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

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/
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, 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 should instil in young children from the moment they enter the world of education. Children are taught to read such classics as The 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. 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 have told me that 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 complicated passages of text from novels that are often difficult to read.

One factor that seems interesting 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 private affair, we chose the books that we like from a private affair, we chose the books that we like from a private affair, we chose the books that we like from a private affair. 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’s choices are often 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 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 the 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 any book lover and they will tell you the wonders of reading Dickens, Austen, 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.

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 songs was their ability to express a positive message about the challenges and difficulties that some people endured, problems that 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 provided a unique experience, but illustrated in my mind how hard it must have been for a lot of people in America. In this essay I will explain how each of these songs contribute to our understanding of American history and culture, and through these songs the different and spread awareness about different subjects they both standing for one thing—equality.

Abel Meeropol 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.” 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 about it and raise consciousness about the need to bring an end to it. Between 1882 and 1968, there were estimated to be 4346 lynching’s of Black Americans. Thousands of black people have died as a result of being judged purely on the grounds of their skin tone. Meeropol was not the only one inspired by the act into her song. The suggestion that African Americans were a threat to America was unjustly pushed. This meant that while 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 lynching was like and they not only may find difficult, but that they may also find little relevance in reading.

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clearly talking about the police brutality that inspired part of the song. Even when people are just trying to stand up for what they believe in, American police still oppress, and people are getting hurt. It seems that in America’s past, people thought they were better, or when one group had more power than the other, they had to dominate because of their status. They thought they were above others, and that we need police force to keep everyone in line.

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 more peaceful way to handle conflict than bloodshed. “You see, war is not the answer” is a line that often returns in the message that there was no need for war and that is thought to have more negative consequences than positive effects. Marvin Gaye had come back from being in the Air Force, where he talked about the way 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 oppose the unfair treatment. The audience would not be encouraged to help stop this unjust treatment. This makes an audience face their possible privilege, which makes 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”1. This relates to how social inequality can be caused by wealth and income as well as race. Middle class people are more likely to be educated 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 a result of being more privileged. 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 how the situation works 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 attitudes can be reduced or be completely removed. This 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 else. It is most likely never forgotten if 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 they are complex individuals who have their own experiences, feelings, making them more relatable. As a result, the text fights inequality very effectively.

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”2. He is comparing it to a prison, suggesting that there is almost the same number of male and female refugees, which equals to 2.5% of the world’s population. 52% of the refugees staying there are being treated like criminals and immediately forms a bias against them since they are not 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, as they are constantly denied basic human rights, for example some suffer abuse, inhumane treatment and neglect, are forcibly transferred to remote islands, denied medical care and assaulted by locals3, as if it has recently happened in the world that we live in. However, in the result, the audience would relate this refugee centre to a prison and therefore 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”2, which shows the extreme overcrowding. Overcrownations of overcrowding include the number of boats and the number of people living in one 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 wellbeing of themselves and their family1.

This makes an audience face their possible privilege and consider whether they have experienced this kind of treatment. If they have not, they feel encouraged to help stop this unjust 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, while the number of international refugees was 25.1 million. 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 population in 2018 was 24.95 million, while the number of under the age of 18. 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”2. The imagery used here creates a similar effect to that of the tidal wave, 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, in America, many people have been living 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 things that are happening to others, which 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 idea or group. This idea of essentialism is a restriction of the individuality and individual identity. It is this discord for the individuality of migrants that is common in the media. Nevertheless, Lampedusa follows the individual lives of two people facing discrimination, this is what is being biassed. The piece 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 how the situation works and allows them to empathise with these people on a deeper level.

Analyzes of Lampedusa by Anders Lustgarten

Lampedusa by Anders Lustgarten exposes the issue of mass migration and encourages an audience to understand and think about the impact of immigration. It highlights some other relevant issues like attitudes towards the poor and racism.

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 are unfortunate people in America, who 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.

References

Can tests fight colonialism and inequality?

Year 10, Key Stage 4

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Supervised by: Dr. L. Alteno
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Course Title: Can tests 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 inequitable treatment of people of colour, because they feelinvisible after the country itself has gained its independence. Inequity is the difference in status, opportunities or wealth between different people or groups2, which can be related to race, gender, health, age and income3. 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, it would convey resistance against racial, gender, physical and verbal abuse, and overall 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.

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There are unfortunate people in America, who 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.
Overall, this text opposes inequality because of the effect it has on a viewer. It would cause an emotional response and encourage people 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 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.

This explains why African American people are still discriminated against, as a result of their subjugation over time, and the consequences of 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”. This symbolises the opportunities white people have over black people because they are not subjected to racism and prejudice which stunt their freedom. It shows the privileges white people have over black people, as it shows the free bird flying high in 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”. 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 experiencing the legacy of colonialism and have to face the impacts of it.

