approaches to combating homophobia in UK sport covered in this assignment are Education and Campaign. The advantages and limitations of each strategy have been presented above and will be evaluated in this section. The education approach can be likened to a preventative approach in medicine, while the campaign approach is comparable to a treatment approach in medicine. Education is a form of precluding homophobia in society and accordingly in sport. Campaigns aim to correct an existing problem, such as homophobia in sport. Both strategies can reduce homophobia in sport but do so from different angles.

These different tactics complement one another. When used together, they can be a very effective way of diminishing homophobia in UK sport. Education can help prevent homophobic attitudes and behaviour from developing at a young age and continuing into adulthood. If the education approach against homophobia is not successful for all, then the campaign approach would help reinforce the message of acceptance of sexual diversity.

Conclusion

In conclusion, this assignment gives an overview of the main reasons why homophobia exists in UK sport. It then

compares the effectiveness and limitations of two UK approaches to combat homophobia in sport. The main reason homophobia exists in sport today is heavily due to the influence of religious beliefs on traditional society attitudes. A lack of education on LBGTQ and gender stereotyping have also contributed to homophobia in UK sport. Hypermasculinity specifically, in relation to male UK sport, was discussed. The Rainbow Laces campaign and education were chosen to illustrate what is being done to combat homophobia in UK sport. Education is a preventative strategy while The Rainbow Laces tackles the existing problem. These two approaches work very effectively together in combatting homophobia in male UK sport specifically. Their limitations are also discussed. Despite these and other approaches, homophobia is still prevalent in UK sport: it is a fact that one in five LGBT people have experienced a hate crime due to their sexual orientation [2]. Barratt (1978) showed there was a willingness by some Christians to address homophobia so this could be another approach to pursue the issue further [5].

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Tutor comment:

"It was a pleasure to teach at Twynham School, where the pupils were enthusiastic to learn during the programme. H.'s exceptional effort, attention to detail and thorough understanding of the topic is evident in her final assignment, where she was graded with a 1st. H. demonstrated an excellent understanding surrounding the area, showed consistent evidence of applying academic research skills, can critically analyse and evaluate relevant topics, and can appropriately structure an assignment with the use of academic language. H. always produced high-quality homework tasks throughout the programme and was very independent in applying new skills needed for university. It is clear that H. has many of the essential skills needed to thrive at a university. Overall, this is an excellent piece of writing for a KS4 individual, and H. should be very proud of what she has achieved. A big well done and congratulations to H. for being published in The Scholar! This is an outstanding achievement that is very much deserved. Well done H.!"

Is there an external world?

Year 7, Key Stage 3

Pupil: R. AlHilli
 School: Hillcrest School, Birmingham
 Supervised by: S. Latham
 Tutor University: The Open University
 Course Title: Is there an external world?

This question has puzzled philosophers for many centuries, but what exactly do we mean by an 'external world'? In this essay, I define the external world as the material world or the world external to the mind. In this sense, I argue that the external world does exist. However, does this mean that there is only one single reality? My essay will explore this question drawing on the work of certain philosophers and scholars, including: Rene Descartes, Susana Martinez-Conde, Karl Friston and John Locke. I will interpret reality as whatever we experience or perceive. My main conclusion will be that there are multiple realities, which are dynamic, changeable and different according to the person involved and the context in which they are experienced.

Section One: What perceptions tell us about the external world

Many philosophers attempted to explain the external world drawing on our senses or perceptions. For instance, while searching for evidence to prove the possibility that the outer world exists, Rene Descartes (in his book Meditations on the First Philosophy- 1641) questioned its existing by doubting the senses. He believed in throwing out any evidence that might be wrong in a search for absolute knowledge. For Descartes, we cannot tell whether we are sleeping or hallucinating when we sense things. Thus, according to him, we can never know when the senses are telling the truth and 'it is therefore prudent never to trust entirely those who have once deceived us'. To achieve this, Descartes emphasises the process of thinking to prove one's existence, when he says 'I think; therefore, I am'. But how can we be sure that we are not hallucinating when we are thinking? When can we trust our senses then?

The English philosopher John Locke provided a more nuanced answer to the questions above (in his book 'An Essay Concerning Human Understanding'). Instead of dismissing the external world altogether, Locke developed the concept of sensitive knowledge, arguing that knowledge is realised through our senses. According to Locke, "If we trace the progress of our minds, and with attention observe how it repeats, adds together, and unites its simple ideas received from sensation or reflection, it will lead us farther than at first, perhaps, we should have imagined." In other words, he differentiates between knowledge and the perception of that knowledge. In particular, what he calls 'primary qualities' including, the shape and size of objects are undoubtedly out there in the outer world. Secondary qualities including, colour, smell and taste do not represent reality. They can be differently experienced and interpreted from one person to another. For example, a colour of an object maybe perceived differently by a person who has red-green colour blindness and a person who does not have this condition. So, he claims that primary qualities exist in the external world, however secondary qualities only exist in the mind.

Therefore, which perception matches reality? In the Illusion of Sense Talk, Rupert Read maintains that we should dissolve the question as he thinks it is meaningless. However, it's philosophers' job to question things. At the same time, Read also claims that "We can't step outside perception to check how perception matches up to 'reality' or 'the external world'. We can only compare evidence from different kinds of perceptions". This means that the way we perceive things can construct a certain reality for us. Therefore, we can never know if that reality truly exists. However, if we compare different perceptions, we may find evidence that confirms the existence of that reality.

In other words, if our senses work together, they can constitute evidence that what we perceive represents reality. For example, if I injure myself, I would see a scar and at the same time feel the pain it causes. This combination of the two senses would confirm to me that my perceptions were compatible with the reality I experienced. In some cases, there are some disorders such as congenital insensitivity, which make certain people insensitive to any pain or feeling. They can be deluded into thinking that nothing happened to them. Nevertheless, other senses, such as seeing and touching, would enable them to recognise that they experienced an injury.

Another example is about people who have had a limb amputated and may have a condition that occurs in 80-100% of amputees, called Phantom Limb Syndrome (in Latin phantom meaning illusion and unreality). This syndrome causes people to feel a limb (e.g., leg, arm) that does not exist. Although such illusions might mislead us, we can eliminate it if we use our other senses. Seeing that their limb is not actually there would tell us that it does not exist.

Illusions, however, may be difficult to eliminate, as the following section explains.

Section Two: Images and illusion

Visual illusion can mislead our brains into believing that the images we are confronted with represent reality. Susana Martinez-Conde, a neuroscientist and science writer, explained in the Secret Conjuror talk that the brain has no absolutes and visual illusion can be the outcome of comparisons it often makes between different images. A perfect example of such illusion is the flashed distortion effect, which compares two different faces that have two different features and makes our brain exaggerate the features to be larger, smaller, or uglier than they really are. If you see a face that has a short nose and, then, immediately after you see a face with a regular-sized nose, the latter would look larger than it actually is. This is because our brain is exaggerating all these differences, as the brain functions in terms of contrast.

Moreover, visual illusions can deceive us. In particular, images can be organised in a particular way or certain colours that may be chosen and orchestrated for the purpose of deceiving us. Take the example of a photo that once went viral on social media. It featured a dress, which could be seen in two different colour combinations: black and blue or gold and white. In other words, some people saw the dress as blue and black and other people saw it as gold and white. I saw it as a black and blue dress, but my mother saw it as the latter. This is a perfect example of optical deception

through the creation of a particular colour or lighting effect.

Section Three: One external world; multiple realities

All the examples examined above suggest that the external world does exist, but we may interpret or perceive it differently. Unlike Hilary Lawson, who seemed to view reality and the external world as one when he contended in the Down the Rabbit Hole talk that "We can't access reality", I argue that it is important to differentiate between the material world and the realities it constructs. The way Karl Friston views reality is helpful. According to him, "The reality we experience is an inherent aspect of our own brains. It has no existence in an external sense". This means the reality we are experiencing right now is what established by our brain. However, it may not be a true reflection of the external world or, indeed, the only one. Take the example of a wall that is visible to everyone. The material object it represents does exist, but it may mean different things to different people. It can mean a prison, protection or defence depending on our experiences.

The idea of reality construction can be traced back to Plato, an Athenian philosopher during the Classical period in Ancient Greece. In the 'Allegory of Cave', a story he wrote in a masterpiece called 'The Republic' written in B.C.E 517, Plato introduced us to prisoners who spent their entire lives chained, deep inside a cave. They had been chained in a way that prevented them from seeing anything except for the cave wall. Behind them, there is a fire burning and between the prisoners and the fire, there is a raised walkway. On the walkway, animals and people carrying items and personal belongings travel every day, creating shadows on the wall that the prisoners face and look at. This is the prisoners' only reality they know and the only one they will ever know. Now, imagine that a prisoner is released from the cave, and after adjusting to the light, he sees the outside world and begins to experience it. The prisoner rushes to the walkway to tell the fellow prisoners about what he saw from outside of the cave. However, the prisoners only hear a distorted echo and can only see the shadow of the prisoner, so they will never know about anything the prisoner has seen or experienced.

The experience of alternative realities has been captured by the 1999's Matrix film. Quotes from the film were used by Susana Martinez-Conde to support her previously mentioned argument. One quote describes the 'Real' as "really electrical signals interpreted by your brain". The real may differ from one person to another.

To conclude, this essay has investigated different positions by philosophers and scholars towards its main question. Its main argument is the external or physical world needs to be separated from reality. The former exists in one form, but is experienced differently in multiple realities. A reality keeps changing from one person to another, and according to the specific context and situation.

Tutor comment:

"The Year 7 & 8 students at Hillcrest School showed remarkable talent for philosophical thinking, producing arguments that would be impressive for much older students. I was very impressed with their maturity and work ethic. All of these girls could pursue philosophy at undergraduate level. R. has written an excellent essay showing logical, reason and sophistication. She is a credit to her school."

STEM

How is our knowledge of genetic defects in cancer leading to personalised treatment?

Year 9, Key Stage 4

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Supervised by: Dr K. Brown

Tutor University: University of Birmingham

Course Title: How do DNA defects cause cancer?

Genetics and oncology: from sequencing to specialised treatment

Contents

- Summary of essay
- Introduction to cancer
- Cancer as a genetic disease
- Molecular targeted therapies: an introduction to personalised cancer treatments
- Concluding remarks and future perspectives

Summary of essay

In this essay, I provide an overview of how our knowledge of genetics has led to – and is still leading to – personalised treatments for cancer (i.e. molecularly targeted therapies). This essay is divided into 4 sections. In sections 1 and 2, the basic properties of cancer are reviewed; in sections 4, molecularly targeted therapies are discussed; in section 5, a conclusion is provided.

Introduction to cancer

In vernacular English, cancer is often spoken of as though it were a single disease. Strictly speaking, however, the term 'cancer' encompasses more than 277 different diseases, and many of these affect not only humans, but also many other multicellular organisms, from cnidarians to ascomycetes [1][2].

Despite this enormous variety, all cancers start off due to damage to normal cells. This damage produces cancer cells that do not obey the usual rules dictating cellular behaviour. There are several ways in which cancer cells differ from normal cells (discussed next), but perhaps the most important are that (1) cancer cells proliferate and grow uncontrollably, heedless of growth factors, and (2) cancer cells invade other tissues and spread around the body, that is, they metastasise [3]. The unregulated proliferation of cancer cells forms tumours, also called neoplasms, of which there are two main types: benign neoplasms (BNs) and malignant neoplasms (MNs) [3][4]. Because they do not metastasise, BNs are not cancerous; for the most part, they are harmless and removable by surgery [5]. Conversely, MNs can metastasise and are therefore cancerous; it is from the spreading (metastasis) of these MNs to form secondary tumours that ultimately causes cancers [3][4][5]. Table 1 illustrates the differences between BNs and MNs.

