BRADFIELD COLLEGE

BRADFIELD ACADEMIC REVIEW

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BRADFIELD COLLEGE

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This magazine is a celebration of academic curiosity, effort, and ambition across the College. It brings together a wide range of student work, from mock exam responses and classroom essays to independent projects, competition entries and reflections on academic experiences beyond the classroom. Each piece represents not only achievement, but also the willingness to think deeply, take intellectual risks and engage with ideas in a meaningful way.

What makes this collection particularly special is its breadth. The work within these pages has been produced by students at different stages of their academic journey, each offering their own perspective, voice and interests. Whether developed in lessons, pursued independently, or inspired by wider opportunities, these contributions reflect a culture of enquiry and a commitment to learning that extends far beyond the curriculum.

This publication has evolved from a Scholars' Magazine into something broader and more inclusive. While it continues to celebrate academic excellence, it now seeks to recognise and showcase high-quality work from across the College, wherever it is found. In doing so, it aims to highlight not just attainment, but enthusiasm, creativity and intellectual engagement in all its forms.

Thank you to all the students who have contributed their work. Your willingness to share your ideas and thinking is what brings this magazine to life. Thanks also go to the many staff who have supported, guided and inspired this work, both inside and outside the classroom.
Finally, a special thank you to our student editors, who have carefully reviewed submissions and contributed thoughtful reflections to each section. Their insight and attention to detail have played an important role in shaping this publication.

We hope you enjoy reading it as much as we have enjoyed putting it together.

Rob Briscoe-Smith
Academic Enrichment Coordinator
Teacher of Physics

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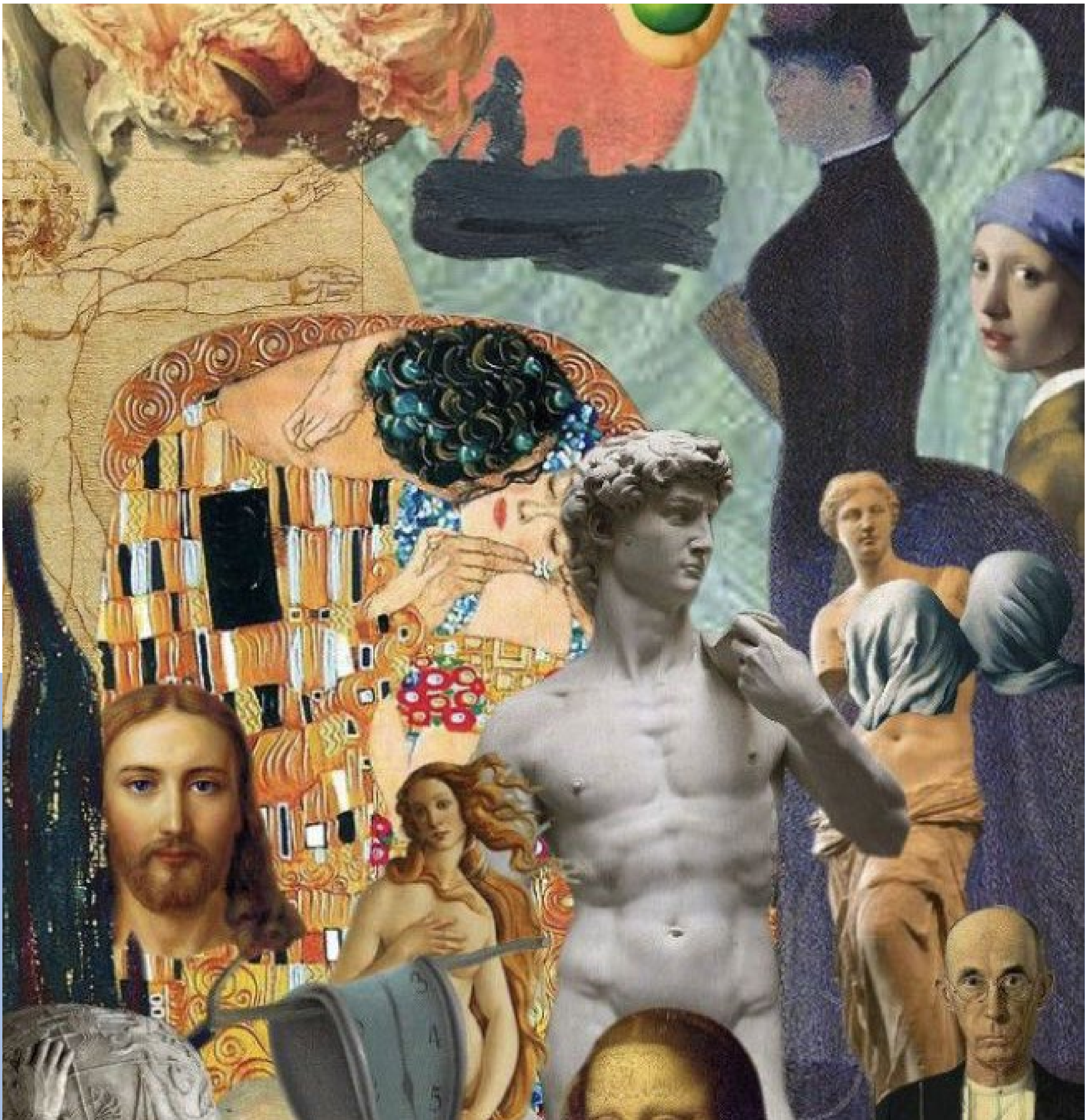
ARTS, CULTURE AND VISUAL STUDIES



The Arts, Culture & Visual Studies section offers a range of unique and interesting essays, written by students from Faulkner's all the way up to UVI. Each piece shows a real passion for the chosen topic. The essays explore things like the symbolism in famous artworks, the hidden meanings in poems, and interesting ideas about well-known music critics.

You'll be able to read about Michelangelo Merisi da Caravaggio's Flagellation of Christ and his struggle between faith and crime; David Lynch and his unusual films, which blur the line between reality and imagination; the design of a potential "scholars' badge"; and much more.

Every piece offers a personal and thoughtful perspective on something new and different.

- Alice A (Editor)

ENGLISH DEPARTMENT HIGHLIGHTS (2025–26)

- **Gatsby: Style, Identity, and Illusion**

Mrs Earnshaw explored how clothing and presentation shape identity and meaning in The Great Gatsby, linking Fitzgerald's portrayal of the Jazz Age with modern film interpretations. A sharp and engaging insight into the power of appearance in literature.

- **Y9 Young Poet Laureate Workshop**

A group of Faulkner's pupils took part in the National Literacy Trust Young Poet Laureate masterclass, inspired by the role of the UK's official national poet. Following this creative and engaging event, pupils participated in a follow-up workshop where they developed and produced their own thoughtful and expressive poetry.

- **Theatre Trip: All My Sons (London)**

Bringing literature to life through live performance, deepening pupils' understanding of dramatic structure, character, and thematic complexity.

HISTORY OF ART HIGHLIGHTS

September: Sandham Memorial Chapel Trip
Twelve UVI and LVI pupils visited Stanley Spencer's masterpiece to enrich their A Level study of War.
October: Curator's Club Exhibition Opening (Stunt)
This was a fantastic evening celebrating this year's exhibition, Intersections between Art and Music, led by Luca Taylor. Ten pupils presented their work to a large audience, supported by an excellent catalogue edited by Posy Harris and Cecily Copeland.

October Half Term: Venice & Florence Trip
UVI pupils enjoyed an unforgettable trip exploring key Italian Renaissance sites. Highlights included Carpaccio's paintings, Santa Maria dei Miracoli, and insightful on-site teaching. Many thanks to Mr Goad, Miss Cowan and Mr Keeley.

November: History of Art Conference (Downe House)
Six LVI pupils attended inspiring talks on careers in the art world and Renaissance patronage. Thank you to Downe House for hosting.

November: History of Art Society (G House)
Sixth Form pupils shared reflections from Italy over hot chocolate, with student presentations and discussion. Thanks to Mr Goad and G House.

October–January: ARTiculation Prize Club
Nine LVI pupils prepared talks for this national competition. Five represented Bradfield in the joint heat, with Kourosh Moghadam progressing to the regional finals for his outstanding presentation. Congratulations to all involved.

March: Trenchard Cox Scholarship
LVI pupils took part in this national competition, with the winner awarded a fully funded Art History Abroad trip to Italy.

March: London Trip
LVI pupils visited major galleries including Tate Britain, the Courtauld, the British Museum and the Wallace Collection, exploring themes of War and Identities.

MUSIC HIGHLIGHTS

Concert Trip
Shell Music Scholars attended a concert at the Academy of St Martin in the Fields, hearing Joshua Bell perform Brahms' Violin Concerto in D major and Schumann's Spring Symphony No.1, alongside Kevin Puts' Earth. An inspiring opportunity to experience performance at the highest level.

Guest Lecture: Ewan Millar
On 15th January, oboist Ewan Millar joined Music Scholars for an evening enrichment session, sharing insights into his musical journey and early professional career. His performance of a specially composed piece was a highlight, and his advice "Be kind to yourself" resonated strongly.

University Success
Congratulations to one of our Upper Sixth pupils on securing a place to study Music at the University of Oxford.

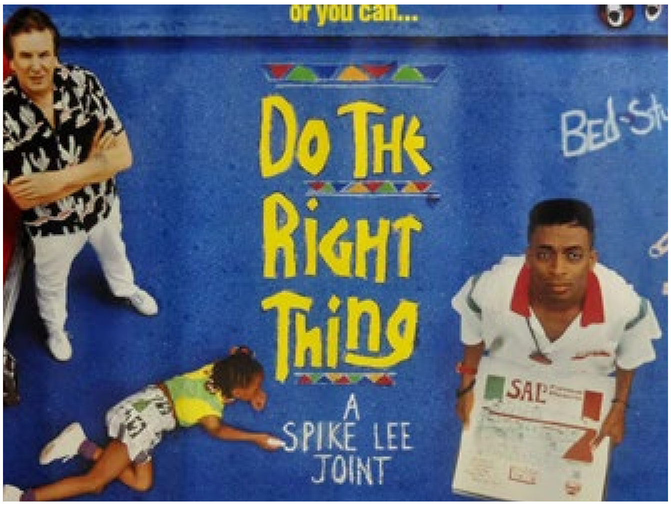
Composing Day
Upper Sixth A Level pupils took part in a composing day with VSH, developing their compositional skills and exploring new creative ideas.

A CLOSE TEXTUAL ANALYSIS OF 'VERTIGO' AND 'DO THE RIGHT THING'

Throughout both 'Do the Right Thing' and 'Vertigo' the cultural contexts of each film shape their perceptions of ethnicity and gender. This, in the case of 'Vertigo', includes its perception of the societal change towards the sexual liberation of women between the pre-war and post-war generations. In the case of 'Do the Right Thing', the historical context of police violence and brutality against African Americans highly influences the films presentation of ethnic tension between black people and the police. Finally, both films also are unconsciously influenced by the ingrained sexism of Hollywood filmmaking through the male gaze, presenting both films female leads as purely sexual characters with little to no agency.

The cultural context of postwar America, specifically its reaction to women's increased autonomy and liberalism is crucial to how gender is positioned within 'Vertigo'. A prime example of this can be found within the scene in which Scottie buys Judy an exact replica of the suit that Madeline once wore, against her wishes. This scene portrays Scottie's obsession with controlling Judy and converting her into a complete replica of Madeline. The contextual subtext of this scene however portrays the drastic change that had taken place within American society after the second world war. The era of strict conservatism that had existed before the war had soon been replaced by a more liberal attitude to sexuality and gender norms. This contrast between the pre-war conservatism and the post-war liberalism is further signified within the film between the pre-war ideal women of Madeline, who Scottie becomes obsessed with, and the post-war, liberal Judy who Scottie attempts to transform into Madeline, despite Kim Novak's performance within said scene portraying her distress at Scottie's obsession. Further evidence for the generation and cultural context shaping the films view on gender can be found within the mise-en-scène of Scottie's purchasing of the suit. Madeline's suit, which Scottie forces upon Judy, is grey and constrictive, portraying the constrictive nature of women at the time, whereas Judy, who wears a bright green blouse and, by Kim Novak's own request, no bra, represents the growing liberalism of the post war generation. However, Scottie's attempts to revert and force her to look like Madeline can therefore be argued to reflect the attempts of men who had returned from war, attempting to return women to the a state of pre-war conservatism. Therefore, the cultural context of growing liberalism in the post war world and certain men's attempts to reverse said liberalism shape and define 'Vertigo''s perception of women and how said women are treated by men, specifically Scottie, within the film.

Within 'Do the Right Thing' the cultural context of police brutality and violence shapes and defines the perception of ethnicity within the film. While Hitchcock focuses more on the generational impact after a violent event has taken place, Lee instead focuses primarily on the effects of continued and active violence on a community. Prime evidence for the impact of this cultural context can be found within the murder of Radio Raheem. Within this scene, as Raheem is suffocated, Lee places a ground view, medium close up, of Raheem's twitching legs as he is slowly killed, heightening the visceral audience reaction, while also portraying the cruelty and brutality of the event unfolding. The framing and visualisation of this murder directly parallels the 1983 murder of Michael Stewart, which Lee has stated he was directly inspired by. This direct parallel with actual police violence further portrays the impact of cultural context within 'Do the Right Thing' on shaping how it portrays ethnicity and the violence enacted on African Americans by the police. It must also be noted that the diegetic sound of this scene in which the people around Raheem and the police screaming and begging for them to stop, to no avail, can be argued to reflect the cultural context of African Americans requests and attempts to prevent police brutality often being ignored, specifically by those in power such as Ed Koch, the mayor of New York city at the time, who was often criticised for not attempting to improve or end the issue of police brutality, instead only enhancing it. Therefore, it can be considered that the cultural context of police brutality within America against African Americans highly influences the presentation of said African Americans within ‘Do the Right Thing’.



Both films however are informed by their cultural context in how they perceive women primarily through the male gaze and perspective, rarely giving female characters any notable agency, and instead, focusing on their sexuality. This can be evidenced in ‘Vertigo’ through Scottie following of Madeline, and in ‘Do the Right Thing’ through the opening dance scene set to public enemy’s “fight the power.” In both of these scenes Hitchcock and Lee highlight the female form with long, laborious medium close ups of the Rosie Perez and Kim Novak’s bodies. This can be considered as submitting to the male gaze, a concept that, within film, male directors shoot women specifically through a sexual context and lens. The impact of cultural context on this can be found within the treatment of women, and typical gender norms that are present within Hollywood. Even as recently as 2017, the #MeToo movement, highlighting sexual harassment within the workplace, began specifically within the film industry, revealing the continued issues around the treatment and perception of women within the film industry. Further evidence for this cultural context of ingrained sexism within Hollywood effecting each film can be found in both Kim Novak and Rosie Perez’s characters lacking agency and being defined by their male love interests despite both being the female leads of each film. Therefore, it can be suggested that the cultural context of underling sexism within Hollywood, weather intentional or not, influenced the presentation of women as primarily sexual character with little to no agency within both ‘Vertigo’ and ‘Do the Right Thing’.


Micheal Stewart (1958-1983)

To conclude, the cultural context, specifically of post war America and the societal changes towards liberalism that had begun in response to the war, heavily influences the presentation and contrast between Madeline, the archetypal pre-war women, and Judy, a character who embodies the post war sexual liberalism. In addition, within ‘Do the Right Thing’, the historical context of police violence against African Americans directly shapes the treatment and presentation of African Americans within the film. Finally, both films are culturally informed by the ingrained sexism and misogyny that exists within the presentation of women within Hollywood films through the male gaze, with both films enacting and embracing said cultural context through the lack of agency and the sexualisation of their female leads.

- Arthur W

EXPLORING A SCHOLARS' BADGE

As Design Scholars, we were given the opportunity to explore what a badge representing academic scholarship at Bradfield might look like. Rather than producing a final design immediately, the project was about experimenting with ideas and thinking carefully about how a badge could represent both the College's heritage and the spirit of academic scholarship.

We began by deciding on the shape of the badge. Initially, we developed two different approaches: a traditional shield-shaped badge and a round badge. Each option had its own strengths. The shield reflected the long-standing tradition of heraldic school symbols, while the circular badge felt simpler and more modern. By developing both shapes, we were able to compare which design worked best.

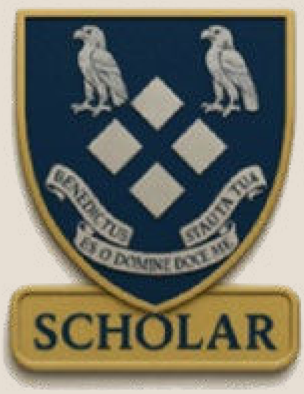
Next, we looked closely at the Bradfield crest and considered how its elements could be incorporated into the design. It was important that any badge we created felt clearly connected to the identity of the College, while still being recognisable as something specifically representing academic scholars.

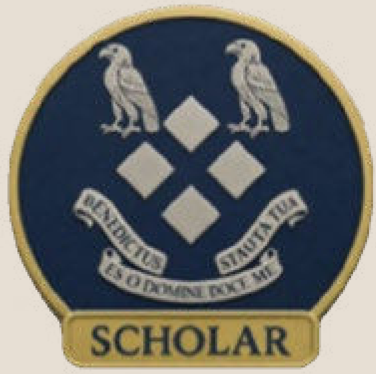
We then explored colour choices and layouts, producing several sketches of possible designs for both badge shapes. This stage allowed us to experiment with different combinations and arrangements to see what looked most balanced and effective.

After refining our ideas, we selected two final designs – one for the shield shape and one for the circular badge. To bring these designs to life, we used AI tools to render images of them, allowing us to visualise how the badge might look in a finished form.

The design shown here is part of that ongoing exploration. While it has not yet been officially adopted, the process has allowed us to think creatively about how a symbol of academic scholarship at Bradfield might look, combining tradition, design, and modern technology.

- Florence A and Freddie C





MILLET'S 'THE GLEANERS' AND BRUEGEL'S 'HUNTERS IN THE SNOW': AN APPRECIATION OF THE RURAL WORKING POOR?

THE TRADITIONAL REPRESENTATION OF THE RURAL WORKING POOR

Jean-Francois Millet's 'The Gleaners' (1857) and Pieter Bruegel the Elder's 'Hunters in the Snow' (1565) have different iconography, styles and purposes and were painted in different times and places yet both provide radical representations of peasant workers which show an appreciation for the rural working poor. Bruegel's work was commissioned for a calendar series, 'Twelve Months by Bruegel' (Gibson, 1995), for Niclaes Jonghelinck, a tax collector from Antwerp (Synder, 1985). This work was radical for its time because peasants were generally ridiculed in art and not depicted in the humble way in which Bruegel has presented them. One collection of works which contrasts Bruegel's depiction is 'Les Très Riches Heures' (1412-16) (Figure 3) by the Duc de Berry, who presents peasants to be partially undressed, thus degrading them. 'Table plays', which mocked peasants, were also popular at the time. Thus, by painting the peasant hunters with a sense appreciation, Bruegel challenged the medieval attitude towards them. Similarly, Millet's work was radical as at the time in France, the peasant population was looked down upon by the bourgeoisie, who considered them to be 'lazy, dirty and ignorant (Cohen, 2009) and gleaners were marginalised by society (Vardi, 1993). Up until this point, artists generally only included peasants in the backgrounds of their works, an example being 'The Village Bride' (1761) (Figure 4) by Jean-Baptise Greuze, which shows peasants in the background on the left-hand side and differs to Millet's work as the gleaners are central. 'The Gleaners' was exhibited in the Paris Salon in 1857, and Parisiens were shocked to see female gleaners, the lowest of the agricultural workers (Vardi, 1993), as the dominant subject matter of a large-scale work, which was typically reserved for history paintings (Nochlin, 1990). Moreover, both artists challenged the Catholic Church. For example, in 1517, Martin Luther started

Figure 3: Les Très Riches Heures, Duc de Berry, 1412-16

the Protestant Reformation in Germany by making his Ninety-Five Theses which spread through Europe, and by the 1540s, substantial sectors of the population of the northern Netherlandish states were Protestants. Bruegel shows influence of this in his work as he painted humble peasant workers which reflects the protestant idea of the importance of honest work bringing you closer to God. He also alludes to religion in the hidden symbolism of the broken sign which depicts a stag and a figure who is said to be Saint Hubert, the patron saint of hunting. Millet also challenges Catholicism as he replaces biblical figures, the traditional subject matter in scale-large works, with ordinary peasants. This challenged the Church and the artistic order of the predetermined hierarchy of genres. Furthermore, he alludes to the biblical figures whom he is replacing as Nochlin discusses that the women reference the biblical figures of Ruth and Naomi who worked in Boas' fields (Nochlin, 1990). Although the Church was the dominant religion in France at the time, the Civil Constitution of the Clergy, in 1790, aimed to subordinate the Church which suggests why Millet has only subtly referenced the Bible. Thus, both works were painted for different purposes and had different religious and social contexts, and the similar formal features enhance the appreciation of the rural working poor.

Figure 4: The Village Bride, Jean-Baptise Greuze, 1761

THE AIMS OF EACH ARTIST IN CONTEXT

Both artists present the rural working poor and although they had different functions, they both depict an appreciation of the workers in their paintings. Despite the limitations that private patronage entails, as Bruegel can't be fully expressive of his opinions, he has still been radical in his presentation of the hunters as he evoked a sense of appreciation, fuelled by his fascination of their work and lifestyle. Bruegel's unusual interest in peasants is well documented in academic literature. Alpers, an esteemed American art historian who specialises in Dutch Golden Age art, argues that Bruegel painted them due to his anthropological interest and fascination for peasants and their culture (Alpers, 1972). This is corroborated by the Metropolitan Museum of Art who states that he was known as 'Peasant Bruegel' (Wisse, 2002). Indeed, he was said to have dressed as a peasant to attend weddings in order to experience their lifestyle (Gibson, 1995). He also painted other works which exhibited the peasant lifestyle, two of which being 'Peasant Wedding' (1567) (Figure 5) and 'The Peasant Dance' (1566-67) (Figure 6). These two works celebrate peasants as they both show the figures to be the main focus in the works, and they show them in times of joy and celebration which differs to the often degrading representations. However, although he often painted peasants, 'Hunters in the Snow' presents a higher degree of appreciation as he portrays a moment of hardship as opposed to a time of celebration and thus the viewer is made to admire and respect their work. Similarly, 'The Gleaners' is not Millet's only work that presents the rural working poor in France.

Figure 5: Peasant Wedding, Pieter Bruegel, 1567

Figure 6: Peasant Wedding, Pieter Bruegel, 1566-67

Two of his other works which also recognise the hardship of agricultural labour are 'The Sower' (1850) (Figure 7) and 'The Wood Sawyers' (1850-52) (Figure 8). Furthermore, alongside Gustave Courbet, a French realist artist, Millet led the realism movement which aimed to reject the previous artistic convention of idealising the subject matter of a work. This nonconformist art movement was supported by the development of the printing of newspapers in France in the 18th and 19th Centuries, which allowed the news of this new movement to spread quickly. The artists painted from real-life observation to empathically present the realities of the French population. However, although in both Millet and Bruegel's paintings they painted other works that showed appreciation towards peasants, they were in the true minority as they led this change in attitude, and most presentations of peasants at the time ridiculed them or weren't painted at all. This radical choice of subject matter was with the purpose of recording everyday rural life to exhibit appreciation for them, leading the artists to challenge the traditional representations.

Figure 7: The Sower, Jean-Francois Millet, 1850

ANALYSIS OF THE FORMAL FEATURES OF EACH ARTWORK

Formal features which both artists used to engender empathy and an appreciation of the rural working poor are pose, clothing and the generalisation of the figures. Firstly, the hunters in Bruegel's work trudge wearily back from a day's hunt. Their hunched poses are suggestive of the difficulty of their work and thus the artist was able to create a feeling of appreciation for them as they have shown the adversity of the labour. Moreover, the hunters' clothing is appropriate for their work as they are wearing many layers of thick clothing and have belts on to carry their game. This enhances the sense of hardship and consequently strengthens the portrayal of appreciation as despite their practical clothing, the work is still difficult which is reflected in their hunched poses. In addition to this, Bruegel's thoughtful placement of the figures in the work has meant that they are generalised. They are facing away from the viewer and so can't be identified as individuals. This could have been done to allow the work to represent all peasants in general and consequently show the hardship that they all face. Similarly, Millet's treatment of the figures achieves this same sense of empathy. For example, in his work, the women are bending over to pick up the crops that were left over by the harvesters, and, along with the blazing sun, this makes their work look difficult. Furthermore, like the hunters, the women's clothing is suitable for their work. They are wearing aprons which they use to hold the wheat, and hats and long sleeves to protect themselves from the sun. The hats have also been cleverly used by the artist to generalise the figures. By the careful observation of light, Millet has painted the shadows that are cast on their faces by their hats to keep their facial features hidden to the viewer, only painting a silhouetted outline of their profiles. Millet did this to create a greater impact on the viewers in the Salon as the three women represented all agricultural workers and so a greater sense of appreciation was shown, leading to a greater reaction from the viewers as they saw this appreciation as a threat of the rural working poor gaining power.

Other formal features used to engender empathy, and an appreciation of the peasant workers are composition, colour and tone and materials, techniques and processes. Bruegel uses the composition to highlight the figures and their work. For example, the trees on the left-hand side provide a vertical emphasis and mimic the poses of the peasants, drawing attention to them in the artwork and presenting a feeling of appreciation. This also balances out the horizontal emphasis, provided by the vast and expansive landscape. Moreover, his thoughtful use of colour and tone contributes to the work as the cold colour palette reflects the winter landscape. Also, the cold tones of the blues and greys in the sky and trees highlight the difficult conditions in which they work and thus evoke empathy and appreciation. Furthermore, Bruegel's work is very naturalistic as he painted with small brushstrokes. This is due to the use of oil, which Northern European artists were pioneers of, and was slow drying, thus allowing for fine detailing. Naturalism was key to Northern Renaissance works as it made them more relatable for the viewer and showed the shift away from Medieval art which was more stylised and included more symbolism. Similarly, Millet uses the formal features of his work to enhance the feeling of appreciation of the workers. In his work, the women are in the centre of the composition and are of a larger scale than the harvesters in the background, meaning attention is drawn to them. Gombrich argues that this placement of the figures presents a sense of rhythm and stability in the work, which is suggestive of the repetitive nature of their work. (Gombrich, 1995). Gombrich's view is corroborated by the trees in the background which echo their poses and draw more emphasis to their labour. In a similar fashion to Bruegel, Millet paints with a high degree of naturalism, as was fitting for the realist style which aimed to present subject matter exactly as it was seen. This quality of realism in both works contributes

Figure 8: The Wood Sawyers, Jean-Francois Millet, 1850-52

to the appreciation of the rural working poor as it makes the work more engaging for the viewer as they can better understand what the work is depicting and so can have a stronger connection to it. In Millet's case, this connection was however not positive as it was seen as a presentation of the threat of peasants. Charles Baudelaire, a French poet and art critic, described the women to be 'pariahs (of) pretentiousness' (Cohen,2009), suggesting that, to the bourgeoisie, the painting portrayed how peasants aimed to strip their social authority from them. Finally, Millet's use of colour and tone contributes to the sense of appreciation as he has used the same warm and earthly tones for the figures' clothing as he did for the landscape. This creates a sense of unity between them (Canaday, 1981), demonstrating a humble and empathetic depiction of the workers.

CONCLUSION

In conclusion, although the two works, 'Hunters in the Snow' by Pieter Bruegel and 'The Gleaners' by Jean-Francois Millet were painted at different times and places and for different purposes, they recognise the perspectives and lives of those who were often not appreciated. By comparing the works to other works of the time, analysing the religious and social contexts of the time as well as their formal features, it can be deduced that their works and, more specifically, their similar presentations of the rural working poor, were radical for their times and show an appreciation of their work.

- Jemima F

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ANALYTICAL COMPARISON OF ‘THE RAILWAY CHILDREN’ AND ‘IN MRS TILCHER’S CLASS’

In both ‘In Mrs Tilscher’s Class’, by Carol Ann Duffy and ‘The Railway Children’ by Seamus Heaney, the poets explore the theme of childhood using the metaphor of travel to depict the journey of growing up. However, the poets make use of imagery, language and tone in contrasting ways.

Duffy’s poem illustrates that imagination transports us, and as the child envisages, “tracing the route”, the reader visualises the scene, demonstrating that Mrs Tilscher’s class is a magical and safe place to explore an exotic and enchanting journey, both of faraway lands and of childhood. Heaney’s poem incorporates a similar idea that children are safe in their innocence, believing “words” were transported along telegraph wires in “shiny pouches of raindrops”; their inventive imagery is beautiful, magical and delicate, just like childhood – a transitory moment that will, like a ‘pouch’ will burst, disappearing forever. Just like childhood, you cannot preserve a raindrop.

In contrast to the ephemeral quality of childhood, the poems imply a sense of immortality: Heaney’s children believed they “could stream through the eye of a needle” reminding the reader that with God, anything is possible, in an echo of the exuberance of youth. In Duffy’s poem, “the sky split open into a thunderstorm”, both indicating that the children can survive anything and suggesting their potential to do anything. However, in both poems the reader is warned that innocence is coming to an end: “A rough boy told you how you were born.” Duffy shows that when children grow up and mature, some of the truth hurts. In ‘The Railway Children’, the reader is told that “we were eye-level with the white cups”. While demonstrating the children’s longing to become adults, this also evokes a sense of ignorance as the narrator describes the porcelain insulators as something as simple and innocent as a white cup, again highlighting their lack of knowledge.

Duffy and Heaney both convey childishness through their diction. In the second stanza of ‘In Mrs Tilscher’s Class’, the simile “glowed like a sweet shop” conveys the inevitability of childish greed and ignorance. Heaney highlights the shiny and appealing quality of the telegraph wires in “the gleam of the lines” that left a vivid and lasting impression.

In both poems, a feeling of joy is created through the poets’ semantic fields. In Duffy’s poem, words like “glowed”, “sugar paper” and “loved” enable the reader

to view the children's school experience as fun and safe. In Heaney's poem, "lovely", "gleam" and "shiny" all evoke a sense of happiness, both presenting the reader withan idealised sense of childhood.

However, there are also semantic fields which dampen the mood to express how the world can never be without imperfections. Duffy uses "smudge", "a xylophone's nonsense" and the mention of "Brady and Hindley" to cast a shadow over the joyful imagery of the classroom. She uses these two characters as they haunted children's nightmares in the 1960s as they were child serial killers.

Furthermore, the statement "This was better than home" begs the question as to whether the home of the narrator could be unsafe or a stressful environment for a child. Heaney includes "burden", "nothing" and "small" to illustrate that children think that they are insignificant and unimportant to the world. Nonetheless, Heaney conveys the children as triumphant and eager while juxtaposing this idea in the last line of his poem: "We could stream through the eye of a needle", indicating that children have an imagination and ambition that very few retain into adulthood.

The poets use structure and form to describe the complexity of childhood. Duffy makes the first two stanzas eight lines long which evokes a feeling of constancy and of a carefree world, but the final two are one line shorter which could suggest that everything comes to an end and in this case the children's primary school life is coming to a close. Likewise, in 'The Railway Children', Heaney uses three-line stanzas to convey the children's constant longing to grow up. Then the last line stands alone, suggesting we all have to stand alone eventually. Enjambement demonstrates travel and the children's urge for this. The phrase "…miles/East…" in Heaney's poem creates a feeling that the children just want to explore the world. Similarly, in the first stanza of Duffy's poem, there are several run-on-lines creating a flow, suggesting that despite the tribulations of growing up, life flows of its own accord.

Both poems convey childhood in unique but equally effective ways. Heaney presents children as the future of this world while demonstrating that their innocence should always be protected. Whereas Duffy focuses more directly on the topic of travel, and the magic of exploring something and somewhere new, while also concentrating on the purity of childhood.