Finally, Angelou describes that the caged bird “opens his throat to sing”. This illustrates that, even in the face of injustice, oppression and limitation, the bird can still resist and fight back. In some ways, 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 approach 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 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 accept some 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 the problem, identify the issue, and 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 progress, by conveying an argument which creates empathy and encourages the audience to have empathy for the characters, which in turn persuades them to think and act against inequality, racism, oppression and discrimination.
Contrastingly, a flexible identity demonstrates how mythological identity was valuable as it provided a fluid form for the culture which others would admire. Placing him as a king of Athens who created democracy meant that the city was tying itself to those of themselves - heroically, Theseus became synonymous with a city. These connections to influential gods incontestably made regions more prosperous evidenced with Athens, which was successful because it endowed with 'useful gods.' However, the same person/groups given that name could use it to their advantage. For example, in Greece, Spartans were named that by other cities, but they used their unique personifications. As a result of being Athenian, if they were a Spartan, you would think twice about coming because that name and attached identity now carried a fierce reputation. Furthermore, mythological identity was beneficial for individuals, 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 fulfill different things. This contradicts an essentialist view that proposes that everything has a set of necessary attributes to its function. In Ancient Greece, the unique personifications of gods developed with their mythological identity. Cultural identities can encompass different viewpoints and be adapted because of this. Theseus fathered his son Pericles, who is known as the "citizen." This shows their pure identity by giving him ties (through children) to the land's culture. Therefore, this allowed them, as the holder of the Theseus myth, to also claim those characteristics (e.g., power) and attributes (e.g., variances in power among regions) and, as a result, be 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 hybridities were focused on psychology. In particular, Hogg’s research has demonstrated that identity connects individuals as a community and provides motivation and rationale for continued engagement. However, if we look at the impact on individual identity within this collective identity, it is evident that people may lose their identity and gain a new collective identity to replace it. Hogg and Abrams may offer a refuting point because their work is focused on psychology. In particular, Hogg’s research is concentrated on how people’s perceptions, attitudes, and behaviors. 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, and the people who live in the region adopt a 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 and how elements of Ancient Greece and both Greece and the Far East created a hybrid culture. Therefore, this allowed for greater status and access to more potent gods who were more influential on the land. For example, if Theseus and Heracles are compared, a fusion culture would offer trade and protection. One example of this is the Phoenicians and the city of Tyre. They already possessed their individualistic mythologies, but because Greece had become extremely powerful during the Hellenistic period, many independent communities were flocking to join the ‘Greeks’ identity’ (otherwise referred to as a ‘reduced identity,’ as everyone wanted to possess it) if they were considered a ‘Greeks’ identity. This hybrid culture formed between Heracles and Melqart (Phoenician god). In archaeology, hybridity is identified in current-time traditions. For example, Heracles and Melqart, who were both sons of Zeus, the Greek god of the sky. Melqart also had a connection to the sacred cults of Asia Minor, which attracted people from all over the region. For intercultural interactions, 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 social 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.
To what extent should the Victorians be celebrated for their achievements?

Year 10, Key Stage 4

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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 our lives today. It has changed 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, the 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 railway 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, the most completed held the Rainhill trial locomotives, 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 throughout 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 railway service. Trains were punctual and 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, at 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 most 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 line made it easier for people 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 bands 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 away from the date the story was 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 this description 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 novel. Professor Stephen Gill(Dickens and the Railways(4)) notes how “Dickens’ stories were littered with references to the positive impacts of the infrastructure and building 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 lines earlier this year 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 railway 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.

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 is their railway freight and travel statistics, showing 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).
on has had many beneficial impacts on society through various means such as: employment, opportunities for leisure, 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 enjoy various 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 more efficient trains. The railway links to cities allow people to live a better quality of life in more rural locations, yet easily work in city centres. 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 ingenuity inventions especially the railway as it is as still important today as it was when it was first invented.

Through the murky mess of bare 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 pealed 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 earth, the ground, the building and building. Stuck 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 tingle. The trees were dead 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 180°, I caught sight of a literal volcano, bubbling and bowing like a baby. Scattered lava stones were innumerable, stuck, precipitating on 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 haunting me, slowly moving as if I was stuck and struggling to free myself.

From over the river, I heard the deader howling again; it grew louder, nearer. Now, I was beginning to become clearer... Werewolves. The fog thickened steadily, beginning to veil fractions of the barren scenery from my hazy vision, but increasing the swirling fog around me. I had almost halved-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 more incensed, proving how uncomfortable they feel in the situation, but because I am more ‘human’ than the wolf is in the story, 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 walking through this horrible landscape. By describing a claustrophobic, violent, colour scale, acid smells and painful feelings, introducing rhetorical questions to prevent the reader from feeling the satisfaction of finding answers. I have aspired for the reader to feel heartbreak, helplessness and creative pupils. It was not easy selecting a piece of work to submit, but I’m suited for the final trial if a degree of imaginative influences can be found with clarity of expression and excellent understanding. I wanted to show through this assignment that I am capable and dedicated to work hard and have so much to learn with them all the very best in the future.

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

Although over the years the soldier-horse relationship has been mythologised, there is doubt among researchers that the war effort had on the horses and the essential part they played. Not only were horses depended upon in the victorian period 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 mythologised in various ways such 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. 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 a relationship through trust and actions, instead of 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 mythical theme of an elephant and a horse, and the bond of friendship that went 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 Mr. J. Flynn

Tutor comment:
“A was a valuable Jacobean to teach. From start to finish he always had relevant contributory to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial, his participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding. It was obvious he had relevant contributions to make to each tutorial. His participation was excellent, and all work submitted was outstanding.
example of how horses were an indispensable support to the war effort. Morpurgo bases his novel from the viewpoint of Albert, a young boy who serves in the cavalry and reports having a close bond with his horse, Topthorn. This bond is expressed through Albert’s detailed account of Topthorn’s well-being, the amount of food provided for the horses, and the care he received. This clearly demonstrates how horses were well looked after, respected, and the responsibility of having to look after a horse and putting it to work on short rations and living out all winter. This further confirms that the horse’s life was far from ‘privileged’ and was instead a constant struggle for survival. Horses were used in various capacities throughout the war, including for transport, artillery, and medical supplies. Horses, donkeys, and mules died during the Great War, with an estimated 8 million horses, donkeys, and mules dying during the war. These accounts give the impression that horses were used as assets to war, but on the other hand, horses were also exposed to the harsh conditions that lead to so many of their deaths. Horses were a crucial part of the war effort, and without them, the war 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 was instead a constant struggle for survival.