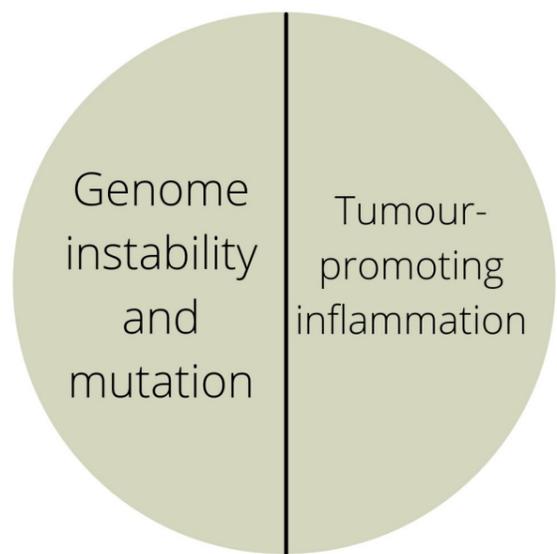
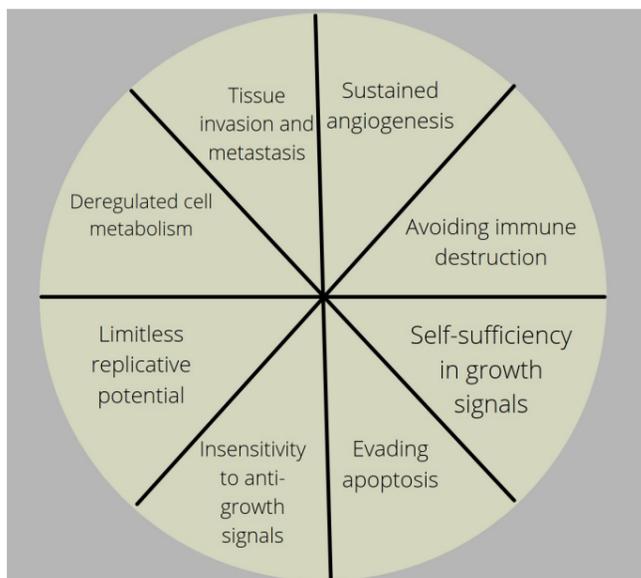
Table 1: the differences between benign and malignant neoplasms

Malignant neoplasms	Benign neoplasms
Are anaplastic (i.e. do not resemble the tissue they originate from, being less differentiated); have an unusual structure	Resemble the tissue they originate from; have a defined structure
Can metastasise (i.e. spread around the body) via blood or lymphatic vessels, invade and destroy surrounding tissues, and form secondary tumours; also able to form new blood vessels (angiogenesis); are present at many sites	Are unable to metastasise or invade other tissues (but can exert pressure on structures, e.g. nerves); are usually enclosed in a membrane; only stay in one place; are localised
Grow uncontrollably, erratically, and often (not always) rapidly; also grow by invasion; characterised by an unregulated cell cycle	Grow relatively slowly and by expansion (and not invasion)
High mortality rate; damaging to the body; can come back after treatment (high recurrence rate)	Usually harmless and removable by surgery; do not usually come back after treatment (low recurrence rate)

Information mainly from: F. J. Schoen et al. Biomaterials Science (3rd edition, 2013). © Elsevier, Amsterdam, Netherlands. Accessed through Elsevier's ScienceDirect.

In the 2000, Weinberg and Hanahan proposed the 'hallmarks of cancer', a scheme that attempts to classify the properties of human cancers into six major hallmarks [6]. They provided a revised version of this scheme in 2011 that includes two 'emerging' hallmarks and two additional 'enabling traits' [7][8]. In total, there are 8 hallmarks of cancer and 2 enabling traits (see Figure 1) [6][7]. Though they have faced criticism [9][10], the hallmarks of cancer have provided a solid foundation for understanding cancers.

Figure 1: the hallmarks and enabling traits of cancer



The hallmarks (left) and enabling traits (right) of cancer. Adapted from citations [6] and [7].

There are many risk factors for cancer, broadly classified as either intrinsic or extrinsic factors [11][12][13][14]. Intrinsic factors are caused by randomly acquired mutations, which occur as a result of DNA replication errors, for example, whereas extrinsic factors occur as a result of either lifestyle factors, exogenous factors, or endogenous factors [14] (Table 2). The extent these factors contribute to the development of cancer is a matter of considerable debate, with some studies [15] suggesting that most cancers arise as a result of intrinsic factors (random DNA mutations in stem cells) and others [16] suggesting that UV exposure and bad diets (Table 2) are responsible for between 70 and 90% of all cancer cases. Regardless of whether intrinsic or extrinsic factors are the primary causes, all cancers ultimately arise from successive deleterious DNA mutations [3], and in the next section the DNA mutations that drive carcinogenesis are explored, for an understanding of these mutations is critical for developing new cancer treatments.

Table 2: extrinsic risk factors for cancer

Examples of life-style factors	Examples of exogenous factors	Examples of endogenous factors
Smoking	UV radiation	Inherited mutations
Lack of exercise	Viruses	Hormone levels
Poor diet (e.g. high-fat)	Carcinogens	Metabolism

All the information for this table was obtained from [14].

Cancer as a genetic disease

Broadly speaking, a mutation is a change in the nucleotide sequence of a gene. While most mutations have no effect on an organism [17], some can be severely detrimental; it is the accumulation of these detrimental mutations that is ultimately responsible for all cancers [1][18].

There are several ways that cancer-causing mutations can occur; these include by point mutations, the insertion and deletion of DNA segments (the former of which may come from viruses), rearrangements in DNA, chromosomal translocation, and gene amplification (where segments of DNA are duplicated) [1][18]. The genes that when mutated promote carcinogenesis are called cancer-critical genes, of which there are two overarching types, namely proto-oncogenes and tumour suppressor genes [3]. When mutated, proto-oncogenes are called oncogenes, and oncogenes encode dysfunctional proteins that promote carcinogenesis (like car accelerators) [19]. Tumour suppressor genes (TSGs), by contrast, are genes that when mutated become inactive, and this inactivity facilitates carcinogenesis (like car brakes) [19].

How do mutations of these genes stimulate neoplastic growth? In a general sense, mutations of cancer-critical genes in a cell cause the cell to divide uncontrollably [20] and thereby acquire the hallmarks of cancer; in the case of TSGs, proteins that regulate the cell cycle and apoptosis are inactivated, and in the case of oncogenes, proteins that stimulate the cell cycle and inhibit apoptosis are activated [20]. To illustrate this, let us consider an example. BRAF is a gene that is located on chromosome 7 and that encodes for the B-Raf protein [21]. A protein kinase, B-Raf is a key regulator of the MAPK/ERK signalling pathway, which primarily serves to regulate cell growth, differentiation, and apoptosis [21] [27]. It may therefore come as no surprise that BRAF is a known proto-oncogene and that mutations therein can cause cancers like melanomas [22] and colorectal cancer [23], amongst many others (see Table 3).

Table 3: BRAF and Cancer

Cancers caused by BRAF mutations	Incidence of BRAF mutations	Notes
Melanomas	Approx. 40 – 70% [25][33]	
Colorectal cancer	Approx. 10% [23]	
Hairy cell leukaemia (HCL)	Approx. 100% [28]	
Glioblastoma	<1 – 15% (for BRAF V600E mutations) [37]	
Papillary thyroid cancer (PTC)	Approx. 25 – 80% (for BRAF V600E mutations) [34]	
Non-Hodgkin lymphoma (NHL)	Approx. 2.5% [36]	Interestingly, Lee et al. found that none of the BRAF mutations they observed in their sample involved the mutation of Val 600 (BRAF V600E) [36], suggesting that NHL is due to other BRAF mutations.
Erdheim-Chester disease (ECD)	Approx. 50 – 60% (for BRAF V600E mutations) [30][35]	
Langerhans cell histiocytosis (LCH)	40 – 70% [38]	
Non-small-cell lung cancer (NSCLC)	Approx. 1 – 5% [31]	
Multiple myeloma	Up to 15% [48]	

Note: The exact figures given in this table are not 100% accurate. This applies especially to melanomas.

Although more than 30 different BRAF mutations have been implicated in human cancers [24], the vast majority (80 to 90% [25][27]) involve the substitution of a T base to an A base at base position 1799, which causes the Val at position 600 to become a Glu in B-Raf, forming B-Raf V600E [25]. B-Raf V600E substantially differs in its activity from its unmutated counterpart, compared to which it is approximately 500 times more active [26] (as Val 600 mimics phosphorylation, which activates B-Raf [29]). As a result of this enhanced activity, the MAPK/ERK pathway – and hence cell growth – proceeds much faster than usual, whereas apoptosis proceeds much slower than usual [46], and coupled with other mutations, this promotes the transformation of normal cells into cancer cells [27]. Most of the remaining carcinogenic BRAF mutations similarly function to activate B-Raf [29]. In this way, it is evident that mutations to cancer-critical genes promote carcinogenesis by interfering with cell growth in some way or another.

The term 'genetic disease' usually connotes diseases such as cystic fibrosis or down syndrome. Seldom does cancer come to mind. However, I propose here that cancer should be considered as a genetic disease. The main reason for this proposal is that, as these discussions have clearly shown, cancers are ultimately caused by mutations, and genetic diseases are by definition diseases that arise by mutations. However, there is a catch to this: unlike cystic fibrosis or sickle cell anaemia (for example), cancers arise as a result of multiple, successive mutations over time. Therefore, an understanding of the particular mutations that lead to specific cancers in individuals, and not just a generic understanding of mutations in tumours, could potentially lead to personalised cancer treatments – and indeed it is. In the next section I examine molecular targeted therapies, the name given to such treatments.

Molecular targeted therapies: an introduction to personalised cancer treatments

As the second leading global cause of death, cancer is responsible for approximately 17% of all deaths [39]. To combat this, various cancer treatments have been developed, and one such treatment, which has become increasingly popular, is molecular targeted therapies (MTTs). A type of molecular medicine, MTTs involve the use of drugs that interfere with genes or proteins that are specific to, and needed by, cancer cells or the environment that encourages their growth, thereby promoting cell cycle regulation, apoptosis, and the destruction of cancer cells, as well as impeding metastasis [40]. This is in contrast to treatments such as chemotherapy, which affect not only cancer cells, but also some normal cells, and are therefore not highly selective [41]. Nevertheless, MTTs are often employed with other treatments, including chemotherapy (see Figure 2).

Treatments used in combination with targeted therapies

- Chemotherapy
- Radiotherapy
- Surgery

Example: surgery may be used to remove a neoplasm and then MTTs may be used to remove any cancer cells left

Figure 2: treatments with which MTTs are used in combination

MTTs are classified into three main types: small molecule inhibitors (SMIs) and monoclonal antibodies (mAbs) [40] [41]. SMIs are small molecules (usu. $m \leq 500$ g/mol) that directly inhibit intracellular proteins and enzymes, cell-surface receptors (e.g. growth factor receptors (GFRs)), and signalling molecules essential to cancer cells [41][42]. These drugs typically disrupt signalling pathways needed by cancer cells for growth, metastasis, and angiogenesis [40][41]. To illustrate how SMIs function, let us consider an example, namely vemurafenib (also known as PLX4032 and ZELBORAF). First synthesised in 2005 [47], this SMI is primarily used to treat melanomas [42], although it is occasionally used for some other cancers, such as PTC [46], ECD, and LCH [44], amongst others.