- Leonardo R

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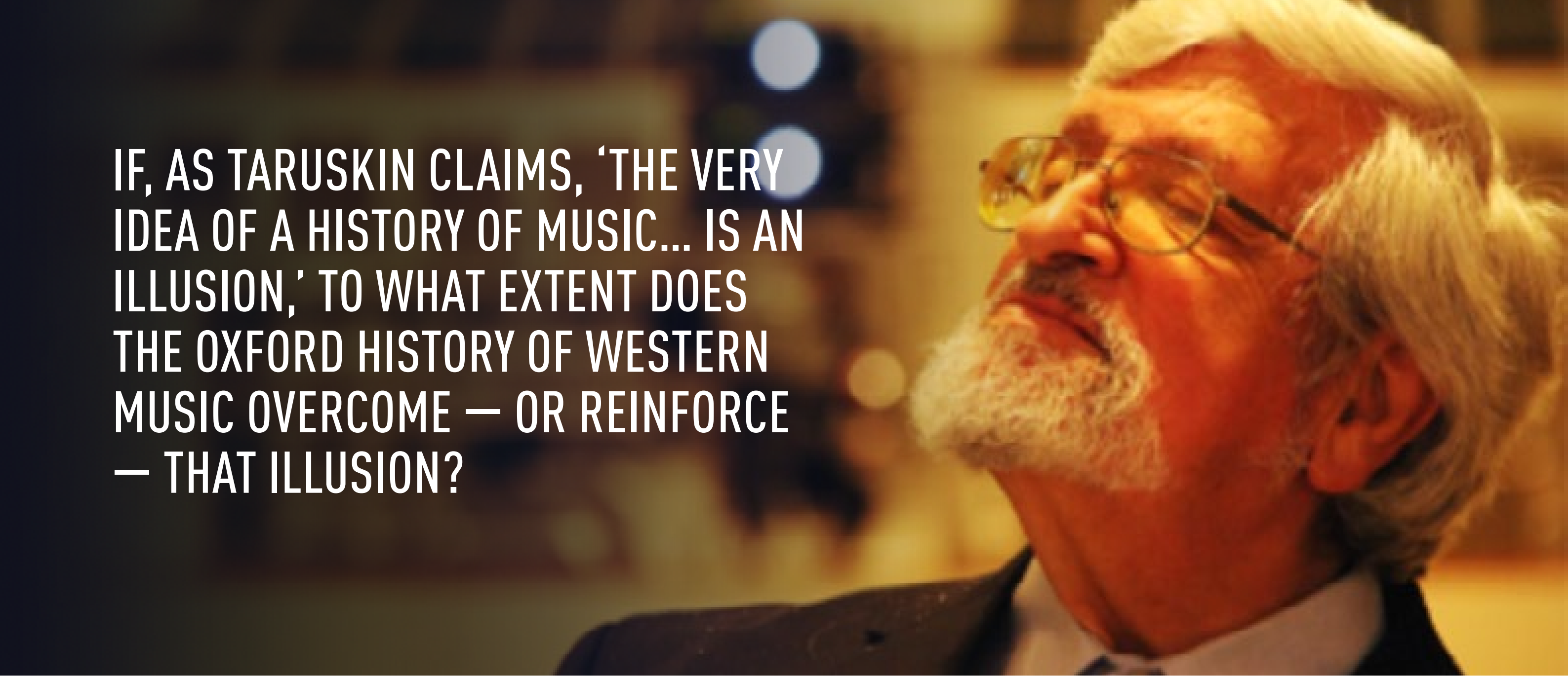
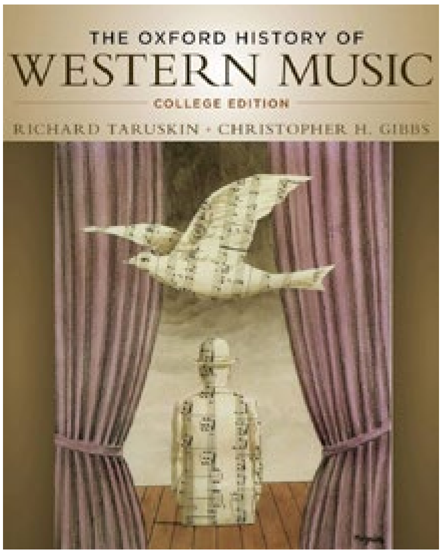


IF, AS TARUSKIN CLAIMS, 'THE VERY IDEA OF A HISTORY OF MUSIC... IS AN ILLUSION,' TO WHAT EXTENT DOES THE OXFORD HISTORY OF WESTERN MUSIC OVERCOME — OR REINFORCE — THAT ILLUSION?

Writing a history of Western music has consistently been problematic. Most attempts become surveys of repertory, creating fictitious and round-edged narratives which neatly link together. Richard Taruskin, in his Oxford History of Western Music, one of the most revered musical texts in modern history, sought to overcome these problems and present a "true history." He aimed to do this by using his objectively rigorous academic knowledge to create well formed, evidence-based arguments, exploring history in its relevant cultural, political, and social contexts. Despite directly addressing 'the illusion' in his introduction, Taruskin seems unable to escape it. In this essay I will examine the ways in which Taruskin tries to expel the myths of an autonomous musical history while paradoxically reinforcing a new form of canon.

To understand how Taruskin makes or breaks his illusion, one must firstly examine what this illusion is. In the introduction to the Oxford History of Western Music (OHWM), Taruskin claims that "the very idea of a history of music, as something separable from the history of its social uses and cultural values, is an illusion" (Taruskin, 2009). The so-called illusion here is in the separation of repertoire from its cultural, political, and social contexts. Taruskin argues that an ideal historiography questions 'how' and 'why' in an in-depth manner, exploring both causation and impact. Therefore, most books "which call themselves histories of Western music […] are in fact surveys which cover the relevant repertoire but make little effort to truly explain why and how things happened as they did" (Taruskin, 2009). Here Taruskin further suggests that music histories have fallen into a linear, chronological overview, often based on repertoire and the ever-controversial canon. Dahlhaus, in his *Foundations of Music History*, has a similar viewpoint, claiming "historical knowledge is not the mere reproduction of facts, but their interpretation" (Dahlhaus, 1983). His opinion that "description and interpretation are inseparable" echoes Taruskin's argument that the "very idea of a history of music" as an objective is an illusion. Both writers reject survey-like, literal historiographies, though Dahlhaus emphasises methodological rigour and internal logic while Taruskin exposes ideological and moral dimensions. The illusion, according to Taruskin, is forged by an author's lack of self-criticism and awareness of historiographic issues, therefore creating an inaccurate, neglectful, canon-based narrative.

Taruskin's Oxford History departs from traditional historiographies not only in its method and tone, but in the breadth of repertoire it embraces. His contextual grounding and rejection of autonomy makes Taruskin's work a meta-history, concerning itself with the meaning, cause, and significance of historical change. This was no doubt to avoid the historiographical illusion he defines in his introduction. Before delving into the descriptive yet necessary repertory, he explores the social and cultural context. This thorough grounding displays Taruskin's ideology against treating musical works as autonomous, timeless objects rather than social/practical acts (Taruskin, 1982). Taruskin's ideology further dispels the linear chronology of music historiographies often associated with the canon; his clear avoidance of the traditional canon is weaved throughout the gargantuan pentalogy. By highlighting neglected repertoires such as Russian traditions and early modern sacred music, Taruskin opposes the ideological basis of the 'great composers' narrative. This ideological inclusivity has drawn both praise and critique from later scholars. Susan McClary, for instance, celebrates Taruskin's expansive treatment of women composers and non-canonical repertoire, yet also questions the moral assertiveness of his narrative. In her review, The World According to Taruskin (McClary, 2006), she praises Taruskin's analyses and range of subjects. His vast inclusion of female composers - from Hildegard von Bingen and Barbara Strozzi to



Ruth Crawford Seeger and Laurie Anderson - deals with them and their activities "with the same respect he extended to men: he analyses the music and collates it within an illuminating cultural context." Similarly, Taruskin's inclusion of issues raised within queer musicology is of high celebration for McClary. His passing mention of Handel's homosexuality and sympathetic debate over Schubert's sexuality demonstrates why "a composer's sexuality should matter to both the historian and the analyst." McClary does however warn of his moral certainty in a humorous analogy to Dr Jekyll and Mr Hyde. She claims that "The very shape of his historical narrative […] reveals sharply his particular critical positions." Taruskin's self-awareness also ensures accountability, McClary cautions that "espousing a particular position in the debate is no business of the historian," which distinguishes the task of the historian from that of the critic. It is this self-awareness paired with the scholastic understanding that "one can only make sense of the music by understanding the human priorities" which makes this work "the crowning masterpiece of a meticulous scholar". Taruskin complicates the illusion by making his own narrative overtly constructed, which (to an extent) disguises the issues presented in a historiography of music.

There is a strong argument that Taruskin manages to successfully transcend the illusion of music histories and directly challenges the issues they face. He exposes the biases of historians and the ideological investment, for example, in his exploration of the 19th century canon in volume three. His focus on major composers chapter by chapter allows him to fully expand on the context and influence on each musical giant. This opposes the linear canon as it does not create the "fairytale of smooth succession, but which each great composer merely passes the torch to the next in line" (McClary, 2006). This rejects the "masterwork" ideology (which was made to serve nationalist and bourgeois interest by rejecting pure, objective formalisation) and acknowledges history as a moral argument, not neutral description. In order to even begin to break down the traditional canon, Taruskin had to attempt the largest music history ever written. Gary Tomlinson commends Taruskin's epically immense scale and ambition of the work in his review from the Journal of Royal Music Association (Tomlinson, 2007). He notes that the sheer scale of the work, which took a decade to write, is integral to its ambition, not just incidental. Quantity does not always equal quality however, but many critics argue that Taruskin's writing style and clarity enhances its insightful and academic perspective. In a review from Sealy, he claims that "the author's style is so easy, fluent and open […] he wears his knowledge lightly yet still manages to interest the reader on every page" (Sealey, 2009). At 20 pounds in weight and nearly four-thousand pages (May 2005), Taruskin's history would not be a successful work unless truly accessible and interesting. Leon Botstein similarly believes that "Taruskin is an engaging and gifted writer", suggesting that underneath the poetic façade lies rigorous academic questioning. So much so that "The only writer […] with Taruskin's scope and power […] is the late Carl Dahlhaus." To be compared to such a powerhouse of musical prowess, a "practitioner of a decidedly modern self-reflective type" (Danuser, 2025), shows in itself the intellectual and academically passionate writings of Taruskin. It is this collective acknowledgement of the issues in music histories, paired with Taruskin's academic yet charismatic and eloquently phrased writing which allows him to trance the illusion.

While many critics hail Taruskin as a skilled writer, some suggest that he too feeds into the inescapable illusion of historiographies, particularly in his narrative. McClary offers an interesting take on Taruskin's narrative, suggesting that he, despite making direct reference to nationalistic bias in the introduction, "puts rather greater stress on Russian composers than is typical" (McClary, 2006). Taruskin, whose name hails from Eastern European and Slavic countries, specialises in Russian musicology; his first book was Opera in Russia in the 1860s (Beckwith and Taruskin, 1983). Therefore, this emphasis on Russian music is perhaps predictable, but it supports an argument that one is unable to write an entirely unbiased, non-nationalistic music history. McClary writes that "the theme of nationalism finally begins to unfold in Volume three […] the Russian narrative, with Glinka as its fountainhead" (McClary, 2006). his narrative once again in her most cutting argument which suggests that Taruskin refuses to acknowledge perhaps the "most extraordinary phenomenon of the last hundred years." This, to McClary, is that the most important music to the West since the early 1900's was produced by African Americans. Taruskin tries to side-step this contention by only claiming responsibility for recounting the history of Western art music. But McClary questions "how one can listen to the recordings of Bessie Smith, Miles Davis, Aretha Franklin, Jimi Hendrix, or Public Enemy and declare them not to be 'art music'?" McClary concludes with stating that "Taruskin's history is a history of music by … white folks", writing acerbically in her footnotes that "Taruskin restricts the examples from popular music to a couple from the Beatles and one (of all things!) from Queen's Bohemian Rhapsody." Another writer who is critical of Taruskin is Botstein, who, after praising the author (as we have examined), argues that "there are dangers in assuming the intellectual ambition to which Taruskin admits" (Botstein and Taruskin, 2004). Using two paragraphs lifted from chapter 5 which wants us to believe that science won the war as a result of the atomic bomb, Botstein states that Taruskin's "argument won't hold upon further inspection." Taruskin "seems unaware" of the relevant history which he is referencing here, and calls him out on multiple statements, namely the use of the theory for relativity as "arcane" and "recondite". Botstein then claims that the breakthroughs of 1905 (including relativity) had "little to do with the atomic bomb and were certainly not in the popular imagination". Here, although not saying it directly, Botstein claims that Taruskin links two non-related facts to create a clear, more concise narrative. That is exactly the illusion which Taruskin so overtly slated in the introduction. This imaginary narrative which Taruskin formulates is how music histories become music surveys, simplifying facts for pedagogical usage. Both McClary and Botstein reveal the illusion in Taruskin' history, in opposite ways; the former critiques his exclusion and disconnection of relative context, and the latter critiques his inclusion and connection of irrelative context.

CONCLUSION

In conclusion, the Oxford History of Western Music both confronts and perpetuates the very illusion it sets out to dispel. Taruskin's achievement lies not in escaping historiographical bias, but in exposing that biases inevitability. Taruskin challenges traditional music histories by his contextual grounding and his rejection of linear, canon-based narratives. This paired with his inclusion of often neglected repertories makes his history more reflective and intellectually rigorous than most predecessors. However, as critiqued by McClary and Botstein, even Taruskin cannot evade the illusion he so overtly challenges. The overemphasis on his specialist subject and neglect of African Influences suggest that one cannot write a music history without bias or personal influences. Similarly, the flawed causal links and simplification of accounts for the sake of coherence gives the work an autonomous narrative, much like many of the histories Taruskin criticises. Taruskin both transcends and recreates the illusion; he exposes and explores the mechanisms which make them up but fails to avoid them. Ultimately Taruskin redefined what a music history can be; not an objective account but a self-aware, constantly changing act. The Oxford History of Western music does not transcend historiographical bias, but redefines it, exposing its inevitability and therefore allowing future historians to confront it with equal rigour and honesty.

- Luca T

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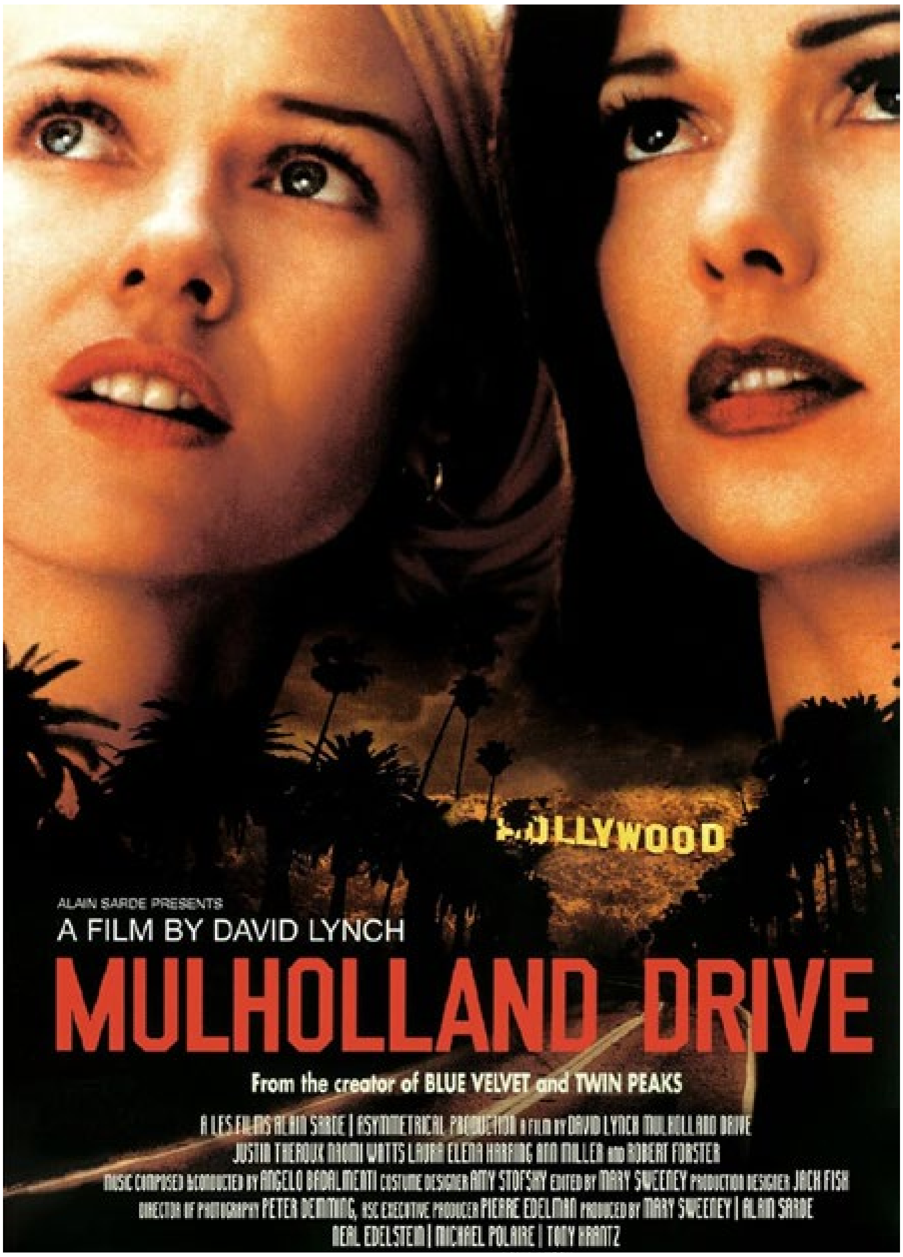
DAVID LYNCH: AN APPRECIATION OF HIS GENRE AND WORK

On January 16th, 2025, the world lost one of its most original, unique and talented artists: David Lynch. He left a definitive mark on experimental cinema as well as on the broader landscape of filmmaking. In this article Paddy and I will explore both Lynch's ability as a director, and the impact he has had on us. While I will be focusing more generally on the power of Lynchian films, like 'Mulholland Drive', Paddy will centre her text around Lynch's series called 'Twin Peaks'.



'Mulholland Drive'
Nothing is what it seems?

Lynch stands alone amongst the new wave directors of the 1970's with an ability to undermine and re-contextualise our perceptions of reality. His dreamlike approach blurs the lines between the reality and what is not. Though often hard to follow on a first watch, it is on greater reflection that Lynch's films truly reveal their genius. They have an uncanny ability to lodge themselves into a deep corner of the viewer's mind. The style of dark oddity that Lynch employs, taking its name after the director himself, has a bizarre surrealism which, while challenging to follow, has a far deeper impact on the viewer. The effect of Lynch's films cannot be understated, even if you don't like them, they are impactful to each and every person who watches them.

'Mulholland Drive', which is one of Lynch's most esteemed works, truly exemplifies how, despite the often confusing and apparently non-sensical nature of his films, Lynch can still impact the audience on a more primal level. While, on first watch at least, the plot of 'Mulholland Drive' can seem highly contradictory and perplexing, the ideas it presents, those of the corruption in Hollywood and the dark, unmistakable, underbelly of LA, provide us with an ultimate slice of Americana. The film, though truly genre-less, has certain elements of horror which, while not the focus of the film, create such a level of unease that they define the entire film. Those who have seen the film will surely conjure to mind the man behind the Winkes, or the deeply uncanny elderly couple, as examples of how the horror of the film creates and unnerves the audience in a manner beyond explanation. It is through this horror that the Lynchian style, in my opinion, crawls under the viewers' skin and hooks them, whether they like it or not, into the deranged worlds and ideas of his films.

'Twin Peaks'
The closer you look, the stranger it becomes?
Who killed Laura Palmer? Well, 14 episodes into David Lynch's 'Twin

Peaks' you can find out yourself, but at that point you should probably just watch the whole show. 'Twin Peaks' is Lynch's most famous TV show, and in my opinion his best work. The story follows idiosyncratic FBI special agent, Dale Cooper, as he arrives in the small Washington town of Twin Peaks to investigate the murder of high school prom queen Laura Palmer. At first, Twin Peaks seems to be a wholesome, cozy, northern town, with mist drifting through tall pines, warmly lit diners, and a welcoming log cabin hotel. However, through Cooper's investigation of Laura Palmer's murder, he uncovers more secrets and mysteries lying beneath the town's surface...

For me, Cooper is one of the rare few protagonists who is emotionally sincere, in a genre which favours cynicism over optimism. Kyle MacLachlan plays Cooper with an earnest warmth that makes his oddities feel sincere rather than foolish. Cooper approaches his investigation of Laura Palmer's murder with equal parts logic and open-minded mysticism, trusting dreams and intuition as readily as forensic evidence. What makes him such a compelling character is that he never loses his fundamental decency, even when he confronts cruelty, evil, and forces beyond comprehension, he remains curious, compassionate, and quietly hopeful. In a show grappling with as dark themes as Twin Peaks, and in the broader neo noir genre, Cooper feels like a refreshing breeze of hope, a good person investigating sinister and dark forces, while maintaining his optimistic composure.

- Arthur W and Paddy H

FAITH, FAILURE AND A FUGITIVE: AN INTERPRETIVE READING OF CARAVAGGIO'S FLAGELLATION OF CHRIST

When we think of religious art, we often picture calm scenes, beautiful halos, and divine perfection. But Caravaggio, Michelangelo Merisi da Caravaggio, disrupts this expectation. He is a painter who dealt in extremities, both in his art and in his life. He lived violently, frequently in altercations with the law with much of what we know of him coming from police and court records. Despite his chaotic lifestyle, Caravaggio remained deeply and sincerely religious. That contradiction of sin and faith is what often made his work so compelling, so engrossing.

His paintings reflect this experienced tension, often being Christian scenes, but with a violent and gritty realism. This coexistence of faith and ferocity was evident in all of his paintings; Caravaggio refused to paint with any sense of moral distance: both he and the viewer are forced to confront the rawness and crude of suffering. Even divine and saintly subjects were stripped of their traditional idealisation, using Rome's homeless as models to make the holy: human.

The Fugitive, Painter in Naples

The work that I think most powerfully embodies the aforementioned is his "Flagellation of Christ", which was painted at a pivotal time in Caravaggio's life. He had just fled Rome after a discord that resulted in the murder of Ranuccio Tomassoni. Now a fugitive, he arrived in Naples—a city marked by political conflict under Spanish rule and harsh taxation. It was here where he received the commission for this painting.

Passion of the Floggers

The circumstances of his life at this moment are visible in the painting's features, especially in the figures of the floggers. They release an intense anger onto Christ, most clearly seen in the first one. His expression alone conveys this ferocity. We see only half his face, the rest swallowed by Caravaggio's chiaroscuro, as if he is hiding within it. The shadow does more than obscure; it separates him from Christ.

Below him, another flogger is completely engulfed in darkness, illuminated only by an emphatic light on his arm as he prepares to strike. This highlights not only the anger of the floggers but also their eagerness. The final figure, also left essentially anonymous, brutally handles Christ, tying His arms to the column while digging his foot into Christ's calf, forcing Him into an unstable and excruciating stance.

God, Made Human

Enduring all of this, Christ is isolated in the centre of the composition, vulnerable, beaten and human. That is one of the most interesting parts of this painting, the emphasis on the human nature and seemingly susceptible of Christ. Looking at Him, we can see the weakened halo which suggests, perhaps, a loss of divinity in this moment. His expression is a mix of agony, but even more so sorrow. Caravaggio has depicted Christ in such a manner where the viewer not only sees Him as the Son of God, but as a man enduring suffering and human cruelty. He looks down, not at us, not at the men beating him mercilessly, just down; suggesting a despair rather than defiance.

Yet even in this state, glimpses of sanctity remain. This light that shines on Him sharply contrasts to the floggers who seem to be enveloped in darkness. It becomes a reminder of Christ's dual natures: fully human and fully divine.

Suffering and Faith

This seeming contradiction leads us back to Caravaggio. This painting, to me, feels like an expression of the conflicts going on in his life. Having murdered a man and fled from the consequences, Caravaggio presents Christ in such an intense and human way, perhaps reflecting his own religious turmoil and tumult. This is also why the floggers have been painted with such vigour: they become a sort of medium for Caravaggio to confront his own anger and guilt.

To me, the floggers represent our own anger towards God. How we often blame Him despite our own mistakes and failures. It is easy to think of God as a sort of genie, someone whose only purpose is to put good into our lives and so this anger we direct at God is not necessarily rooted from hatred, but rather from expectation. When God does not act how we want, our faith turns into frustration and, like the floggers, use this to justify this disappointment, pique and wrath. When prayer is not answered directly, certainty often turns to confusion and confusion to enmity. But that is when it is most important to reflect...

...But this is precisely when reflection is most necessary.

The floggers are not calm nor are they rational. They embody impulsive anger and blame, directed at the nearest target. Christ becomes their outlet simply because He is physically present. When we imagine God who is all-loving and all-powerful, suffering becomes difficult to understand. Suffering seems to disrupt the narrative of God that has become so common. It can cause faith to become somewhat transactional; only believing for the benefit of it. So, when life inevitably refuses to match the image of God we have constructed, the result is not only disbelief, but often resentment.

Suffering Without Resolution

What is most striking about all of this, is that suffering left unresolved. Caravaggio does not offer an answer to it. It is immediate, brutal and blind. This painting is not purely lead by the Biblical scene, but also by personal experience. Caravaggio seems to pour his own anger, his own blame into the painting. All the violence in his life explodes with Christ as the primary target. Caravaggio, often like

us, would have gone through his own struggles, his own doubts; especially in such an extreme circumstance that he had put himself in.

Christ is crushed, compressed by suffering, not detached from it. In this way, Christ's depiction is unusual. Typical portrayals would emphasize the serenity of him, like in Piero Della Francesca's Flagellation, where Christ feels separate from the viewer. However here we have a Christ, whose body is tense from pain, one who is sorrowful and one who feels. We do not have a distant God: we have the incarnation; God in Flesh.

A Human Painter and a Human God

And so, I think this piece remains as one of Caravaggio's most uncompromising pieces. He has captured such a vicious, but necessary, moment with rigorous realism. In stripping away traditional idealisation and depicting Christ in such a human manner, he has transformed a religious subject matter from something distant to something instantaneous and impactful, which is what sticks with me the most.

Here, Christ is not triumphant, but rather fragile, exposed and human. Yet in this state of "weakness", this tender, and deliberate light still falls on Him. Caravaggio reminds us that whilst Jesus can often feel distant, He has experienced the greatest extent of human suffering. Through all of this, He stands as the only figure in the painting who is not overcome by extreme anger, although is perhaps the only one with cause to be.

Caravaggio's Flagellation is, to me, so meaningful not solely due to the subject matter, but also because of the man behind it. Caravaggio has approached suffering in such an explicitly honest way. He brings us closer to God in showing Him at his most human. That is what makes it so impactful and memorable.

- Oscar S

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AN ANALYSIS OF PROMISING YOUNG WOMAN (FENNELL, 2020) AND JOKER (PHILLIPS, 2019)

In Fennell's 2020 revenge thriller Promising Young Woman, Fennell works to critique the dominant ideology perpetuated through societal issues and Hollywood tropes that "nice guys" are automatically trustworthy and have innocent intentions. She does this right from the start through her creation and subsequent deconstruction of audience alignment with Adam Brody's character Jerry, influencing audiences to question their own moral and ideological standings.

In the opening scene, Jerry and his friends Jim and Paul are framed in a wide group shot talking at the bar of a nightclub. Fennell immediately aligns us as an audience with Jerry, who is central in the frame, with a gap in proxemics between himself and Jim and Paul. His reaction of disdain to Ray Nicholson's character Jim making a dismissive and offensive comment about a woman is framed and emphasized by Fennell through an MCU of Jerry. The camera's not-so-subtle focus on him immediately influences us to identify with him, as his reaction of disdain is how we as an audience would hope to react. Fennell, in an interview, stated that she wanted to dismantle the Hollywood-perpetuated ideology of identifying with a male character purely based on the fact that he is "not as bad" as his friends. Fennell positions Jerry initially as a rom-com hero, who the audience may hope will grow into a better man throughout the film, through her focus of the camera on him and his reaction. In reality, Fennell is setting up an ideological trap, designed to make the audience question their own morals.

Fennell further aligns us with Jerry in order to critique the dominant ideology that the "nice guy" is automatically well-intentioned, through her use of a POV shot from Jerry's perspective, looking at Cassie, following his friends' remarks that suggest women like Cassie are asking for attention. The POV shot immediately works to align us with Jerry, as Fennell parodies classical Hollywood "nice guy" tropes. When Jerry goes over to Cassie with the intention of "helping" her, he is framed in a warm golden lighting, immediately enforcing the rom-com hero stereotype, making him seem kind, and contrasting with the previous harsh blue club lighting of his friends. He is framed with a high angle shot from Cassie's POV, immediately making him seem unthreatening. Fennell's use of cinematography also draws from the exploitation of the audience's inter-textual memory, as Adam Brody is renowned for playing "nice guy" roles, including Seth Cohen in The OC and Dave in Gilmore Girls.

Fennell's critique of this ideological trope at this moment is subtle, but as a knowing viewer on a second or third viewing of the film, it is clear that Fennell is constructing an alignment with Jerry in order to subvert audience expectations and challenge the ideology that "nice guys" are inherently well-intentioned. When Jerry does eventually attempt to take advantage of Cassie, Fennell betrays audience trust, imploring the audience to think about our own ideological viewpoint, through the low-angle shot from Jerry's POV, where Cassie directly addresses us, asking, "What are you doing?". Mark Kermode described the film as "a mirror held uncomfortably close to the audience's face", and Fennell makes us feel complicit in Jerry's actions through alignment, making us question if that "nice guy" could be ourselves.

In Todd Phillips' 2019 thriller Joker, Phillips also uses character alignment with Arthur in order to present an anti-capitalist ideology, framed through the lens of a society whose elites have a complete disregard for its working class, mentally ill, and vulnerable members.

During the subway scene, Phillips frames three Wall Street men harassing a lone, commuting young female worker. Phillips' use of a POV shot immediately aligns us with Arthur, as he watches one of the drunk Wall Street men throw a French fry at the woman. The switch to a closeup of his face presents his disdainful reaction, which, through alignment and our own morals, reflects our own reaction of disgust. Immediately, Phillips is presenting an anti-capitalist ideology through the lens of the societally alienated Arthur.

The lighting in the carriage is comprised of sickly green and golden hues, which reflect Arthur's mentally ill mind, echoing how the capitalist society of Gotham's upper class has abandoned the working class. Despite the sickly nature of the lighting, the golden hues have a somewhat glorious quality, potentially reflecting and foreshadowing how Arthur revels in the chaos and anarchy of Gotham city. The Guardian's review stated that the film "romanticises male rage", and this could be partially down to the seductive nature of the lighting. Phillips stated in an interview that he wanted the scene to feel like a "fever dream", through his use of golden hues, and also large moving LED panels outside the carriage set which simulate subway movement. The strobe effect of the panels, combined with the "fever dream"-like nature of the lighting, reflects themes of psychological disorientation, further aligning us with Arthur's mind.

We are aligned with Arthur further, as the entire scene was shot by a single camera operator, Geoffrey Haley, whose shaky handheld style influenced the audience to feel as though we too are in the carriage with Arthur, aligning us with his anti-capitalist ideology. This is enforced by the low angle POV shot from Arthur's perspective of the Wall Street men looming over him, presenting them as intimidating.

- Paddy H

CONCLUSION

In conclusion, an ideological critical approach; examining Fennell's Promising Young Woman through the lens of forced alignment to dismantle common Hollywood-promoted ideologies, and Phillips' influenced alignment with Arthur to explore an anti-capitalist ideology, has been significantly useful in my understanding and explanation of how cinematography is used.

HUMANITIES AND SOCIAL SCIENCES

This section of Humanities and Social Sciences explores the complex forces that shape our societies, cultures, and systems of belief. The work displayed here isn't just saying why things are the way they are but questioning why things are the way they are and challenging the default response. Pupils have looked into a range of topics from the power of systems to cultural identity and ethical dilemmas. Other reports from Westminster and the USA bridge the gap between political theory and its real-world impact. Together, these essays highlights students extending their knowledge and research to the wider world.

- Emily D (Editor)

HISTORY HIGHLIGHTS

- **Moulsdale Society (Senior History Society)**

Senior historians published 1850 and All That, the department's magazine celebrating pupil scholarship. They have also begun planning local history walking tours and are now working with Dr John Cardwell, the College Archivist, to support the preservation and organisation of the College's archives.