The horse states that ‘suddenly there was no longer any pain in my leg, and I trod 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 acknowledgments Morpurgo makes it clear that he has included ‘all accounts that I have been able to secure’. Lastly, he discussed with the Captain, but ‘he also illustrated it to the captain, saying “there is no reason why we should not treat horses like this – we treat our machines better”.

Tutor comment:

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

Bibliography:


iv Reid G.L., Officer in Cavalry Brigade, Royal Engineers, Memoir Based on Service Diary 1915-1918, Reproduced with the permission of Special Collections, Leeds University Library, Liddle Collection, G1537


vi Reid G.L., Officer in Cavalry Brigade, Royal Engineers, Memoir Based on Service Diary 1915-1918, Reproduced with the permission of Special Collections, Leeds University Library, Liddle Collection, G1537


xii Reid G.L., Officer in Cavalry Brigade, Royal Engineers, Memoir Based on Service Diary 1915-1918, Reproduced with the permission of Special Collections, Leeds University Library, Liddle Collection, G1537


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Well done J!
Identify and analyse a human rights challenge under the current COVID-19 pandemic, paying close attention to the involved factors.

In this essay, I will argue that the focus on the physical health threats of COVID have hidden other health-related issues such as access to healthcare, women’s health, cancer patients, and physical and mental disabilities. Human rights are the moral principles protected under international law. These moral principles set standards of human behaviour; they define the people we should be. 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 1948 and the Universal Declaration of Human Rights (UN Women, 2021). These human rights range from Article 1 which states that “All human beings are born free and equal in dignity and rights”, its the state of being equal to others. Still, the government lacks to address the needs of vulnerable groups. To Article 30 which states that nothing in this declaration may be interpreted by any groups or individuals, as a way for them to use human rights for the purpose of exclusion against any of their collective rights. During this COVID-19 pandemic, we 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. In 3 women already suffer from domestic 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 percent of the 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 help. This increases the risk of violence. People who have the ability to healthcare. People who in this pandemic, people have felt, and there’s evidence for this, that they have had their individual rights violated.

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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, though it can vary even according to different periods 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 played a part in his image.

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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 II. 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 unapproachable 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 positive 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.

References:

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

Throughout this essay, war will be defined by using its outcomes and the state of peace which occurs after the physical war ends. The outcome of World War I (WWI) and World War II(WWII) 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 WWII. I will then begin to explore apassing perspectives from the people who believe that they can have a lasting peace.

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 may occur which include: ‘Equitable distribution of resources, free flow of information, well-functioning government, low levels of corruption and good relations with neighbours.’ [2] Despite these factors, ‘positive peace is the attitudes, institutions and structures which create and sustain peaceful societies’ [3] for further explore these concepts, WWI and WWII 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 on Serbia on 28 July 1914. Due to ‘the submarine, the tank, chemical weapons and armed aircraft, appearing on the battle fields of WWII,’ [4] millions of lives were lost; up until 11 November 1918 when the fighting stopped. Short of supplies and faced with invasion, an armistice agreement [5] was put this 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 create positive peace. However, all it brought was remembrance 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 ‘lied the treaty and the Allied states into 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 fulfill 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 conflict between the Sunni and Shiites over Iraq is conflict between the Sunni and Shiites 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 allies throughout the war, further minimising Germany’s chance of success. This led to a German surrended 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 This is because of 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 (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 followed the war in 1945 is still arguably unresolved and affecting many lives
Making the most of tourism: Discuss with reference to Sustainable Tourism Development and your chosen case study


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 flock to the city every year. As the years progress, the tourist figures escalate and in 2019, Dubai boasted a record of 16.73 million tourists. 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?

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

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School: Croxley Dales School, Herfordshire
Supervised by: D. Williams
Tutor University: University of East London
Course Title: Sustainable tourism development in Cuba

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

Tutor comment:
“A’s essay makes an excellent contribution to the conflict and peace debate. Throughout the essay, A makes a strong case to support the view that ‘wars do not end’, it was a pleasure working with A.”

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[1] Barbados, What a Walf Key Stage 3 Programme, 28

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 sourcing the materials for the tourism scheme, ensuring that no place has a right to claim that it has 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 hundreds of thousands 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 environment, 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 passed 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 befit 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 potential 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 have been clearly derived. This issue has been mitigated by broadening the arguments with information obtained from secondary sources.
Large investments of time and resources have been put towards it, amounting to construction costs of $78 billion, 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 is bringing 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 magnified 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’ awareness” [12]. These guidelines demonstrate 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]. 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]. These 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].

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 experience 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 moving to Dubai has done enough to maintain its cultural roots when welcoming a diverse range of tourists, or if it is only 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 conclusion 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 eventual 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, while 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 classified 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 national scale and this track record will stand the test of time to deliver on the aspirations of its rulers, residents, and tourists alike.

Bibliography

dubai-sustainable-tourism
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, utilising 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, Veganism 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 and general public. Mobilisation, therefore, could be used 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 is critical for both the Anti-Nuclear 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] and the Anti-Nuclear movement in 1958. The support from influential power elites such as 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 both the legitimisation of the movement, because after 6 years of warfare, the British public was suffering from war weariness and hence were more motivated to bring anti-semitic sentiments into their lives and move away from their violent and destructive tendencies. This, therefore, set the focus on animal-rights and peace among all species in the manifesto of the Veganism movement, which may have appeared particularly appealing to people post-war, thus giving it an advantage. Moreover, 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 inculcated 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 a meal and also mean that the movement used a new aspect of the British lifestyle, named Sanity, which ran from 1961-1991 [12]. The newspaper promoted CND accomplishments and upcoming demonstrations, which was effective because this helped the 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 the 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 the movement, it was also informative about where the public was coming from [14]. Being a film, this was able to reach a large audience with minimal effort, increasing their knowledge of the negative impacts of nuclearism hence meaning that they were minimally effective power elites to give the movement more backing since it was in opposition to the very authoritative UK government and general public. Mobilisation, therefore, could be used 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.