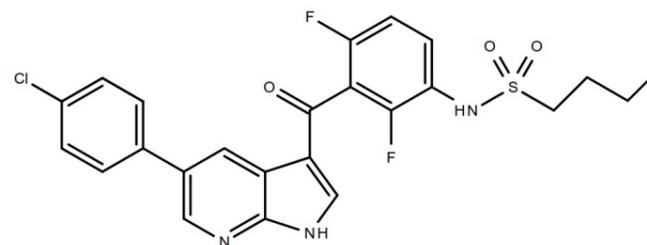


Figure 3. The molecular structure of vemurafenib. Drawn using ChemSpider.

Vemurafenib functions as an inhibitor of B-Raf V600E (see previous section), which is expressed in ~40 – 60% of melanomas (see Table 3) [25][43]. Specifically, vemurafenib binds to the kinase's ATP-binding site, thereby inhibiting it [46]. As a result of this inhibition, cell growth slows down, apoptosis is stimulated, and the MAPK/ERK pathway is inactivated. The overall effect of this is that the cancer promoted by B-Raf V600E is suppressed. Thus, vemurafenib acts as an inhibitor of cancers characterised by the presence of B-Raf V600E. Importantly, the development of vemurafenib was dependent on information about cancer genetics. The molecular details of the BRAF V600E mutation and its importance in melanomas and other cancers, elucidated by genetic sequencing and cell culture experiments [29][47], prompted studies and experiments (e.g. screening, biochemical assays therefor, and crystallography) that investigated potential ways of inhibiting its product kinase [47]. From these studies, it became known that vemurafenib was a B-Raf V600E inhibitor; clinical trials later showed its ability as a cancer treatment. Thus the development of vemurafenib was based on fundamental genetic information about cancer; indeed, the development of all SMIs is ultimately due to genetic information about cancer. Table 4 provides some more examples of SMIs, the cancers they work on, the genes or proteins they target, and some general analysis as to how genetics led to their development.

Table 4.

SMI (brand name)	Cancers they work on	Genes/proteins they target	Analysis
Imatinib (Gleevec)	Gastrointestinal stromal tumours (GISTs), chronic myeloid leukaemia (CML), acute lymphocytic leukaemia (ALL) [41]	Bcr-Abl [42]	<p>Imatinib is an SMI and an inhibitor of Bcr-Abl kinase, an abnormal and constitutively active kinase (active without ligands present) formed by the Philadelphia chromosomal translocation (mutation), in which the ABL1 gene (chromosome 9) and the BCR gene (chromosome 22) fuse together (forming the Philadelphia chromosome). Bcr-Abl, expressed at high concentrations in CML and other cancers, promotes carcinogenesis by interfering with signalling pathways involved in cell growth, apoptosis, and metabolism. Imatinib binds to and inhibits Bcr-Abl and thereby turns off the carcinogenic signalling pathways activated by Bcr-Abl [19][61][62].</p> <p>An understanding of the Bcr-Abl mutation and its importance in cancers helped scientists identify imatinib as an MTT. First, the identification of the abnormal Philadelphia chromosome in CML patients made scientists suspicious as to whether it had a role in cancer. Then, detailed molecular descriptions of this chromosome (e.g. that chromosomal translocation produced it, the genes involved) and experimentations with it allowed scientists to identify that it was indeed an oncogene. Once it was known that this gene encodes for the Bcr-Abl kinase was identified, scientists used information about the Bcr-Abl protein to synthesise imatinib. In this way, knowledge about the genetic defects in cancers has led to the development of imatinib, an MTT. The development of imatinib is the archetype of how genetics is leading to MTTs [63].</p>
Gefitinib (Iressa)	Non-small-cell lung cancer (NSCLC), some breast cancers [41]	Epidermal growth factor receptor (EGFR or HER1) [40]	<p>Gefitinib is an SMI and an inhibitor of the human epidermal growth factor receptor (EGFR or HER1), which is a cell-receptor kinase that controls cell proliferation. In various cancers (e.g. NSCLC), the gene encoding for HER1 (a proto-oncogene) is mutated (typically via gene amplification and point mutation), leading to overexpression and increased activity of HER1. As a result of this, HER1 becomes deregulated, leading to uncontrolled cell division, inhibition of apoptosis, and carcinogenesis. Gefitinib works to block and inhibit HER1 and thereby promote cell cycle regulation and apoptosis, as well as the suppression of cancer cell growth. It works only on cancers with HER1 mutations [19][64][65][66].</p> <p>The development of gefitinib as an MTT was likewise based on knowledge of genetic defects in cancer, though its story is nowhere near as remarkable as imatinib's. First of all, it was discovered that various cancers (e.g. NSCLC) were characterised by mutations that encoded for aberrant versions of the HER1 protein. From this, it was identified that gefitinib is able to target HER1 and suppress cancer growth. Thus clinical trials for gefitinib began, and in the 2000s it was approved to treat such cancers as NSCLC. In this way, an understanding of importance of HER1 mutations in cancers led to the approval of gefitinib as an MTT [67].</p>
Bortezomib (Velcade)	Multiple myeloma (MM), mantle cell lymphoma (MCL), non-small-cell lung cancer (NSCLC), pancreatic cancer [41][70]	26S proteasome complex [41]	<p>Bortezomib is an SMI and an inhibitor of the 26S proteasome complex, which is a large protein involved (either directly or indirectly) in the degradation of proteins and various other cellular processes, such as cell cycle regulation, angiogenesis, DNA repair, apoptosis, and cell growth. In several cancers (e.g. MCL, MM, etc.), this protein complex is mutated, and these mutations are believed to promote carcinogenesis by disrupting cell cycle regulation, inhibiting apoptosis, and promoting angiogenesis. Bortezomib targets, binds to, and inhibits the 26S proteasome complex, and this binding serves to upregulate apoptosis and downregulate cell growth, thereby suppressing cancer cell growth [68][69][70].</p> <p>Ultimately, it was through an understanding of cancer genetics that bortezomib was developed as an MTT, though the story of bortezomib's development is not nearly as archetypal of the importance of genetics in producing treatments as imatinib's is. First, it was observed that various cancers were characterised by enhanced or altered proteasome activity [73]. Subsequent analysis made it clear that this enhanced proteasome activity was due to mutations in proteasome genes. These mutations were soon shown to be implicated in cancers. Thereafter bortezomib, which was synthesised in 1995, was shown to display anti-tumour activity, so that clinical trials for it soon began. In this way, the importance of proteasome mutations has led to the use of bortezomib as an MTT [71][72][74][75].</p>

The second major MTT type is monoclonal antibodies (mAbs). Defined as antibodies produced by a single clone of in vitro leukocytes specific for a single antigen [5], mAbs have gained traction in recent years. mAbs display diverse mechanisms of action, but in the broadest sense they work by inducing (directly or indirectly) an anti-tumour immune response [49].

To illustrate this, let us consider an example, namely ipilimumab (Yervoy), which is often administered with nivolumab and which is used to treat (metastatic) melanomas [50], prostate cancer [51][53], and NSCLC [52], amongst others. With a mass of ~150,000 g/mol (= 150 kDa) [53], ipilimumab stimulates T-cells to attack cancer cells by binding to cytotoxic T-lymphocyte antigen-4 (CTLA-4) [51][53], a T-cell antigen whose purpose is to inhibit T-cells' activity [54]. Specifically, the activation of T-cells requires the binding of tumour antigens (TAs), presented by an antigen presenting cell (APC), to a T-cell receptor via the MHC, and the binding of CD28, a T-cell receptor, to CD80 or CD86 (located on the APC) [53][55]. These two signals serve to stimulate immune response. CTLA-4 deactivates T-cells – and hence decrease immune response – by competing with CD28 for CD80 and CD86 with much more affinity [55]. A problem arises when T-cells are inactivated in a patient with cancer: the cancer cells evade immune destruction. Ipilimumab works by preventing CD86 and CD80 from binding to CTLA-4, allowing them to bind to CD28 and thereby stimulate T-cell activation [53][55] (see Figure 4). This promotes the destruction of cancer cells; however, ipilimumab only works on some cancers such as melanoma.

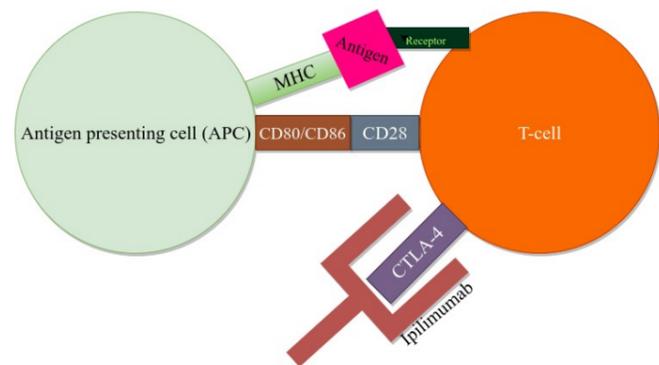


Figure 4: How ipilimumab works.

Based on citations [53] and [55]. MHC = major histocompatibility complex.

The development of ipilimumab, an MTT, was ultimately based on genetic information: CTLA-4 was discovered by isolating DNA sequences from T-cells, and genetic studies subsequently revealed its purpose; then it was proposed that blocking CTLA-4 could lead to the stimulation of T-cells; after it was discovered that this stimulated anti-tumour responses; ipilimumab was then developed; and clinical studies revealed its efficacy in treating cancers (e.g. melanomas). This suggests that an understanding of the genetic defects in normal cells (not just cancer cells) is important in developing cancer treatments. Table 5 provides some more examples of monoclonal antibodies, the cancers they target, and some analysis as to how genetic information about cancer led to their development.