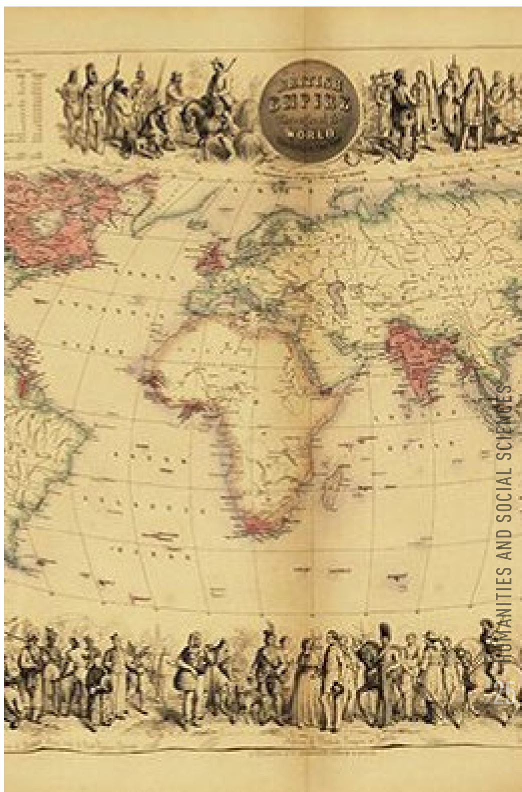
- **Junior History Scholars**

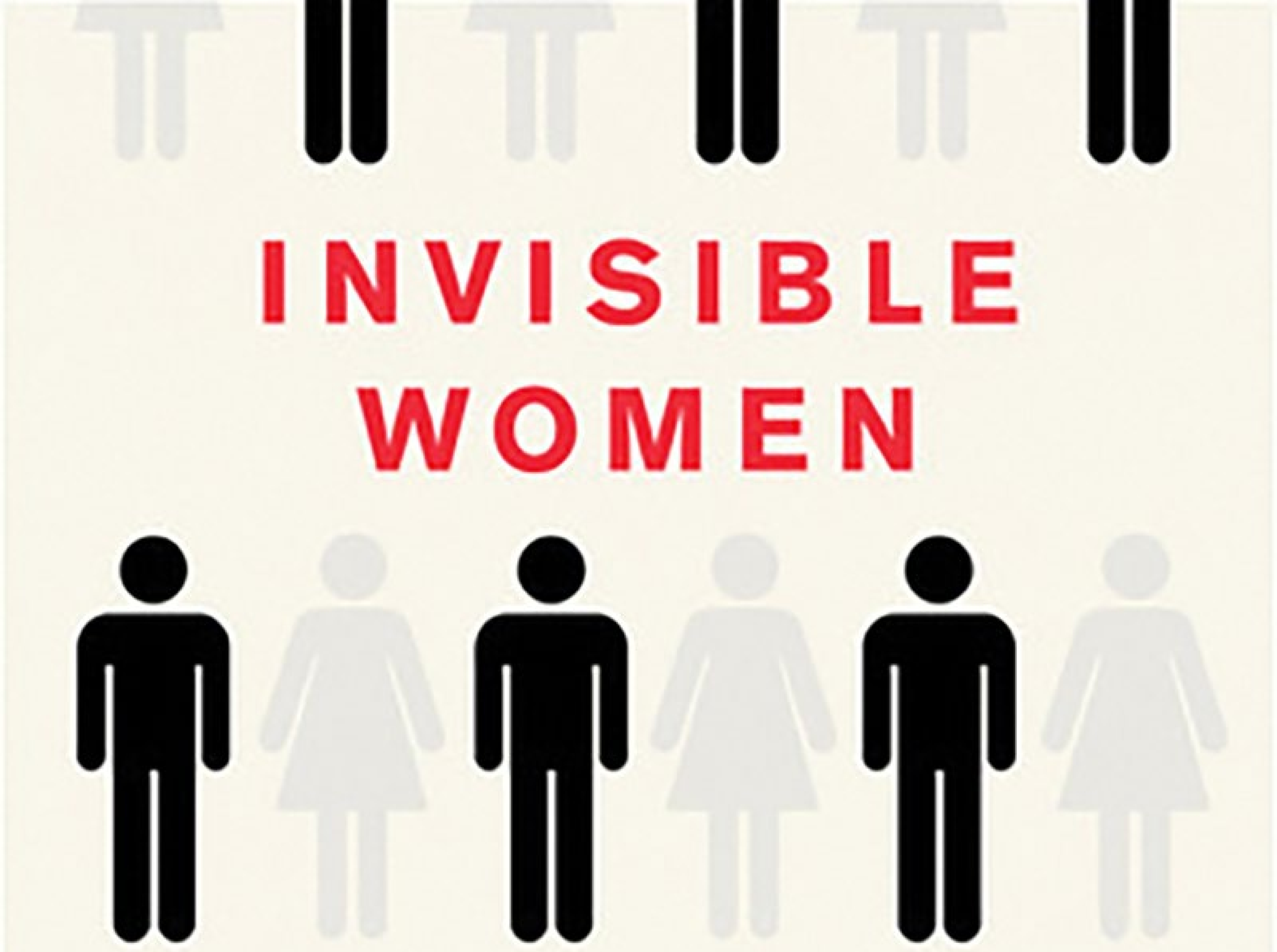
Junior scholars contributed to 1850 and All That and have recently begun a research project using the College archives. Their focus is Arthur Holloway, the blacksmith behind the Snake Door and much of the College's historic metalwork, offering a fascinating insight into the school's past.

IS LAW TRULY FAIR, OR IS IT SHAPED BY HISTORY AND GEOGRAPHY?

Law is meant to treat everyone equally, yet justice can look very different depending on where and when a person lives. This idea is often assumed everywhere; however, it doesn't work everywhere. Many countries have many different laws, even when they share borders.
Laws that were created centuries ago are still intact. Does that reflect tradition or justice? So, the thesis for this article questions: if law is always fair or is it shaped by history and geography? This article discusses if law is fair and how history and geography shape it.
Laws are often created based on the context of their time in history, or the importance in societies. Many of these rules are still used in the 21st century. This raises a question: do these laws reflect on pure justice or also on the country's history? A great example in the United Kingdom is the Colonial legal system. When the British still had colonies across India and parts of Africa, they imposed their own rules and laws. This completely overrode the tradition of those countries. One of many was valuing British customs over any other. Now, many years later many of those laws are still in effect today. This demonstrates the historical influence on regulations in a variety of countries. Those laws were created to benefit the British, not the colonised countries. Although it's unintentional, many people are negatively affected by these laws. They completely ignore the idea of neutrality and the local needs. None of these laws considered the modernisation of the world. They didn't consider technology, population or modern society. This makes these legal laws not just whatsoever.
Although laws are sculpted by history, a large part is also shaped by geography. Countries which share a border can have drastically different laws. A clear example of this is Canada and the United States. Despite being neighbours, they have many differences in drug laws, gun laws and healthcare regulations. This highlights how law is determined by national priorities and the geographical circumstances, not ensuring justice for everyone. This reflects on the country's political priorities and distribution of population, rather than having universal justice.
Countries have very strict regulations and laws depending on their environment and the urgency of their local needs. Desert nations, such as Saudi Arabia, have laws restricting water usage, to prevent waste and to preserve their short supply. Coastal countries such as Japan and Indonesia, regulate their maritime affairs and enforce strict fishing laws. These are great examples, for how the countries adapt their laws to prioritise their local environment, rather than applying overall justice.
Laws are fundamentally created to uphold justice and to treat people equally, even though this idea is often challenged because of historical and geographical matters. There are many examples that support this aim. Judges are expected not to have a personal bias. Human rights are created to support justice for everyone. Legal systems rely on precedent and consistency, meaning many cases are treated in a similar manner. Despite this, numerous neutral laws have unequal outcomes based on various circumstances. Access to good legal representation or financial resources benefits only a small group of people in the legal system. This shows that even though law, in theory, strives for complete universal fairness, this ideal is impossible to achieve in real life.
In conclusion, even when laws are created to uphold fairness, this aim is often challenged by historical and geographical factors. Laws are shaped by past events and historical influences. Laws, such as colonial legal systems, are still present in our modern society. Geography has a significant impact on laws and regulations. Countries adapt their laws to suit their environment, location, and political priorities. While legal systems attempt to be neutral, it is impossible to achieve complete fairness for everyone. Therefore, law can never be considered universally just.

- Amina H





EXPOSING DATA BIAS IN A WORLD DESIGNED FOR MEN

In today's world, data is used to design almost everything around us, from technology and transport to healthcare and workplaces. However, much of this data mainly represents men, often overlooking the needs and experiences of women. This problem, known as data bias, quietly shapes everyday life and means that systems meant to be fair and neutral often end up working better for men.

WHO DOES "NORMAL" REALLY MEAN?

Imagine typing "cartoon person" into a search engine and seeing that most of the images are men. Many people would not question this, because the word "person" is often automatically linked to a male image. This small assumption reflects a much larger issue. Our world is still designed with men as the default.

DESIGNED TO PROTECT BUT NOT EVERYONE

A clear example of data bias can be seen in car safety. Car crash test dummies are based on the average male height and weight. Seatbelts, airbags, and other safety features are tested mainly on male bodies, not female ones or pregnant women. Research shows that women are 47% more likely to die in a car crash than men, not because they are worse drivers, but because safety systems were not designed with them in mind. This shows how invisible bias can have serious consequences.

CLEARING ROADS, IGNORING REALITY

The idea that women are overlooked in data is explored in depth in Caroline Criado-Perez's book Invisible Women. In the first chapter, "Can Snow-Clearing Be Sexist?", Criado-Perez reveals how even something as simple as clearing snow can be shaped by gender bias. At first, this idea sounds strange. Snow affects everyone so how could it be sexist? The answer lies in travel patterns.

By analysing data from Norway, Finland and Sweden Criado Perez shows that men and women tend to travel differently. Men are more likely to drive and usually follow a simple routine: commuting to work and back once a day. Women, however, are more likely to walk or use public transport and often make several shorter trips throughout the day. This pattern is known as "trip-chaining", and it includes tasks like the school run, grocery shopping, and caring for elderly relatives.

For example, in Canada, two-thirds of public transport users are women, and in Norway, women are twice as likely than men to take their children to school. In Sweden, studies have shown that around 79% of pedestrian injuries occur during winter, and women account for nearly 70% of those injured in slips and falls on icy or snowy surfaces.

Despite this, snow-clearing schedules usually prioritise major roads and business districts, areas more commonly used by drivers. Residential streets, pavements, and routes near schools or nurseries are often cleared later, or not at all. As a result, women are more likely to slip, fall, and suffer injuries. The system wasn't designed to harm women; it just simply didn't consider them.

WHEN A NAME MAKES A STORM MORE DEADLY

Data bias also affects how people respond to natural disasters. When a hurricane forms, the World Meteorological Organisation assigns it a name, alternating between male and female names. A 2014 study published in Proceedings of the National Academy of Sciences found that hurricanes with feminine names are twice as deadly and destructive than those with masculine names. This is because people take hurricanes with softer sounding, feminine names less seriously and do not prepare as much because people believe that they are not very threatening. This can lead to more damage and loss of life.

A LONG ROAD TO GENDER EQUALITY

These everyday examples connect to a much larger global issue. According to a UN Women report from 2022, the world is not on track to achieve gender equality by 2030. At the current rate, it could take almost 300 more years. Recent events such as the COVID 19 pandemic, global conflicts, and growing restrictions on women's rights have slowed progress even further.

Violence against women remains widespread, and many women report feeling less safe than before. Climate change and humanitarian crises have also increased risks, especially for women and girls in vulnerable communities. Since the Global Goals were introduced in 2015, many countries have made little or no progress, and in some cases inequality has worsened.

SEEING THE INVISIBLE

To conclude, gender inequality is built into many of the systems we use every day, from search engines to snow clearing to global laws. The first step toward fixing this problem is noticing it. When we question who data represents, and who it leaves out, we begin to challenge the idea that men are the default. Only then can we start designing a world that truly works for everyone.

- Bea F

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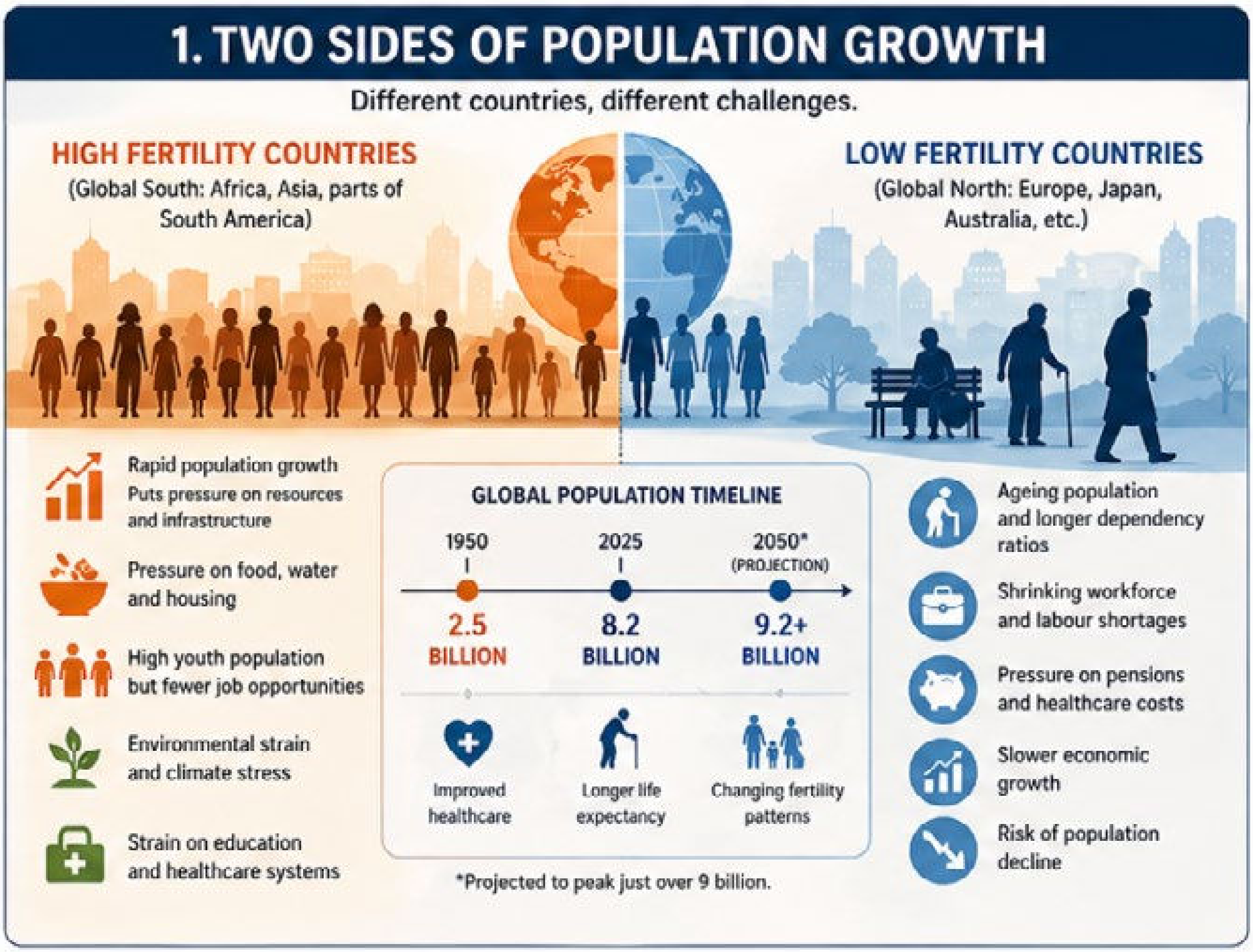
TO WHAT EXTENT IS IT MORALLY JUSTIFIABLE FOR GOVERNMENTS TO CONTROL POPULATION GROWTH THROUGH DIRECT INTERVENTION?

The world's population is three times larger than it was in the mid-twentieth century, reaching 8.2 billion in 2025, compared to an estimated 2.5 billion in 1950. This stark increase in population has been the key driver of global economic growth and has predominantly come from increasing longevity and reproductive rates, as a result of revolutionary improvements in health care. This population expansion is expected to progress for the next few decades before peaking just over 9 billion, resulting in a population demographic that could become unmanageable in terms of governance and unsustainable economically and environmentally.

Despite this overall clear growth trend, a generalisation cannot be made to summarise the varied demographic patterns of current global population growth. Governments operating within differing socio-economic situations are increasingly grappling with very divergent trends. Despite overall global population growth, there are also clear demographic patterns of an extraordinary drop in female fertility rates in economically developed countries. These variations in fertility trends between advanced and less developed economies countries, express different inequalities and societal outcomes that are shaped by contrasting cultural and socio-economic contexts. These differing trends of growing young populations in high fertility countries, and increasingly older populations in developed counties, presents vastly different challenges to the governments of those regions.

The rate of annual population increase historically accelerated every year, as a result of birth rates exceeding the death rates, with a widely accepted fertility rate that a population needs to maintain stability of 2.1 children per women. Fertility rates above this level observed in less developed economies have largely reflected the need for children to be engaged with agricultural, domestic and economic activities. The lack of easy contraception access and general lower levels of female education contributed to the historically logical drive to have multiple children. The societal norm to have multiple children was also due to the expectation that a significant proportion would die at a young age



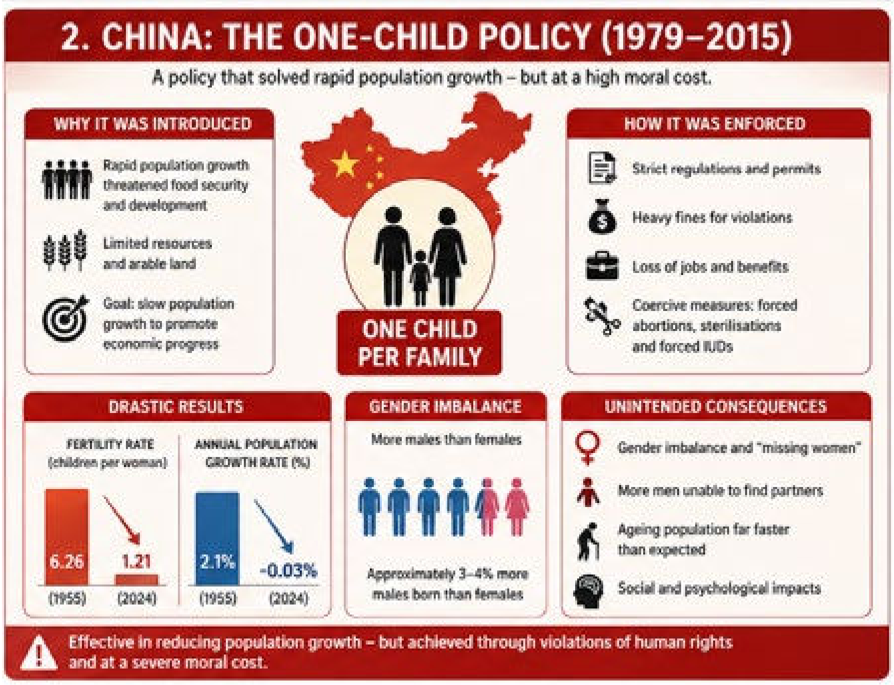
as a result of poor health care. In recent times however, global health care and awareness has improved drastically, but cultural norms however have been slower to change.

This has been compounded by average global longevity rates rising to 72.8 years, contributing to a steep population growth as death rates improved. In underdeveloped regions, children and extended family were seen as crucial to help with labour and provide care for their parents in old age, which also acted as a significant contributing factor to families having multiple children.

The social structure of more industrialised and developed countries, however, has tended to produce lower fertility rates as governmental welfare and aid meant that the elderly were able to be supported through benefits and government care provision. Declining birth rates were also driven by several other factors including lifestyle choices associated with birth control being more accessible, education systems providing a strong influence for women to enter into the work force, and an expansion of healthcare services that dramatically lowered infant mortality rates. These factors have been seen to create very significant demographic and economic responses, within only one generation of birth rates data.

As a result of this differing population growth dynamic, the projected rise of world population to 9.2 billion around the 2050s is largely confined to the ‘global south’ countries, e.g. Africa, Asia, South America. Anomalies within this group would include Australia, Japan and New Zealand, due to the different historic government and economic developments of those countries.

To understand the very different circumstances and demographic situations that governments face in these different situations, we need to examine key examples of how

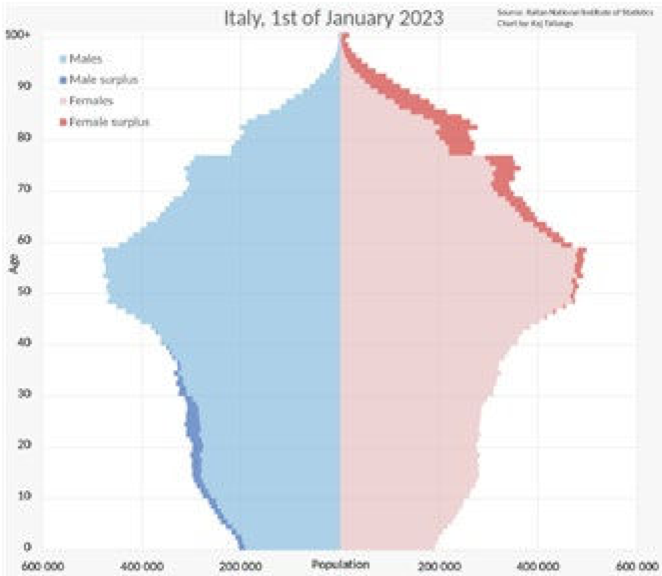


governments have managed excess population growth on the one hand and significant population decline on the other, to highlight the dramatically different challenges they face and the morality of policy choices they have adopted.

China is the classic example of a government that went to extreme lengths to control a growing population, only to encounter the reverse challenge 50 years later. China’s approximate population is 1.4 billion and ranks 2nd globally for the highest population, only behind India which equates to 17.7% of the total world population.

Fertility rate from the years 1955-2024, decreased from 6.26 to 1.21, and with latest data still seem to be heading lower. The yearly % change of population also had a staggering drop from 2.1% to -0.03% in 2024. The (net) migrants movement highlights the increased loss of migrants, where in 1955 the loss was -16,814 whereas 2024 the number increases to -310,866. Here we can clearly see where a government has taken into actions to actively influence a decrease in their overall population, due to the risk of the country being unable to feed its own population or increase general economic wellbeing as they were trying to develop the economy in the 20th Century. The Chinese government responded to this population growth challenge by the implementation of the one-child policy, initiated in the late 70s / early 80s. Its sole purpose was to limit a family to one child, which with the controls allowed under a communist system, created a clear reduction in the population growth rate. The distribution of the policy was very uneven between the rural and urban parts of China. This resulted in a separation between more traditional labour working families in the rural countryside who needed the extra labour support, compared to the easily influenced, more willing to comply, or easier to control families in the city. An increasing larger divide between social classes formed, with the government imposing sanctions against those who didn’t comply, including extreme lengths and coercive measures such as forced abortions and sterilisations.

The result of this general reduction did prove to be very successful as seen in the statistics, however it came at a severe moral costs, restricting individuals’ rights and most likely leading to deaths of young unwanted babies. Most notably the gender divide became greater towards males, with roughly 3-4% more males born than females. With the one-child restrictions, having a girl



became highly undesirable culturally, resulting in a rise in abortions of female foetuses. Overtime this gap widened, and as the situation grew, China has ended up with fewer females available for marriage and potentially a big problem with large numbers of unstable men without a family. Historically, governments have often responded to the danger of large young male populations by going to war to divert their attention.

Another country with a deep rooted and long history of intervening in population issues is India. Being a sixth of the entire world's total population with an estimated 1.4 billion people as of 2024, the Indian government has had to battle with the overpowering consequences of overpopulation. However for economic and cultural reasons, "India has long been called the country of missing women." – a quote from the Nobel Prize winning economist Amartya Sen (Pandey, 2021) in an article back in 1990 when the gender ratio was 927 women for every 1000 men. To put this number into perspective, this was around 37 million "missing" women. For many years, the religious and cultural perception of women was seen as supporting the family and playing an important role in religious activities. The history of India's population crisis goes back to the 1950s, when India became one of the first countries to initiate a national family planning programme. However, the "dark period" came in around 1975-1977. This was when the then prime minister Indira Gandhi imposed a national emergency through a family planning program of forced sterilisations and abortions. Unfortunately, given India's strong cultural preferences to have at least one son rather than daughters in a family, the terrible fact was that girls were much more likely to be subject to abortion or be killed after birth in infanticide, which can be seen in the clear trend of the large majority male population.

The repercussions of this two-year emergency policy was estimated to be around 6.2 million men were sterilised. Furthermore, a deliberate targeting of the marginalised and poor sections of society became the easier outcome of this crisis, with poverty eradication being a dominant theme throughout the 1970s. The evidence of this extreme coercion was shown when the policies of sterilisation became as influenced as: "you can have as many children as you like, but the authorities will limit your options and civil rights if you have more than two." It is clear that these policies undermined reproductive freedom and exercised gender inequality and misogynistic misconceptions as the marginalised sections of India were robbed of their individual autonomy rights. However, it is difficult to determine exactly where the line should be drawn as to how far governments can go with intervening in population balance at the expense of ethical and moral rights.

While the discussions of overpopulous countries and the measures each government have taken to combat that issue is clear, it is important to understand the other side of the demographic challenges occurring globally, with those countries experiencing rapid population shrinkage. European countries such as Italy have historically and currently had some of the lowest birth rates in the world. Its long-standing low birth rate level has dropped to 1.3 in 2023 as its economic development in the 20th century meant the social status and economic and family role of women developed in a way to make women feel less pressure to have lots of children. Societal views projected towards women have become more empowering, leading to a shift in their fertility perspectives and birth rates, as women work more and are seen as having independent lives outside of traditional home and motherhood ideas. Overall, this progressively slows down the population growth in these regions, as women are sought to experience a life outside of just having children. However, this negative population growth can contribute to long-term and very negative economic sustainability problems. With the average longevity expectancy in Italy now being 84.2 years, and the total fertility rates being 1.3 per woman (WorldOMeter (2023)), this is a clearly unbalanced age distribution population, with not enough young working age people able to provide economically for an ageing retired population.

With the more recent drive for young adults to move to the big cities and seek better educational futures, the expanding elderly population find themselves with a short-term shortage of elderly health care and aid. Considering the overall lack of children being born, compared to the ideal 2.1 average to keep a population stable, a dramatic imbalance between the elderly individuals who can't provide for themselves, and the future dwindling younger population can begin to affect the socio-economic development and stability of the country. In specific scenarios we can see where Italian governments have tried to combat this issue. A village in the mountains called Massiola reports that no babies have been born there since 2015 and 23 residents have died. Jones (2023). This degrading population is due to a number of reasons. Due to the town being 772 metres above sea level, the phone reception and connection are weak, and the roads are so narrow that cars can only parked at one end of the village. The 'inconvenience' of these factors would be unappealing for youthful populations who want to make a living and keep up to the societal norms, so therefore drive them out unknowingly. Massiola is not the only one. Several other under the radar, mountainous villages in Italy are slowly dying out. This is where the one-euro homes come in place. In the hope for restoration of abandoned towns, the government have set forward a scheme for homes to be sold for 1 euro. They appeal towards young as well as older audiences who desperately need places to live. However, the repercussions of this scheme have been slow and unreactive

Many other countries such as Japan, are also effectively slowly dying through very low fertility rates and for those that do not want to allow increased immigration to compensate for the falling population, this leads to similar long term economic and elderly care issues. Whilst many countries such as America have been created through immigration and it can help economic growth and provide a safe haven; it can also provoke a backlash and cause extreme political parties to gain support. Government actions to increase population also bring some problems as they are basically coercing women and young people to have more traditional family lives, when that may not want to, or this does not make sense culturally and economically to those people. Some governments have brought in tax or financial policies to promote having children, such as the Finnish family benefit programmes (Vehviläinen, 2019), which provided a monthly child benefit of around €100 euros per child. This tax subsidy incentive shows how several European counties such as Estonia, Sweden and Finland are all taking humane and civilised approaches of population management. The compensation appears more appealing to families, therefore providing a positive influence on having more children to boost the population back to a stable number.

It is clear that both sides of the argument around managing population growth present complicated moral and economic issues. It does appear much more difficult morally for governments to restrict population growth given the gender imbalances and risks of infanticide that creates. But promoting population growth can also benefit and coerce some groups over others or create pressures around immigration causing political stresses within countries. On balance, it does seem justifiable and necessary for governments to intervene in population growth, however this must be implemented with strict moral boundaries and protection of civil and democratic rights. In particular, these boundaries and rights must consider women's specific autonomy and freedom to control their own reproductive rights.

- Charlotte M

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THE BLUEPRINT OF A LIE: WHY WE PRETEND THE WORLD IS FAIR.

We are taught that the world is a workshop: a place where you can build any life you want if you simply work hard enough. But is that actually true? If you take a proper look at the floorboards, you will see a blueprint that has been there since birth. It is a blueprint that decides which rooms you are allowed to enter and which doors stay locked, regardless of how hard you try to open them. We call this fairness. We call it merit. I call it the most successful lie ever told.

The world is not fair. It is incredible how many disadvantages people face simply because of the family they were born into. If a child from a wealthy family starts a business and it fails, they often have the money and support to start again. If the same thing happens to someone from a poorer background, the consequences can be devastating. Society is not simply a test of who is smartest or who works hardest; often, it is a test of who can afford to fail the most.

You will all have heard of Albert Einstein, F. Scott Fitzgerald, James Watson and Francis Crick, Walter Keane, Charles Darrow and Henry Gauthier-Villars. But what if I told you that some of these famous men were not the only minds behind their work? What if I told you that Mileva Marić contributed to Einstein's early scientific work, or that Rosalind Franklin's research played a crucial role in the discovery of DNA? What if many women throughout history were overshadowed, ignored, or denied recognition for their contributions? So the next time you hear these names, also think of Mileva Marić, Zelda Fitzgerald, Rosalind Franklin, Margaret Keane, Elizabeth Magie and Sidonie-Gabrielle Colette. This begs the question: how many great men's achievements were built upon the hidden contributions of women?

I am not saying that it is impossible to reach the top — it certainly is not. Despite the odds being stacked against some people, you should still fight for wherever you want to be in life. In many ways, overcoming those barriers can make success even more impressive. There are countless examples of people who began life on unstable foundations and still managed to create extraordinary change.

A powerful example of this is Marsha P. Johnson and Sylvia Rivera, pioneering Black and Latina LGBTQ+ activists, particularly for gay and transgender rights. Despite homosexuality and transgender identity being heavily discriminated against at the time, they were at the forefront of the Stonewall uprising in 1969. This movement helped ignite a major shift in the modern LGBTQ+ rights movement, leading to the formation of many activist groups and annual Pride events. They did not ask politely for a seat at the table — they challenged the structure itself. They did not simply succeed as individuals; they helped force the blueprint to change for millions of people.

Because the structure of society has never been completely equal. Not only do people begin life with different

advantages and disadvantages, but society also decides whose voices are considered believable, intelligent or authoritative. Even Einstein himself struggled to be taken seriously at points in his career, so would society really have listened to Marić over him at the time?
The "blueprint" idea acts like a filter on society, influencing whose voices are heard and whose are ignored. Even if Marić had shouted her ideas from the rooftops, the system may still have dismissed her as 'hysterical' while automatically granting a man more authority or respect. So what is the message here? Challenge the blueprint. Because if inequality can be embedded before the foundations are even built, then perhaps we can rebuild the structure entirely. Maybe then we can start listening to people not because of who they are, but because of what they have to say.

- Emily D

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SHOULD AI REPLACE HUMAN JURIES?

In the world we live in today, the advancement of artificial intelligence has been taking human roles in society, including the role of a jury. For example, artificial intelligence has never before been used in legal proceedings but has been used as lawyers in experimental trials. This article will look into whether it would be advisable for AI juries to replace human juries in the future. By allowing artificial intelligence to have a role in the decision-making in the courtroom many questions and concerns are raised that must be carefully taken into perspective. While AI may seem efficient and helpful, its use in such important settings could lead to serious3 problems if not carefully regulated and restricted.

For instance, the misuse of artificial intelligence in legal proceedings increases the need for strong regulations and laws. AI may be used for the dissemination of fabricated evidence (the act of creating or knowingly spreading falsified information and presenting it as real evidence, with the intention of misleading decision-makers such as judges, juries, investigators or the public.) This could lead to crimes such as fraud, contempt of court or obstruction of justice.

Human juries exist for many important reasons. A key reason is to prevent one single person from deciding one other person's fate. Juries are specifically selected to reduce bias. Both AI and human juries aim to uphold the law and order of the courtroom and deliver justice to the person being brought to trial. Thomas Jefferson once said, "I consider trial by jury as the only anchor ever yet imagined by man, by which a government can be held to the principles of its constitution." This quote highlights the importance of human involvement in justice. Artificial intelligence works by analysing data and statistics from the past. Although AI can learn patterns, it cannot understand real-life situations in the same way that humans do. Every case brought to the courtroom is different, and human jurors can consider context, behaviour, and credibility. However, humans can be influenced by persuasive arguments from lawyers for the prosecution and defence. Therefore, AI should be used to support human juries, working around the strengths and the weaknesses of both, as human and artificial intelligence-based judgement is highly essential.