A power elite is defined as an individual or group who are “perceived as ‘being’ the centre of wealth and political power” [3] and are integral to a social movement because they can be used as a persuasive force which can justify the movement’s legitimacy; the power elites could propose leaving them more vulnerable than other major powers. Perhaps, the movement required backing from a political power elite who could persuade the government to change their stance. For example, the Quakers, a professional athlete hence the pure existence of her diet. This may have discouraged a variety of powerful groups throughout its lifespan, such as sports because of his diet [9]. This may have discouraged individuals from converting to Veganism once it emerged, because of the fear that they would be constrained similar dietary issues if they converted. Through its lifespan, such opposition to Veganism has circulated and the movement relied on the use of media, rather than power elites to use to demonstrate that it is support from an appropriate power elite for the Veganism movement 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 described as “the medium of communication […] through which reach or influence the 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 central part of their success by reaching a diverse range of people and giving information on tips for prospective vegans, as well as informing readers of the latest revelations in the Veganism movement. Social media such as Instagram, which is a 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 accessible, cheap form of mass media. Social media can also be used to promote the VegNews, which was a good decision, because in today’s age, 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 inculcated 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 a meal and also mean that the movement used a new aspect of the British lifestyle, named Sanity, which ran from 1961-1991 [12]. The newspaper promoted CND accomplishments and upcoming demonstrations, which was effective because this helped the movement and helped to increase labour turnout at their demonstrations by promoting them beforehand.

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Parliament. The Veganism movement had an appropriate power elite in the form of celebrities who helped to make Veganism seem 'cool'. Translating the 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.

While 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 [18] are successful, 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 nuclearism. In this sense, the success of the Veganism movement may be a result of government attempts to appease political activist groups like the CND, without committing to stick to these agreements or that anti-nuclearism is a goal and hard work and diligent, independent research. Her critical analysis went beyond the scope of this paper, but it can be argued that, once these parties are out of government, the progress made by the Anti-Nuclear movement could be reversed. For example, despite the CND achieving the Non-Proliferation Treaty and the Intermediate-Range Nuclear Forces Treaty [19] as well as working to prevent the Neutron bomb from being made [4], the UK still possesses large amounts of nuclear weapons. The CND is estimated that 3% of the world population is vegan and 1/3 is following a diet which aims to reduce the animal product 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, this success is not as apparent. It may be a result of government attempts to appease political activist groups like the CND, without committing to stick to these agreements or that anti-nuclearism is a goal and hard work and diligent, independent research. Her critical analysis went beyond the scope of this paper, but it can be argued that, once these parties are out of government, the progress made by the Anti-Nuclear movement could be reversed. For example, despite the CND achieving the Non-Proliferation Treaty and the Intermediate-Range Nuclear Forces Treaty [19] as well as working to prevent the Neutron bomb from being made [4], the UK still possesses large amounts of nuclear weapons. The CND is estimated that 3% of the world population is vegan and 1/3 is following a diet which aims to reduce the animal product consumed [17], indicating that the Veganism movement has been so far largely successful in its lifespan.

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

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Year 8, Key Stage 3

Humans have been on the earth for years, endlessly creating and creating new things. From 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 view 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, was 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 high atmospheric levels of greenhouse gases. Such as carbon dioxide and other greenhouse gasses.

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 due to eccentricity, obliquity, 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 thus cannot be influenced by humans.

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 solar system are returning to the values that will increase the Earth’s 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 it will increase temperatures. An article from 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 effect on Earth’s climate. But over tens of thousands of years, these changes could add up to significant global warming or cooling. If these changes in solar radiation 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 of cooler. The lower atmosphere is getting cooler, while the upper atmosphere is getting warmer. This, instead, matches the fingerprint of changes driven by increases in carbon dioxide much more closely.’ (Buis, 2020).

The current warming of the earth is caused by human interference. The carbon dioxide being emitted by human activity and the warming of the planet is not natural. This warming is being caused by humans changing the earth to their liking and the warming is possibly caused by the operation of greenhouse gases that originate from human activity. This warming and the warming of the planet is caused by humans.
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 has released CO2 and 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, the earth’s temperature increases in temperature. This fact completely disproves the current argument that climate is always changing so humans aren’t responsible.

Humans are responsible for the current warming as with the rise of the industrial age fossil fuel burning has increased, coal and oil generate electricity, run transport and fuel manufacturing. These 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, 2017b). Another point that negates the argument that the climate has always being 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 that are naturally occurring in the earth. 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 emissions emit 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).” This is 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 for livestock.” (Wikipedia, 2021a)

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

What 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. It is quite apparent that both climate change and 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 now be seen as a large challenge as we are not able to put off 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. Instead of just reacting to the urgency of climate change, it should be embraced with hope.

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Tutor comment:

> "Being a tutor of St Angela’s Uxbridge School was a great experience. All pupils at a secondary school should be able to talk about their hobbies (and it was good to see how engaged they were with the topic). P. showed outstanding research and writing skills in her assignment. Her final essay and the introduction was really well written. I was glad to see how engaged they were with the topic. P. showed understanding of the topic and did very well on this essay."