Monoclonal antibody (brand name)	Cancers they work on	Genes/proteins they target	Analysis
Trastuzumab (Herceptin)	HER2-positive breast cancer [49]	HER2 receptor (ERBB2) [49]	<p>Trastuzumab (known more commonly as herceptin) is a mAb and an inhibitor of the HER2 (or ERBB2) receptor, a kinase and a growth factor receptor. The gene for HER2 receptor is a proto-oncogene. Therefore, when mutated, the HER2 gene can promote carcinogenesis, and this is corroborated by the fact that mutations of the HER2 gene/receptor are seen in approximately 25-30% of breast cancers (approximately), as well as in considerable percentages of other cancers. In cancers where HER2 mutations are present (HER2-positive cancers), the HER2 receptor is overexpressed (due to gene amplification) and/or dysfunctional (the former is the more prominent factor). Both of these factors serve to promote carcinogenesis by increasing the invasiveness of the cancer cells, inhibiting or decreasing apoptosis, decreasing cell cycle regulation, and increasing cell proliferation (interestingly, overexpression of the HER2 receptor is sufficient to cause carcinogenesis). Herceptin is a drug used to treat HER2-positive breast cancers as well as stomach cancer. Herceptin works by binding to and inhibiting the HER2 receptor. As a result of this, immune cells are recruited to attack cancer cells that overexpress the HER2 receptor (herceptin is in itself an antibody and has been shown to be able to bind to immune cells), cell growth is suppressed, and cell cycle regulation is promoted. This serves to suppress cancer cell growth. [19][76][77][78]</p> <p>The development of herceptin was, too, based on genetic information about cancer, and it truly highlights the importance of genetics in developing MTTs in the same way as imatinib. First of all, in the early 1980s, the HER2 gene was identified in patients with breast cancer. Thereafter it was discovered that gene amplification of the HER2 gene was particularly common in such cancers as breast cancer and that it was associated with poor clinical outcomes; on this basis, it was proposed that the HER2 gene is an oncogene (which indeed it is). After subsequent investigations with monoclonal antibodies and the HER2 receptor, herceptin was synthesised, and soon clinical trials began. Herceptin is now commonly used to treat breast cancers. Thus in this way, knowledge of the HER2 gene's importance in cancer led to herceptin [79].</p>
Alemtuzumab (Campath)	B-cell chronic lymphocytic leukaemia (CLL) [49]	CD52 [49]	<p>Alemtuzumab is an mAb and it targets CD52, which is an antigen located on lymphocytes and monocytes, types of white blood cells. Alemtuzumab is used to treat B-cell CLL, a leukaemia. The details of alemtuzumab's mechanism of action(s) are not completely understood as yet, but by binding to CD52, the destruction of leukaemic cells is induced [80][81][82].</p> <p>Nevertheless, alemtuzumab's development was ultimately based on genetic information about cancer, though to a much lesser extent than herceptin or imatinib, for example.</p>
Bevacizumab (Avastin)	Colorectal cancer, non-small cell lung cancer (NSCLC), advanced renal cancer (RCC), glioblastoma [49][60]	Vascular endothelial growth factor (VEGF) [49]	<p>Bevacizumab is an mAb and an inhibitor of the vascular endothelial growth factor (VEGF), which is a protein that is involved in the stimulation of endothelial cell growth, proliferation, survival, and apoptosis inhibition, as well as angiogenesis. In various cancer cells, VEGF is overexpressed, and the effect of this overexpression is that it promotes the angiogenesis (and lymphangiogenesis, angiogenesis via lymph vessels) of cancer cells and cancer signalling pathways. This encourages carcinogenesis. Bevacizumab binds to and inhibits VEGF; this limits the blood supply to cancer cells and neoplasms and decreases angiogenesis, thereby suppressing the growth of cancer cells. Bevacizumab works on cancers such as NSCLC and RCC [83][84][85].</p> <p>An understanding of cancer genetics is what ultimately led to bevacizumab's development as an MTT. First of all, after VEGF was discovered in the 1980s, the gene that encodes for it was found to be present in many cancers, such as NSCLC. Then, via techniques such as site-directed mutagenesis, it was discovered that bevacizumab, an mAb which had already been synthesised, can bind to VEGF and inhibit neoplastic growth. Finally, once this was known, clinical trials for the drug began, such that bevacizumab is now used to treat NSCLC, RCC, and other cancers. In this way, the identification of VEGF as having an important role in cancers led to the use of bevacizumab as an MTT [86].</p>

CD = cluster of differentiation.

Concluding remarks and future perspectives

As our knowledge of the genetic defects underlying cancer increases, so too does the quality of personalised treatments. The efficacy of MTTs has been a matter of debate; for example, Czibbesz et al. found that only 11.6% of melanoma patients who were treated with vemurafenib attained complete responses, suggesting that vemurafenib has minimal effect in eradicating melanomas characterised by BRAF mutations [57]. Recent evidence has also suggested that tumours can acquire resistance to MTTs [58]. Nevertheless, MTTs have shown more promising results than traditional cancer treatments such as chemotherapy [58]. As our knowledge of cancer increases, MTTs will probably become the predominant cancer treatment.

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Tutor comment:

"B. showed excellent engagement throughout the course, even though Covid restrictions forced all our interactions to be online. In his final assignment, he showed sophisticated knowledge and understanding of the subject, using evidence from an impressive range of sources to consistently support what was said. He very clearly demonstrated independent thought about the question, which produced an extremely mature piece of writing. He was a pleasure to teach."

Pre-eclampsia: What goes wrong with the placenta?

Year 9, Key Stage 4

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Course Title: **The Placenta**

Pre-eclampsia, formally known as toxemia, affects around 5% of all pregnancies and is defined by high blood pressure and proteinuria. Its origins are unknown, even with the research and theories given. This essay describes the placenta and pre-eclampsia and aims to highlight and analyze the risks and origins of the disorder as well as discuss the future of the disorder and placental research.

The Placenta: What is it?

The placenta is a temporary organ in pregnancy. It connects the fetus to the uterus and is made up of a complex network of blood vessels. The purpose of the placenta is to allow the exchange of nutrients from the mother to the fetus. The blood of the mother and fetus do not mix; instead, this process happens via diffusion. The placenta does not only transfer nutrients, oxygen, and antibodies from the mother, but also brings waste

and carbon dioxide back to the mother. In addition, the placenta acts as a barrier, preventing certain harmful substances in the mother from affecting the fetus, although substances like alcohol can still pass through.

Pre-eclampsia: What goes wrong?

Pre-eclampsia is a placental disorder defined by hypertension (140/90mmHg) and proteinuria (protein in the urine). It occurs on or after the 20th week of pregnancy, however, in some cases, can happen earlier or after delivery. It is associated with fetal growth restriction. Pre-eclampsia affects 2-8% of pregnancies.

Risk factors include a personal or family history of pre-eclampsia, race – black women have a higher chance of developing pre-eclampsia, certain health conditions (like chronic hypertension, obesity, among others), first pregnancy or new paternity, and more.

Monitoring blood pressure is important, as high blood pressure is a major characterization of pre-eclampsia. Other symptoms of pre-eclampsia include severe headaches, nausea or vomiting, vision problems (blurriness or seeing flashing lights), pain below the ribs, sudden weight gain, oedema (swelling in the feet, ankles, hands, or face) or feeling very unwell.

Currently, there is only one way to treat pre-eclampsia: to deliver the placenta. Severe pre-eclampsia may call for induced labor or delivery. If necessary, delivery by caesarean section may happen, otherwise, scheduled vaginal delivery might be recommended.

Some complications that could happen if pre-eclampsia is not treated include:

- Fetal Growth Restriction – The slow growth of the fetus when it does not get enough blood, oxygen, and nutrients

- Preterm Birth – Premature birth can lead to breathing problems for the baby

- Placental Abruption – When the placenta separates from the uterus too soon – this can cause heavy bleeding and can be life-threatening,

- HELLP Syndrome – Hemolysis Elevated Liver enzymes and Low Platelet count. This is a more severe version of pre-eclampsia and may be life-threatening.

- Eclampsia – Another form of pre-eclampsia, with the addition of seizures

Spiral Artery Remodeling

The pathogenesis and the reason for pre-eclampsia is unknown, but it is widely speculated to be related to poor placentation and inadequate spiral artery remodeling. In a healthy pregnancy, extravillous trophoblast cells will migrate and invade the spiral arteries in the decidua and anchor in the villi of the placenta. Approximately 100–150 arteries are transformed during development. The purpose of this remodeling is so that maternal blood can flow to the placenta with little resistance to support the fetus's growth. The failure to complete this process is thought to be the cause of disorders in pregnancy, such as pre-eclampsia and fetal growth restriction.

In severe pre-eclampsia, only some spiral arteries in the heart of the placental bed (Brosens I. et al., 2011), have fully transformed. The placental bed of those with pre-eclampsia showed that defective transformation is more severe in the myometrium, rather than the decidua. The shallow trophoblast invasion may be caused by a maternal immune system response from the decidua, as there are anti-invasive factors in the decidua that are supposed to balance the trophoblast invasion. Perhaps these anti-invasive factors are overactive, causing an imbalance. However, this hypothesis needs investigation and empirical evidence (Sharma S, et al., 2016).

Angiogenesis

A likely reason for the development of pre-eclampsia is failures in angiogenesis. Pre-eclamptic placentas produce an excess of antiangiogenic factors (Karumanchi S.A et al., 2015, Maynard S.E et al., 2011) like soluble Flt1 and soluble endoglin. These are secreted from the placenta, and in pre-eclamptic pregnancies, the amount is increased in the circulation of the mother. Antiangiogenic factors create endothelial dysfunction which leads to hypertension and proteinuria, and as stated earlier, are symptoms of pre-eclampsia. The role of angiogenesis in pre-eclampsia, as of 2010, is just starting to be researched.

Ethnicity in Relation to Pre-eclampsia

Ethnicity could be a potential risk for pre-eclampsia. African American women, along with Indian and Pakistani women, have a higher risk of pre-eclampsia. A study in 2014 (Ghosh G. et al.) showed that Black women had a higher risk of entering pregnancy with chronic hypertension – and therefore pre-eclampsia – compared to white women. By contrast, Hispanic, Asian and Pacific Islanders have higher odds of entering pregnancy without. They concluded that there were patterns associated with the ethnicity of the woman in question, this suggesting that there may be shared risk factors between different groups.

A different study in 2014 (Xiao J. et al), this examining pre-eclampsia rates in Chinese women, showed that the prevalence of pre-eclampsia in Chinese women living in mainland China and overseas is lower than the Caucasian women in the west. The reason for this is unclear, whether genetic, social or a combination of both. A potential reason for this may be because of the differences in birth control. The study discusses how the most common form of birth control in China is oral contraception, instead of the use of condoms in the west. They explain that, because of the exposure to male antigens, the maternal immune system is less likely to cause an immunological reaction, thus ensuring a healthy pregnancy. The risk of developing pre-eclampsia in different ethnic groups could differ because of a mix of genetic and cultural differences.

Though many studies group Asian subgroups together, an investigation done in 2006 (Rao A.K et al) showed that distinct groups had a variety of results in perinatal outcomes. Among the women in the study, Filipina women had the highest risk of pre-eclampsia/gestational hypertension, Indian and Pakistani women had the highest chance of preterm delivery and Pacific Islander women were at highest risk of macrosomia (when the baby is born larger

than average). The investigators in the study concluded that research of race/ethnicity in relation to perinatal outcomes should examine the differences within these subgroups before grouping them together.

Researching Pre-eclampsia

Pregnancy is a difficult topic study and studying the placenta, as well as its abnormalities, is hard to do, since it is temporary.

Pre-eclampsia is more difficult to research, as it has many factors that could potentially contribute to why and how it happens – the parents' genes, health conditions, differences in placentation, et cetera. In addition, investigating the pathogenesis of both a healthy and abnormal pregnancy could be dangerous, the researchers must be careful not to harm the mother or fetus. While the intention of using tissues from mothers is good, human research is risky and needs a lot of attention and care to ensure that nothing goes wrong.

Ethics is defined as a system of moral principles recognized by a particular group. In the context of pre-eclampsia, and by association, the placenta, and the reproductive system, it means the morals behind research using human tissue or human subjects.

The Human Tissue Act 2004 (HTA) is a series of regulations supervising the removal, storage and use of human tissue. This includes material from the human body and consists of human cells and blood. In addition, the Human Tissue Act has stated that it is unlawful to have and analyze human tissue and DNA, without the knowledge and consent from where the tissue came. This Act covers England, Wales and Northern Ireland. Scotland has a version of this created in 2006. The HTA was introduced because of, among others, the Alder Hey organs scandal, in which over 2,000 organs were discovered in Liverpool's Alder Hey Children's Hospital.