On one hand, AI juries are more consistent and efficient. Human juries can be influenced by emotions, personal beliefs, or peer pressure. Although AI systems are programmed to always follow the same rules. This could lead to fewer unfair verdicts caused by human error. AI can process large amounts of information very quickly, meaning trials could be shorter. In a busy legal system, this can save time and money.

On the other hand, artificial intelligence is not always fair or neutral. AI systems are trained using data that has been created and inserted by humans, and this data contains bias in most cases. Cathy O'Neil (author) warns that, "algorithms are opinions embedded

in code." This means that if the data is biased, the decision made by AI will also be biased. For example, when an AI system is programmed based on past court cases that may have treated certain groups unfairly, il would continue this discrimination. This could end up making the justice system even more unjust rather than improving the system.
Another major problem with artificial intelligence-based juries is they lack moral judgement. Human jurors feel sympathy and understand more complex emotions such as fear or regret. These emotions are important when deciding punishment or guilt. AI cannot truly understand human feelings or moral responsibility. As the legal Lord Neuberger said, "justice is not a mechanical exercise." This shows that justice requires human judgement, not just calculations from artificial intelligence.
If an AI jury makes a mistake, you cannot be unclear as to who would be responsible. The programmer, the company, or the court? With human juries, the responsibility is shared and transparent. People are more likely to trust a system run by humans rather than machines and robots. Courts rely on public confidence to function. If the citizens do not trust AI juries, they could feel the system is unfair. This may reduce respect for the law and cause further problems in society. There should be an outcome of a compromise, although AI juries should not fully replace human juries, it should still help in the decision-making of the courtroom. Artificial intelligence could be used to organise evidence, check the legal precedents, or highlight any inconsistencies in testimonies. They should support human juries instead of fully replacing them. By combining AI efficiency with human perspective and judgement, courts would be fairer and much more effective. This allows society to benefit from technology while keeping justice where is should be.
In conclusion, artificial intelligence is progressing and so juries should as well. I believe that there should be a mixed balance between AI and humans. Humans should work together with AI to end up choosing guilty or not guilty for the person who is being tried. However, this is a statement to be cautious as there is a risk of hackers leaking information through artificial intelligence, but through humans there can be an unconscious bias therefore the outcome may differ from person to person resulting in some being more disadvantaged.

- Emma D

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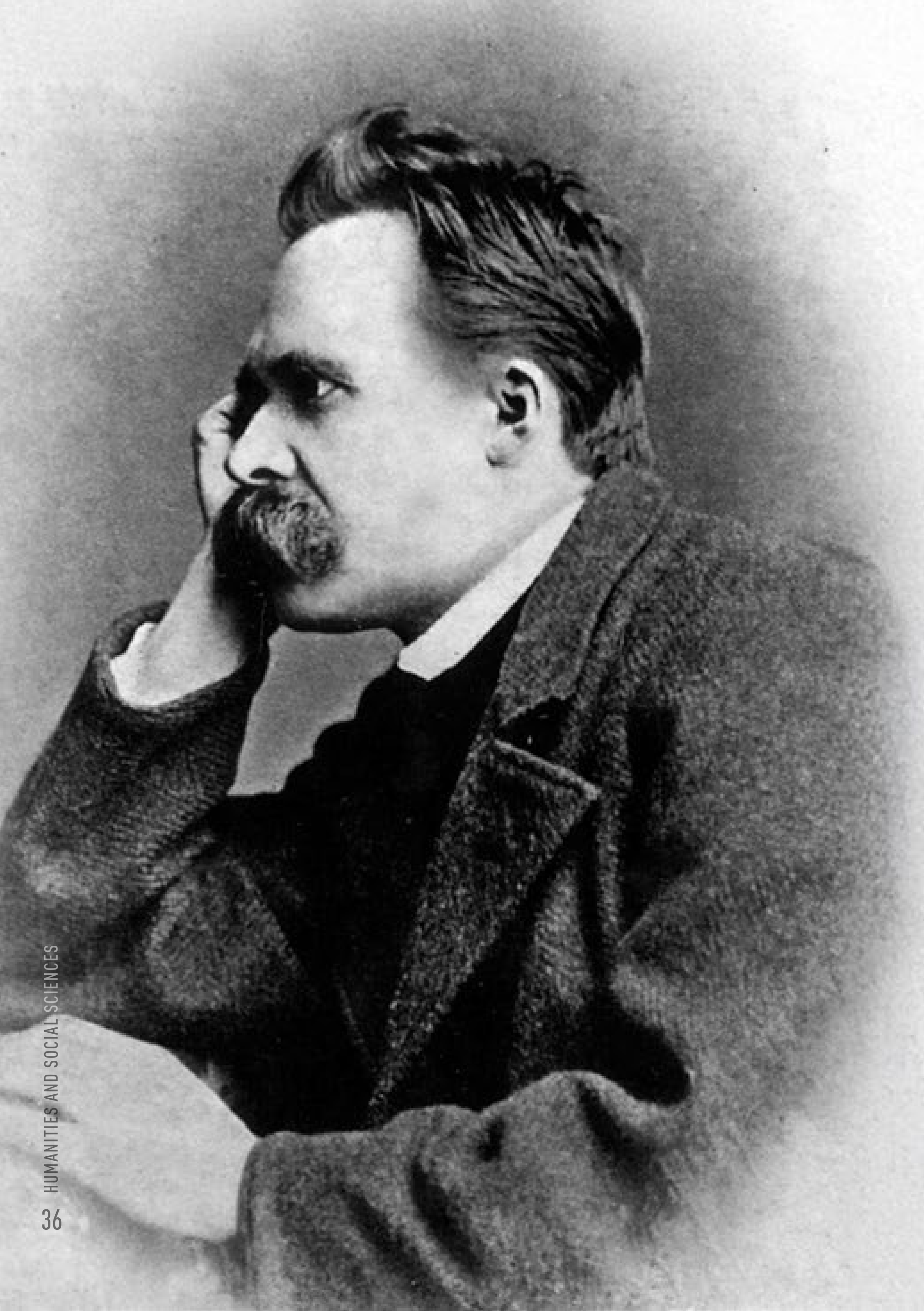
IS NIETZSCHE'S CRITIQUE OF WESTERN MORALITY DESTRUCTIVE OR LIBERATING?

Friedrich Nietzsche was a 19th century German philosopher best known for his radical challenges to traditionalist beliefs surrounding religion, morality, and truth. Writing in a period when Christianity deeply shaped European culture (1870-1890), Nietzsche wanted to question the foundations of western moral thought, as opposed to innately accepting them as absolute truths. His critique of morality tended to be viewed as deeply destructive, as it rejects well-known, established moral values, denying their validity. However, Nietzsche does not aim to eliminate morality entirely; he aims to expose what he views as the life denying nature of western morality, to make the possible creation of new, life affirming values. My contention is that his critique is destructive in its rejection of traditional Christian values, but I also believe that it can be liberating, as it aims to encourage genuine self-belief and thought.



Nietzsche's critique is predominately aimed at Western morality, particularly in its Christian aspects. He argues that Western moral values, such as humility, obedience, and selflessness, did not arise from objective moral truth but from historical power dynamics and relationships. In the Genealogy of Morality, Nietzsche describes the Christian system as a 'Sklavenmoral' meaning slave morality. Essentially, he believes that there was a resentment of the weak toward the strong during the Roman empire, and so, those lacking power redefined strength and pride as 'evil', while portraying weakness and submission as 'good'. This in turn reframed weakness as moral virtue. Nietzsche interpreted this through the Christian value system. For example, the idea of sexlessness is turned into purity, and submission to those in power becomes obedience.

As a result, Nietzsche's critique comes across as very destructive. By denying the existence of objective moral truths, he undermines the foundation of ethical life and the core Christian value system. If morality is a result of historical construct, instead of a universal binding, there is a huge worry that there will no longer be a clear distinction between what is considered morally right and wrong. Consequently, this has led many to accuse Nietzsche of promoting moral relativism and nihilism, which is the idea that life lacks inherent meaning and value. Moreover, Nietzsche's admiration for strength and excellence can be interpreted as justifying domination and selfishness, which raises further concerns about responsibility and the limits of morality. From this perspective, Nietzsche's philosophy destroys traditional shared moral standards, without offering a stable replacement, leaving us in a collapsed system of nihilism.

However, Nietzsche understood that although the destruction was intentional, it was also a way to reconstruct a new system. Instead of leaving humanity in a world without any morals, he wanted to confront nihilism which had been created by the collapse of traditional religious beliefs. Nietzsche argues that Western Christian morality is life denying as it suppresses natural human instincts, creativity, intelligence, and individuality. By encouraging guilt, self-denial, and obedience, it prevents people from fully affirming life and living in accordance with nature. For Nietzsche, dismantling the system is ultimately the first step toward overcoming nihilism. Only by rejecting inherited values can individuals now recognise their own power to create meaning rather than passively accepting it for what they have been told it is.

The liberating aim of Nietzsche's critiques can be seen in his want for a 'revaluation of values.' He believed that individuals should actively create and adopt their own values based on strength and authenticity. This idea is often portrayed though the concept of 'Übermensch' - an individual who could overcome traditional values and live according to self-created ones. While the idea is highly controversial and not meant for everyone, it represents Nietzsche's vision of liberation, and his want for people to embrace their true potential.

To conclude, Nietzsche's critique of Western morality is profoundly destructive in its rejection of traditional Christian values and claims to moral universality. But Nietzsche believes that dismantling the Western Morality system is logically necessary to overcome nihilism, as only then are people able to create new sources of meaning. I would argue his philosophy carries many flaws, particularly the absence of shared moral certainty, but if viewed as an idea of liberation and renewal, then I do believe that it can be viewed as both destructive and liberating.

- George C

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MUN

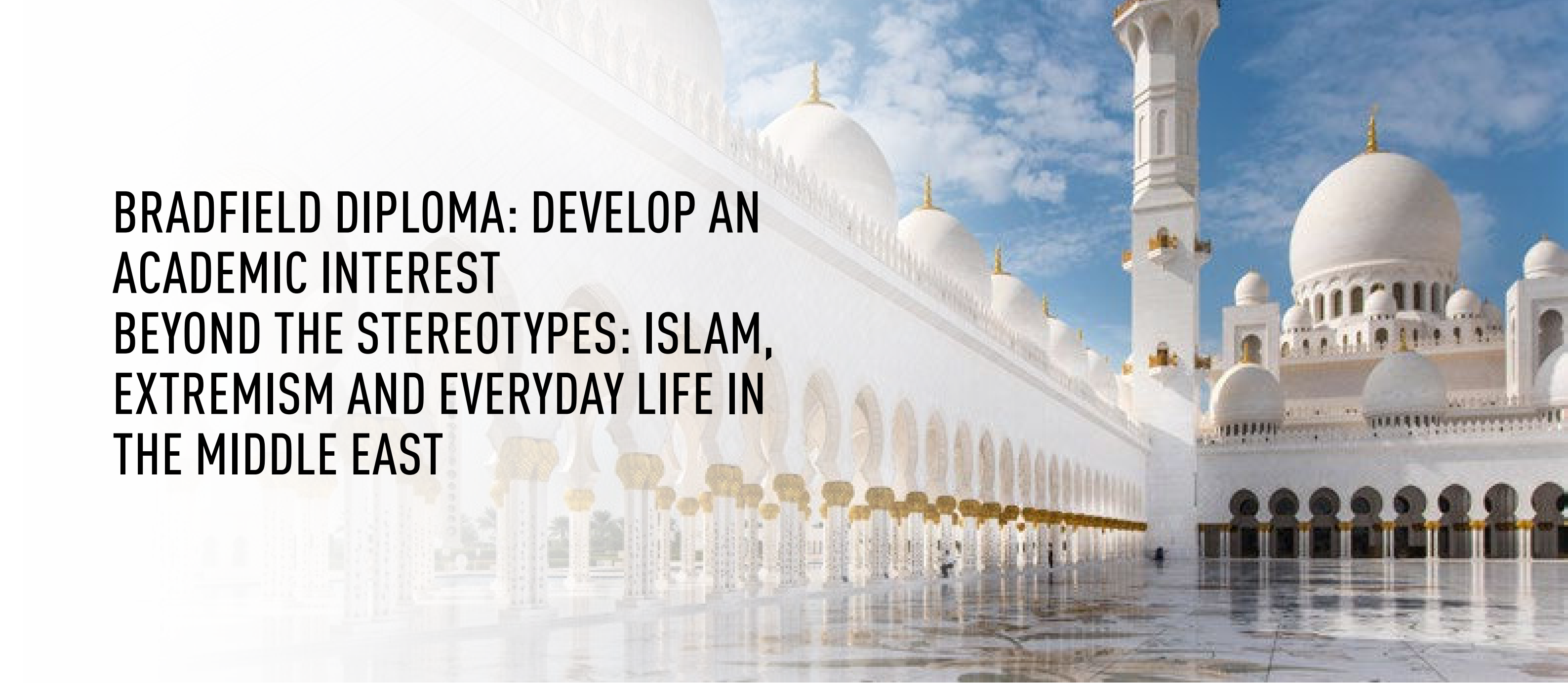
Each Wednesday from 4.00–5.00pm the Drama Studio hosts our Model United Nations sessions, bringing together around twelve Lower Sixth students to explore international affairs through debate and diplomacy.

Working alongside students from Kennet School, participants represent different countries and practise the key elements of Model UN: researching global issues, drafting resolutions, negotiating with other delegations, and delivering formal speeches. The sessions develop confidence in public speaking while encouraging students to consider complex global challenges from multiple perspectives.

The programme also includes participation in a conference at **Magdalen College, Oxford**, where students represent their assigned nations alongside delegates from other schools, applying the skills they develop in the weekly sessions in a formal conference setting.

BRADFIELD DIPLOMA: DEVELOP AN ACADEMIC INTEREST

BEYOND THE STEREOTYPES: ISLAM, EXTREMISM AND EVERYDAY LIFE IN THE MIDDLE EAST



Until recently my understanding of Islam and the Middle East region was very limited. Worse than that, my overall impression was a negative one, founded on news coming out of places like Israel, Iraq, Syria, and Yemen – it was knowledge based on fundamentalist ideas, backed up by movies such as *Zero Dark Thirty, The Kingdom, and the Jason Bourne* series. As a result, I had a very sheltered view of the Middle East, and I thought of it as a dangerous place associated with conflict and extremism.

In February of 2024 my Dad was offered a job in Riyadh in the Kingdom of Saudi Arabia, which he accepted, and so I decided for my Bradfield Diploma I would educate myself on the region, and I have concentrated my research on Islam and what it means to be a Muslim. Saudi Arabia has become an important focus of my research, as it is both the birthplace of Islam and it is the country I have visited most over the next 24 months. In this essay I hope to challenge regional stereotypes by separating Islam as a faith from political extremism carried out in its name.

The Middle East and North Africa region of the world is made up of 22 countries and has a population of 315 million Muslims. Muslims account for 93–95% of the total population, Christians account for 3–5% with less than 0.1% Judaism.

The practice of Islam is woven through every part of society in Saudi Arabia, and is present in everyday life. On arriving at Riyadh airport, you are immediately struck by the dress code – the vast majority of men are dressed in white thobes with the traditional red head dress, and women are wearing black abayas (covering their hair and body – photo below). And as soon as you step out of the airport you are faced with a huge mosque which is one of the 17,000 mosques in Riyadh that ring out with a call to prayer on loud speakers across the city, five times a day.

Riyadh alone is estimated to have over 17,000 mosques, highlighting how central Islam is to daily life in Saudi Arabia. During my visits to the region, I observed that the dress code is far more strictly adhered to in Saudi Arabia than in countries such as Oman or the United Arab Emirates, where traditional clothing is often mixed more freely with Western styles. In Saudi Arabia, traditional dress is the norm rather than the exception.

Also, unlike in other Middle Eastern countries I have now visited, such as Oman and the UAE, I was unable to visit a mosque in Saudi Arabia. This is because public non-Islamic places of worship are not generally permitted in Saudi Arabia. Saudi Arabia significantly expanded international tourism in 2019, and as a result there are still fewer designated tourist sites compared to neighbouring countries. This reinforces the idea that Saudi Arabia is not primarily presenting itself as a tourist destination, but as a religious and cultural centre of Islam – and as the birthplace of Islam, this is likely to stay for some time.

In Islam there are two main branches of Muslims; Shi'a and Sunni. Sunnis make up around 90% of the global Muslim population, whereas Shi'a Muslims account for roughly 10%. Both have the same key beliefs, but vary in some aspects. Where they differ is in religious leadership, historical development and some practices and interpretations. The split began after the death of the Prophet Muhammad. Sunni Muslims believe that the leader of the Muslim community should be chosen by consensus, and they supported a close friend of Muhammad after his death to become the first leader, whereas Shi'a Muslims believe that the leader should come from Muhammad's family, so their first leader was Muhammad's son-in-law Ali.

It is important to understand this distinction, as political instability in parts of the Middle East is sometimes linked to sectarian tensions, although the vast majority of Sunni and Shi'a Muslims live peacefully alongside one another.

Many Muslims believe that all people are born in a natural state of submission to God, known as fitrah. Muslims believe in God or 'Allah', and that people may later move away from this path through cultural influences or upbringing. Muslims believe that the true path to follow is the one of Allah (God), and that he has sent (according to certain Hadiths) 124,000 prophets to guide humanity to follow the right path, of which Muhammad is the most important.

Islam shares many things in common with Christianity, one of them is the belief in Jesus. However, Muslims do not see Jesus (Isa) as the son of God or part of the holy trinity. Instead, they see him as one of the many prophets or messengers of God, alongside figures such as Adam, Noah, Abraham, Moses and Muhammad. 'We make no distinction between one and another among them' — a quote from the Quran which emphasises the importance of all prophets within Islam. The final Prophet Muhammad was born in Mecca in approximately 570 CE, around six centuries after the time of Jesus. Muhammad is not seen as divine, but as a human chosen by Allah to deliver his final message to humanity. Understanding this historical and religious timeline helps clarify where Christianity and Islam differ, as Muslims see Islam as the final completion of a message that had already been started by earlier religions such as Christianity and Judaism through prophets such as Jesus.

Muhammad, the final prophet, is particularly important to Muslims because he was told the surahs over a period of 23 years, which were later written down to form the Quran. The surahs are believed to be the exact word of God, which was revealed to Muhammad by the angel Jibril. The Quran has 114 surahs and it outlines the five pillars of Islam which are the key practices for all Muslims. They are:

1. Shahada – the declaration of faith
2. Salah – performing five prayers daily
3. Zakat – giving a portion of wealth to charity and those in need
4. Sawm – fasting during the month of Ramadan
5. Hajj – performing a pilgrimage to Mecca

The importance of time in Islam is also reflected through the Islamic calendar and daily prayer schedule, which you experience through daily life in the region. The call to prayer rings out over the streets and men stop what they are doing and head to the mosque, or they have a prayer mat with them and stop to pray wherever they are. There are five daily prayer times:

1. Fajr – before sunrise
2. Dhuhr – midday
3. Asr – afternoon
4. Maghrib – just after sunset
5. Isha – night

Sign outside a Mosque

These prayer times change slightly each day depending on the position of the sun, reinforcing how Islamic worship is closely connected to natural rhythms. I found it incredible to think that family life is so structured by this – and for children as young as seven. In most mosques today you will find Islamic clocks (photo below) which show the Hijri date and the five daily prayer times. The Hijri calendar is the Islamic lunar calendar, which is based on the cycles of the moon rather than the sun. Each month begins with the sighting of the new crescent moon, meaning that Islamic months are around 29 or 30 days long and shift approximately eleven days earlier each year compared to the Gregorian calendar.

Islamic clock and lunar calendar


The Islamic calendar also determines major religious festivals and periods of worship that structure the Muslim year. For example, in 2026 the month of Ramadan is expected to begin in mid-February, followed by Eid al-Fitr, which marks the end of fasting. Later in the year, Muslims observe Hajj, the pilgrimage to Mecca, which concludes with Eid al-Adha, one of the most important festivals in Islam. Because the calendar is lunar, the exact dates depend on the sighting of the moon. The key calendar dates for 2026 are as follows:

- Ramadan – expected to begin around 17–18 February 2026
- Eid al-Fitr – expected around 19–20 March 2026
- Hajj pilgrimage – expected late May 2026
- Eid al-Adha – expected around 27–28 May 2026
- Islamic New Year (1st Muharram) – expected around 17 June 2026
- Mawlid an-Nabi (Prophet Muhammad's birthday) – expected around 26–27 August 2026

Not only is daily prayer extremely important for Muslims, but ideally it should take place in a mosque. Mosques are therefore key features of the Middle East landscape and they all have certain features in common. For example, all mosques point towards the Kaaba (the most sacred site in Islam). So in Jordan mosques point south-east, but in Oman mosques point west. This is because Muslims must pray facing the Kaaba. Mosques have two rooms for prayer, one for women and children, and one for men. Mosques also have two tall towers outside called minarets. These towers are where the muezzin (the person who says the call to prayer) will call out so he can be heard from above the roofs of the houses.

Practices around prayer include Wudu (washing before prayer). Every mosque has running water, whether it is from a tap, river, or irrigation system. The order of washing is as follows:

- Intention (Niyyah) – mentally intend to perform Wudu for the sake of Allah
- Say "Bismillah" (In the name of Allah) – say it before starting
- Wash hands – x1
- Rinse the mouth – x3
- Rinse the nose – x3
- Wash the face – x3
- Wash each arm – x3 (right arm, then left arm)
- Wipe the head – x1
- Wash the feet – x3 (right foot, then left foot)

Wudu is intended to help Muslims prepare mentally and spiritually for prayer through cleanliness and focus. When we were in Oman we went on a tour into the desert with a Muslim Omani as our tour guide. He showed us a very small town with a little mosque in the middle, where he showed me how to perform ablution. Oman is known in the Middle East for its irrigation systems which are present in most towns. It was in the small manmade river where I performed a version of Wudu (see photograph). In order to pray correctly Muslims are expected to dress modestly during prayer; women often also cover their hair.

Whilst I was in Oman we also visited the Grand Mosque in Muscat. This mosque is one of approximately 15,000 mosques in Oman. It was opened and built using donations from the previous Sultan in 2001. The Sultan Qaboos Grand Mosque is immense; it can accommodate up to 30,000 people including the outside courtyards. It has the second largest chandelier in the world reaching 14 metres tall, with 1,122 light bulbs. It also has the world's largest hand-woven carpet, which is 60 x 70 metres and was created by 600 workers over four years. But before you see all of these things you are struck by the five tall white marble minarets and the mosaic patterns scattered below. All of these exquisite designs are for the worship of Allah. This mosque is a Jama mosque, meaning that it is used for Friday prayer, which is the holy day in Islam. Thursday and Friday used to be the weekend days before they adjusted to Saturday and Sunday to match global business days. It is mainly used on Fridays apart from religious festivals such as Eid al-Fitr, which follows the month of fasting called Ramadan. Being a Jama mosque makes it particularly special. Mosques are where Muslims pray, reflect and devote time to Allah. For this reason they are built with great thought and care, with attention given to all details and with the utmost respect for Allah as it is one of the most important places in a Muslim's life.

The most sacred and holy place for Muslims is the Kaaba in Mecca, Saudi Arabia. Every time a Muslim prays, no matter where they are, they pray towards Mecca. When Muslims perform Hajj (one of the five pillars of Islam) they travel to Mecca. In the airport you can identify the pilgrims because they wear a simple cloth called 'ihram', which represents a focus on God. The cloth matters because of the following reasons:

- Equality – everyone looks the same; wealth, status, nationality and professions disappear
- Humility – the plain white cloth mirrors a burial shroud, reminding pilgrims of their mortality
- Purity and simplicity – no adornment, no distractions
- Unity – millions worship together as one
- Detachment – a stepping away from one's own identity

Interpretations of dress codes, especially for women, are often debated in Western society. For example, many families and societies across the Middle East expect women to wear full body and face abayas even though it is not always a legal requirement. This is sometimes perceived as oppressive for women. Women (and men) are told in the Quran to dress modestly and behave with purity. The Quran is believed to be the exact word of Allah, so it holds a lot of weight in society:

‘O Prophet! Ask your wives, daughters, and believing women to draw their cloaks over their bodies. In this way it is more likely that they will be recognized as virtuous and not be harassed. And Allah is All-Forgiving, Most Merciful.’ (Surah Al-Ahzab Ayat 59 – 33:59 Quran)

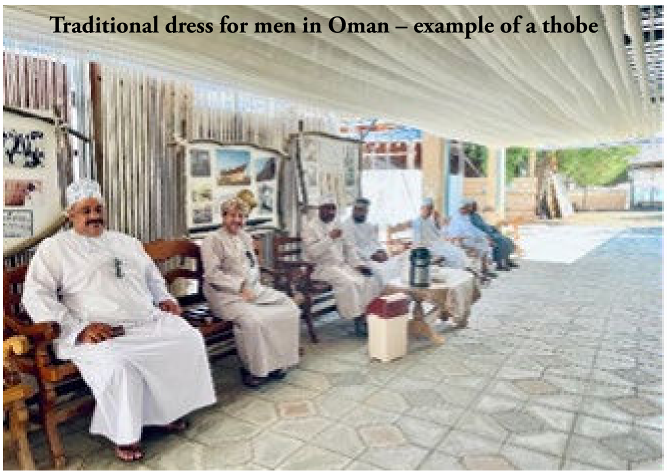
Our Omani guide used an analogy commonly used within conservative interpretations of modesty to explain the concept of purity:

‘There are two plates of food in front of you,’ he says. ‘The two plates of food have the same food on them, however, one plate is covered with a cloth and one is not. The plate that is not covered attracts flies, dust, and the food quickly goes off under the bright hot sun, however the food that is covered remains pure.’

It is often overlooked that dress codes in Saudi Arabia also apply to men. Men traditionally wear thobes and headscarves, which cover much of the body and reflect modesty, climate and cultural identity. This shows that modest dress is not only expected of women, but is a broader cultural norm.

In the last two years that I have been visiting Saudi Arabia, it is already possible to see changes for women and in the country generally. On our most recent visit we had a female taxi driver, which would not have been possible only a few years ago. She spoke positively about the changes happening in the country. She was covered, but not in black, and her face was visible. This demonstrated how personal choice within cultural boundaries is increasing.


Traditional dress for women in Saudi Arabia – example of abaya


Traditional dress for men in Oman – example of a thobe

When travelling to and from Riyadh on the aeroplane there is often a large queue for the toilets in both directions. On the way out of Saudi Arabia many young girls and women change into Western clothes, and on the way back they change from Western clothes into abayas. This may be seen by some as oppression, but it may also reflect respect for family expectations and older generations. As a tourist, I noticed that locals respond very positively when visitors dress in traditional clothing, not because of religious enforcement, but because they are flattered that someone wishes to respect and adopt their culture. At my Dad’s workplace they even have ‘Thobe Thursdays’, where non-Saudi colleagues join in wearing traditional dress.

More broadly, women’s rights have been improving. In 2019, when Saudi Arabia opened up further to tourism, the powers of the religious police were significantly reduced under Crown Prince Mohammed bin Salman’s reforms. Since then many people in the Kingdom have experienced greater freedom of movement and social change. This has had many positive knock-on effects, alongside the fast-growing economy and momentum in non-oil related sectors such as the entertainment industry. Importantly, it has allowed women in Saudi Arabia to drive, travel more independently and access wider employment opportunities. It has improved opportunities for many women, although challenges and debates around equality still remain.

Although parts of the Middle East are unstable and Islamic terrorists do exist, some countries such as Oman, the UAE, Saudi Arabia, and Qatar have some of the lowest crime rates in the world. When visiting, I have noticed that residents are happy to leave their belongings unattended in restaurants, malls, and on beaches. Women and children also go out unattended at night across many areas of the city. Some people in Western societies often associate this with the harsh punishments for crime; for example, in Saudi Arabia severe punishments for theft can act as a deterrent. However, culturally the vast majority of the population also follow the teachings of the Quran, in which stealing is not permitted.

Another misconception in the West is that the concept of ‘jihad’ justifies terrorism. Jihad literally means ‘struggle’ and can refer to the struggle to defend the Muslim community under strict conditions. Islamic teachings and Hadith traditions also outline rules governing conduct during conflict, including the protection of civilians and places of worship. These include:

- Do not cut a tree
- Do not kill a woman
- Do not kill a child
- Do not kill a sick person
- Do not kill old people
- Do not kill a monk or a priest
- Do not destroy a temple or a church
- Do not disfigure the dead
- Do not destroy buildings
- Do not kill an animal except for eating
- Do not kill those who surrender
- Be good to prisoners and feed them
- Do not kill those who run away
- Do not enforce Islam

However, extremist groups have misused the term 'Jihad' to justify violence. These groups, often referred to as jihadists, include organisations such as ISIS, Al-Qaeda and Boko Haram. Islamic extremism refers to political movements that distort Islamic teachings to support violence and terrorism. These groups represent a tiny fraction of Muslims worldwide and are widely condemned by Muslim scholars and communities. Their actions are political and ideological rather than religious, yet they have heavily influenced Western perceptions of Islam.

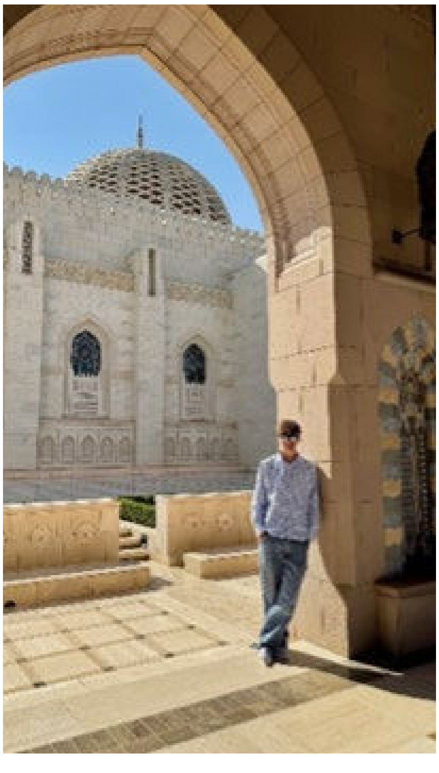
The Quran very clearly emphasises the value of life here:
'If anyone murders an innocent person, it will be as if they have murdered the whole of humanity. And anyone who saves a person it will be as if they have saved the whole of humanity.' (Surah Al-Maaida 5:32)

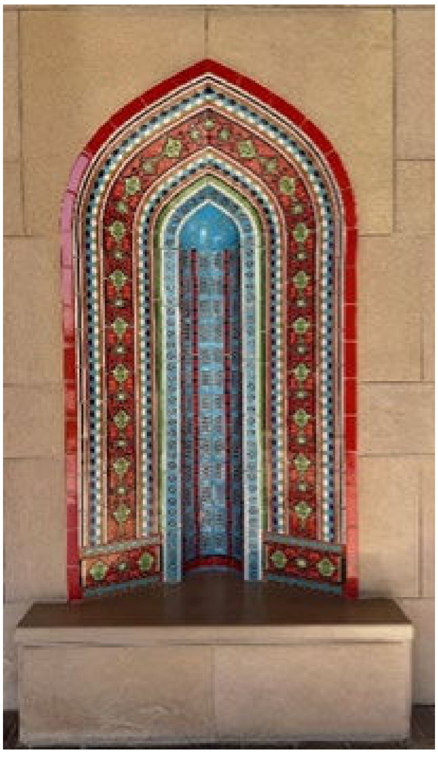
My experiences in the Middle East have opened my eyes to a new way of life, where the culture, religion, language, and day-to-day practices are very different. In this essay I have outlined some of the basic practices of Islam and covered some of the more poignant questions related to it, such as misconceptions surrounding jihad and why some women choose to cover up. I hope that this essay has helped you understand the region better, and that you have learnt about how different and interesting foreign places can be, even if they may initially seem unfamiliar.