> "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: approaches to combating homophobia. This is in line with the 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, leafl et 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 sport, for the purpose of the search. This assignment firstly explains why homophobia exists in sport and secondly, will consider the effects of these 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 influence of the Christian Church [2]. The four main reasons homophobia exists in UK sport are currently employed through 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 sport, for the purpose of the search. This assignment firstly explains why homophobia exists in sport and secondly, will consider the effects of these approaches to combating homophobia in sport. Following that, will be a clear and comprehensive conclusion, summarising the main points throughout the assignment.
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 twin combination of 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 how current approaches in the UK combat homophobia in sport: Campaign and Education.

The Rainbow Laces Campaign

The Rainbow Laces Campaign is the chosen campaign 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 premier league sports 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 is the fear of being thought of 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 response” [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”, media pictures of the teams wearing striped rainbow laces posts draw homophobic responses” [9]. This article shows the existence of homophobia in sport, which is also evident in the issue of Sports participants. This can lead 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].

The comparison of two approaches

The two approaches to combating homophobia in UK sport covered in this assignment are Campaign and Education. 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. In this sense, it is an educational 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 sport. This can help prevent homophilic 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.

Conclusions

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, originally due to the influence of religious beliefs on traditional society attitudes. A lack of education on LGBTQ and gender stereotyping have also contributed to homophobia in UK sport. However, in the UK, the National Health Education Code of Practice, especially related to LGBTQ, 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 combating homophobia in male 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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Finds’, Huffpost, 22nd March 2020

Tutor comment:

It was a pleasure to teach at Twynham School, where the pupils were enthusiastic to learn during the programme. H. has demonstrated an ability to engage with the topics covered in class and to substantiate her arguments with evidence. H. has made the effort to engage with the course material and to apply it to real-world situations. H. has many of the essential skills needed to thrive at a university. Overall, H. has demonstrated an excellent approach to learning and a clear understanding of the subject matter. 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.!
Benign neoplasms

It as the latter. This is a perfect example of optical deception

gold and white. In other words, some people saw the dress
deceiving us. Take the example of a photo that once went

can be organised in a particular way or certain colours

is exaggerating all these differences, as the brain functions

features to be larger, smaller, or uglier than they really are. If

different features and makes our brain exaggerate the

A perfect example of such illusion is the flashed distortion

Illusions, however, may be difficult to eliminate, as the

is not actually there would tell us that it does not exist.

Another example is about people who have had a limb

or feeling. They can be declined 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.

The idea of reality construction can be traced back to Plato,

Aphantiler an philosopher during the Classical period in

Ancient Greece. In the ‘Alegory of the Cave’, a story he wrote

in a masterpiece called ‘The Republic’. Written in B.C. 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 look of. The truth is

that the prisoners only really know the things that they can

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

readily electric 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

‘realistic illusions are interpreted by your brain’. The read

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

constructed. The way Karl

I argue that it is important to differentiate between the

material world and the realities it constructs. The work of Karl

Friston views reality is helpful. According to him, “The reality

material world and the realities it constructs. The way Karl

Down the Rabbit Hole talk that “We can’t access reality”,

its visibility to everyone. The material object it represents does

be a true reflection of the external world or

be a reflection of a true reflection of the external world.

This syndrome causes people to feel a limb (e.g., leg, arm) that

does not exist. Although such illusions are rare, we can

can eliminate if it 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 work of Karl

Friston views reality is helpful. According to him, “The reality

material world and the realities it constructs. The way Karl

Down the Rabbit Hole talk that “We can’t access reality”,

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 section 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 human cancers are caused by other agents than only the cell itself. But cancer does not necessarily mean a single disease and can cause damage, cancer cell metastases continue to grow uncontrollably, and new growths develop. As a result, cancer is a disease that is, it metastasises. 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; if it is not treated, the spreading (metastasis) of these MNs to form secondary tumours that usually causes cancer [3][4]. Table 1 illustrates the differences between BNs and MNs.

Table 1: Differences between benign and malignant neoplasms

<table>
<thead>
<tr>
<th>Malignant neoplasms</th>
<th>Benign neoplasms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are anaplastic (i.e. do not resemble the tissue they arise from, have an unusual structure)</td>
<td>Resemble the tissue they arise from, have a defined structure</td>
</tr>
<tr>
<td>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)</td>
<td>Are unable to metastasise or invade other tissues but can exert pressure on structures, e.g. nerves; are usually enclosed in a membrane; may stay in one place; are localised</td>
</tr>
<tr>
<td>Grow uncontrollably, often and at not always rapidly; also grow by invasion, characterised by an unregulated cell cycle</td>
<td>Grow relatively slowly and by expansion (and not invasion)</td>
</tr>
</tbody>
</table>


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 hallmark [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.

Malignant neoplasms

Are anaplastic (i.e. do not resemble the tissue they arise from, have an unusual structure) | Resemble the tissue they arise 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 unable to metastasise or invade other tissues but can exert pressure on structures, e.g. nerves; are usually enclosed in a membrane; may stay in one place; are localised |
| Grow uncontrollably, often and at not always rapidly; also grow by invasion, characterised by an unregulated cell cycle | Grow relatively slowly and by expansion (and not invasion) |


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Interestingly, Lee et al. found that none of the BRAF UV radiation hormone levels viruses metabolism <1 – 15% (for BRAF V600E mutations) [37] Approximately 2.5% [36] critical for developing new cancer treatments.

The information for this table was obtained from [14].

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 (whereas 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].