Researching on human tissue can be incredibly beneficial to medical progress. Testing on human tissue is directly relevant to human development. The reaction an animal has to a drug may not be replicated on a human, so using human tissue to test drugs to see how the human body will react makes more sense. For example, the use of HeLa cells in the 20th and 21st century was revolutionary to the modern understanding of medicine.

In 1951, an African American woman named Henrietta Lacks went to the John Hopkins Hospital in Baltimore, Maryland, for treatment for her cervical cancer. While receiving treatment, cells from her tumor were taken. These cells were discovered to divide infinitely, and so, were labelled "immortal". Named "HeLa" for Henrietta Lacks, these cells were used to test medical ideas. In 1953, HeLa cells were used to research how polio infects cells, in 1988, they were used to understand how the HIV virus works. A recent use of these cells was in the research of COVID-19.

However, HeLa cells were taken without the knowledge of Henrietta Lacks. Neither Lacks or her family were given any money from the biotechnological companies that profited from these cells. Lacks' family were not asked before her name, medical records and even her cells' genome were

released. This not only highlights the racial issues in the medical field, as Lacks was an African American, but also asks the question is it ok to sacrifice one person's consent, if it means scientific discovery and progress in the medical field, especially if it saves lives.

The Future of Pre-eclampsia

The treatment of pre-eclampsia is limited, this is because we do not know much about the origins of the disorder. As we learn more about pre-eclampsia, treatments will change. Perhaps in future, there will be preventative measures. When the causes of pre-eclampsia are fully understood, there will be ways of preventing pre-eclampsia.

A risk factor of pre-eclampsia is chronic hypertension and obesity. As these health conditions are understood and treated, the number of women who develop pre-eclampsia may decrease. In addition, as the world begins to globalize and the DNA of different ethnic groups blend, the genetic factors of pre-eclampsia could fade.

Conclusion

Pre-eclampsia is a placental condition that effects 1/20 pregnancies. The cause is unknown but speculated to be related to poor placentation. During placentation, the placenta secretes anti-invasive and antiangiogenic hormones. Pre-eclampsia could be caused by an imbalance of these hormones. Genetics can also have an impact on the risk of developing pre-eclampsia. Certain racial groups are more likely to develop pre-eclampsia than others. Black and brown women have higher odds of developing pre-eclampsia than white women, east Asian women, and Pacific Islanders. The more the reproductive system is studied, the better the understanding of abnormalities like pre-eclampsia. The more pre-eclampsia and other pregnancy-specific conditions are understood, the more women are saved.

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Tutor comment:

"I had a fantastic time working with pupils from Esher C of E High School. They were enthusiastic and worked extremely hard to produce high quality assignments that far exceeded my expectations. E. went above and beyond to create a first-class university style essay which demonstrated a deep understanding of the topic and encompassed a broad spectrum of skills that were taught on the course. Not only did she thoroughly explain the scientific background on pre-eclampsia, but also discussed the ethical issues of using human tissue in research and backed-up her points by referencing primary literature throughout."

Produce case studies of two countries and give two or three recommendations for how to improve life expectancy in one of these countries

Year 7, Key Stage 3

Pupil: **E. Catheral**
 School: **Mossley Hollins High School, Tameside**
 Supervised by: **J. Twigg**
 Tutor University: **University of Manchester**
 Course Title: **The secret to living a long and happy life**

Life expectancy in two different countries

Italy vs Nigeria

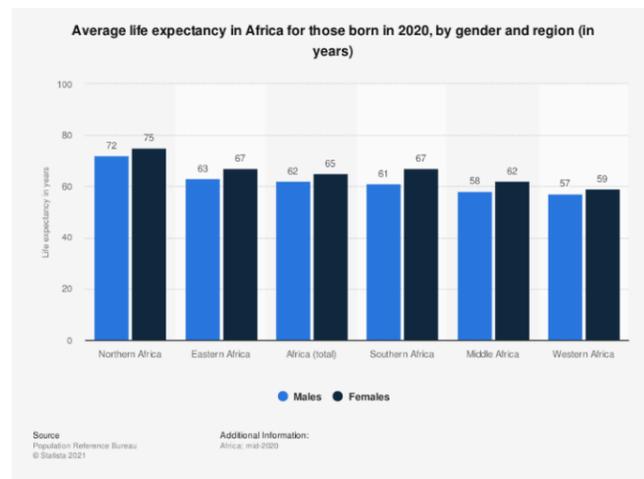
	Italy	Nigeria
Population (2019)	60,302,093	200,563,599
Urban population growth (2019)	-0.2%	4.2%
Life expectancy	84.0 years	55.8 years
Happiness ranking	28th	116th
Income per person (2019)	\$34,530	\$2,030
Income share of lowest 20% (2018)		7.1%
% of educated people (2018)	99.16%	62.02%
Access to health-care	100%	43%
Immunisations (2018)	94%	54%
Births attended by skilled staff (2018)		43.3%
Poverty (2018)	20.1%	40%
Housing (sanitation)	96.21%	26.65%
Inequality	12%	44%
Continent	Europe	Africa

[1, 2, 3]

From this table, it is easy to see that Nigeria is much less fortunate than other countries, such as Italy, and that there are areas that need to be improved to improve wellbeing and life expectancy.

Recommendations of how the government can improve life expectancy and wellbeing in Nigeria

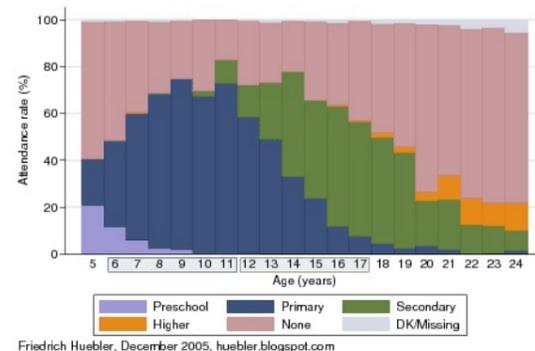
Within this assignment, I will be recommending ways that the government can improve life-expectancy and wellbeing in the developing county of Nigeria, which is located within West Africa. In Nigeria their population is 200 million people and it is thought that this figure would be even higher if the mortality rates were lower and life expectancy was higher. [4] I find it devastating that so many lives could be saved if only the government were to step in. I will be focussing on three areas that I believe that it is possible for the government to improve and the most important areas to improve wellbeing and life expectancy. These areas of priority are: education, health and sanitation.



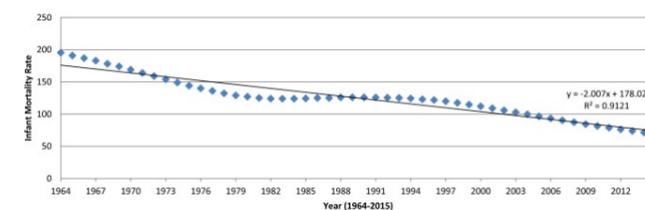
This graph shows that in Western Africa, where Nigeria is located, that the life expectancy is the lowest across the whole of Africa.[5]

In Nigeria the life expectancy is only 55.8 years and the happiness ranking is 116th of 140 countries [3] measured, therefore the government need to think about areas that could be improved so that people in Nigeria live longer and have a better quality of life.

Firstly, to improve wellbeing and life expectancy, I think the government need to spend more money on education. They need to hire more teachers so that more children can learn and therefore in the future the economy will grow. People will then be knowledgeable enough to set up businesses, as well as work in a variety of jobs, and employment levels will increase. In 2018 only 62.02% of people had some level of education (many children only going to primary school and not secondary school) and only 54.4% of adults could read and write. [2] I find it hard to believe that in the 21st century, in Nigeria, there are 10 million children out of school and three quarters of the poorest women have never been to school and 94% of them are illiterate. [6] This is worrying and I believe the government needs to spend more money on education so that this situation improves. I believe that all children should be educated so they learn but also they should be able to go to school so they can socialise with other children their own age. This will hugely help the wellbeing of children in Nigeria who will be happier and also the wellbeing of adults who will then have more opportunities to work in good jobs and earn better money for themselves and their families.



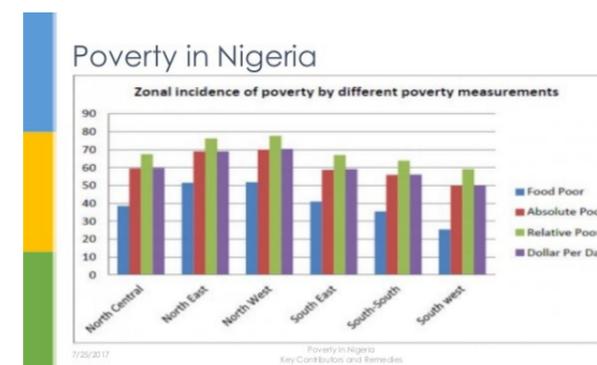
This graph shows the level of education and attendance of different aged pupils. Also, it shows the staggering amount of people who have no education at all. [7]



This graph shows the infant mortality levels in Nigeria over the years. Although the figure is falling, I still believe that more money needs to be sent in this area. [8]

This leads me on to my next recommendation, which is to hire more medical staff. If more people are educated they can get jobs in hospitals. Nigeria needs more doctors, nurses and midwives. I think it is a shocking statistic that at only 43.3% of births, there were medical staff involved [2], meaning babies were at risk leading to higher levels of infant mortality. The government also needs to spend money in the area of healthcare so that this situation improves. Not everyone in Nigeria has access to healthcare, in fact only 43% of people have this access [2], which is worrying because if people are not treated when they are ill then they could die. More nurses and doctors are also needed to give more injections to children to prevent them getting deadly diseases. Only 54% of children are fully immunised in Nigeria [2] and so more money also needs to be spent on getting the vaccinations. All of these recommendations will help to increase the life expectancy in Nigeria. In addition, if people become healthier, they will be happier, leading to increased wellbeing. It must be heart-breaking for parents to lose their children at such a young age, either in childbirth or due to them not being vaccinated. By spending more money in this area, families will be together for longer, all leading to happier and healthier lives.

My third recommendation is that the government need to make sure that money is spread more evenly and fairly so levels of poverty are reduced. In Nigeria, 40% of people live in poverty and only 26.65% of people live in houses with good sanitation [2] (with clean running water and sewerage). Money needs to be spent on better housing and making sure that all houses are sanitary by connecting them to clean water supplies and sewers. This will help to prevent diseases such as cholera, which will increase life expectancy, as fewer people will suffer and die from deadly diseases. It will also improve the quality of life as people will be living in much cleaner homes within the poorer villages as well as in the wealthier areas.



This bar chart shows the poverty levels in different parts of Nigeria. I find it worrying that in most parts of Nigeria such high numbers of people can't afford to buy basic food. [9]

The poverty in Nigeria is due to extreme inequality. Although the Nigerian economy is expanding, there are areas that are very rich and areas that are very poor. According to Oxfam, there is enough money available in Nigeria to lift millions of people out of poverty. They state that "inequality in Nigeria is not due to lack of resources but to the ill-use of resources". [6] I believe that the government should share the money more equally to ensure wellbeing is better for everyone.