- Harry H

Minarets at Sheikh Zayed Grand Mosque in Abu Dhabi

Performing Wudhu in an Omani village irrigation system





BEYOND THE STATUE: UNDERSTANDING CHURCHILL IN FULL

Throughout my time at school, my peers and I have been taught about the deeply successful Winston Churchill. During the rise of the Black Lives Matter movement in 2020, people began to vandalise statues and paintings of Churchill. As I read this in the news I was confused as to why people would not want to recognise such an influential and inspiring figure in English history, so I began to look further into the issue. After this I began to realise how ideals of perfection and heroism surround our society. Churchill is thought to be deeply intelligent and a figure to aspire to be however, what goes unnoticed and is consistently excused was his attitudes towards minority groups and his racist outlooks. During the Bengal Famine, when 3 million Indians died due to starvation after World War II, Leo Avery, the Secretary of State for India in 1943, explained that Churchill had privately said that Indians were "a beastly people with beastly religion," and plainly, "I hate Indians." Churchill made these comments out of frustration after being blamed for the outspread starvation that India was facing after Churchill took food and nutrients from India in order to keep England fed. Furthermore, it is understood that Churchill had a hierarchal view on race, upholding an "imperialistic" view which is now often translated into racist views. During an interview in which Churchill was in favour of bringing Jewish people to Palestine he explained that "a stronger race, a higher-grade race… has come and taken [the Palestinians] place." After learning this, it was difficult for me to grasp the idea of worshipping Churchill the way children are meant to when educated about him, however I also had to learn to understand that although Churchill did and said awful things about innocent groups of people, he equally still did many good things during World War II and was in many ways heroic. This has helped me understand that no person is perfect and that historically people are said to be simply "good" or simply "bad" and that there is no in between. The story of Winston Churchill and learning who he truly was in his character in contrast to the incredible achievements he created for himself has helped me to understand this.

- Indigo P

WESTMINSTER THROUGH THE EYES OF GAVIN WILLIAMSON

On the 26th of January, I had the chance to attend a fascinating and thought-provoking politics talk, presented by Sir Gavin Williamson. He began the talk by speaking casually about his experience as a member of parliament, which offered us a personal perspective on what life in Westminster is really like, and what paths the career can lead to. He spoke about how he became an MP for South Staffordshire in 2010 and mentioned the responsibilities and issues that he faced with representing his constituents, while also representing his party. I found this area of the talk particularly interesting as this is a topic in A-Level politics that we cover, and so Mr Williamson's person insight into this revealed other debates that are not necessarily covered in the textbook, providing us anecdotes with what is seen beyond the Commons.

He mentioned what his time was like in government, including the interesting role that he had as Chief Whip (under Theresa May), where he had the role of needing to maintain party discipline, while also ensuring that government legislation could be passed through Parliament. His personal experiences of negotiation and building relationships in the role revealed to us how dependent the role was on trust, as well as persuasion and resilience when aspects of the role are difficult. We then learned about his role as Secretary of Education for Boris Johnson, and then later becoming Secretary of State for Defence.

In my opinion, the most valuable part of his talk was the emphasis on his early political engagement and interest in the subject. He spoke about how he worked as an intern and advisor for politicians, meaning he was able to have an insight into life as a politician. This emphasised how politics relies heavily on experience and understanding- something that I hope to pursue as I aim to study politics at university.

The Q and A session added a more personal feel to the speech. When asked about his pet spider, he responded with humour- making the talk feel more relaxed while still allowing us to learn about the issues that the media can have on politicians.
Overall, the talk deepened my understanding of how Parliament works in practise, strengthening my enthusiasm to study politics further. Hearing directly from someone who has held senior government positions made the talk an invaluable experience, further motivating

- Jecca C

THE POLITICS AND ECONOMICS TRIP TO THE USA - OCTOBER 2025

A storm hitting the east coast of the USA and a government shutdown was not enough to stop the 25 politics and economics pupils from having a fantastic five day trip to New York and Washington DC.

We arrived in New York in late afternoon on Thursday and made the 45 minute journey to the hotel by coach. The hotel was in a brilliant location in Manhattan, only two blocks away from the Empire State building. That evening the group went to Times Square, via Central Station and Trump Tower and took in the sights of the bustling city. Having Messrs James and Marples leading the group meant that despite it being incredibly busy no – one got lost, despite Seb's map reading skills not quite always being on point. The evening was spent in a local diner enjoying our first taste of a classic American meal. After a long day of travelling after a rather unsociable 5.30am wake up everyone was ready for some sleep.

On Friday morning the group split with the Economics group, led by Ms Chia heading to Wall street for their walking tour and the rest going a short way from the hotel to the United Nations. After being carefully signed in and going through the necessary security we made our way in for our guided tour around the UN. Mr Saunders, after negotiating his way on to the tour, found a fellow BBC journalist to compare notes with. The group were lucky enough to go into the chambers and to see where the general assembly and the security council meet. With the global events taking place this was very relevant for our Global Politics IB pupils. The guide was brilliant and told us about when Malala had spoken at the UN campaigning for equal access to education. With it being the 80th year of the UN it seemed even more significant we were visiting.

Once we had worked out the metro system both groups joined up to pay our respects at the 9/11 memorial. It was a very moving experience. The remodelling and repurposing of the area meant it was still busy but also a poignant place to visit. Once again guided by Seb we made our way to the boat trip to Liberty and Ellis island. What an amazing day to see the statue of liberty! The bright blue sky was amazing, and it gave us some fantastic sights back to Manhattan. The tours around the two islands were awesome and the American values of freedom were clear to see. While Ellis island was less spectacular the stories which made up the museum helped us appreciate how much the country has changed and how society has become known as a melting point. With the raw emotion within the stories of the migrants who arrived in the early 1900s and the challenges they faced they was clearly some symmetry with today.

After some shopping, where those previously tired legs became energised, we made our way back to the hotel to freshen up for our meal out. Today was Harrison Wright's birthday so we celebrated with a meal out. The slightly odd bread and nuclear style fizzy drinks meant it was certainly a birthday meal to remember!

Saturday morning was a chance to explore New York and so off we went to central park, and to see Trump towers and the ostentatious Louis Vuitton shop. Polly and Lottie went up the Empire State building and had some amazing views across the city. Once the coffees and snacks were consumed by all we got ready for the coach trip south. The next two hours were probably the most stressed we saw Mr Grinham and Mr Saunders. A delayed coach pick up meant traversing two blocks west to get on

our coach. What we didn't anticipate was the 15 minute walk coinciding with the 'No Kings protest' march. While it was good to see democracy in action we were slightly concerned, we had missed the coach which was to take us south to Washington DC. After a few frantic phone calls we located our coach and then headed south on the 5 hour journey.

After we had arrived in DC and checked in to our hotel, we headed out to see the White House. This was not before Seb had realised, he had left his laptop on the coach which was now heading back to New York. (it was later recovered!). On our way to the White House we stopped off at the famous Ford Theatre where Abraham Lincoln was assassinated and then tucked in to more classic American food at the Hard Rock café. We saw the Jefferson memorial lit up and we had team photos outside the White house, just days before the renovation of the East Wing started! We had a more leisurely start to our Sunday and so we went to a really cool food mall close to the hotel for coffee and pastries in the morning. At lunch we made our way back into town to go and watch the Washington Capitals play ice hockey. The game was brilliant and it had everything... goals, fights, and half-time entertainment. The all-American experience continued and we made our way to the Mall for our sight-seeing of the famous landmarks. We went to the National Archives where Mr Grinham spoke to use about the importance of the US constitution and then we headed to the Washington monument. From here we could see Congress to the East and the White House to the north. After we had passed the reflecting pools and the Second World War memorial we arrived at the Lincoln memorial. We are studying civil rights as part of our course and to stand at the steps where Martin Luther King delivered his 'I have a dream' speech was really poignant.

On our way back to the White House we passed the Vietnam War memorial which was very cleverly designed. One concern when we arrived just outside the lawn of the White House was that we were missing our guides, Oli James and Seb Marples. It turns out their sense of direction was not quite as good as we had hoped as they had gone to the wrong side of the White House. After a team photo we were unceremoniously moved out of the park by federal agents. We were given some free time in the evening to get our own food.

On our penultimate day we had one of best experiences. Due to the government shutdown we were unable to go into Congress for our tour and so a few favours were asked and some e mails later we had found ourselves on a tour of the British embassy. Not only did we have a tour, but we then had over an hour of having a Q and A with four diplomats who work at the embassy. We were split into four groups, and all had a chance to find out what life is like as a diplomat. Hearing stories of managing humanitarian crises and working with the federal government was fascinating. India D wowed them with her knowledge of chicken shops in New York. This has definitely given some of us interested in studying International Relations at university some ideas for potential careers.

After the embassy we visited Georgetown and then Arlington Cemetery. Again, the weather was amazing so despite keeping the step count nice and high we were able to see both places at their best. Rafa decided to have a three-course lunch so if you want to eat out in Georgetown it is best to ask him. Arlington was especially significant as we got to see the eternal flame at the grave of John F Kennedy. We then enjoyed some retail therapy at the nearby Pentagon shopping mall before heading to the Navy Yard Diner for our last team meal.

On the last morning the Economics group went to visit the Bureau of engraving and printing, and the politics group had a Grinham lead tour around the Capitol building and the Supreme Court. While he was very excited about the Supreme Court it did resemble Army house as it was shrouded by scaffolding and so we maybe didn't quite appreciate it as much as we could have!

Once back at the hotel we squeezed our shopping in to our bags and Gabe Strutton Smith dressed himself in a new wardrobe for his flight home. We then made our way to the airport for our flight back to the UK. It was the end of a busy and packed trip which was an amazing experience.

- Joey G and Harry L

FROM EMPIRE TO INFLUENCE: SPAIN'S CULTURAL COMEBACK

THE SPANISH EMPIRE:

The Spanish Empire began in 1492 and quickly became one of the most powerful global forces of the early modern era, ruling vast territories across the Americas, Europe, Africa, and Asia. It was fuelled by immense wealth from American silver and gold, making it a dominant world power controlling land on every inhabited continent - gaining the title “the empire on which the sun never sets”.

THE FALL OF THE EMPIRE:

By the late 1800s, Spain's Empire had shrunk down to Cuba, Puerto Rico, Guam and the Philippines. Major independence movements, such as The Cuban War of Independence and The Phillipine Revolution, drew international attention from the United States, - weakening Spanish control and triggering the Spanish-American iwar.
The war began after the USS Maine (a U.S. ship) exploded, the cause remains uncertain and controversial, but at the time the US Navy concluded an external mine caused the blast, implying Spanish involvement.
On December 10, 1898, the Treaty of Paris was signed, marking the end of Spain's colonial empire.
Following this, Spain faced deep economic decline. A defeat that shattered its imperial pride, sparking political unrest and disillusionment known as the “El desastre del '98” Out of this crisis emerged a drive for renewal, led by the Generation of '98, who sought to redefine Spain's identity and future.

SPAIN'S CULTURAL COMEBACK:

Despite the instability under Franco's dictatorship (such as the Civil War and years of isolation from Europe) Spanish culture experienced a powerful revival.
In art, Picasso's Guernica transformed national suffering into a universal symbol of peace and protest. Salvador Dalí's surrealist masterpieces, like The Persistence of Memory, captured Spain's dreamlike imagination and redefined modern art worldwide.

After losing its colonies, Spain found a new way to leave its mark on the world - not through conquest, but through culture, language, and creativity. Across Latin America and the U.S., the Spanish-speaking world reshaped what it means to be “Hispanic,” turning an old colonial past into a shared cultural identity.
As the Mexican poet Octavio Paz observed, “Spanish is no longer Spain's alone”. Meaning it belongs to a vast, interconnected community bound by a common language and creativity.

The Generation of '98 emerged after Spain's defeat in 1898. This was a group of writers and thinkers trying to make sense of their country's decline. They reflected on Spain's land, people, history, and culture, pointing out its problems while celebrating its beauty and spirit. At the same time, they questioned: meaning, death, loneliness, and changing values - writing with honesty, emotion, and a lyrical, modern style that brought Spain's struggles and hopes to life.

- Jojo W

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HAS MIGRATION BENEFITTED BRITAIN THROUGHOUT THE YEARS?

INTRODUCTION

Have you ever thought about whether migration benefitted Britain? Well today I will be to discussing the main positives of migration into Britain. Migration has had multiple different benefits throughout the years, and different generations of migrants have brought different skillsets and benefits to Britain.

WHAT IS MIGRATION?

Migration is the movement of people from one place to another either within a country or across borders. It can be temporary or permanent, and it can be driven by multiple different push or pull factors.

OVERVIEW

During this article am going to state how migration has benefitted Britain after that I will then demonstrate how migration can and has boosted Britains economy and I will then provide some examples of the most positive outcomes that migration has had on Britain.

COMMON MISCONCEPTIONS

To begin, I'd would like you to understand that I know many people believe that migration has caused pressure on public services - such as emergency services and schools - along with-it causing overcrowding and over population and unemployment. It also meant that some people were not paid sufficient wages and there was also a huge gender imbalance as more men tended to migrate more often rather than women. While some of these things may be true, the number of benefits outweighs the number of disadvantages.

BENEFITS OF MIGRATION

My main point that I will be discussing as I move on to the positive impact of migration into Britain is the boost it gave to the culture. For example, the Windrush generation transformed Britain into a more cultured country. Increasing the variety of food cooked, music played and sports engaged with. This is one of many benefits of the Windrush generation. Secondly, migrants brought a whole new skill set into Britain. For instance, can you imagine not having the free healthcare system of the NHS? The NHS was established in July 1948 by Aneurin Bevan and the Windrush generation, who then also played a crucial role in staffing and forming it. Lastly, it kept inflation down because migration caused a rise in labour supply. These are just a few examples of the multiple different benefits that migration had on Britain.

CONCLUSION

Today I argued that migration Britain to Britain is a great advantage because I passionately believe migration has benefited Britain throughout the years with the many waves of migration from the 1850's from Ireland escaping famine to 1972 Ugandan Asians escaping political persecution and especially the Windrush generation. In conclusion my main reasons for believing that migration has had a positive impact on Britain are: The skills that they brought, the diverse culture that has transformed Britain into a more cultured and diverse place to visit and their roles in helping the NHS to form.

- Minnie PC

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IS YOUR DIET KILLING THE PLANET?

Could the things you consume be harming our environment? The food you eat goes beyond the calories, protein or sugar content; it also affects the planet. Every meal has an impact, whether it's releasing greenhouse gases into our atmosphere or using countless gallons of water. What we eat will affect the future of people and the earth.

A greenhouse gas is a gas that causes the atmosphere to warm by absorbing and emitting radiant energy. They prevent heat produced and radiated from earth escape by creating a blanket that smothers the planet. While the production of all food produces greenhouse gases, the top five leading producers are: beef, lamb and mutton, prawns, beef from dairy cows and dairy products such as cheese and milk. These are closely followed by other types of meat. These statistics, and the science behind them, highlight how animal products - meats and dairy - are causing the highest amount of environmental damage. Reflecting on these statistics, and the fact that 72% of people in the UK are meat eaters, could lead us to changes to our diets.

Land usage should also be considered as we select what foods to eat. To create one kilogram of lamb (4-6 portions worth) 369 square meters of land are needed. For those wedded to meat eating, it might be interesting to note that this is approximately 30 times as much as that needed for the same amount of poultry meats. Land designated for food production requires the deforestation of trees, destroying natural environments to create more room to feed the ever-growing population. Trees also act as carbon sinks, absorbing carbon dioxide and when cut down they release stored carbon into the atmosphere.
Food production also places significant pressure on global water supplies and in extreme cases, it can lead to water scarcity. 7% of the world's population live in water scarce areas: that's 560 million people. Some food types consume more water in production than others; if you buy 1kg of beef, there has been an average of 15,415 litres of water used in its production. Aside from meat, the thirstiest food type is nuts, with 9,063 litres of water needed to produce the average kilo. Further down the scale are fruits and vegetables, requiring 962 and 322 litres per kilogram respectively. With increased levels of water scarcity, the ability of earth to meet the growing demand for food becomes a major policy concern for governments.

How can you save our environment? Every little action for our planet has huge impact, whether you ditch animal products altogether or cut down a little on the biggest culprits for environmental impact. When I tell people that I am a vegetarian, many respond that they too would go vegetarian, but are too attached to a certain product. Yet, changing your diet needn't mean a total ban on things you enjoy. Go 'vegetarian' but still indulge in the things that you love occasionally. Every little action reduces the demand for products that are killing the planet. You don't need to solve the problem yourself; you just need to care because unless someone else like you cares an awful lot, nothing is going to change.

- Pen E

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LANGUAGES AND CLASSICAL STUDIES

This section showcases the independent academic research on languages and classical studies from both outside and inside the classroom. There is a diverse range of topics within this section, and the ones included here vary from exploring languages, different cultures, history and society. The essays featured go into great depth and show how ideas studied in classrooms can link to worldwide contexts, from the influence of linguistic prestige to the cultural impact of global music figures such as Bad Bunny, as well as the difference between national healthcare systems and Julius Caesar's political beliefs. All these excellent essays demonstrate how Bradfield students are able to apply their knowledge from inside classrooms to greater issues that extend globally.

- Lexi A -(Editor)

LANGUAGES HIGHLIGHTS

In October, pupils travelled to Nice for a French trip, immersing themselves in the language and culture through real-world experiences. From exploring the local area to practising their spoken French in authentic settings, the trip provided a valuable opportunity to build confidence and deepen cultural understanding.

In November, Bradfield entered teams into the Cheltenham College MFL Debating Competition. Our pupils performed strongly, engaging thoughtfully with complex topics and demonstrating impressive linguistic skill and confidence in debate.

BANGERS AND MASH - ENGLISH CONVERSATION CLASSES WITH CATERING STAFF

The Mosaic Society has the aim to promote international and cultural awareness and integration and has introduced English Conversation sessions as a way to support members of the catering team at Bradfield College. We have participants from Nepal, Poland, and Ukraine, who all speak a basic level of English, and our job is to build confidence and improve communication both at Bradfield, and in their home lives with the hope of strengthening community and integration.

Much of the start of our programme was designed by Eva (UVI, K) and Mrs D'Cruz. These sessions began with simple conversations getting to know each other to first ascertain the teams' level of English. We got to know the people we were helping, their interests, hobbies, their work life, and why they came to work in England. At the start of each lesson, we do ice-breaker activities to create a relaxed environment and to go over what we did the previous week. Our first activities were helping them to express their likes and dislikes, food preferences, and favourite things to cook. This was done using pictures, cards, Power Point presentations and worksheets, with the emphasis on speaking without fear of mistakes.

When learning basic English, there is not much specific language involved; therefore, when coming to work in a kitchen, there is a lot of specific vocabulary that needs to be learned. One of our priorities was to teach the team food and cooking-related vocabulary and processes. We did this through using kitchen and food-related images, practising everyday workplace language, and trying to encourage full sentences rather than single words. Another key part of this learning was to teach how to understand the menus (and strangely named English dishes like Bangers 'n' Mash!) We try to make this as real-life as possible so the learners can apply it to their daily work, allowing them to practice regularly and making progress.

Another goal for us is to try to improve day-to-day expressions for life outside of work, how to discuss plans with people, and particularly how to ask questions (as a language student, I know this is one of the hardest parts of learning a language!). We did this through sharing our plans and then encouraging the team to share their plans and ask us questions using prompt cards and photos. Before the Christmas holidays, we were able to exchange our traditions with each other and compare British traditions with those from participants' home countries. This provided a two-way learning experience, with language learning becoming a sharing of culture and traditions.

We now run four sessions every week and have learned that teaching English as a second language has many challenges, as we can only communicate with the participants in English. Sometimes there are people with different levels of language in the same session, and this means we have to ensure that everyone makes progress, and no one is left out. On top of this, the catering team work very hard and have busy schedules, so we have to be flexible. Moreover, when the lessons began, there was a clear shyness and lack of confidence, not just with the participants, but also with us. Fortunately, due to everyone's consistency and dedication, we found that these issues can be overcome, and relationships of trust and safety were formed. The final and biggest challenge is when there is a misunderstanding. Not being able to speak their native language requires us to adapt our explanations when something is not understood, and the key is to make sure the misunderstanding is resolved by the end of the lesson, and to take time to reflect on why this problem occurred. Over time, both participants and teachers demonstrated a deeper understanding and respect for each other.

It has been an extremely rewarding experience, seeing growing confidence in conversation, and promoting links in the community. The experience has developed both participants' and students' connections, patience, and communication skills. Students and the catering team now appreciate each other, understand different cultures and continue to learn together. Despite the challenges, clear progress is being made, and this is deeply fulfilling. We, as the Mosaic Society, aim to continue this programme, with pupils now taking a TEFL (Teaching English as a Foreign Language) course, allowing us to expand and improve the programme.

- Amelia E

CEASAR'S POLITICAL CAREER

"Throughout his political career Caesar was only interested in reforms which benefitted the ordinary people of Rome." Evaluate how far you agree with this statement.

Julius Caesar was a Roman politician who had a great deal of success in his career. He was born into a Patrician family (a ruling class family in ancient Rome), rose through the ranks of the Cursus Honorum at an astonishing speed, and gained an immense amount of fame and glory through military campaigns. But interestingly he was a Populares politician (Latin for "supporters of the people", who sought to gain political power by appealing to the common people and advocating for reforms that benefited the lower classes), instead of the expected Optimate (Latin for "best ones", who represented the aristocratic elite and aimed to maintain the power and privileges of the Senate, often opposing the Populares reforms). He passed legislation that benefitted the common people of Rome, enacted reforms on the Senate and built architecture that supported Rome's people. It is the task of this essay to evaluate the extent to which Caesar was only interested in these reforms, which benefited the ordinary people of Rome, or if it was his ambition and desire for wealth and glory that pushed his goals and motivations forward.

There are numerous arguments which supports the view that Caesar only cared about reforms, as seen in his numerous policies that support the people after winning the Civil War, and his desire for reforms throughout his journey in the Cursus Honorum. The Civil War started as a conflict between the Optimates and the Populares factions, with Pompey and Caesar taking the main stage. After he defeated Pompey in Egypt and at Thapsus (modern-day Tunisia) and killed his sons to prevent lingering rebellion, Caesar declared himself "Dictator Perpetuo", dictator for life. This was not for power but to reform the society of Rome and give more rights to the people in it. Caesar expanded the grain dole for the common people and the veterans of his wars, he gave work to said veterans by expanding Rome's interests into the nearby swamps and marshes, which allowed Roman architecture and houses to be built, giving jobs and living space to the citizens of Rome. Caesar also increased the Senate's numbers from 600 to 900. This allowed more men from lower ranking backgrounds to climb to power and bringing benefits to their poorer families. These are clear examples of how Caesar gained the love and support of the ordinary people of Rome, because he cared about them, and was interested in making their lives better. This is supported by the scholar Syme, who believed Caesar was a model Roman because he was such an opportunist. Gaining power at the same time as helping the common people, making him more powerful and increasing his reputation as a benevolent leader. I agree with this point, as it gives an insight to Caesar's motivations at other stages of his political life.

Additional arguments that Caesar put the reforms which benefited the common people above all else can be seen by his roles in the Cursus Honorum. When he worked as a Quaestor in the state treasury, he worked with Cato and managed anti-bribery cases, learning about issues of over-taxation and extortion against common Roman citizens, which he would focus on fighting when he was made consul and dictator years later, showing his interest in giving reforms to the ordinary citizens. When he worked as Aedile, Caesar commissioned buildings and oversaw festivals and games that gave the ordinary citizens enjoyment and financial aid, thanks to the number of people coming into the city from elsewhere, and his further roles as Pontifex Maximus, and his Consulship in 59 BCE, allowed him to make more reforms benefitting the common people of Rome in the form of religious reassurance as Caesar was the High Priest of Jupiter giving him divine sanction and through his consulship, enacted anti-corruption laws in the provinces. All these examples showcase Caesar's interest in reforming Rome, even in his earliest years, and his desire to create policies that benefitted the people of Rome and giving them greater control over their lives. This could be attributed to Caesar's own personal hardships in his youth, losing his father at only 16 years old, and being forced to spend years in the military alongside the common people due to Sulla's prescriptions. It was meeting these people that he learned of their struggles and gained a desire to support them by reforming Rome.

However, the arguments against these points are seen in the belief that it was Caesar's ambition that drove his political interests. Caesar was the standard Roman politician at the time, rising through the political ladder for the sole purpose of gaining political influence and power, as was the norm for the Patrician families. It can be argued that Caesar only put forward these policies and reforms for the ordinary people of Rome, to gain their support and votes. When examining his policies closer, we can see an agenda behind many of them. Such as his expanding of the Senate from 600 to 900. This did allow more people from lower backgrounds to gain office, but almost all of them were Caesar's supporters and sponsors. Giving him an unfair majority in the Senate and allowing him to place no interest on the opinions of the Optimates, as the Populares voters he got were able to prevent the Optimates from blocking his bills. Showing that Caesar placed his ambition and desire for power at the forefront, and the reforms he gave the common people were merely an obligation and result of gaining their votes. Additional examples can be seen through the establishment of the First Triumvirate itself in 60 BCE. Caesar formed a political Amicitia with Pompey Magnus and Crassus to help each other gain power. This decision is an example of how only Caesar's ambition for power interested him, as the help he gave the other members of Triumvirate were not a benefit for the common people of Rome. The aid Caesar gave Pompey was to pass legislature for land for his veterans and to ratify his treaties in the East. This would involve forcing lower ranking citizens from their farms and demolishing houses in other areas to make room for the land for Pompey's troops. Crassus's requests were even more unfavourable to the common people, as Crassus wanted a tax rebate for his fellow equites and to remove the treaties preventing over taxation and extortion of the provinces and their citizens. This example makes it clear that Caesar was only concerned with gaining power and support from powerful friends and more important social groups, in this instance the equites and the soldiers, who were far greater help in gaining Caesar the seat of Consul than the common people ever could.

We can also see further instances of Caesar not being interested in the common people themselves, as he wanted glory in battle and military fame. After becoming Consul Caesar went on to fight numerous battles and military campaigns to gain glory for himself. He went to Trans-alpine Gaul and Gaul Major, plundering the land, committing war crimes and killing millions, and attaining riches without any thought for the common people of Rome at the time, showing a complete lack of interest in the lives of the common people. This example is particularly negative against the idea that Caesar was only interested in the reforms which benefitted the ordinary people of Rome, because while he was out fighting his wars, he left his agent Clodius Pulcher in control of Rome. Clodius was waging gang wars across the city against Milo and Pompey, causing chaos and bloodshed for all involved, with murders on the street a common sight. Caesar did nothing to rectify this, as Clodius was one of his agents who helped him keep power while he was away gaining glory and a potential triumph, showing clearly that Caesar focused on his personal

achievements and the retention of power far more than giving benefits the people of Rome. It is due to this that the other "Champions" for the common people and the Republic, such as Cato (who expanded the grain dole, worked in the extortion court and prosecuted a legal case against Murena) and Cicero (wrote speeches about anti-bribery,

successfully prosecuted Verres for extortion, exposed the Catiline Conspiracy), disliked Caesar so much. As he focused on enriching himself with power and wealth first and put the reforms and protection of the common people and the Republic second. The scholar Tempest supports this notion as he claims that although Cicero did not hate Caesar as a man, he hated the fact that he seemed to have no interest in restoring the Republic. I agree with this point as it shows that Caesar preferred to keep his power and a centralized cult of personality at the height of his attention, as it would allow him to focus on his own glory and wealth, rather than supporting the ordinary citizens of Rome who voted for him, as they were unimportant and couldn't fight against his influence, wealth and army, which he refused to disband.

In conclusion, despite the numerous positive reforms Caesar gave to the ordinary citizens of Rome, such as an expansion of the grain dole, creating jobs and opportunities for lower ranked plebeians, and his roles of reforms in the Cursus Honorum. Ultimately, this is the weaker argument. Caesar was primarily ambition focused, simply because he was a Roman who followed the traditional pathway for a Patrician. He gained power and military triumphs on the suffering of the people of Rome, not caring about those who elected him after the election was over, and letting people like Clodius run rampant in Rome and ignoring the deaths and chaos he caused as long as he remained loyal to him, showing conclusively that he was not primarily interested in reforms that benefited the common people.

- Caleb P

LA SÉCU — FRANCE'S "NHS"?

(EN)
La Sécu is similar to the NHS as it provides public healthcare. However, it also supplies family benefits and retirement pensions. La Sécu stands for La Sécurité Sociale and was created in 1945 and has become France's mandatory public social protection system. It is separated into multiple different branches: Health, Family, Retirement, Occupational Hazards, and Autonomy.

The NHS —
The National Health Service is the UK's publicly funded health system. It was founded in 1948 and employs over 1.3 million people in England alone. The NHS provides a comprehensive service that is available to all, and is based on clinical need, not the ability to pay. There are 6 main values that each member of the NHS staff must adhere to: working together for patients, respect and dignity, commitment to quality of care, compassion, improving lives and everyone counts. These core values allow every employee to strive for excellent healthcare.

Une Carte Vitale — qu'est-ce que c'est? (FR)

La Carte Vitale est une carte essentielle pour la santé. C'est une carte gratuite et obligatoire pour les personnes en France dès l'âge de 16 ans. Elle contient les informations nécessaires au remboursement rapide des soins, sans des feuilles de soins en papier. Également, la Carte Vitale permet de limiter le gaspillage de papier, réduisant donc la déforestation et le réchauffement de la Terre.

La Carte permet d'utiliser le « tiers payant » - vous devez payer seulement une partie des frais qui ne sont pas pris en charge par l'État.

Mais, comme la plupart des choses, il y a des inconvénients. Par exemple, il peut être particulièrement difficile pour les nouveaux résidents en France d'obtenir une Carte Vitale. Cela dit, ce n'est pas impossible, mais cela pourrait être vraiment difficile.

En outre, on peut choisir de souscrire à une mutuelle. Il s'agit d'une assurance maladie complémentaire fortement recommandée, mais facultative, qui couvre les frais restants non payés par l'État.

Finalement, je dirais que la Sécu et la Carte Vitale sont de très bons moyens de prendre soin de la communauté française. Il est vraiment important que l'État prenne soin de la santé de ses citoyens et gère efficacement le pays.

A 'Carte Vitale' — What is it? (EN)

A 'Carte Vitale' is essential for your health. It is a free and mandatory card for the people in France over the age of 16. This allows for the necessary information for quick reimbursement of care without the need for paperwork. Also, a 'Carte Vitale' would limit the waste of paper, therefore reducing deforestation and global warming. The card allows the user to use 'tiers payant' (third party payment), and you only must pay the portion of the fee that is not covered by the State.

However, like most things, there are disadvantages. For example, it is particularly difficult for new residents of France to get a card. That being said, it is not impossible, but it would be very difficult. Furthermore, one can choose to pay for a 'mutuelle'. It is a highly recommended, but optional supplementary health insurance and it covers the remaining cost that the state has not paid.

Finally, I would say that La Sécu and La Carte Vitale are both great ways to take care of the French community. It is very important that the state manage the health of their people and also manage their country.

(EN)
Overall, the French healthcare system, La Sécu and the UK's National Health Service (NHS), are both widely accessible systems, but they function on different models. La Sécu uses a statutory health insurance model, also known as L'assurance Maladie, to provide mandatory partial reimbursement, while the UK uses a tax-funded model and covers 100% of healthcare costs (except for dental care and prescriptions). Although these systems are not the same, they both strive to provide the best care towards the people in need.

- Jennie C


"BAD BUNNY'S HISTORIC JOURNEY: GRAMMYS, TOURS, AND CULTURAL IMPACT"

Following the wave of publicity surrounding Bad Bunny's historic Super Bowl performance and his win at the Grammys for Best Album of the Year, it is unsurprising that his rise to fame has been revolutionary for the Hispanic world. Whilst most Hispanic artists aiming for stardom are typically pushed to translate themselves or even neutralize their identity, Benito Antonio Martínez Ocasio (Bad Bunny) has done the opposite: embracing and promoting his identity as a Puerto Rican rapper.

From having announced "ICE out" during his Grammy speech to his inclusive display of multi-culturalism during the Super Bowl – shouting "god bless America" as all the North and South American flags were paraded – Benito's political and social influence is increasingly powerful, however this political focus has not simply emerged in 2026. His 2024 'NUEVAYoL' music video, for example, features a scene of the artist stood inside The Statue of Liberty, displaying the light blue version of the Puerto Rican flag. The scene directly references the 1977 and 2000 protests carried out by Puerto Rican pro-independence activists, which underlines Benito's aim in promoting national pride and combatting the increasingly repressive nature of the US government towards Hispanic immigrants. The light blue Puerto Rican flag remains a potent symbol of national independence as its current dark blue colour was initially created to mirror the US flag, after having become a US commonwealth in 1952. Hence, the former flag's feature in the Super Bowl half-time performance intentionally referenced the Puerto Rican independence movement: to seek independence as a sovereign state.