The hallmarks (left) and enabling traits (right) 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

<table>
<thead>
<tr>
<th>Examples of lifestyle factors</th>
<th>Examples of exogenous factors</th>
<th>Examples of endogenous factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>UV radiation</td>
<td>Inherited mutations</td>
</tr>
<tr>
<td>Lack of exercise</td>
<td>Viruses</td>
<td>Hormone levels</td>
</tr>
<tr>
<td>Poor diet (e.g. high-fat)</td>
<td>Carcinogens</td>
<td>Metabolism</td>
</tr>
</tbody>
</table>

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].

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Table 3: BRAF and Cancer

<table>
<thead>
<tr>
<th>Cancers caused by BRAF mutations</th>
<th>Incidence of BRAF mutations</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melanomas</td>
<td>Approx. 40 – 70% [20][33]</td>
<td></td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>Approx. 10% [23]</td>
<td></td>
</tr>
<tr>
<td>Holy cell leukaemia (HCL)</td>
<td>Approx. 100% [28]</td>
<td></td>
</tr>
<tr>
<td>Glioblastoma</td>
<td>~1 – 15% (for BRAF V600E mutations) [37]</td>
<td></td>
</tr>
<tr>
<td>Papillary thyroid cancer (PTC)</td>
<td>Approx. 25 – 80% (for BRAF V600E mutations) [34]</td>
<td></td>
</tr>
<tr>
<td>Non-Hodgkin lymphoma (NHL)</td>
<td>Approx. 2.5% [36]</td>
<td></td>
</tr>
<tr>
<td>Erdheim-Chester disease (ECC)</td>
<td>Approx. 50 – 60% (for BRAF V600E mutations) [30][35]</td>
<td></td>
</tr>
<tr>
<td>Langerhans cell histiocytosis (LCH)</td>
<td>40 – 70% [38]</td>
<td></td>
</tr>
<tr>
<td>Non-small-cell lung cancer (NSCLC)</td>
<td>Approx. 1 – 5% [31]</td>
<td></td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td>Up to 15% [48]</td>
<td></td>
</tr>
</tbody>
</table>

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 [24] (as Val 600 mimics phosphorylation, which activates B-Raf [29]). As a result of this enhanced activity, the MAPK/ERK signaling pathway, which primarily serves to inhibit apoptosis are activated [20], 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.

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 chemotheraphy, 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).
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 signal-ling 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].

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 experiments 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, it was identified that imatinib has the ability to target it. 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].

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), 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.

The development of bortezomib 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), the gene encoding for HER1 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.

Table 4.

<table>
<thead>
<tr>
<th>SMI (brand name)</th>
<th>Cancers they work on</th>
<th>Genes/proteins they target</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imatinib (Gleevec)</td>
<td>Gastrointestinal stromal tumours (GIST), chronic myeloid leukaemia (CML), acute lymphocytic leukaemia (ALL)</td>
<td>BcR-Abl [42]</td>
<td>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 signaling pathways involved in cell growth, apoptosis, and metabolism. Imatinib binds to and inhibits Bcr-Abl and thereby turns off the carcinogenic signaling pathways activated by Bcr-Abl [19][61][62].</td>
</tr>
<tr>
<td>Gefitinib (Iressa)</td>
<td>Non-small-cell lung cancer (NSCLC), some breast cancers</td>
<td>HER1 [40][41]</td>
<td>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].</td>
</tr>
<tr>
<td>Bortezomib (Velcade)</td>
<td>Multiple myeloma (MM), mantle cell lymphoma (MCL), non-small-cell lung cancer (NSCLC), pancreatic cancer (11)[70]</td>
<td>26S proteasome complex [41]</td>
<td>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, MAA, 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][72].</td>
</tr>
</tbody>
</table>

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. First, it was observed that various cancers were characterised by enhanced or altered proteasome activity [73]. Subsequent analysis made it clear that the 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 1993, 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 [77][78][79].
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 it is known that when binding to CD52, the destruction of leukaemic cells is induced [80]. Nevertheless, alemtuzumab’s development was ultimately based on genetic information about cancer, and it truly highlights the importance of genetics in developing MTIs in the same way as intransit. 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].

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 angiogenesis. Bevacizumab binds to and inhibits VEGF; this limits the blood supply to cancer cells and decreases angiogenesis, thereby suppressing the growth of cancer cells. Bevacizumab works on cancers such as NSCLC and RCC [80][81][82].

An understanding of cancer genetics is what ultimately led to bevacizumab’s development as an MTI. 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 MTI [86].

The development of herceptin was, too, based on genetic information about cancer; and it truly highlights the importance of genetics in developing MTIs in the same way as intransit. 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].
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 MTIs has been a matter of debate, especially for melanoma. The knowledge that only 11.6% of melanoma patients were treated with vemurafenib altered complete responses, suggesting that vemurafenib has minimal effect in eradicating melanoma cancer. Recent evidence has also suggested that tumours can acquire resistance to MTIs [58]. Nevertheless, MTIs have shown promising results than traditional cancer treatments such as chemotherapy. As our knowledge of cancer increases, MTIs will probably become the predominant cancer treatment.

References

Note: All the sources cited in this assignment are either legally available in the public domain (having been accessed through open access websites such as ScienceDirect and the website of the Royal Society of London) or websites such as ScienceDirect (Overview) and the WHO. In addition, the citations have been minimally modified to reflect the position in the assignment although the author has endeavoured to provide some consistency between the references and text.


Pre-eclampsia: What goes wrong with the placenta?