In conclusion, there is much to be done in Nigeria to reduce the levels of inequality and unfairness. Currently inequality is very high at 44% [2] but by the government taking basic measures to improve education, healthcare and housing, this figure could be levelled out and more people could live lives that are much more enjoyable and longer. The population is growing at a rate of 4.2% [2] and this is worrying because more people are being born into poverty and so it needs sorting out now. Better education will mean people will know more about where babies come from and can then be more cautious. Currently, only 6.5% of Nigeria's money is spent on education [6] and this needs to be increased as everyone has the right to a good education to give them better life chances, such as being able to get a good job and also knowing about how to keep themselves and their families healthy and safe. Better healthcare will mean that diseases can be prevented and cured. Only 3.5% of Nigeria's money is spent in this area [6] meaning millions of people in the country are missing out on being looked after and good health and I feel this is not acceptable. Better housing will mean better hygiene and sanitation. People cannot help where they are born and being born in Nigeria should not mean that people don't have basic hygiene that they need to keep themselves healthy. It is not their fault and so the government needs to help them. I do not mean that these houses have to be expensive and huge, they just have to provide shelter and a safe place for people to live. I strongly believe that these measures will all help to improve wellbeing and life expectancy in Nigeria and none of them are unrealistic as there is money available to the government to do these things. This is what I think the Nigerian government should do to help people live a better and longer life.

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Tutor comment:

"E. worked incredibly hard throughout The Brilliant Club sessions and made insightful contributions to our discussions each week. Her final assignment is a testament to her effort and ability. I have no doubt that she will be a great asset to the university of her choice in the future. Well done E!"

Using exercise to reduce the severity of outcomes for people with Chronic Breathlessness and to help relieve pressure on the health system

Year 10, Key Stage 4

Pupil: **M. Pollard**
 School: **Toot Hill School, Nottinghamshire**
 Supervised by: **U. Karsanji**
 Tutor University: **University of Leicester**
 Course Title: **Dyspnoea – You take my breath away**

Introduction

Since chronic diseases (CDs) have become more prevalent in the population, the National Health Service (NHS) has been suffering. The tests for CDs are expensive and time-consuming, and the treatments can have negative effects due to co-morbidities. The NHS is in a desperate need for a new style of treatment one that is cheaper, and that will not have a detrimental impact on other co-morbidities.

The change in the presence of CDs

CDs are 'a disease that persists for a long time', specified as '3 months or more'¹ CDs account for 50% of all GP appointments, and 70% of all hospital bed stays. The treatment of CDs is costly, estimated to take up £7 of every £10 the NHS spends. CDs are also more prevalent the elderly, affecting 58% of over 60's, yet only 14% of under 40's. The NHS, since the 1990's, has been trying to combat the pressure that CDs pose, yet due to the unhealthy western lifestyle embodied by those that it cares for, 22% of the UK's population live with a long-term medical condition.²

The growth in patients with CDs has increased the pressure on the NHS with more patients requiring more complex treatments- this change has occurred in the past few hundred years. Up to the 19th century, illnesses were mostly caused by communicable diseases, and CDs were rare. Following this was a time where communicable diseases were still prevalent, occasionally outbreaking, but there was a growth in CDs. This was due to the poor lifestyles that people developed, such as unhealthy eating and physical inactivity, occurring alongside worsening living conditions, like more polluted air. Then came the last known age of epidemiological transition, where CDs became more prevalent, especially as peoples lifestyles worsened further, such as physical inactivity leading to dyspnoea.

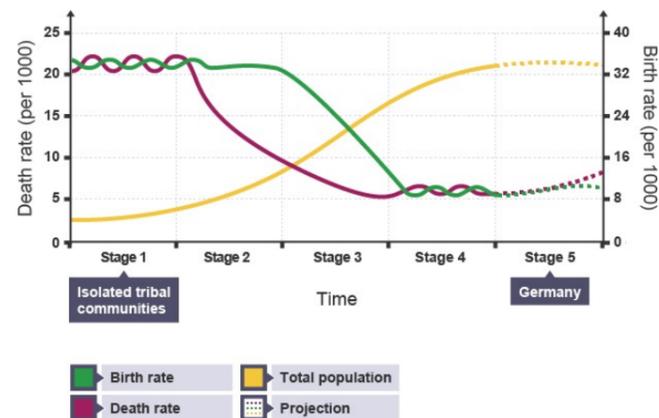


Figure 1: Showing the change in epidemiological transmission, and the changing mortality rates. ^A

Two main components of epidemiological transition are:

1. Changes in population, particularly age. As people start living longer, they are more susceptible to CDs, increasing pressure on the health system. You can see on the graph the lowering birth rate and rising total population.
2. Changes in the pattern of morbidity, including increasing life expectancy and different causes of death.³ If the whole population was dying due to one particular communicable disease, then herd immunity would reduce the risk of death to the population and the epidemic would subside⁴.

0-10 Borg Rating of Perceived Exertion Scale	
0	Rest
1	Really easy
2	Easy
3	Moderate
4	Sort of hard
5	Hard
6	
7	Really hard
8	
9	Really, really, hard
10	Maximal: just like my hardest race

Figure 2: Showing the Borg Rating of Perceived Exertion. ^B

How Chronic Diseases are managed within primary care (GP's Surgeries)

Dyspnoea, or chronic breathlessness (CB), is prominent within the healthcare system, due to the effect that it maintains over the organ systems in the body. The long-term effect of CB, which develops over weeks or months⁵, is negative because it restricts oxygen supply to major organs in the body, resulting in the development of co or

multi-morbidities. This leads to increased pressure on the NHS.

In primary care, diagnosing CB is hard, and diagnosing the cause is even harder. As patients usually are at rest in the surgery, breathlessness becomes 'invisible', and it becomes unmanaged in clinical practice, despite its capabilities to worsen both physical and mental health. Consequently, CB may be ignored, as it does not come to the forefront of the patients mind, meaning they do not tell their GP the distress that it is causing them.⁶

As CB is hard to diagnose, doctors use self-administered scales to measure the impact of this condition. Scales such as the Medical Research Councils (MRC) Breathlessness Scale are used, with patients using Grades 1 to 5 to describe the discomfort their breathlessness is causing them. It is mostly used if a patient is suspected to have Chronic Obstructive Pulmonary Disorder (COPD), rather than to fully quantify breathlessness. Another scale is the Borg Scale, which asks patients to rate the difficulty of their breathing on a scale from 0 to 10, are used for this.⁷

How Chronic Diseases are managed in secondary care (Hospitals)

After breathlessness is identified, the National Institute for Health and Care Excellence (NICE) recommends certain investigations to understand the cause(s) of the CB. These include:

- Chest radiography
- Electrocardiogram
- Spirometry⁸

These tests investigate the cause of the CB; however, NICE doesn't specify the number of tests to be carried out by hospitals. Because of this, the medical treatment can change depending on the location, hospital policy and doctor, leading to inconsistencies in levels of care offered across the NHS. While carrying out all of the recommended tests can lead to a conclusive result, it is both time consuming and expensive. A potential change the NHS could make is to publish clear and consistent guidance that links to NICE's recommendations. This would clarify the levels of care, but it wouldn't deal with the overwhelming pressure on the NHS. This is a flaw within the diagnosing of CDs; the tests are often costly and inconsistent⁹.

There are many different possible treatments for a patient with CB, including:

- Painkillers
- Sedatives, relieving anxiety
- Steroids, which reduces inflammation in the lungs.
- Pulmonary rehabilitation, which also helps protect against heart failure¹⁰, a common co-morbidity to CB.

These methods are beneficial, however, patients experiencing co or multi-morbidities may experience side effects to their medication. The complications that they may suffer increases the cost of medicines for the NHS, as

they require more treatment, further highlighting how the NHS needs cheaper medication that works for all illnesses. There is one medicine that does this: exercise.

How dyspnoea and chronic diseases can be managed better, especially within tertiary care

One potential cause of CB is physical inactivity. To combat this, exercise can be recommended by doctors to those at risk and those diagnosed with CB. Exercise strengthens the cardiovascular system, reducing the chance of developing CB, or other CDs. Exercise can be free, for example going for a walk or run, meaning there is no cost on the NHS. The NHS provides guidance on their website that helps people start exercising, ensuring this treatment is not exclusive to people with a specific illness or condition.

The treatment can also occur in a tertiary facility, such as someone's home, local park, or community centre, meaning they are not placing the NHS under more pressure by requiring resources and valuable time of doctors for the treatment.

Physical health is known to impact mental health; improving both will help to relieve the pressure on the health service. Improving physical health improves the health of the organs as the muscles were previously weakened, including those in the cardiovascular system. Exercise also decreases the chance of developing mental health illnesses and, in some cases, has been proven to be as effective in combating mild depression as antidepressants.¹¹ Initial investment in promoting and sustaining physical activity can lead to long-term savings in the NHS by a reduction in the future need of expensive treatments. Regular exercise can save up to £6,900 per person in medical costs, meaning that this money can be spent on other treatments.¹² Simply moving is proven to improve cardiovascular health; people who sit a lot are twice as likely to contract diabetes and are two and a half times as likely to suffer a cardiovascular disease.¹³ Exercise is especially beneficial to your physical health; just eleven minutes of exercise a day past the age of forty added 1.8 years of life expectancy.¹⁴ The endorphins released after exercising help to relieve pain and stress¹⁵ and in the long-term can decrease the risk of developing mental health illnesses.

Exercise improves the life of those with CB, as well as helping those who are at-risk, by strengthening bones, boosting the immune system (further relieving pressure on the NHS), and lowering the risk of developing cancer or diabetes. It has been noted that there is not a single organ in the body that doesn't benefit from exercise.¹⁶

Exercise also helps to maintain a safe glucose level in the bloodstream; decreasing the risk of diabetics developing CB.¹⁷ Regular exercise is proven to lower the risk of Type 2 Diabetes by up to 50%.¹⁸

Benefits and Negative Implications of Exercising

Exercise has many benefits towards the NHS and at-risk patients, but some notable disadvantages. The recommendation of exercise by the NHS is positive because:

- Endorphins improve your mood.
- It helps with weight loss, relieving pressure on the cardiovascular system.
- Exercise improves insulin sensitivity, cardiovascular fitness and decreases blood pressure.
- It helps with relaxation and sleep, possibly up to a 65% improvement in sleep quality.¹⁹
- Exercise helps to build and maintain your bones and muscles, especially in older ages.²⁰
- However, there are some down sides to prescribing exercise:
- It is hard to monitor whether people are taking the recommendation.
- Exercise could lead to injury - the treatment they require increases pressure on the NHS.
- Even when people exercise, they can still spend a lot of their time stationary.
- Doctors can have limited faith in the treatment.²¹
- Some people can struggle to start exercising – they may lack motivation or time.

Exercise, in moderation, has health benefits both mentally and physically- not only helping to combat CB, but it also helping to prevent many other diseases. However, people should make sure that they do not have bad habits, as exercising on its own will not cure CB.

How physical activity can be implemented within the NHS

The benefits of exercise are clear but implementing it in the complex system that is the NHS is a different matter. For many doctors, the need to improve physical health is something that affects them personally- they may display similar habits to the patient they are treating. This can lead to a lack in confidence towards the treatment, or from the patient. A common concern that doctors may hold is proving the patient is following their advice and actually exercising, as it can be hard to track. One way that you could combat this is by creating exercise classes that run through the NHS. This gives the doctors the confidence that their advice is being followed. It also may give the doctors an opportunity to exercise themselves – giving them confidence in the treatment. An alternative suggestion is the use of pedometers which are cheap and encourage people to walk more. A study of people with diabetes, once they began to use the pedometers found they decreased their body mass index by 0.3822- relieving pressure on the NHS leading to improved healthcare. Finally, accelerometers could be used; accelerometers provide more accurate data on an individual's movement, and can send real life data to the NHS, meaning doctors can have faith that their advice is being

followed.²³ However, traditional accelerometers are more expensive than pedometers, can be cumbersome to use, so are not always suitable for use. A solution to the cost and technology barriers of pedometers and accelerometers could be the use of smartphones which are owned by most adults in the UK and would send real time data for monitoring. Possible barriers to this solution would be the age profile of smartphone owners, as CBs are prevalent in the elderly who have a lower ownership rate of smartphones. The accuracy of the solution would also need to be verified to ensure doctor confidence.