The acknowledgement and appreciation of the Hispanic world extends beyond Bad Bunny's social stance on equality, into the core of his music. At the age of 14 he began making beats heavily influenced by reggaeton: a Latin urban music genre mixing Jamaican dancehall, hip-hop and Latin rhythms. This genre, along with Plena, Salsa and Merengue, which his mother would play at home when he was a child, has greatly influenced his music and formed part of his identity. Having been top Spotify artist from 2020-2022 and again in 2025, Bad Bunny has powerfully popularised these genres worldwide, sharing the profound beauty of the Hispanic music scene which so influenced his upbringing.

Such cultural characteristics can be seen on a more physical level through the Super Bowl half-time performance, which provided an important Hispanic representation which has been lacking throughout history. The set design itself is an example of this: filled with sugar cane as tribute to the agricultural backbone of Puerto Rico at the end of the 19th century, when it became US territory. This cultural pride ranges to small details, such as the red flower on Lady Gaga's dress, known as the flor de maga, which is the national flower of Puerto Rico – furthering this cultural fecundity embedded into Benito's performance.

Overall, Bad Bunny has established himself as more than just a rapper and singer, but a symbol of Hispanic pride and source of inspiration. This can further be seen through the icon of el Sapo Concho, an endangered species of toad in Puerto Rico which Bad Bunny used to promote his album 'DeBÍ TiRAR MáS FOToS' and also featured in his 'KETU TeCRé' music video. Having come to symbolise the resistance of Puerto Rican people against displacement and gentrification, the toad has been seen on several anti-ICE posters in San Francisco in the lead-up to the Super Bowl. Its presence underlines how Bad Bunny's music and previously outspoken stance on equality have inspired many and illustrates the importance of unity in a society.

- Posy H

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WHAT IS LINGUISTIC PRESTIGE, AND HOW DOES IT INFLUENCE SOCIAL PERCEPTION AND IDENTITY?

Linguistic prestige is a concept commonly used in sociolinguistics1, which impacts us more than we may ever realise. In this essay, I will explore the two different types of linguistic prestige and the ways in which they impact social perceptions and how they may cause unfair treatment. I will discuss this through the lens of social perceptions of accents in the UK and the English language.

According to Richard Nordquist, linguistic prestige is the degree of esteem and social value attached by members of a speech community2 to certain languages, dialects, or features of a language variety3. One of the ways this manifests itself in the English language is through social perceptions of dialect and pronunciation. This can be seen in William Labov's studies of language variation, in which he concluded that linguistic prestige can be separated into two types: overt and covert. Lobov deduced that overt prestige is generally associated with observing perceived social norms and behaving in a socially desirable manner. Covert prestige, on the other hand, serves the function of asserting oneself into a social group or community of likeminded people with similar experiences to one's own.

Therefore, overt prestige would be associated with a Received Pronunciation (RP) accent, subconsciously indicating that the speaker is of a higher social class, or has more authority. Covert prestige, on the other hand, would be associated with regional accents like Cockney and therefore would often be used to express belonging to a group or community.

However, due to the way accents may be perceived by others, it tends to lead to harmful prejudices. The 'Accent Bias in Britain' (ABB) project claims that accents such as RP continue to be rated very positively, whilst urban working-class and ethnic minority accents are awarded much less prestige. Furthermore, in 2006 the Chartered Institute of Personnel and Development conducted a survey on accent bias, using a sample of employers from across the UK. In doing so, they found that 76% of employers admitted to discriminating against potential employees based on their accent. Nevertheless, this is something that can be changed for the better: the ABB project has also shown that although accent bias is widespread, people in positions of power have the capacity to resist its effect. In recognising the existence of accent bias, we can strive towards accepting it as a protected characteristic4, and making the world a more equal place for all.

In conclusion, linguistic prestige is the social status attributed to a specific language, accent, or dialect within a society. It can be classified into two types: overt and covert linguistic prestige. Overt linguistic prestige is used to align oneself with a higher social status, or to showcase authority, whereas covert linguistic prestige serves the purpose of helping one align oneself with a certain group or community. Furthermore, a case study in the UK has shown that linguistic prestige can lead to prejudice, although it is possible to decrease its levels by raising awareness of the issue.

- Tekle U

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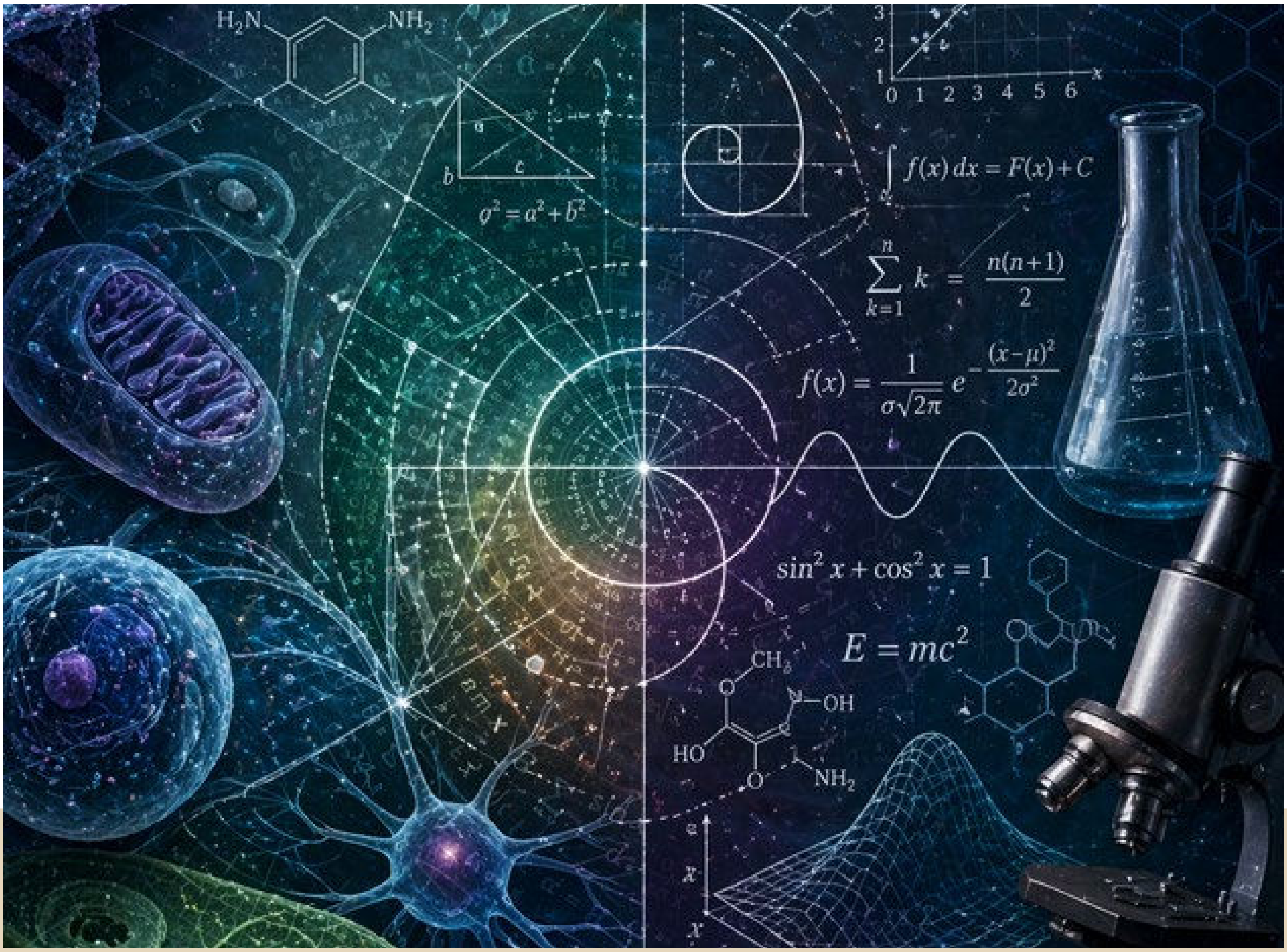
MATHEMATICS AND THE SCIENCES



This section showcases the independent academic research on maths and sciences from both outside and inside the classroom. There is a diverse range of topics within this section, and the ones included here vary from exploring mathematical theory, scientific innovation, technology and the natural world. The essays featured go into great depth and show how ideas studied in classrooms can link to worldwide contexts, from the effect of music on mental health to the impact of artificial intelligence on future jobs, as well as the role of ultra-processed foods in the development of chronic diseases. All these excellent essays demonstrate how Bradfield students are able to apply their knowledge from inside classrooms to greater issues that extend globally.

- Georgia E (Editor)

MATHS HIGHLIGHTS

- **Senior Mathematics Challenge**

Four pupils achieved Gold awards: Ali Demirkol, William McGee, Theo Stephenson and Isabella Jones. All progressed to the Kangaroo Challenge, where Theo Stephenson (Bronze), Ali Demirkol (Silver) and Isabella Jones (Gold) were recognised among the top mathematicians nationally.

- **Intermediate Mathematics Challenge**

94 pupils participated, with 70% achieving a Bronze, Silver or Gold award. Eight pupils secured Gold (top 10% nationally), with five progressing to the next round: Tommy Hill, Frederick Jourdan-Brown, William Perrott, Cecilia Sheppard, Beatrice Stevens, Kieran Williams, Tilly Armstrong and James Coghlan.

- **House Maths Challenge**

All Houses competed in a UKMT-style team challenge. In a closely contested event, C House finished first, followed by K House and A House.

IS MATHEMATICS NATURAL OR MAN-MADE?

Whether mathematics is embedded in the universe or merely a human invention created to explain what we do not yet understand has long created a bond between philosophers and scientists. The debate centres on two main views: mathematical realism, which argues that mathematics exists independently of humans and is discovered, and mathematical constructivism, which argues that mathematics is invented by humans as a descriptive tool. Both perspectives offer compelling arguments, and a deeper examination of each reveals how closely mathematics is tied to both reality and human imagination.

Those who argue that mathematics is embedded in the universe point to its uncanny effectiveness in describing physical laws. The structure of spacetime, planetary motion, magnetic fields, and many other phenomena exhibit extraordinary mathematical precision. These relationships appear to hold true regardless of human culture or interpretation. For example, the Fibonacci sequence appears naturally in the organic world, especially in plants. Another, more simplistic example is triangles. Have you ever seen them out in the open? Of course—they are everywhere. With the mathematics we have today (whether invented or discovered), we have identified patterns and relationships that apply to any triangle through trigonometry. Another strong point : Simultaneous Discovery. Independent discoveries of the same math (like calculus by Newton and Leibniz) suggest the concepts were waiting to be found. This has happened on many accounts and is a strong argument that mathematics is embedded in the universe, waiting to be found.

From this perspective, mathematics is less like an invention and more like a discovery—a pre-existing framework that humans gradually uncover. Just as we discover new species or physical laws, we discover mathematical truths that were always there, waiting to be recognized. This side of the argument fundamentally points to the idea that the universe is structured in a way that allows intelligent beings to advance into a civilization capable of understanding, manipulating, and fully utilizing their environment.

Extending this argument further, supporters also claim that mathematical truths are not dependent on opinion. Two plus two equals four regardless of language, belief, or culture. A theorem, once proven, is universally true. This universality suggests that mathematics is not arbitrary.

On the other hand, the argument that mathematics is invented emphasizes that mathematical systems are built from human-defined rules and symbols. Number notation and operations are products of human language and logic. Historically, different cultures developed different counting methods. We choose axioms—starting assumptions—and derive conclusions from them. In essence, we create a set of rules and then explore abstract systems that obey these laws, until they no longer suffice.

Take imaginary numbers, for example. The number *i* is defined as the square root of −1.

This is not possible using the original axioms of real-number mathematics, so mathematicians introduced a new concept that simply extends those rules. This example supports the view that mathematics is invented to describe phenomena that existing frameworks cannot explain.

From this perspective, mathematics is like a tool or a language—extremely powerful, yet still created. Following this logic, it is possible that everything we understand about the universe mathematically could be very far from absolute truth, as mathematics may simply be a human-made method for explaining phenomena we cannot fully comprehend. When mathematics fails to describe something, we modify or expand it. Calculus, probability theory, and complex numbers were all developed when earlier mathematical tools proved insufficient. This suggests adaptation rather than discovery.

Ultimately, whether mathematics is embedded or invented may depend on how one defines existence. Mathematical structures may not exist physically like stars or atoms, but they may exist as abstract realities that constrain how the universe behaves. Alternatively, they may simply be the most precise language humans have developed to describe the patterns we observe.

Whether discovered, invented, or a combination of both, mathematics remains one of humanity's most profound intellectual achievements.

- Aleixa DS

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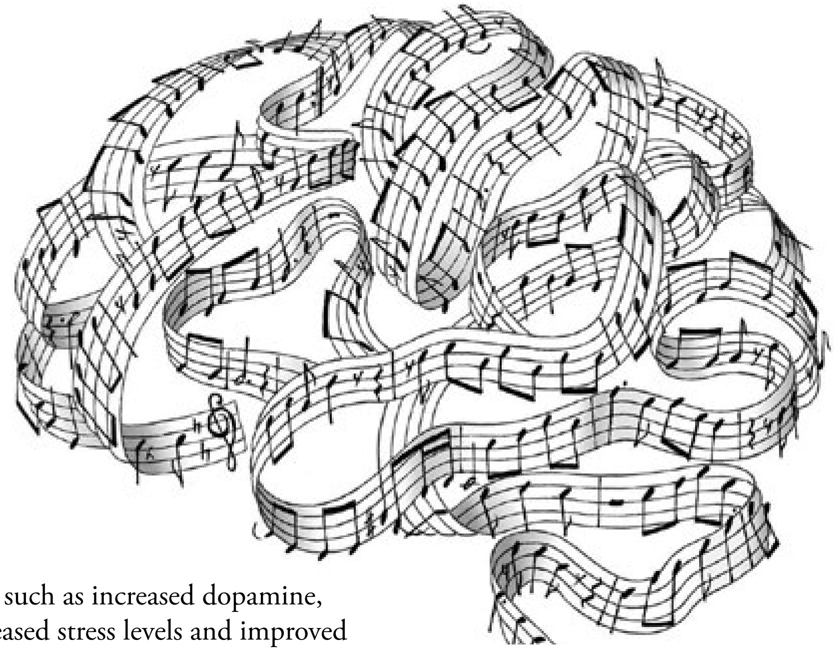
THE EFFECTS OF MUSIC ON MENTAL HEALTH



Music is something that has been used by an extraordinary amount of people across the the world, dating back even 40,000-50,000 years, with bone and ivory flutes as vessels, contrary to the diverse and exploded nature and culture of today's soundscape. The complex symphonies of vibrations have appealed to our species since we could create them; so much so that they have become almost crucial to everyday life as we know it today for many. But why are we drawn so closely to music and what are the effects of it on our mental health?

Music is well-known to reduce anxiety and day-to-day stress in humans. When we listen to music, and the different pitches of notes and beats enter our eardrums, the cortisol level in our brains is lowered. This effect is further amplified with calming, slow tempo music, often reducing heart rate, blood pressure and even muscle tension. Calming music is a fantastic way to wind down or relax after a demanding day, or just to make us feel good. Trials have shown that music therapy helps people with anxiety, so listening to music, especially softer types, is a great way to temporarily calm down.

Not only anxiety is positively affected by music; depression and general low mood swings can be improved as well. Music has been clearly shown to stimulate the release of dopamine, the brain's reward chemical, making people feel happier, even if they don't have much to be happy about. Again, it is a temporary relief from these mental health issues.

There is, however, a caveat. As mentioned, the 'cures' of music are not everlasting. It is a temporary fix to permanent problems; effective, but it can be deceiving. Studies have shown that listening to music one day does not create a direct noticeable, if any, effect the day after. However, due to the positive short-term effects of it, such as increased dopamine, decreased stress levels and improved emotional processing, it can actually play a significant part in better sleep quality and routines and decreased brain fog – especially for people with conditions such as ADHD, who have a naturally lower base dopamine level.

Although there are many beneficial effects of music on mental health, it is important to consider that there are many diverse genres and types of melodies and instrumental subtleties which affect the brain differently. Harsher-sounding and higher-energy music can actually contribute to higher levels of stress and a less relaxed body and mind, creating the opposite effect on things like cortisol and body tension. These more pumped up songs can even cause overstimulation for many, especially after an already stressful day, with declined mood and happy chemicals in the brain. People with ADHD and autism are more likely to experience this; there is a higher chance of positive mental health benefits for neurodivergent people through calmer, more ambient music.

In light of all of this, it is safe to say that most mental effects of music are generally positive, and there are many benefits for almost everyone to experience through it. People more prone to stress, anxiety, depression or low mood episodes have the possibilty to be relieved right at their earlobes.

However many believe that music is a fix, which it is not; it is to be used as a catalyst for mental health improvements, and in that aspect, it is very powerful.

- Alex K

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BRITISH SCIENCE WEEK (2025–26)

Theme: Curiosity – what's your question?

- **Big Question of the Week**
Pupils explored unanswered questions in science, including why humans dream, and were encouraged to submit their own ideas.

- **Live Research & Medicine**
Professor Vitaliy Khutoryanskiy on invertebrates in pharmaceutical research.

- **The Brain & Dementia**
Dr Mark Dallas on brain function and careers in neuroscience.

- **Climate Science**
Professor Richard Allan on the causes and consequences of climate change.

- **South Pole Science**
Live link to the IceCube Neutrino Observatory, exploring cutting-edge neutrino research.

- **Conservation & Fieldwork**
Dr Vicky Boult on studying elephants and careers in conservation biology.

- **Citizen Science**
Pupils contributed to real-world research through online projects.

- **Film Screenings**
Microcosmos and Close Encounters of the Third Kind offered scientific perspectives through film.

CHEMISTRY RACE 2026

The *Chemistry Race* is a fast and furious trial of intellectual virtues, based upon a Czech conception, with all the questions written, and the competition run by University of Cambridge Chemistry post-grad students; their humour and quirks neatly reflected in the small pieces of paper teams were given to wrestle with.

Within the space of two hours, the team of *Joshua A, Isabella J, Ollie C and Yeva K,* had to answer as many questions as they could across six branches of Chemistry, requiring team members to run the correct answer up to a panel of judges, before being given subsequent question if the answer was correct, or being sent back to their team if was wrong. Three strikes and out! Each question was worth different points depending on difficulty and brutally, if you were unable to answer a question, you were not issued with another, limiting your points significantly.

Under competition rules, teams could take whatever physical resources they want into the hall with them, but they cannot use the internet. The staff's private library of University classics were called upon, such as *'Shriver and Aitkins',* and *'Clayton, Greeves, Warren and Wothers'* being brought along for reference.

Training has already begun with our L6th hopefuls to prepare them for this ferocious competition when they shall take up their intellectual gladiatorial responsibilities.

IS OUR MODERN DIET COMPATIBLE WITH GOOD HEALTH?

A healthy lifestyle is a balanced approach to daily living that promotes physical, mental, and emotional well-being. It is not limited to diet or exercise alone; but includes all these aspects of life, including nutrition, physical activity, sleep, stress management and social connections. Maintaining a healthy lifestyle can significantly reduce the risk of chronic diseases, improve quality of life and increase life expectancy.

For centuries, people have been wondering what the 'perfect lifestyle' looks like. A large part of this is the food we eat and exercise we do and how they balance each other. Many people believe eating your '5 a day' and cutting down on sugar is the key to perfection – but how much of this is true, and what does a healthy diet really look like?

In 2023, 64.5% of adults aged 18 years and over in England were estimated to be overweight or living with obesity, meaning fewer than half of our population is considered a 'healthy weight'. Based on recent data, the overall health of the UK is getting worse, with increases in chronic illnesses and child obesity, especially in more deprived areas.

The NHS recommends 150 minutes of moderate-intensity exercise weekly to the average UK adult but between 2023 and 2024, it was found that 63.7% of adults did an average of 150 minutes or more a week of active sport whereas, 36.3% of adults were fairly or less active with an average of less than 30 minutes a week.

Having a variety of food each day is the main feature of a healthy diet, if not done, you will miss out on the nutrients your body needs. Different fruits and vegetables provide vitamins, minerals, and antioxidants which are important to support your immune system and energy production, so a colourful plate is a good sign of a healthy diet. For example, leafy greens like spinach contain iron, orange vegetables like carrots contain vitamin A, and berries are rich in antioxidants. It is important to also include a range of proteins such as beans, chicken, nuts and eggs to build muscles, bones and blood, and create vital hormones and enzymes. This variety supports your immune system and improves digestion to look after your body.

The biggest factor we consume daily and is acting against our body is ultra-processed foods (UPF). UPFs are foods which have been heavily changed from their original form and contain ingredients which you wouldn't use at home. These foods have become so common and accessible to us, that we don't think of the harm they are causing us; for example a white loaf of bread from Warburtons (the most bought loaf of bread in the UK) does contain flour, water and yeast, but along with this, there is a huge list of chemicals, preservatives and emulsifiers used to preserve the bread for freshness and texture. This, surprisingly causes an unexpected damage to our body, causing gut irritation and inflammation because they are disrupting gut bacteria and weakening your gut's barrier.

The reason UPFs have become so popular is because they're designed to be cheap, tasty and long-lasting. These foods often contain high amounts of sugar, unhealthy fats, salt, flavourings, additives and preservatives meaning they're low in nutrients and fibre causing you to overeat and not feel full for long. Because UPF are so high in calories and low in nutrients, they increased risk of weight gain and make it harder to maintain energy levels. Over time eating too many UPF is linked to health problems such as heart disease, type 2 diabetes, high blood pressure and poor gut health.

A healthy diet doesn't have to banish UPFs, as they are compelling. But instead, try to incorporate a wide spread of natural, whole foods that leave you feeling nourished and satisfied, aim for a colourful plate with a balance of food types which taste good. Eating the odd chocolate or crisp is normal and completely fine, but as long all your food is not constantly coming from a 'ready-made' plastic dish or a packet – you are eating a healthy diet. By doing this, you are creating a lifestyle that not only prevents chronic disease but also promotes mental well-being and longevity, therefor, individuals can lead a life which is productive and fulfilling.

- Georgia E

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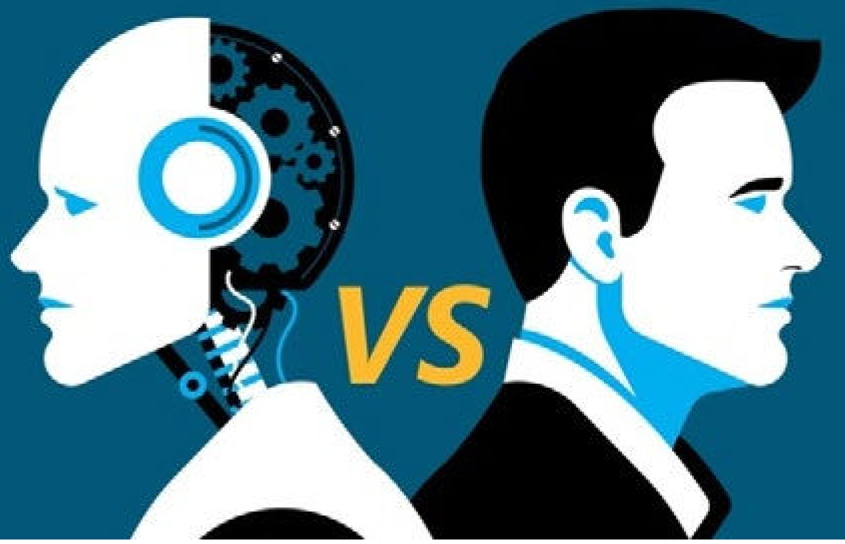
"DOES ARTIFICIAL INTELLIGENCE POSE A GREATER RISK OR BENEFIT TO FUTURE EMPLOYMENT?"



There are many reasons why AI can be considered both brilliant and terrible. In the past few years, it has advanced exponentially, with chatbots such as ChatGPT and Gemini being used in a vast multitude of fashions, ranging from planning essays to processing data. Yet, it poses a significant threat to many people's livelihoods, with jobs such as clerks and paralegals rapidly becoming obsolete.

While AI is widely praised for its achievements in fields like science and engineering, its rapid advancements and increasingly widespread use have been a cause for debate, as people find themselves at risk of losing their jobs. Various well-known and influential people such as Sadiq Khan, the Mayor of London, has spoken out about its dangers saying it could cause "mass unemployment" if measures aren't taken. Furthermore, AI can benefit the wealthy and educated but can widen the gap between those with little money or access to education, increasing socio-economic divides. In addition, people have voiced concern over AI one day taking over. Although this grim vision is still a long way off from becoming reality, the threat is there. Geoffrey Hinton, often acknowledged as the Godfather of AI, has spoken publicly about this saying "These things are going to get more intelligent than us." As well as that, he has revised his original estimation of when this might occur. At first, he said that he estimated it would be 50 - 100 years away but now he believes it could be in as little as 5 years.

However, there are numerous benefits to AI as well. It has been used to rapidly advance understanding in medicine, because it can give faster, more accurate diagnoses which lead to patients being treated more quickly and efficiently. In addition, it has helped in data analysis because of its ability to process vast amounts of information incredibly quickly. This means that businesses and even governments can respond much faster to problems than they otherwise would have. As well as that, AI can help students revise, by simplifying tricky topics, summarising lectures into notes and even creating practice questions in order to be as prepared as possible.

Despite these somewhat misleading advantages, it is important to recognise that AI's effect on large-scale employment depends hugely on how it is used and controlled. While some jobs will inevitably be lost, others are also likely to be created, particularly in areas such as AI development, monitoring, coding, science and regulation. In the past, major technological changes have transformed the job market rather than eliminating it completely. For example, the introduction of computers reduced the need for some manual roles - but also led to the creation of many new careers. If governments and employers invest in retraining workers, people may be able to adapt instead of being replaced.

In conclusion, artificial intelligence poses both risks and benefits to future employment. Although it threatens certain jobs and could increase inequality if left unmanaged, it also has the potential to vastly improve efficiency and create new opportunities. Overall, AI itself is not the main issue; the way it is introduced that will determine the impact it will eventually have on society. With responsible use and support for those who will be affected, AI is more likely to benefit future employment rather than cause harm.

- Jamie C and Otto E

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FROM NUTRITION TO ADDICTION: THE ROLE OF ULTRA-PROCESSED FOODS IN CHRONIC DISEASE

One of the most important aspects of our overall health and wellbeing is nutrition. Hippocrates' quote, "Let food be thy medicine," from around 400 BC highlights how important the right diet is in influencing our lives. The phrase embodies the idea that the food we consume plays a pivotal role in nourishing our bodies and preventing disease. What we eat has a direct impact on our energy levels, mood, cognitive function, and risk of developing chronic diseases (World Health Organization, n.d.). Scientific evidence proves that nutrition plays a critical role in human development, especially during the early years of life (Harvard T.H. Chan School of Public Health, 2022). It is commonly said that a healthy diet consists of nutrient dense foods such as fruits, vegetables, whole grains, lean protein, and healthy fats. These foods provide essential nutrients our bodies need to function properly. So if this is widely known, why do eating habits around the world deviate so far from it?

For most people, quality of life is improving through better education, housing, and access to electricity and hot water. However, these comfortable lifestyles are undermined by the fact that our food is killing us, not through lack of it but through ignorance of what we consume. In the past, humans feared diseases such as tuberculosis or plague. Today, the leading cause of mortality worldwide is diet (The Lancet, 2019). The food industry sends misleading signals about what is normal to eat, making the idea of everything in moderation meaningless when most foods available are excessively processed and sugary (BMJ Group, 2024).

There has been a massive increase in chronic diseases over recent decades. In 2015, approximately 12 million deaths worldwide were linked to dietary risks, exceeding those caused by tobacco or alcohol (The Lancet, 2019). Between 2005 and 2015, global prevalence rose sharply, including a 31 percent increase in diabetes and a 28 percent increase in cardiovascular disease (World Health Organization, n.d.). At the same time, global sales of fast food and packaged food increased significantly. The correlation between ultra processed foods and chronic disease is clear, with evidence showing that one is a direct consequence of the other (Rico-Campà et al., 2019). These numbers are not slowing down. By 2040, one in five adults is expected to be living with a major illness (Health Foundation, 2023). Compared to previous decades, lifestyles have evolved to the point where little thought is given to whether food is healthy. Highly processed, calorie dense foods loaded with additives and sugar have replaced fresh, locally grown foods. This shift is a primary reason why people worldwide, including children, are becoming sicker and more overweight (Monteiro et al., 2019).

Ultra processed foods are typically ready to eat and low in nutrients. These include sugary drinks, cookies, frozen pizzas, breakfast cereals, and ice cream. They contain unnatural ingredients added to enhance flavour and shelf life, such as artificial colours, flavourings, preservatives, sugar, salt, and trans fats. Trans fats are linked to inflammation, heart disease, and stroke (NHS, 2023). Sodium is widely used in processing, with around 70 percent of salt intake in the UK coming from processed and restaurant foods (Public Health England, 2020). Sugar remains the most common and damaging additive, present in nearly everything (Harvard T.H. Chan School of Public Health, 2022).

Convenience plays a major role in ultra processed food consumption. Many people lack time, skills, or access to fresh foods, while takeaway options are often the only available choice. Cost is another misconception, as processed foods are often believed to be cheaper than fresh ingredients. Taste and texture also contribute, as these foods are engineered to be addictive (BMJ Open, 2019). Food companies spend billions marketing their products as healthier than they are, using misleading claims such as low fat or high fibre (NHS, 2023). A lack of nutritional knowledge further contributes to overconsumption.

Ultra processed foods damage both physical and psychological health. Even short term consumption can cause spikes in blood sugar, leading to increased hunger and overeating (Li et al., 2025). These foods interfere with the brain's ability to recognise fullness, creating a cycle of addiction. Excess sugar, particularly in liquid

form, disrupts appetite control and promotes weight gain (Harvard T.H. Chan School of Public Health, 2022). During industrial processing, foods are exposed to extreme conditions that can create harmful compounds linked to cardiovascular disease (Li et al., 2023). Sugar overload in the liver causes fat accumulation, increasing the risk of fatty liver disease (Healthline, 2025). Gut health is also affected, as diets high in ultra processed foods disrupt the gut microbiome, influencing digestion, fat storage, and hunger signals (NHS, 2023).

Sugar consumption today is unnaturally high. Historically, sugar was used to fuel undernourished workers and soldiers, but modern intake is driven by political, social, and economic forces. The food industry has long concealed the risks of sugar through misleading labelling and advertising (Public Health England, 2020). In the 1960s, the sugar industry funded research to downplay its link to heart disease, shifting blame onto saturated fat (BMJ Group, 2024). As a result, generations were misled about what constituted a healthy diet.

In conclusion, maintaining a balanced diet is increasingly difficult in a world dominated by ultra processed foods. However, making small, gradual changes toward whole, natural foods can significantly reduce the risk of chronic disease (World Health Organization, n.d.). While genetics and luck play a role in health, diet remains one of the most controllable factors. If we fail to address the declining quality of our food, these health problems will continue to worsen. Why should the one thing we can control, what we eat, be the thing that harms us the most?

- Kat C

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WHY BACTERIA DO NOT HAVE A RIGHT TO LIFE

Whether an organism has a right to life depends on how "life" and "rights" are defined. While bacteria are alive in a biological sense, the attribution of moral rights is a philosophical issue rather than a scientific one. This essay argues that bacteria do not have a right to life because they lack sentience and moral awareness, destroying bacteria is often a necessity for our own lives, and philosophy often places them at a low level within a hierarchy of life. By these factors, it becomes clear that rights should only be for beings capable of awareness, suffering, or moral agency which bacteria do not have.

First, bacteria do not have a conscience and are not sentient beings, this means that bacteria are not aware of what is 'right or wrong' and can't think, reason or make moral decisions. They are unable to experience or feel anything. In Michael L. Woodruff's 2016 article 'Bacteria and the Cellular Basis of consciousness' Woodruff wrote that "Analysis of the genetic mechanisms underlying bacterial chemotaxis indicates that sentience has no explanatory power in this case." This statement indicates that bacterial behaviour such as chemotaxis are caused by genetic and biomechanical processes and not by their conscience or sentience. Based on this, bacteria do not knowingly do anything. Ethical and legal 'rights' are given to beings capable of feeling, suffering or making choices. Humans and animals can do these things, but bacteria cannot, meaning that they have no awareness or value of life, further supporting the argument that they have no right to live. To reinforce this, in his 2018 article entitled 'Antonio Damasio, Feeling, and the Evolution of Consciousness', Damasio writes "Bacteria are a good example of such simple creatures. … In violation of what could be logically expected, those creatures already exhibited social strategies that were laying the groundwork for what became feelings and cultures in the proper sense." Reflecting the ideas that even very simple organisms act on homeostatic imperatives and not conscious intention. This further supports the argument that bacteria act without awareness and their actions are biological precursors not conscious decisions. Their "social strategies" are automatic and lay the evolutionary foundations for consciousness in higher organisms not evidence of consciousness or 'life'. An example of their social strategies is: Quorum sensing which is when bacteria release chemical signals to calculate population density. This allows them to perform coordinated actions once there are enough present. This links to the development of collective decision making in higher creatures as well as context dependent behaviour.