Year 9, Key Stage 4

Pupil: E. H
School: Esher Church of England High School, Surrey
Supervisor: Z. Tryfonos

Tutor University: St George’s, University of London
Course Title: The Placenta

Pre-eclampsia, formally known as toxaemia, 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 analyse 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 of maternal and fetal tissues. 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, 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 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 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 risk 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 characteristic 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 cesarean 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 wall of the uterus – 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 placentaion and inadequate spiral artery remodeling. The failing spiral artery, extruded fetal blood may migrate and invade the spiral arteries in the decidua and anchor in the vill of the placenta. Approximately 100-150 arteries are transformed during development. The purpose of the spiral artery is to transport maternal blood 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.

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In severe pre-eclampsia, only some spiral arteries in the heart of the placental bed (Broersen et al., 2011), have fully transparent placenta, which showed that defective transformation is more severe in the myometrium, rather than the decidua. The shallowest trophoblast invasion may be caused by a maternal immune system response to the decidual area because there are anti-inflammatory factors in the decidua that are supposed to balance this trophoblast invasion. Perhaps these anti-inflammatory 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 angiogenesis. If placental vessels produce an excess of antiangiogenic factors (Karanth S A et al., 2015, Maynard S E et al., 2011) like soluble F11 and soluble endoglin. These are secreted from the placenta, and in pre-eclamptic pregnancies, this factor 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 (Ghoosh 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.), examining pre-eclampsia rates in Chinese women, showed that the prevalence of pre-eclampsia among 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 lack of anti-invasive factors, 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 can 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, Indian and Pakistani women had the highest chance of preterm delivery and Pacific islander women were at the 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 be examined within these subgroups before grouping them together.

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 research is conducted, the more other pregnancy-specific conditions are understood. The more women are saved.

References


Karanth S A., Srihasan, R., Byrd, Y., White, K., Anthony, M., Cate, D. and Ault, A. (2006). The proportion of Asian subgroups 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, Indian and Pakistani women had the highest chance of preterm delivery and Pacific islander women were at the 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 be examined within these subgroups before grouping them together.

Research 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 placental, 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, researchers need to be very cautious 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 similar act with a stricter regulation 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 related to human research is risky and needs a lot of attention and care. Lacks’ family were not asked before her tissues were used to research how polio infects cells, in 1988, they were discovered to divide infinitely, and so, were labelled as “immortal”. Named “HeLa” for Henrietta Lacks, these cells were used to test medical ideas. In 1953, HeLa cells were used in research for polio vaccines. 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 was 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 questions about justice, and sacrificing one’s person’s consent, 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, research of different ethnic groups blend, the genetic factors of pre-eclampsia could fade.

Tutor comment

"I found a fantastic time working with pupils from Edith Cavell C of E High School. They were enthusiastic and worked hard to produce a high quality assignment that far exceeded my expectations. I went above and beyond to create a 55-class online weekly essay which asked pupils to research how a broad spectrum of cells were taught on the course. Not only did the topic fit in the syllabus, but the tutor also demonstrated the ethical issues using human tissue in research and backed-up my points by referencing primary literature throughout."
Life expectancy in two different countries

Italy vs Nigeria

This graph shows that in Western Africa, where Nigeria is located, the life expectancy is the lowest across the whole of Africa.[3]

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<tr>
<th>Continent</th>
<th>Europe</th>
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<tr>
<td>Italy</td>
<td>82.45</td>
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<td>Nigeria</td>
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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 go to school and thus learn about how to keep themselves healthy. It is not their fault and it is not fair that these houses have to be expensive and huge, they need to keep themselves healthy. It is not their fault and it is not fair that they need to keep themselves healthy. It is not their fault and it is not fair that they need to keep themselves healthy. It is not their fault and it is not fair that they need to keep themselves healthy.

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

**Introduction**

Since chronic diseases (CDs) have become more prevalent in the population, the National Health Service (NHS) has been struggling. 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 60s, yet only 14% of under 40s. The NHS, since the 1990’s, has been trying to combat the pressure that CDs pose, yet due to the unhealthy western lifestyle imbodied by those that it cares for, 22% of the UK’s population live with a long-term medical condition.

The growth in patients with CDs has increased the pressure on the NHS with more patients requiring more complex medical care. 22% of the UK’s population live with a long-term medical condition.1

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 transmission, where CDs became more prevalent, especially as peoples lifestyles worsened further, such as physical inactivity leading to dyspnoea.

There is one medicine that does this: exercise. 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 months, 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.2

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 Medical Research Council (MRC) dyspnoea scale, which asks patients to rate the difficulty of their breathing on a scale from 0 to 10, are used for this.3

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
- spirometry

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 guidelines that link 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 inconsistent.

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 failure,4 a common co-morbidity to CB.

These methods are beneficial, however, patients experiencing co or multi-morbidities may experience side effects from treatment. 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 also decreases the chance of developing mental health illnesses.14

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

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%.
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 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 deal with patients similar to the patients 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 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.23 However, traditional accelerometers are more expensive than pedometers, can be cumbersome to use, and 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. People lacking 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.

Endnotes

2. Karsanji, U (2020) Dyspnoea: You take my breath away, Scholars Program (Page 42)
10. Karsanji, U (2020) Dyspnoea: You take my breath away, Scholars Program (Page 41)
19. Training Articles: Top Ten Reasons Exercise is Bood for You https://www. trainingtips.com/blog/top-10-reasons-exercise-is-good-for-you
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Malaria outbreak in a rural Mali village

Year 9, Key Stage 3
Pupil: I. Newby
School: Mael Lambert School, Kingston Upon Hull
Supervised by: Y. Black
Tutor University: Hull
Course Title: Disease detectives

Introduction

I have been appointed as the Head of the WHO’s new Disease Detective Division, today I am 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].