Conclusion

CB poses an intense burden on the NHS, when it is not managed effectively. One way that CB can be managed is through using physical activity to tackle a sedentary lifestyle and improve cardiovascular health. This treatment helps the whole body, and it particularly strengthens the cardiovascular system. With the rise in CDs that has been seen by the NHS, it is in my opinion that the medicine of physical activity should become more prominent to combat its affect. I propose that modern technology such as smartphones is utilised to overcome historical cost and technological barriers to monitoring the impact of physical activity as a treatment, also creating greater confidence in the healthcare profession.

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Tutor comment:

"It's been my absolute pleasure to teach M. on The Scholars Programme about epidemiology and chronic diseases. Her essay focuses on the problems within healthcare surrounding the management of chronic breathlessness and how early diagnosis and interventions can increase life expectancy and long-term outcomes. The level of detail and execution that has gone into her essay is far beyond KS4 level and her ideas are promising for the future management of chronic diseases as well as improving healthcare utilisation. Wishing M. all the best of luck for her future endeavours, she'll be an asset to any career field!"

Malaria outbreak in a rural Mali village

Year 9, Key Stage 3

Pupil: I. Newby
School: Malet Lambert School, Kingston Upon Hull
Supervised by: Y. Black
Tutor University: University of Hull
Course Title: Disease detectives

Introduction

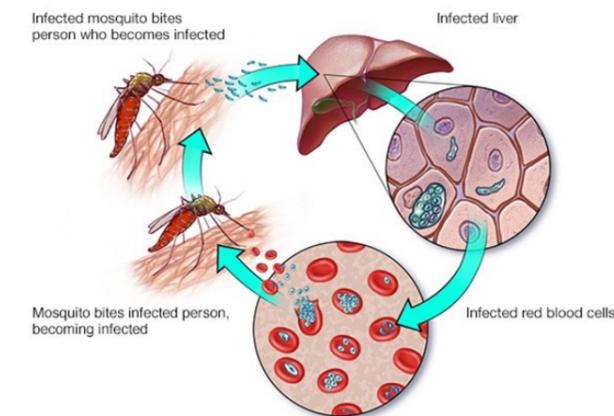
I have been appointed as the Head of the WHO's new Disease Detective Division, today is my first day on the job and I have received an alert which details an outbreak of malaria in a rural village in Mali, West Africa. This malaria outbreak is spreading quickly throughout the village and needs to be contained.

What is Malaria?

Malaria is an example of a bloodborne parasitic disease, the vector (carrier) of Malaria is the female Anopheles mosquito, these mosquitoes take blood meals for egg production [1], and the transmission of infected blood from one person to another is how the disease spreads. There are many different species of the 'Marsh Mosquito', over 100 can transmit human malaria; however only 30 - 40 commonly transmit parasites of the genus Plasmodium, which cause malaria in endemic areas. [2]



Female Anopheles Mosquito [3]



Malaria Transmission Cycle [4]

Once someone is infected some of the symptoms that may occur are:

- A high temperature of over 38°C or above.
- Feeling hot and shivery.
- Headaches.
- Vomiting.
- Muscle pains.
- Diarrhoea.
- Generally feeling unwell. [5]

Malaria may also cause anemia and jaundice due to loss of red blood cells. If not promptly treated, the infection can become severe and may cause kidney failure, seizures, mental confusion, coma, and death. [6]

Mali

This outbreak needs to be contained and then stopped before it puts other villages and more people at risk. UNICEF estimates that malaria kills one child every 30 seconds, about 3000 children a day. Worldwide over one million people die from Malaria, with 90% of malaria cases occurring in Sub-Saharan Africa. [7] This is backed up by the WHO who reported that 67% (274,000) deaths from Malaria occurred in children under 5. [8] Understanding Mali and its demographics shows why this outbreak can pose such a serious problem.

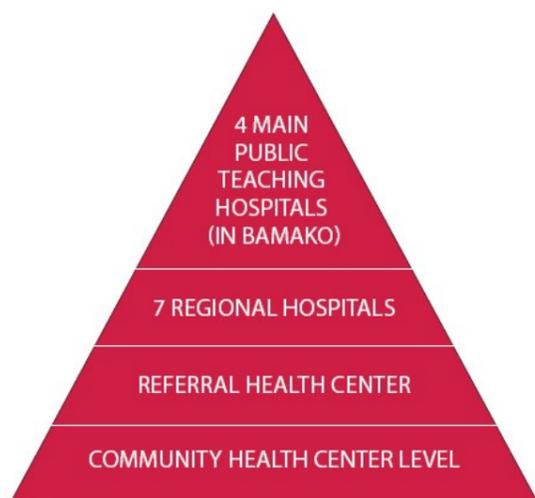
Mali is a landlocked country in Western Sub-Saharan Africa, the country has a population of 20.7million [9], spread over its 1.24 million km² area [10], the location of Mali within Western Africa is shown below



Map of Mali [11]

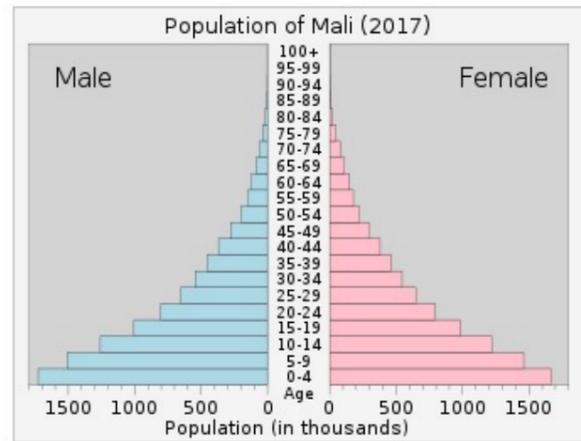
This spread of population over space gives it a population density of 15.9 people per square kilometer, this makes it the 176th most densely populated country in the world. [12] The country has only 5 cities with populations of over 100,000 people, and 4 more with populations between 50,000 and 100,000 people. In 2019, only 43.14% of the population lived in urban areas, meaning that over 11 000 000 people live in rural areas. [13]

As such people may be travelling large distances to receive healthcare, and this could aid the spread of the outbreak. People travelling to one of the 900 community health centres could easily come into contact with people from other rural villages, this could mean that the spread jumps from village to village. It is also unlikely to be reported fully until the patient reaches one of the 59 referral health centres, which are better equipped and staffed, having both laboratories and doctors, the community centres are normally staffed by nurses. This would suggest that the outbreak has had a significant period of time to have already spread. The country as a whole only has 18 hospitals with 8 in the capital city. [14] Healthcare as a whole is organised in a pyramid, this is shown below.



Health Care Pyramid, Mali [15]

Another factor that makes this so dangerous in Mali is the age distribution of the population. In Mali 48.03% of the population is under the age 15, within this is a large number of infants, who are particularly at risk from malaria. The country has a population growth rate of 2.98%, and the mean age at birth of a mother is 18.8 years, the average female has 5.9 children. [16] The diagram below shows the population pyramid of the country.



Mali Population Pyramid [17]

The final factor of concern is the timing, the country is under pressure already dealing with the COVID pandemic, we will need to gather support from other areas to stop this outbreak as soon as possible and to prevent it from adding to an already struggling medical system.

Difficult To Stop

Some of the factors contributing to the difficulty to stop the spread of this outbreak have been detailed above, these include the remote nature of the villages and the number of health centres, this means that people will travel for healthcare and come into contact with others, they could even bring malaria into an area that does not have mosquitos carrying the parasite now.

The parasite evolves over time, meaning it can evade the human immune system. This also means that if someone has had malaria it does not guarantee them immunity in the future, and that finding a vaccine to prevent malaria is unlikely. It also means that the disease can become resistant to treatment medicines, as happened with the emergence of parasites resistant to artemisinin at the Thai-Cambodian border. [18]

The Anopheles mosquito can also develop resistance to insecticides, which limits the effectiveness of current strategies such as the indoor spraying of insecticides and the use of insecticide treated bed nets. [19]

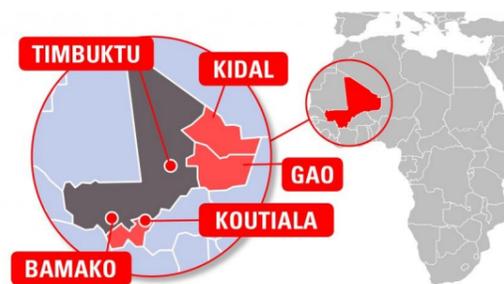
One factor in our favour is that the rainy season is from June - October, in March the weather is usually dry and hot, [20] this will reduce the amount of stagnant water that the mosquitos use for breeding. [21]

However the most difficult factor to overcome in this situation is time, the longer that passes the more likely the outbreak is to spread, how we can try to address this is covered below.

Strategies to Employ

The first thing needed would be to get medical teams into the area, the WHO has spent time training rapid response teams in the African continent, [22] at times of crisis countries need to support each other to help prevent epidemics. The deployment of these teams could be coordinated from the WHO Regional Centre in the Republic of Congo until this can be done on site. [23]

There are also already medical teams from Medecins Sans Frontieres and the International Medical Corps operating within the country and with the support of their organisations they could access the rural village in the first stages.



- Regions where MSF has projects
- Cities, towns or villages where MSF works

MSF in Mali [24]



International Medical Corps [25]

Once we have people in place we can start to treat the infected with anti-malarial drugs, these include Chloroquine Phosphate, [26] however many of the parasites are resistant to Chloroquine. The better choice may be Artemisinin-based combination therapies (ACT's) as these are a combination of two or more drugs that attack the parasite in different ways. [27] The treatment of malaria with ACT's is over 3 days, which means that the likelihood of the full dose not being completed is low. [28]

We can also try to start to vaccinate the children against malaria using Mosquirix, however this is done in 3 doses, each one month apart, so this is a longer term project. The vaccine is already a routine vaccination given in Ghana, Malawi and Kenya. [29]

Whilst providing treatment we need to prevent further infections, the approach of using treated bed nets to prevent further infection needs to be put in place, as does the use of insecticides to treat buildings and the use of fogging to kill mosquitos that are already there.



Insecticide Spraying [30]



Mosquito Fogging [31]



Mosquito Nets [32]

We also need to trace people who may be infected, this will be difficult in rural Mali, so mass testing may well be most effective in preventing this outbreak from becoming uncontrollable.

Conclusion

This outbreak has the potential to become out of control if it spreads to more rural villages in Mali. The high number of cases already seen yearly in Africa and the high death rate in the young makes malaria a major problem on the continent, increased birth rates and low age demographics will make this a long term problem. Even though we can manage this outbreak with a quick response time and effective treatment and prevention, it is only a matter of time before there is another.

The effective roll out of the vaccine along with continued research can be the only long term solution, and this has to be paid for in more developed countries as African continent as a whole does not have the money to invest in this sort of program. This raises the question of if Malaria can ever be eradicated, [33] and why programmes being run such as the President's Malaria Initiative; [34]

and the work done by the Gates Foundation [35] could prove to be instrumental in this fight. The WHO must also continue to support the governments in this region in their fight against this killer disease.