Furthermore, it is necessary to kill bacteria to preserve the lives of higher, more intelligent animals. If we gave all bacteria the right to live, humans would have many different bacteria on everything. We would not be able to disinfect surfaces, wash our hands, or cook food. In the Gov. uk article entitled: Preventing and controlling infections, it is stated that "Hand hygiene is one of the most important ways of controlling the spread of infections, especially those that cause diarrhoea or vomiting and respiratory infections." This is a good representation of how if we did not kill bacteria on our hands, we would put ourselves and others at much higher risk of contracting a disease that could have extreme effects on our bodies. For example, E. Coli is most likely to be spread if people do not wash their hands. E. Coli can cause gastrointestinal infections, urinary tract infections (UTIs), and more serious complications like Haemolytic Uremic Syndrome which can destroy red blood cells. This is proof that washing hands is vital for preventing extreme and mild infections and diseases which may leave the victims with extreme health problems and sometimes death. Some people might argue that killing all bacteria is harmful to the body, but that does not mean that all bacteria should be kept alive. Just because no bacteria have a right to life does not mean that we must kill all bacteria.

In philosophy, there is a hierarchy of life. With some things having a higher right to life and some lower. There are most often considered to be four layers. On top are fully conscious, moral agents. Most people consider humans to be the only thing in this tier, but many people also think that animals with higher intelligence and sentience such as dolphins, elephants and primates are in this tier as well. Most commonly, these creatures have self-awareness and the ability to make moral decisions. The second tier is for animals with some sentience but limited awareness. This includes: most mammals, birds and some fish. These are often animals that can feel pain and experience social interactions but lack full moral reasoning. In the third tier, there is plants, fungi, and microorganisms like bacteria. Who can grow and reproduce but can't feel, think or have awareness. The final tier is for non-living or artificial things such as viruses and inanimate objects. In DeGrazia and Millum's article published in the Cambridge Article Press entitled: A theory of Bioethics, they write "All and only sentient beings have moral status." Bacteria have not proved that they are sentient beings and therefore do not have a moral status and do not deserve the right to life. We should draw the line of the right to life at this third tier of microorganisms giving sentient, conscious being the right to life but not the unconscious beings relying on natural processes, not decisions, to survive.

In conclusion, bacteria do not have a philosophical right to life because they lack sentience, consciousness, and moral agency. Their behaviour is controlled entirely by biochemical processes rather than awareness or their own decisions, placing them outside moral consideration. Furthermore, the necessity of controlling and destroying bacteria to protect human and animal life proves that granting them rights would undermine the survival of more complex, sentient beings. Within the philosophical hierarchy of life, bacteria are in a lower tier, lacking moral status and therefore the right to life. For these reasons, bacteria can be considered biologically alive but philosophically undeserving of rights.

- Kearsney V

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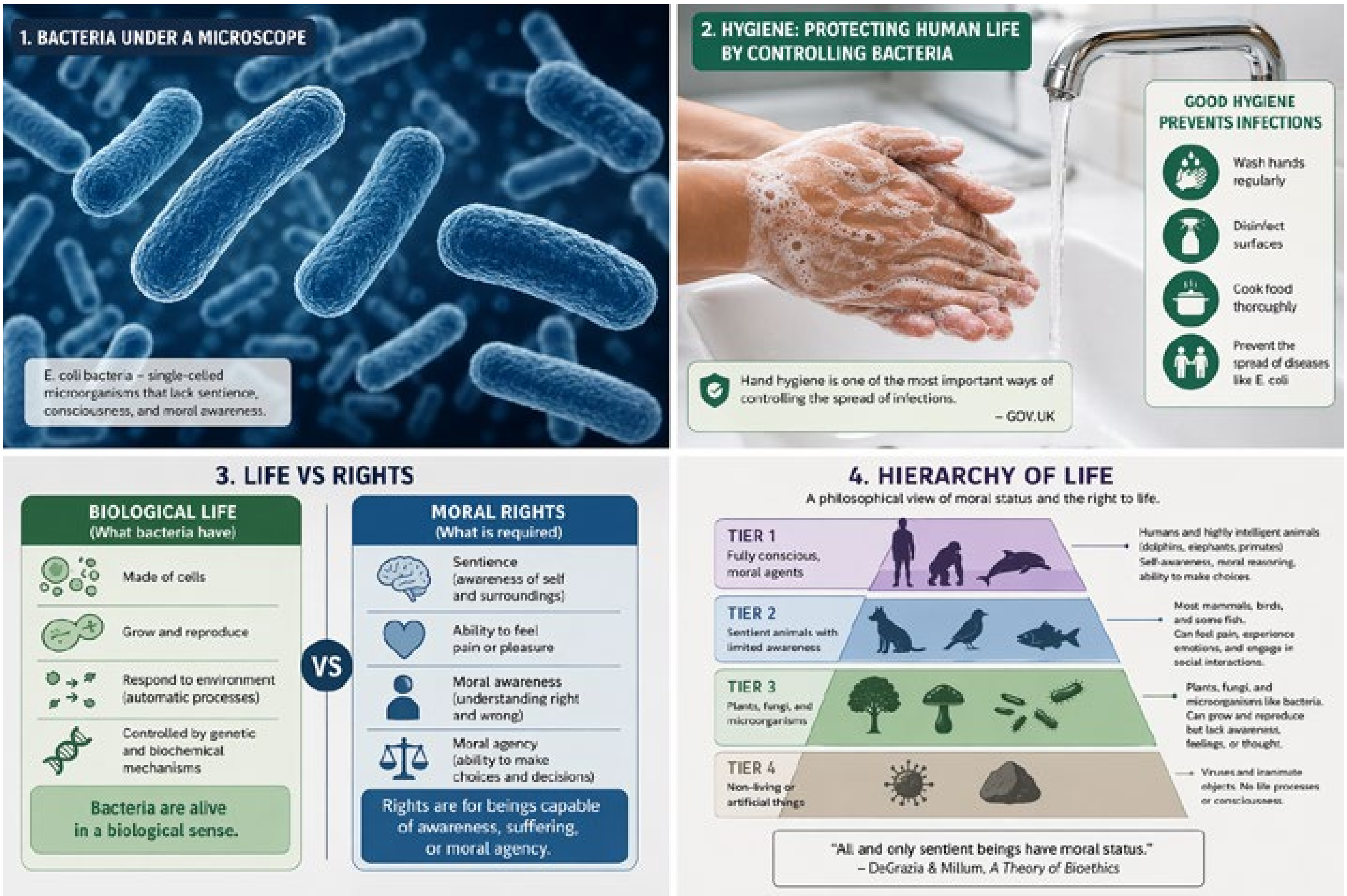
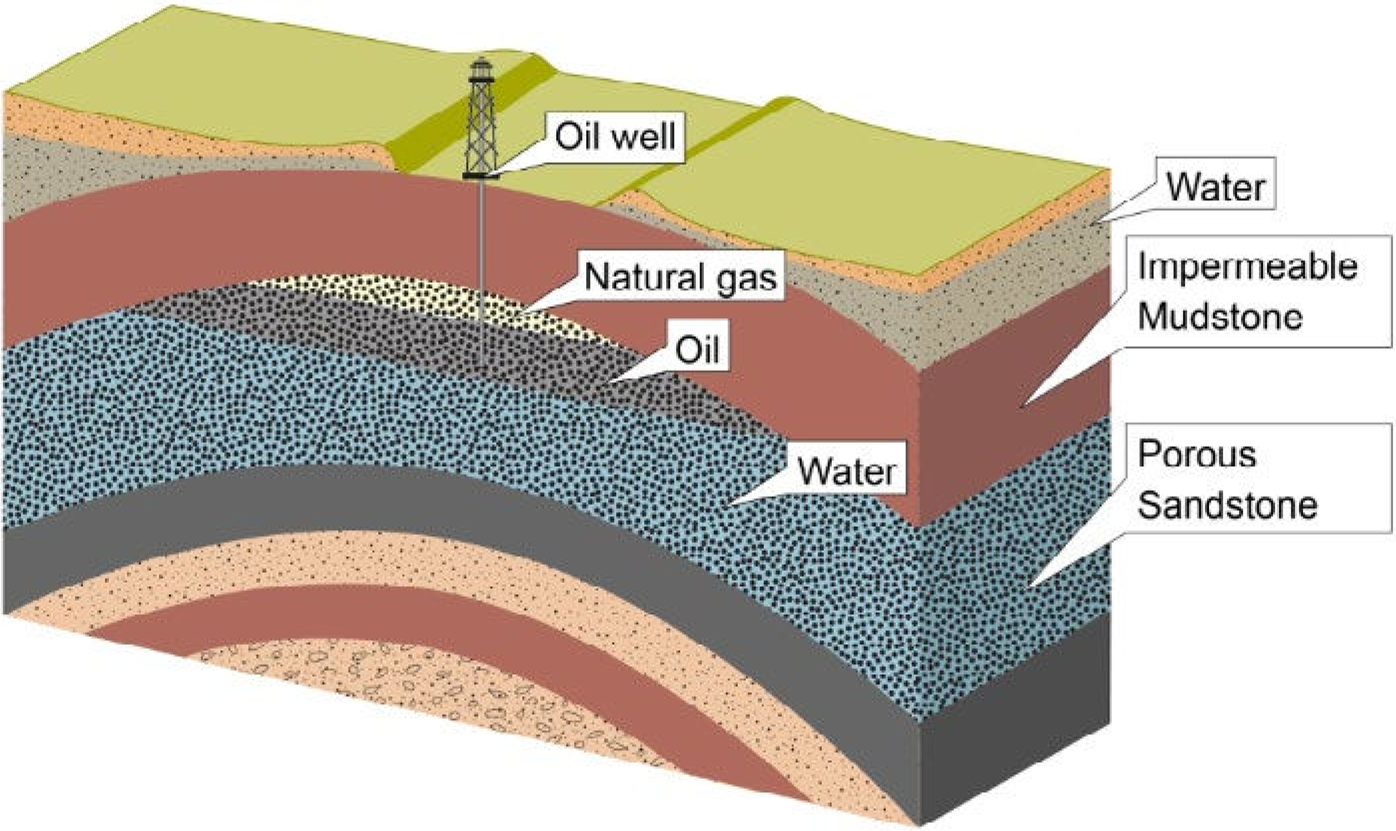


CARBON CAPTURE, UTILISATION AND STORAGE, PAVING THE WAY TO A CLEANER FUTURE FOR EVERYONE



INTRODUCTION

It is common knowledge that climate change is one of the largest global problems that humanity is facing in the modern day. A rise on average of 1.46 °C above pre-industrial levels (Madge, 2026), as of 2026, means intensified and more frequent hurricanes, countries becoming uninhabitable soon as well as increased droughts and floods. To counteract this, the world needs to reduce their greenhouse gas emissions by burning fewer fossil fuels and planting more trees. As we have seen, humans aren't very good at this, but what if we could reduce our emissions while still burning the same amount of fossil fuels. We can do this by using a process called carbon capture, companies then store or utilise the carbon dioxide that is captured. There are two main forms of carbon capturing, these include: Direct Air Capture (DAC) and Point Source Carbon Capture.

DIRECT AIR CAPTURE

Direct Air Capture (DAC) is when technology is used to extract CO2 directly from the atmosphere. There are 27 DAC plants commissioned around the world which capture nearly 1 million tonnes of CO2 per year (Budinis, 2024). DAC systems expose outdoor air to a liquid solvent or solid sorbent (material used to absorb liquids or gases) to specifically remove CO2 from the extremely dilute atmosphere This happens through chemical reactions with the solvent or adsorption with the sorbent. After the CO2 is absorbed a change in temperature or pressure releases the CO2 in a concentrated stream which can be collected and compressed down for use or storage. Direct air capture can be carried out at any location, it produces pure CO2 and it is scalable. However, it is very energy intensive and thus very expensive (APS, 2026)

POINT SOURCE CARBON CAPTURE

Point Source Carbon Capture (PSC) is when CO2 is removed directly from the exhausts from places like power plants before it reaches the atmosphere. The byproduct exhaust mixture from burning fuel is called flue gas and it has a relatively high concentration of CO2. The flue gas is first cleaned to remove contaminants that could damage capturing technologies. The CO2 is then captured using similar methods to the DAC process including chemical solvents, adsorption, absorption or membranes. A membrane is a thin, semi permeable barrier that only lets certain substances through. The captured CO2 is then released due to heating or pressure change to release a pure stream of gas that can be collected and compressed.

(National Academies, 2019). PSC is much less energy intensive than DAC, so it is far cheaper and can be linked to the power plant's energy output so that no extra energy is required. However, it cannot remove existing CO2 in the atmosphere and can only be scaled up in line with the power plant.

HOW THE CO2 PRODUCED CAN BE UTILISED.

Captured CO2 can be used for enhanced oil recovery, a process that is used to extract more oil from a reservoir after natural pressure is not enough by increasing the oil's viscosity (runniness) (NETL, n.d.). The CO2 can also be used in the fertiliser industry to produce calcium ammonium nitrate or urea (CO(NH2)2) which are both widely used agriculturally. CO2 can also be used to produce synthetic fuels such as methanol or synthetic hydrocarbons. Such fuels are mainly used in flights and shipping. Furthermore, the CO2 can be used as a feedstock for materials such as plastics and carbon-cured concrete. Carbon-cured concrete is stronger than normal concrete and permanently stores the CO2 inside. CO2 can also be used in making fizzy drinks (OECD, 2026). Most of these utilisations only temporarily recycle the CO2 or result in a net-zero process. The way to have an overall CO2 decrease is to store the collected gas deep underground.

STORAGE OF THE CO2

Captured CO2 is compressed into a supercritical fluid, in which it behaves both like a liquid and gas, and is injected deep into the Earth's surface, typically between 800-1000 metres where pressure keeps it dense. It is stored in porous rock formations like saline (very salty) aquifers, depleted oil or gas reservoirs or basalt rock formations. The ways in which the CO2 can then be trapped varies including techniques such as structural, residual, solubility or mineral trapping. Structural trapping includes using an impermeable cap rock to physically block the gas from rising. Residual trapping is when CO2 gets trapped as tiny bubbles in rock pores due to surface tension. Solubility trapping consists of the CO2 dissolving into underground brines, in which it becomes denser and sinks. Mineral trapping is permanent and occurs when dissolved CO2 reacts with rock minerals to form solid carbonates. As time passes, the CO2 becomes more secure and can be stored for millions of years. (IPCC, 2022)

CONCLUSION

Climate change is a big problem, but if we tackle it at its source and reduced the CO2 emissions in the atmosphere then a real difference could be made. However, if humans continue to act in the same way and repeat the same mistakes then by 2030-2035 climate change effects may become irreversible as global warming passes 1.5°C (McGuire, 2023). Everyone can try to do their part to combat global warming but, in my opinion, it is up to the 'important' people in power to make the necessary changes.

- Marius P-C

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THE MICROBIAL START: HOW EARLY-LIFE GUT HEALTH SHAPES A LIFETIME

From the moment a baby enters the world, an invisible but powerful process begins: the establishment of their gut microbiota. These first microbes - tiny bacteria, viruses, and fungi - play a surprisingly huge role in shaping lifelong health. Emerging research suggests that the microbes in infants, which are influenced by birth method, early environment, and nutrition, can set the stage for risks of obesity, diabetes, and even certain cancers decades later.

The way a baby is born has an immediate impact on their microbial foundation. Babies delivered vaginally are exposed to their mother's vaginal and intestinal bacteria, which pass into the infant's gut. In contrast, those born via Caesarean section or exposed to antibiotics early may miss out on these critical microbes. Studies indicate that lacking key gut bacteria in infancy can raise the risk of developing chronic diseases by up to 50 percent.

The order and type of microbes acquired in the first months of life are significant - they help program both the immune system and metabolism. A well-balanced gut microbiota teaches the immune system to distinguish between harmful and harmless substances, reducing the risk of allergies and autoimmune conditions. It also influences energy storage and glucose metabolism, which can affect obesity and diabetes risks later in life.

Nutrition plays a critical role in supporting these microbes. Breast milk, for example, contains specialized sugars called oligosaccharides, which do not feed the baby directly but instead serve as food for beneficial gut bacteria. This selective feeding helps set up a healthy microbial community that supports immune and metabolic health. Environmental factors, like contact with siblings, pets, and even a moderately "messy" household, introduce microbial diversity that helps maintain a healthy gut ecosystem.

Fortunately, scientists are uncovering ways to repair and improve early microbial development. Disrupted microbiota, caused by C-sections, antibiotics, or other factors, can be restored through targeted probiotics and synthesized nutrients derived from breast milk. This aims to reintroduce missing microbes and support their growth, helping restore the imbalance affected by early disruptions. Researchers envision a future where every child begins life with a healthy gut, helping to support long term health regardless of birth circumstances.

The potential impact is huge. Regularly checking a baby's gut health could help spot children at risk of imbalances

in their microbes. This would allow tailored support before long-term health problems start. Using probiotics, nutrients from breast milk, and healthy lifestyle advice, it may be possible to prevent issues like obesity, metabolic disorders, and immune-related illnesses before they develop.

This emerging understanding of the gut microbiome also challenges traditional ideas about cleanliness and hygiene. While maintaining a safe environment is important, a certain level of microbial exposure (from household pets, siblings, or outdoor play) can actually strengthen a child's microbiota. These everyday exposures help expand gut communities, creating a more resilient immune system.

Ultimately, the research points to a fundamental change: early life is not just about growth and development in the traditional sense but also about establishing a microbial foundation that can influence health across a lifetime. The microbes that infants first encounter help shape metabolism, immunity, and disease risk. With advances in science and nutrition, it may soon be possible to ensure that every child has the microbial tools for a healthy start, despite birth circumstances or early medical interventions.

As our understanding of the gut microbiome grows, so does the opportunity to control it for lifelong health. The first microbes a baby receives are not just a biological curiosity - they are the starting course for a lifetime of wellness.

- Megan H and Ava F

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AN INVISIBLE SHORTCUT: HOW QUANTUM TUNNELLING ACCELERATES CHEMISTRY

Most reactions, either in the lab or elsewhere, should not occur at the rate that they do. The atoms involved are meant to reach a threshold level of energy called the activation energy which is essentially like climbing a hill – you need a minimum amount of energy to reach the top. But some atoms and subatomic particles are able to pass through the side of the hill due to a phenomenon called quantum tunnelling. This process reduces the total energy required to start the reaction, allowing processes to be made much more efficient and occur at much lower levels of energy.

You may be wondering; what actually is quantum tunnelling? Many people have heard the term, but few know the ins and outs. Quantum tunnelling is when a tiny specimen like an electron passes an energy barrier that classic physics says it should not be able to do. If you find that confusing, don't fret – Albert Einstein was never a fan of the idea of quantum mechanics. He stated "God does not play dice with the universe" which attacks the process's random nature.

An energy barrier, the context of tunnelling, is not a physical obstruction, but a region where an electron – or other subatomic particles – are classically unable to pass because the particles themselves do not have enough energy to breach the potential energy generated by the electrostatic forces of the substance. Quantum mechanics permits particles to bypass the barrier because of their wave-like properties. The wave-like properties in question are the fact that the particle cannot be located at any single point, it has a region where it is possible to be. This volume of possibility does not just disappear when it reaches the forbidden area (the energy barrier), it gradually fades into it. If the area is thin enough, the region where a particle could be can venture onto the other side of the reaction. Therefor there is a chance the electron can exist on the product side of the reaction.

How is this actually useful in the real world? Many chemical reactions that are instrumental to our survival as humans are made much more efficient due to the effect of quantum mechanics. Photosynthesis, for example, operates efficiently enough to sustain human life, partly because of this quantum phenomena. Electrons can bypass energy barriers they would not classically be able to, thereby aiding the conservation of energy, making the process more efficient and sustainable.

Not only electrons can display tunnelling; protons are also able to display tunnelling over extremely short distances, despite being nearly 2000 times more massive than electrons. This is possible because of their wave-particle duality (being able to display wavelike properties and particle properties) as well as their ability to able to be transferred along proteins or hydrogen bonded networks, such as water during a reaction like photosynthesis.

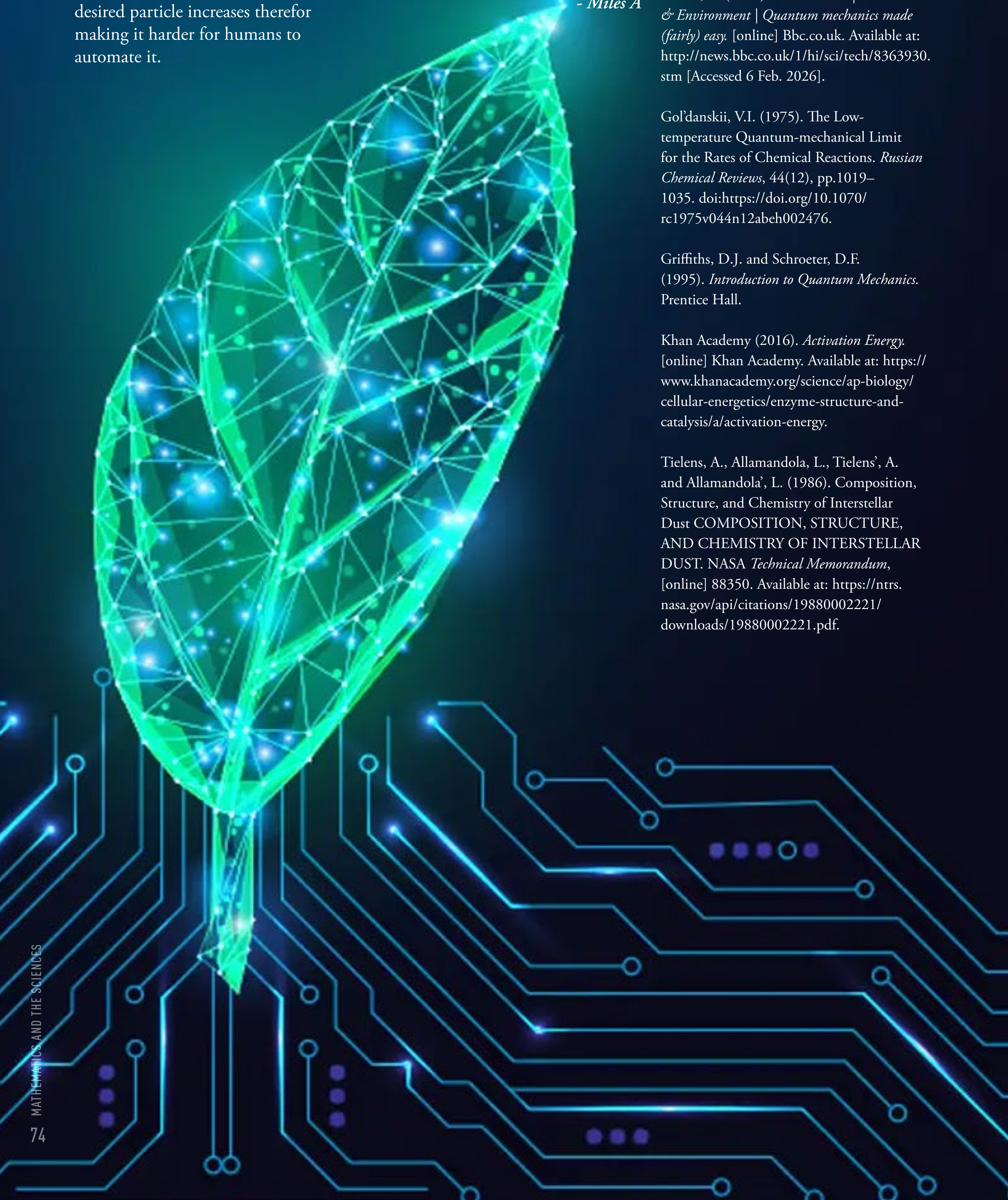
Proton tunnelling is significant since it gives rise to a higher production of ATP which, in turn, supplies more energy to the plant allowing essential metabolic processes to occur quicker. Furthermore, the rate of reaction increases meaning more oxygen escapes, and more carbon dioxide is extracted from the atmosphere which both benefit our existence as humans.

Beyond biological systems, quantum tunnelling plays a crucial role in non-biological chemistry. Interstellar chemistry is not typically expected due the severe lack of thermal energy, the temperature in space is around 10K – 50K. At this temperature atoms are highly unlikely to overcome the activation energy for any given reaction. But since minuscule particles like hydrogen atoms are able to tunnel past the energy barrier reactions to create compounds like NH_3, H_2 and CO the foundations of planet formation and early life are made possible.

Despite its wide range of applications tunnelling is subject to many limitations and constraints. Some of which being the size of the energy barrier, the size of the particle or merely the probabilistic nature of the act. While its possible to maximise the possibility of the phenomena occurring – by making the particle as small as possible and making the energy barrier of minimal width, there is never a guarantee of it taking place. While there is no upper limit to the mass of a particle that can display tunnelling, in practice it is only shown by very light particles or tiny atoms. The probability of its occurrence decreases exponentially as the size of the desired particle increases therefor making it harder for humans to automate it.

To conclude, the phenomenon of quantum tunnelling exposes that nature operates in ways far beyond classical intuition, permitting particles to access pathways through energy barriers that were once thought to be impossible.

- Miles A



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UNDERSTANDING HUMAN CONSCIOUSNESS: HOW THE BRAIN THINKS, IMAGINES AND SPEAKS

How and why humans experience consciousness still remains a mystery for researchers. Thinking is the cognitive process that enables us to form ideas, reason, and solve problems. Despite extensive debate and research, a universally accepted definition or explanation for consciousness has not been found.

However, there are a few responses that are widely accepted. Consciousness can be defined as awareness of one's feelings, thoughts, and sense of self. According to scientific theories, the brain's intricate neural processes, which involve billions of neurones and their synaptic connections, are responsible for consciousness. Since consciousness is a result of brain activity, meaning it is not spiritual. It is widely believed that consciousness evolved to aid in our survival in the wild. There are still many philosophical questions about how we perceive consciousness and the connection between our bodies and minds.

Thinking lets us imagine situations without actually living through them. A person might imagine a decisions outcome before actually doing it. We can think about things like time, right and wrong, and who we are, something no other living being seems to have the capabilities to do. When someone imagines an object or scene, the visual cortex, typically associated with processing visual input, becomes active. This activation isn't random; it mirrors the patterns of activity seen when the individual perceives the same object in real life. This suggests that the brain reuses its visual pathways for both real life perception and what we imagine.

This reconstruction process is influenced by various factors, including context, emotion, and our previous experiences, leading to highly personalized and sometimes distorted mental representations of memories and events. Our brain's ability to create mental images is not limited to visual reworking of memories, it extends to other senses, like auditory (imagining a sound) or somatosensory (imagining a touch). Ongoing research continues to investigate the precise mechanisms of mental imagery, including the role of oscillatory brain activity which is the frequencies in our brains.

Inner speech is complicated. It can manifest in different forms, ranging from fully formed sentences to fragmented words or even abstract phrases that only a specific person could understand. Some researchers propose that inner speech is a condensed version of external speech, while others argue that it possesses distinct characteristics. Regardless of its exact nature, inner speech serves as a crucial tool for mental processes.

One of the primary functions of inner speech is its involvement in keeping people in check. By talking to ourselves, people can monitor their progress towards goals, evaluate their performance, and adjust their strategies accordingly. For instance, when solving a difficult problem, we might silently talk to ourselves about different approaches, weigh their pros and cons, and then select the most suitable option. This internal conversation allows for more deliberate and effective problem-solving.

Furthermore, inner speech is deeply intertwined with memory and learning. It assists in encoding information by allowing us to rephrase or summarize new concepts in our own words. This active processing strengthens memory traces and improves memory retention.

The development of inner speech is a fascinating area of research. It is believed to emerge during childhood, evolving from overt speech as children learn to internalize their thoughts and conversations. As we mature, inner speech becomes more sophisticated, reflecting our growing cognitive abilities. Neuroimaging studies have identified several brain regions that are active during inner speech, including areas associated with language processing such as the Broca's and Wernicke's area, and auditory perception, the primary auditory cortex. Further research in this domain promises to provide a more comprehensive understanding of the neurological underpinnings of this essential cognitive process.

In conclusion, how humans think and the factors behind them, inner speech and mental imagery, are still not fully understood by researchers, but are still foundational aspects to what makes us human.

- Temidere R

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INDEPENDENT RESEARCH AND COMPETITIONS

This section celebrates pupils' work, both in and out of the classroom. It includes extended essays, EPQs, and out-of-school academic competitions. It represents what pupils at Bradfield College can achieve in their spare time, answering questions that arise in real life beyond the classroom. Topics can range from medicine to exploring the impact of plastics on the environment. Combined, these, along with the foundation knowledge from the classroom, are stretched into the real world.

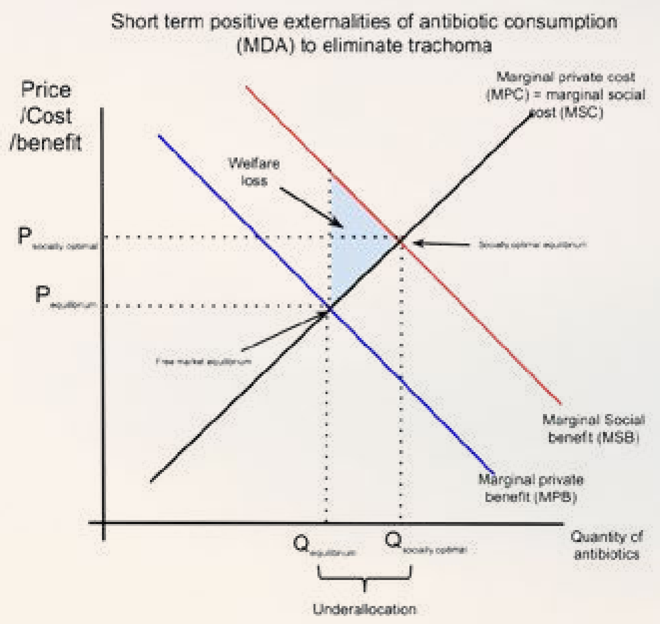
- Emma D (Editor)

CAN MASS DRUG ADMINISTRATION OF AZITHROMYCIN IN ETHIOPIA BE JUSTIFIED FOR THE SHORT-TERM TREATMENT OF TRACHOMA DESPITE GLOBAL CONCERNS ABOUT ANTIBIOTIC RESISTANCE?

Comparing the health and economic impacts of trachoma to Anti Microbial Resistance :

Ethiopia must decide to prioritise the containment of trachoma or the protection of antibiotics. Short-term, MDA against trachoma could be justified due to benefits for firms, individuals, and the government.

GRAPH 1

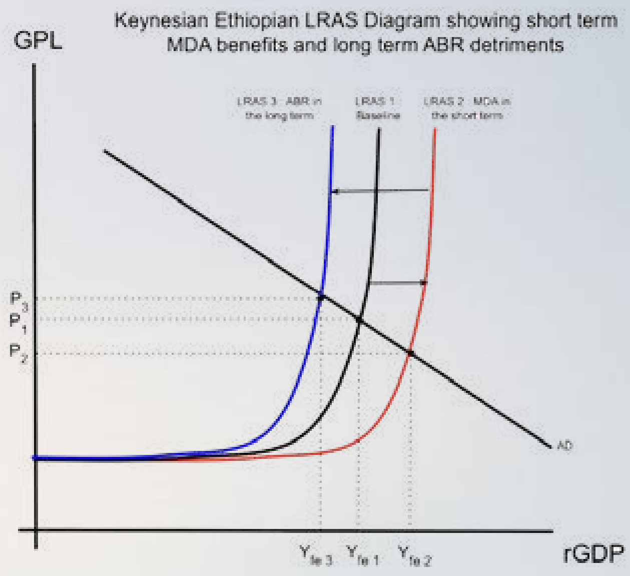


Graph 1: Short-term positive consumption externality of antibiotics MDA (made by author)

Graph 1 shows in the short term that MSB>MPB, meaning that social benefits of MDA exceed the private benefits, and antibiotics are underutilised. MDA corrects the underconsumption, reducing the welfare loss associated with trachoma. For individuals, a reduction in trachoma burden, besides improved health, means they can work and bring home an income, decreasing poverty.