Tutor comment:

“Tutor from my absolute pleasure to teach Mr At. 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 improve our health. The level of detail and execution of what she has written is far beyond KS4 level and her ideas are promising for the future management of chronic diseases. As well as improving healthcare education, Waniwai, at the best of us for her future endeavours, she fits an asset to any career field.”

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 anaemia 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 20,700,000, spread over its 1.24 million km2 area [10], the location of Mali within Western Africa is shown below.

Malaria Transmission Cycle [4]

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- Headaches.
- Vomiting.
- Muscle pains.
- Diarrhoea.
- Generally feeling unwell. [5]
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 traveling 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]](Image)

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 mean age of the population is under 15, within this is a large number of infants, who are particularly at risk from malaria. The mean age at birth of a mother is 18.8 years, the average country has a population growth rate of 2.98%, and the health centre 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 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 can we try to address this is shown 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]

### 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.

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

Pupil: H. Mountain
School: University Technical College Norfolk
Supervisor: Mr. P
Tutor University: University of East Anglia
Course Title: Reproductive Biology: How do we go forward?

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 could be due to several factors, environmental factors or a combination of the two. Infertility can be either naturally-irreversible 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 and long-term.

Male Infertility and Treatments:
10%-15% of severe male infertility is caused by genetic causes [3]. Kleinfelter’s syndrome (KS) is a genetic disease causing man to have a XYY genotype. KS is an autosomal sex chromosome aneuploidy, 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). By using donor sperm and the sperm of the couple or even using TESE is also an option however, only 50% of KS patients have suitable spermatozoa [6]. Using damaged sperm should be avoided, however, this can have complications with multiple births [7] although current laws reduce this likely hood. 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 infertility treatments:
In men and women who have had chemotherapy the pregnancy due to an increased risk of miscarriage [8]. Smoking also affects the sperm concentration, making it difficult to conceive a successful pregnancy [9]. Other conditions include kidney stones, diabetes and high cholesterol levels which can cause infertility [10]. Also, a lot of treatments come with major ethical concerns against the processes that happen to 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 the embryo’s DNA [11]. This is one of the most important reasons why PGD is used to check if the baby is healthy, however there also be a risk of miscarriage with some types of genetic testing and there is ethical issues related to this.

Limitations of current treatments:
All of these infertility issues can sometimes be secondary, meaning that the couple may have conceived a child already and the problem might have with conception 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 grows outside the womb in places like the ovaries and the fallopian tubes [14]. It is predicted that approximately 10% of women who are of a reproductive age experience issues with endometriosis like infertility and severe pain in the lower back and abdomen. Shocking 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 [15]. 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. Intratetne Insemination (IUI) is also an option however, the success rates can vary [16].

Polycystic Ovary 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 egg. This reduces the ability of the eggs to move and can stop the ovaries from releasing eggs. 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, in women [11]. PCOS can be treated using fertility medicines (PGD) to test the embryo for chromosome aneuploidy, to 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 should be avoided, however, this can have complications with multiple births [7].

TESE is also an option however, only 50% of KS patients have suitable spermatozoa [6]. Using damaged sperm should be avoided, however, this can have complications with multiple births [7] though some women are not able to conceive a pregnancy until a point where they can no longer conceive without the help of artificial reproductive technology (ART). TESE is also an option however, only 50% of KS patients have suitable spermatozoa [6]. Using damaged sperm should be avoided, however, this can have complications with multiple births [7].

Non-genetic male infertility can be affected by many environmental factors like age, obesity, smoking, alcohol, recreational drugs [5] and some genetic factors like the mobility and vitality of sperm decreases [8]. However, this is not a natural process that your body goes through as you age. The effect of obesity, smoking, alcohol and recreational drugs can be overcome through alternations of behaviour and lifestyles [8]. All of these infertility issues can sometimes be secondary, meaning that the couple may have conceived a child already and the problem might have with conception again due to changes in lifestyle and aging.

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 for this would be difficult [9].

Due to this, the field is majorly restricted, however as more research is done to provide evidence that these methods can help people conceive as well as the research behind it. There is also a lot of treatments come with major ethical concerns against the processes that happen to the embryo’s DNA [11].

The use of anaesthesia, adhesions, infection [12]. This may be due to the post-surgery scarring. IVF is also another option; however, this can cause other issues. Although it is overall recommended that conception whilst a partner or both partners are having chemotherapy should be avoided. This because of the chemotherapy medicines used 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 the body and hormones like testosterone which can cause issues with the pregnancy due to an increased risk of miscarriage [8]. Smoking also affects the sperm concentration, making it difficult to conceive a successful pregnancy [9]. Other conditions include kidney stones, diabetes and high cholesterol levels which can cause infertility [10]. Also, a lot of treatments come with major ethical concerns against the processes that happen to the embryo’s DNA [11]. This is one of the most important reasons why PGD is used to check if the baby is healthy, however there also be a risk of miscarriage with some types of genetic testing and there is ethical issues related to this.
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 association 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 lower 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 ovarian cancers [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 inclined may help a wider range of people. If none of these are available or recommended for a couple, then adoption may help a wider range of people. If none of these are available or recommended for a couple, then adoption may help a wider range of people.

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 concern 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 possibility 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 considered as a feasible option it needs a lot more research to prove it is safe and to reduce the cost to increase the availability.

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 of 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 a 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 add resolved genetic issues such as cystic fibrosis and muscular dystrophy and help couples who are at risk for 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 genome engineering, boosting its applicability for large scale use [24].

There is also research into artificial gametogenesis, although this technology has serious ethical concerns. This is because making gametes from cells is against some moral codes 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 concern 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 possibility 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 considered as a feasible option it needs a lot more research to prove it is safe and to reduce the cost to increase the availability.

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