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Infertility from current options to future developments. How will human reproduction change?

Year 12, Key Stage 5

Pupil: H. Mountain

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Supervised by: D. Marcu

Tutor University: University of East Anglia

Course Title: Reproductive biology: How far do we go?

Introduction:

Infertility is the inability for a couple to conceive a pregnancy after having unprotected sex for a year or more. Approximately 14% of people in the UK may have difficulties conceiving [1]. This can be caused by genetic factors, environmental factors or a combination of the two. Infertility can be either naturally-irrevocable primary infertility or it can develop after the birth of a child, secondary infertility. Since the first IVF birth in 1978 [2] there has been vast developments in the technology available to couples that struggle with fertility, with many more innovations on the horizon related to genetic engineering. Although the current options provide a wide range of treatments, there isn't extensive research that provides evidence that they are safe long-term.

Male Infertility and Treatments:

10%-15% of severe male infertility is caused by genetic causes [3]. Klinefelter's syndrome (KS) is a genetic disease causing man to have an XXY genotype. KS causes an insufficient amount of testosterone and increased production of LH and FSH. The imbalance of the hormones affects fertility by causing abnormal spermatogenesis which produces non-obstructive azoospermia [4]. Other conditions that affect chromosomes, like microdeletions in the Y chromosome also causes infertility [5]. There are currently methods to treat fertility issues caused by chromosome aneuploidy, like intracytoplasmic sperm injection (ICSI) and testicular sperm extraction (TESE). Also, possibly used alongside preimplantation genetic diagnosis (PGD) to test the embryo for chromosome aneuploidy, to stop the inheritance of the aneuploidy [5]. ICSI can help a couple conceive, although the male offspring would be infertile making it an undesirable option. PGD has been developed to reduce the chance of this through testing the embryos, although this has come with a lot of ethical backlash and needs more research to be widely used. TESE is also an option however, only 50% of KS patients have suitable spermatozoa [6]. Using damaged sperm can increase the chance of a miscarriage or a still birth [7] making it currently hard to conceive using current treatments. Alternative options include adoption and donor sperm.

Non-genetic male infertility can be affected by many environmental factors like age, obesity, smoking, alcohol and recreational drugs [7]. With age your fertility declines, as the mobility and vitality of sperm decreases [8] however this is a natural process that your body goes through as you age. The effect of obesity, smoking, alcohol and recreational drugs can be overcome through alterations

of behaviour and lifestyles [8]. All of these infertility issues can sometimes be secondary, meaning that the couple have sometimes already conceived a child and they might have issues with conceiving again due to changes in lifestyle and aging.

Female Infertility and treatments:

Female infertility accounts for approximately 35% of all infertility cases with 10% of women who are of reproductive age not being able to conceive a pregnancy [9]. This can be caused by a wide range of genetic and non-genetic factors.

Endometriosis is a disease where the lining of the womb begins to grow in other places like the ovaries and the fallopian tubes [16]. It is predicted that approximately 10% of women who are of a reproductive age experience issues with endometriosis like infertility and severe pains in the pelvis [17]. This can cause infertility by blocking the ovaries and stopping ovulation completely. The cause of endometriosis is currently unknown which means that as for treatments and cures, there is currently very few options [17]. However, IVF can be used to retrieve the eggs from the ovaries for fertilization and implantation into the mother or into a surrogate if needed. Intrauterine Insemination (IUI) is also an alternative option for conception although the success rates can vary [18].

Polycystic Ovarian Syndrome (PCOS) is an example of a non-genetic cause of infertility in women. It is caused by fluid filled sacks that block or surround the ovaries and the eggs. This reduces the ability of the eggs to move and can stop ovulation. Another symptom of PCOS is amenorrhea, which completely reduces the chances of conceiving as the entire menstrual cycle is disrupted [10]. It is predicted that, in the UK 1 in 10 women have PCOS [9] and it accounts for approximately 75% of anovulatory infertility cases [11]. PCOS can be treated using fertility medicines /Ovulating inducing agents like Gonadotrophins and Clomiphene Citrate. If these are ineffective, laparoscopic ovarian drilling may be recommended. However, due to the surgery's invasive nature problems can arise from the use of anaesthesia, adhesions, infection [12]. This may be counterproductive as this can cause further infertility issues due to the post-surgery scarring. IVF is also another option; however, this can have complications with multiple births [13] although current laws reduce this likelihood. Also, ovarian hyperstimulation from the fertility medicines and ectopic pregnancies [13].

Non-genetic factors like age and lifestyle choices can also affect the fertility of women, like men. With age, women become less able to conceive a pregnancy until a point (menopause) where they can no longer conceive without the help of artificial reproductive technology (ART).

Other causes of infertile treatments:

In men and women who have had chemotherapy it is very common to have issues with fertility due to the chemotherapy medicines and the nature of the treatment. Women who complete chemotherapy might experience ovarian toxicity, sterilisation and chemotherapy-related amenorrhea (CRA). In a study approximately 76% of women experienced CRA after

completing chemotherapy with only 40% of these women regaining their menstrual cycle [14]. This CRA can be treated using IVF or ICSI where the egg is externally fertilized. Also, if the women have cryopreserved eggs before undergoing chemotherapy, then there may be the option of artificial insemination. The effect of chemotherapy on male infertility is caused by the cancer treatment targeting and damaging rapidly dividing cells. Unfortunately, as spermatogenesis is a rapid process, the cancer medication involved with chemotherapy will target the sperm cells and damage them. This can be temporary; however, it can be permanent. If the effects of chemotherapy are permanent, then IVF can be used to help the couple conceive, donor sperm may have to be used if the male's sperm is malformed as it can cause other issues. Although it is overall recommended that conceiving whilst a partner or both partners are having chemotherapy should be avoided. This is because of the chemotherapy medicines can cause malformation in the gametes and subsequently harm the baby [15] or cause miscarriages or still births as the gametes are damaged [7].

Environmental factors such as weight, age, smoking, alcohol, recreational drugs and STIs can affect someone's fertility. There is also idiopathic infertility which has unexplained causes. This makes some infertility cases hard to treat because the cause is unknown so finding the most effective treatment is challenging. There is a link between a low/high BMI and issues with sperm function and concentration [8]. This can be treated using IVF or ICSI. There is also a link between smoking and infertility in males and females. Carcinogens in tobacco can cause mutations in the DNA which can result in issues with fertility depending on which genes are affected by the mutation [8]. Smoking can also cause lowered levels in oestrogen and progesterone which can cause issues with the pregnancy due to an increase in risk of miscarriage [8]. Smoking also affects the sperm concentration, also making it difficult to conceive a successful pregnancy [8]. Like fertility issues with BMI, issues caused from smoking can also be treated using IVF or ICSI. The use of alcohol and drugs can affect the fertility of a person but if it is continued to conception and during the pregnancy, then there is an increased risk of a miscarriage, birth defects and childhood cancer [8]. Testing of the embryo could be used to check if the baby is healthy, however there is also a risk of miscarriage with some types of genetic testing and there are ethical issues related to this.

Limitations of current treatments:

With most current treatments there are lots of limitations involving lack of research and knowledge about potential long-term side effects. This is due to large samples being very limited as some of the technology is relatively new. Also, a lot of treatments come with major ethical concerns against the processes that happen to help people conceive as well as the research behind it. Due to this, the field is majorly restricted, however as more research is done to provide evidence that these methods are safe these restraints might be loosened to allow for more innovation.

IVF, ICSI, IUI, laparoscopic ovarian drilling and TESE are all

forms of Artificial Reproductive Technology (ART). There are possible connections with suboptimal cardiovascular function, potentially increased blood pressure and stunted growth in offspring conceived through ART [19]. IVF has thought to have had a positive connection with cardiovascular and metabolic issues in offspring which are predicted to worsen with age and possibly cause cardiometabolic disease[20]. However, confirming these connections is complicated as there is limited data, making this currently unreliable data as many studies have conflicting results. There are also possible connections with lowered neurodevelopment and an increased chance of ADHD and autism spectrum disorder [21]. Although the studies that have suggested this connection have had limitations as there is small sample sizes so results might not be accurate or precise. There are also conflicting results for many variables of neurodevelopmental health, meaning that it is a concerning possibility which could be verified with more studies and larger sample groups. These techniques are also expensive so they might not be available to people who have a lower income.

Medications used to induce ovulation can be harmful if taken wrong and might lead to ovarian hyperstimulation, multiple births and ectopic pregnancies [13]. This can severely affect the health of the mother and the baby. So, these medications are not entirely beneficial. Therefore, a lot more research is needed, to develop current medicines and to develop new medications.

Surrogacy, Sperm donors and egg donors are also expensive options however these don't involve any invasive surgeries and are more suitable for cases where gametes are severely damaged. The cost of these treatments means that this isn't an option for people with lower income. To improve these techniques increasing availability for people who are not as financially incline may help a wider range of people. If none of these are available or recommended for a couple, then adoption is also an option.

Future treatments, applications and benefits:

Genetic engineering is changing the structure of DNA to make a living thing stronger or healthier[22]. CRISPR is a type genetic engineering that was 'discovered' in 1993 by Francisco Mojica who began researching the CRISPR locus[23]. In January 2013 the technology was adapted for genome editing in eukaryotic cells[23]. CRISPR is currently being considered for large scale use to cure certain diseases. This technology is based on proteins from the immune systems of bacteria and archaea. It has been repurposed as an RNA-guided DNA targeting platform for altering genetic information[24]. The main principle of the technology is that the protein is used to locate the damaged gene and insert donor DNA or Nonhomologous end joining can be used [25]. This procedure can be done on regular cells or it is suggested it can be used to change the human germline through the use of CRISPR on gametes or embryos [26]. CRISPR can be used to cure or reduce symptoms of genetic diseases like cystic fibrosis and muscular dystrophy and help couples who are at risk of genetic disease have a healthy child. Although there are concerns that this can be harnessed for cosmetic use.

CRISPR is currently more effective, easier and more precise than current genome editing as it reduces the need for protein engineering, boosting its applicability for large scale use [24]

There is also research into artificial gametes, although this technology has serious ethical concerns. This is because making gametes from cells is against some morals as it can be used for things other than reducing the impact of infertility on couples.

Conclusion:

In conclusion, there are various issues that affect the fertility of men and women and because of this there is an increasing need for effective and easy treatments. Many of the current treatments work effectively however there are issues with the long-term side effects and how beneficial these methods are. There is also a lot of resistance from the government and religious groups about how 'ethically right' these methods are. Researching these methods in more depth will help advance these current technologies as well as possibly reduce these ethical concerns. These developments need to make the treatments more available to people before society changes how they reproduce. This being said, there is the possibly of enhancing this technology for cosmetic use which could change the way that we reproduce. Genetic Engineering is a huge innovation in the way that it is more effective and precise than other methods of ART, however before it can be widespread it needs a lot more research to prove it is safe and to reduce the cost to increase the availability.

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Tutor comment:

"It was a pleasure teaching at the University Technical College Norfolk. The lead teacher was incredibly supportive, and pupils were welcoming and enthusiastic about the programme. H. was incredibly curious, motivated and hard working from the very start. It was a privilege to assist her grow academically. Her essay is a perfect example of academic writing, including understanding of the subject area and critical thinking. H.'s essay outlines the progress to date on fertility options and it also alludes to future developments and the need for further well-designed research studies. She attained a very well deserved first class in this complex assignment. I have no doubt she will be able to excel in academia or industrial sector."



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