Graph 2: Keynesian LRAS diagram, showing the short-term benefits of MDA and the long-term disadvantages of ABR (made by author)

GRAPH 2

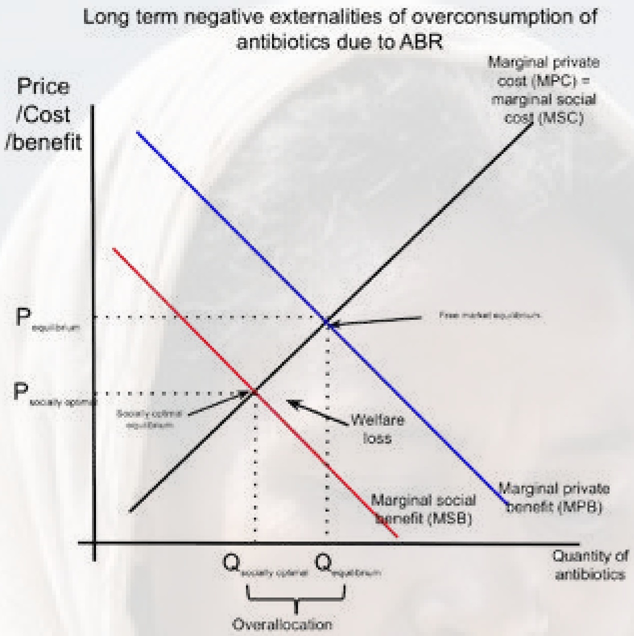


Firms experience an increase in productivity, meaning increased output per input. This causes an outward shift of long-run aggregate supply LRAS causing an increase in real GDP, as can be seen on graph 2, as YFE 1 shifts to YFE 2.

There is a lower fiscal opportunity cost of paying for trachoma treatment for the government, and while the initial MDA cost may be high, this could be subsidised by NGOs. Additionally, when trachoma is no longer a burden, the

government would have increased fiscal space to improve the quality of life in Ethiopia. This, as well as the reduction in individual poverty, limits the bidirectional cycle of poverty, generating a positive feedback loop of decreasing poverty and decreasing trachoma burden. This justifies increased government and NGO support of MDA; however, the long-term implications should be considered.

Graph 3: Long-term negative consumption externality due to overconsumption of antibiotics due to AMR (made by author)



In the long term, the MSB of MDA decreases due to ABR. Graph 3 shows that now MPB> MSB, showing antibiotic overallocation. Mortality increases due to ABR as communicable diseases are challenging to treat, hence reversing any benefits provided by MDA. Another consideration is the difference between mortality and morbidity. While trachoma is debilitating, it is not fatal, and in many cases, surgery can improve the severe visual impairment. However, ABR can be fatal. Mortality permanently shrinks the labour force, meaning firms would struggle to find labourers, reducing productivity and output, all while increasing costs perhaps more than trachoma due to the scale of ABR.

This leads to a reduction in the SRAS and, more importantly, the LRAS. This not only diminishes the benefits of MDA but also permanently reduces Ethiopia's productive capacity, as YFE 2 shifts inwards to YFE 3 seen in Graph 2. Therefore, increases in the general price level and a reduction in rGDP can be observed. Additionally, Governments must now direct the fiscal budget back to limit the costly issue of resistance, generating a larger opportunity cost than previously. While MDA seems viable in the short term, the benefits are not sustainable in the long run when antibiotics are less efficacious. The impacts on individuals, firms, and businesses are arguably more profound in the long-term ABR scenario.

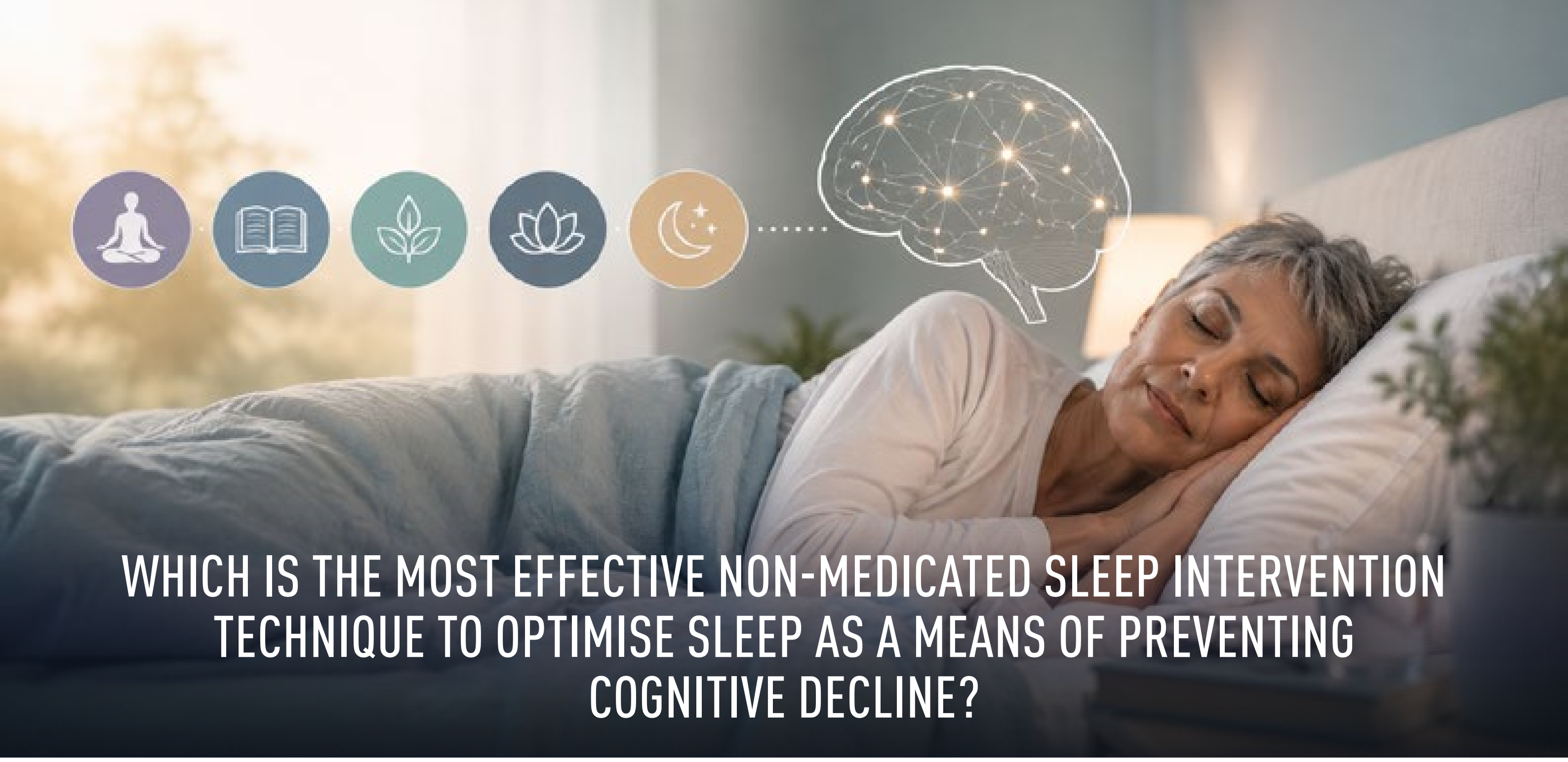
Trachoma is geographically concentrated and has been eradicated in economically developed countries, which contrasts with ABR. ABR is a global issue, and does not recognise country borders. This means there is not just a national cost, but also a global cost. Superbugs spread rapidly, particularly due to international interdependence and travel, spreading across the globe with ease. Horizontal gene transfer amplifies the problem as other bacteria can become resistant. This would have significant healthcare, economic, and human mortality costs for countries beyond Ethiopia. The same would not be seen with Trachoma.

The treatment costs should also be considered. When bacteria become resistant at the rate they are now, we cannot develop new drugs in time, as developments can take 10-15 years minimum. Incentive for new antibiotic development is also incredibly low due to the costs of up to 1 billion dollars.1 Bacteria become resistant faster than our development, which means in a high ABR scenario, we have no treatments to limit the spread of ABR bacteria. Treatment for trachoma includes surgery, which costs around $180 per patient, 2 which, even if the entire Ethiopian population had to be operated on, is significantly less than the cost of drug development.

CONCLUSION

The objective of this investigation was to explore whether MDA of prophylactic antibiotics for the short-term treatment of trachoma in Ethiopia could be justified. Despite the complexity of the question, the aim was to gauge whether MDA could be justifiable using my subject skills in both biology and economics. Firstly, there are short-term and long-term considerations to be made, where in many cases it could be argued that MDA is justifiable in the short term. Significant improvements in health mean increased productivity and employment, reducing poverty, as well as lowering the burden on healthcare systems. However, in the long term, the consequences of AMR become more significant. Higher mortality causes a recurring lack of productivity and unemployment, which is significant for the overall GDP of the country. While NTDs should not be ignored, and treatment for trachoma should still be pursued, considerations must be made for the safekeeping of antibiotic efficacy. This means that despite the success of MDA programmes, they should be reconsidered as they aren't in compliance with every nation's role of antibiotic stewardship. In terms of trachoma, focus should instead be on surgery, and on improvement of environment and hygiene, which will have improvements on lives beyond just trachoma reduction, as well as limiting the spread of other communicable diseases. Although elimination of NTDs like trachoma is urgent, the escalating antibiotic resistance crisis that the world faces cannot be ignored, and makes MDA seem irresponsible. Progress against trachoma should instead prioritise sanitation and hygiene-based intervention alongside broader poverty reduction. This would provide effective health and economic outcomes for households, firms, governments, and nations, while upholding our stewardship duty to preserve antibiotic efficacy.

- Caroline K



WHICH IS THE MOST EFFECTIVE NON-MEDICATED SLEEP INTERVENTION TECHNIQUE TO OPTIMISE SLEEP AS A MEANS OF PREVENTING COGNITIVE DECLINE?

INTRODUCTION

'Insomnia occurs in at least 40% of older adults. People with insomnia or sleep disturbances had more than a 1.5–2.4-fold increase risk of developing Alzheimer's Disease' (Siengsukon et al, 2020). This fact demonstrates the importance of sleep and how it can impact one's chances of developing cognitive decline or Alzheimer's. This report will aim to determine the most effective sleep intervention technique to prevent cognitive decline, especially Alzheimer's disease (AD) and dementia as these are most frequently together in academic literature and have the most research available. Dementia is an umbrella term for a range of conditions associated with damage to the brain or brain cells (neuron), meaning the brain cannot work efficiently (NHS inform, n.d.). This is different to AD as dementia is a general term; however, AD is a specific brain disease and is the 'biological process that begins with the appearance of a buildup of proteins in the form of amyloid plaques and neurofibrillary tangles in the brain'(Mayo Clinic, 2023). Cognitive decline is defined as problems with a person's ability to think, learn, remember, use judgement, and make decisions(National Cancer Institute, 2011). Although the hypothesis of this report is not commonly examined as the cause for cognitive decline, the National Institution of Health declared that 'in multiple cross-sectional studies, sleep durations ≤5 h and ≥11 h per night have been associated with an increased risk of cognitive impairment' (Ju, Lucey and Holtzman, 2013). Therefore, this topic is worthy of discussion since improved promotion of sleep health and hygiene can positively impact the rate of cognitive decline. There are multiple statistics that prove that cognitive decline 'is a common problem that affects 1 out of 3 people in the UK' (NHS, 2023), and, according to the Cleveland Clinic (2023), 'about 10% of adults meet the criteria for a diagnosis of insomnia disorder'(NHS, 2023). As for cognitive decline being a prevalent issue, 'research shows there are more than 944,000 people in the UK who have dementia. 1 in 11 people over the age of 65 have dementia in the UK' (NHS 2023). An NHS prediction assumes that, by 2030, there will be over one million people diagnosed with dementia – given the gravity on the issue, it is important to examine how the two increasingly worrying issues of cognitive decline and insomnia or sleep disturbance are related to each other.

PROJECT AIMS AND OBJECTIVES (A01)

To reach an evidence-based conclusion to my research title, this report will establish the link between sleep disturbance and cognitive decline, especially Alzheimer's disease (AD). Then, it will explore the effects of three interventions listed below which seek to optimise sleep to prevent cognitive decline and ultimately draw conclusions to confirm whether each intervention has been sufficiently proven to be effective by scientists or medical professionals. These three interventions include:

1) **Cognitive Behavioural Therapy for Insomnia, (CBT-I)**

2) **Bright Light therapy** (BLT)

3) **Acupuncture for insomnia and sleep improvement.**

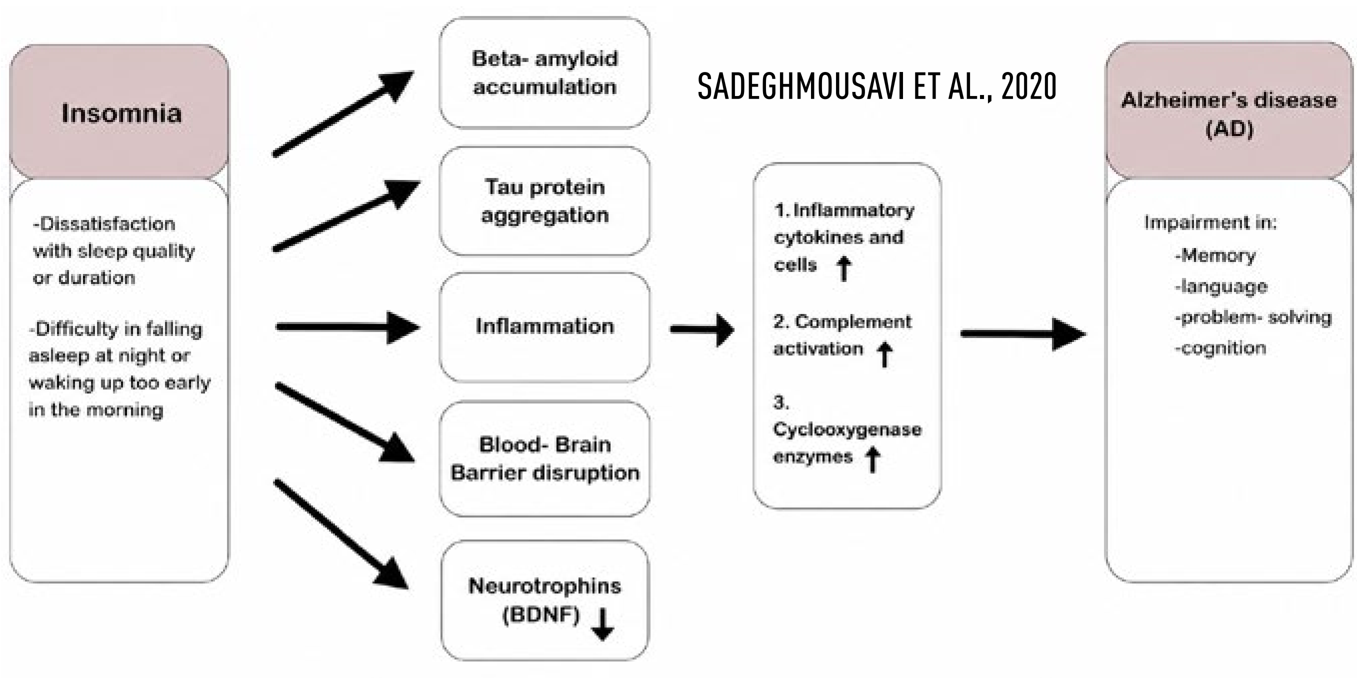
In comparing case study data and gathering the evaluations of qualified experts, this report will compare and rank the effectiveness of these three interventions to conclude which is truly the most effective at optimising sleep and preventing cognitive decline. This area of investigation is highly significant considering '52% of people think dementia is the biggest health problem facing older people today' (Dementia Statistics Hub, n.d.), demonstrating that a resolution is required to improve this statistic for the betterment of today's society.

THE LINK BETWEEN SLEEP DEPRIVATION AND COGNITIVE DECLINE

There are many factors that contribute to the development of cognitive decline, including genetics, age, gender, and brain injuries. Sleep, however, does not seem to be the first factor to arise when undertaking basic research. Nevertheless, thanks to modern technology, we can assess the full effects of sleep deprivation and its possible causal link to Alzheimer's disease, as shown in the diagram below: SADEGHMOUSAVI ET AL., 2020

AMYLOID, TAU, AND CYCLOOXYGENASE ENZYMES

Scientists at the Stanford University School of Medicine have shown that a 'protein fragment known as beta-amyloid, strongly implicated in Alzheimer's disease, begins destroying synapses before it clumps into plaques that lead to nerve cell death' (Goldman, 2013). As seen in the diagram above, beta-amyloid plaques are linked to insomnia – this has been proven by many trials, including a studyperformed by the Washington University School of Medicine which discovered that the accumulation of the amyloid-β (Aβ) peptide in the brain appears to initiate a cascade of key events in the pathogenesis of AD (Ju, Lucey and Holtzman, 2013). The study found evidence that the sleep–wake cycle directly influences levels of Aβ in the brain. In their own trial models, scientists discovered that sleep deprivation increases the concentration of soluble Aβ and results in chronic accumulation of Aβ, whereas sleep extension has the opposite effect. Moreover, once Aβ plaques accumulate, increased wakefulness and altered sleep patterns develop, meaning that regulated sleep may become increasingly difficult, further increasing Aβ plaque accumulation and thus worsening sleep quality (Ju, Lucey and Holtzman, 2013). They also discovered that 'in both mice and humans, levels of soluble Aβ fluctuate with the sleep–wake cycle, in a diurnal pattern.' The International Journal of Molecular Sciences states that "in terms of human studies, sleep deprivation alter[s] the levels of CSF Aβ in cognitively normal people, which could be seen after just a single night of complete sleep deprivation" (Lloret et al., 2020). This shows that even after one night of poor sleep, a person has accumulated Aβ in their brain, which could result in a higher risk of cognitive decline. On Sadeghmousavi's diagram above, the increase in cyclooxygenase enzymes has also been linked to sleep deprivation. The Journal of Neuroinflammation (2020) found that cyclooxygenase enzymes (COXs) can be defined as 'inflammatory agents and enzymes that play roles in the production of the active lipid molecules named eicosanoids, metabolization of the arachidonic acid, and converting them to prostaglandins.' Their studies also show that the elevation of COX-2 expression in the AD brain, especially in the frontal cortex and the hippocampal formation, leads to clinical dementia. This highlights that the relation of COX-2 and Aβ may play a key role in mediating the development and progression of AD and dementia (Sadeghmousavi et al., 2020). Lastly, tau is a microtubule-associated protein that stabilises neuronal microtubules under normal physiological conditions. In certain pathological situations, (in this case sleep deprivation), tau proteins may undergo modifications, through



SADEGHMOUSAVI ET AL., 2020

phosphorylation, that can result in the generation of aberrant aggregates which are toxic to neurons (AVILA et al., 2004). Therefore, it is clear that all of these proteins and enzymes have been scientifically proven to increase in volume when sleep is lessened, and have a profound influence on the progression of cognitive decline, dementia, and AD.

SLEEP INTERVENTION TECHNIQUES

There is a comprehensive variety of sleep intervention techniques that target different areas; however, for the purposes of my investigation, this report will explore the effectiveness of three key therapies. To determine their relative success, we must set out the definition of 'effective' for purposes of this report – an intervention will be deemed 'effective' when it results in a statistical improvement in the quality or quantity of sleep. The multitude of different sleep disorders makes the task of allocating the beneficial therapy challenging. As the American Psychiatric Association states, 'there are several different types of sleep-wake disorders, of which insomnia is the most common' (2020). For context, other sleep-wake disorders include:

- Obstructive sleep apnoea
- Parasomnias
- Narcolepsy
- Restless leg syndrome (American Psychiatric Association, 2020).

For my three interventions, this report will concentrate on:

1. Cognitive behavioural therapy for insomnia (CBT-I), also looking into Sleep Restriction Therapy (SRT) which is its own form of CBT
2. Bright light therapy (BLT)
3. Acupuncture therapy.

'In humans, brain imaging studies have reported smaller hippocampi in those suffering from chronic insomnia and associations between hippocampi size and performance on a range of cognitive tests has also been demonstrated, highlighting a potential pathway through which chronically disturbed sleep leads to cognitive deficits' (Herbert, Kyle and Pratt, 2018). This again confirms the connection between lack of healthy sleep and cognitive benefits.

COGNITIVE BEHAVIOURAL THERAPY (CBT-I)

CBT-I is a psychological treatment which aims to change the patterns of maladaptive thinking and behaviour which are proposed to maintain sleep difficulties (Herbert, Kyle and Pratt, 2018).

There are said to be five key components to this therapy:

1) Sleep consolidation

2) Stimulus control

3) Cognitive restructuring

4) Sleep hygiene

5) Relaxation techniques (Rossman, 2019).

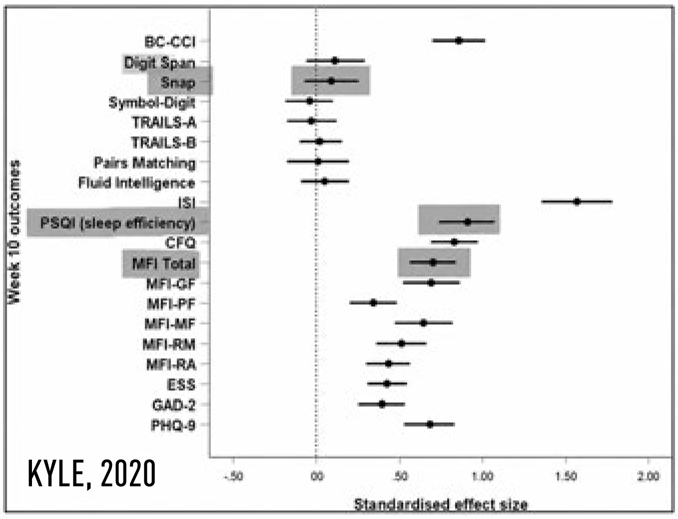
However, Rossman (2019) acknowledges that, although the treatment is considered safe and highly effective to treat insomnia, it is underutilised for two main reasons:

1) A current shortage of trained CBT-I practitioners

2) Use of medication as treatment being more available and prescribed to patients.

Regardless, this is not to say that other professionals do not deem the treatment to be successful or useful, as CBT-I is now considered a first-line intervention for primary insomnia and has even shown improvements to 'sleep in patients with co-morbid psychiatric disorders' (Taylor and Pruiksma, 2014). The International Review of Psychiatry carried out an investigation with the primary objective 'being to evaluate the effects of CBT-I on sleep in patients with co-morbid psychiatric disorders'(Taylor and Pruiksma, 2014). When looking at the results for insomnia, the studies carried out were said to 'vary in duration from three to ten sessions, but the mean effect size (ES) for the insomnia symptom outcomes was 1.001, indicating that CBT-I results showed significant improvement' (Taylor and Pruiksma, 2014). Although the investigation was for a combination of patients with co-morbid psychiatric disorders and some without, the improvement shown from their primary data collection supports the claim that CBT-I is effective at improving insomnia symptoms.

In further support of this, the Sleep Research Society also claim to have found similar positive outcomes. They examined the 'impact of digital cognitive behavioural therapy (dCBT) for insomnia on both self-reported cognitive impairment and objective cognitive performance' (Kyle, 2020). The trials included dCBT therapy followed by tasks that the participants did to determine their reaction times, and their cognitive performance was assessed via a web-based test battery. One of these tests was the 'snap test' where 'two cards (matching or non-matching) appear side-by-side on the screen. Participants are instructed to respond as quickly as possible when they see two matching cards and withhold responses to non-matching cards' (Kyle, 2020). This was one of many other tasks that the participants completed, with the results showing that at 10 weeks post-randomisation the estimated adjusted mean difference on the initial outcome measurement of cognitive impairment (self-reported) was –3.03, indicating that participants in the dCBT group reported less cognitive impairment than the control group.



KYLE, 2020

The table above shows the full outcomes of dCBT on all the participants' tasks, including the snap test previously mentioned. 'Medium-to-large improvements on the mental fatigue subscale of the MFI, suggest dCBT effectively reduces perceived cognitive impairment; and these benefits are sustained at 6 months follow-up' (Kyle, 2020). While this shows a positive correlation of dCBT and insomnia symptoms, it should be noted that 'although robust effects were observed in the selfreported domain, we found no evidence that dCBT engenders change in cognitive performance indexed via computerized tasks' (Kyle, 2020). These tasks (including the snap test among others) contrast with the overall feedback from participants, as the mean report stated that although cognitive performance improved, this reported improvement was often not supported by task performance. However, it is said that 'self-reported reports and task performance may probe different aspects of cognitive health' (Kyle, 2020), so this is one of the limitations and an unpredicted outcome of the experiment. To conclude, the study demonstrates that dCBT 'robustly' improves self-reported cognitive impairment through 'increased sleep efficiency' and 'reduced insomnia severity' (Kyle 2020). Yet, a disadvantage of this trial is that no evidence was found that dCBT enhances 'objective cognitive performance relative to control, across a range of tasks and domains' (Kyle, 2020), highlighting the fact that CBT may not be the most beneficial at improving cognitive decline in specific areas.

To draw an overall conclusion on this form of treatment, I will compare those findings to a review in the journal 'Current Treatments in Neurology' titled: 'Current and Emerging Sleep Interventions for Older Adults with or without Mild Cognitive Impairment' which states that there is preparatory evidence for only small to moderate positive effects of CBT-I on self-reported cognitive functioning; however, adequately powered randomly controlled trials (RCTs) are required before firm conclusions can be drawn (Herbert, Kyle and Pratt, 2018). There is a lack of evidence regarding the impact of CBT-I on objective cognitive performance, which indicates that it might not be the most effective at optimising sleep and preventing cognitive decline in participants. This is further supported by a chapter from 'Adapting Cognitive Behavioural Therapy for Insomnia' which serves as a 'guide for clinicians who are working with patients who have already tried (and failed) CBT-I' (Grandner, Esquivel and Dawson, 2022), providing further proof that CBT-I cannot be deemed as the most effective treatment for all patients. To summarise, this was determined due to the following reasons:

- The characteristics of the patient.
- The characteristics of the provider or therapist providing treatment.
- Therapists did not apply techniques correctly.
- Therapists focusing on techniques that were not well-suited to the patient (e.g. focusing on cognitive rather than behavioural approaches).
- Patients could have been taking medications that interfered with progress or refused to adhere to recommendations about medication.
- Patients were unable to complete a sleep diary.
- Patients may have had a medical condition that interfered with sleep consolidation efforts.
- Delivery of CBT-I is insufficient: 'this may be attributable to problems with the therapeutic alliance, lack of individualization of therapy, inappropriate patient expectations, lack of therapist experience, or the patient's stage of change at the time of therapy' (Grandner, Esquivel and Dawson, 2022).

Furthermore, it is substantially well-known that sleep hygiene is not effective as a treatment for chronic insomnia. During many clinical trials of CBT-I, sleep hygiene is usually what is offered in the control condition.

EVALUATION CBT-1

Overall, CBT-I could be deemed as highly effective for reducing insomnia, including chronic insomnia and insomnia symptoms, according to the volume of positive results from multiple articles, including emerging evidence showing that 'CBT for insomnia may exert antidepressant effects' (Ballesio et al., 2018). Statistics say that '45% of patients treated with CBT-I are able to increase their total nightly sleep time significantly by the end of the treatment period' (Charlton and Charlton, 2023). This improvement in mood may represent an 'additional mechanistic pathway to the restoration of cognitive function' (Kyle, 2020). Similarly, there is evidence from further articles proving increased sleep efficiency, improved self-reported cognitive impairment with effects maintained at 6 months post-treatment (Kyle, 2020). There are very few negative side effects for CBT-I, making it a negligible risk and sustainable as a long-term option for treating insomnia. However, there are still some restrictions with this therapy. Firstly, its application must be executed correctly to be successful (Grandner, Esquivel and Dawson, 2022). Secondly, as the therapy has been trialled to examine the effects on cognitive decline individually, we lack evidence that the therapy is effective at improving this. 'We found no evidence that dCBT improves objective cognitive performance relative to control, across a range of tasks and domains' (Kyle, 2020). So overall, there are many positives to using CBT-I, and many articles prove its effectiveness at optimising sleep and improving insomnia; however, its utilisation remains limited when required for the improvement of cognitive function, for the reasons outlined above. Therefore, this therapy may have limitations at improving cognitive function first-hand but may improve insomnia symptoms, therefore reducing beta amyloid build up and reducing diseases such as AD in the long term.

SLEEP RESTRICTION THERAPY

Sleep restriction therapy, developed by Arthur Spielman, is designed to eliminate prolonged middleof-the-night awakenings. It does not aim to restrict actual sleep time but rather to initially restrict the time spent in bed (stanfordhealthcare.org, n.d.). Sleep restriction therapy (SRT) aims to disrupt a negative sleep cycle and to restore healthy sleep patterns in people with chronic insomnia, in turn improving cognitive function due to improved sleep (Bryan and Cotliar, 2023). As explained by the 3P model of insomnia (see appendix), cognitive tendencies and behavioural habits that prolong sleep disturbance are usually the most propitious targets for intervention. Some of these factors include:

- Perpetuating factors, such as spending too much time in bed
- Anticipatory anxiety about the prospects for sleep
- Inordinate concern about daytime performance deficits (Maurer et al., 2021).

These are all addressed by SRT which may make it a suitable and personalised solution to cognitive decline due to sleep deprivation. SRT can be practiced either as single component therapy, or as part of cognitive behavioural therapy for insomnia (CBT-I). Anecdotally, SRT is believed to be one of the most active elements of CBT-I, (Miller et al., 2014). SRT has initial aims of matching time in bed with the reported sleep time to reduce wakefulness during the night and consolidate sleep (Maurer et al., 2021), The 'Sleep and Circadian Neuroscience Institute' carried out a meta-analysis which I will be using to aid my evaluation of the efficiency of SRT. 'In order to quantify the efficacy of SRT, [they] performed a comprehensive meta-analysis of randomised controlled trials (RCTs) comparing SRT to minimally active or non-active control groups' (Maurer et al., 2021). During this therapy, the restricted sleep opportunity typically results in mild sleep deprivation during early implementation, which has been hypothesised to strengthen sleep drive and reduce arousal before and during sleep. However, if the therapy is successful following enough treatment, this deprivation should be eliminated. Establishing consistent bed- and rise times has also been suggested to regularise exposure to zeitgebers, which in turn may stabilise the circadian rhythm, align it with the sleep homeostat, and aid both the predictability and consolidation of sleep' (Maurer et al., 2021). A selection of different clinical guidelines on SRT have produced slightly inconsistent findings about the efficiency and outcomes of this therapy:

1. The 2017 European guideline for the treatment of insomnia considers SRT to have 'good efficacy' (Riemann et al., 2017).

2. Practice parameters from the American Academy of Sleep Medicine (2006) recommended SRT as a 'guideline,' not as a 'standard' intervention (Morgenthaler et al., 2006).

3. In 2016, the American College of Physicians regarded the evidence for SRT as 'insufficient' (Qaseem et al., 2016).

The results from the meta-analysis from Maurer et al. (2021) found evidence of 'large treatment effects for SRT' compared to control patients on insomnia severity and for 'all self-reported sleep' continuity variables at post-treatment (g range: 0.62 to 0.93)'. The most potent effect was found for the Insomnia Severity Index (ISI) (g=0.93). Together, these results indicate that SRT confirmedly improves sleep and insomnia symptoms. To assess any potential harms of SRT, there were further exploratory searches conducted for adverse events and side effects – out of all eight studies, only two reported on adverse events and side effects measured in a systematic manner and these were only minor, with the SRT group reporting more negative effects of the intervention during week two compared to the control arm, due to the initial sleep deprivation upon preliminary treatment. On the contrary, in this study, long-term effects and efficiency of SRT were not tested; however, a recently published meta-analysis on long-term treatment effects of CBT-I showed that although significant effects were observed for insomnia severity, sleep efficiency, and sleep onset latency (SOL) at 3-, 6-, and 12-months follow-up, effect sizes appeared to decline over time and, considering SRT is part of CBT-I, similar declines may be expected (Van der Zweerde et al., 2019). Another investigation from 'Sleep Medicine Reviews' similarly investigated the efficiency of SRT on chronic insomnia patients and continues to determine the intervention technique as only partially effective in some cases. On the one hand, it explains that 'examination of daytime functioning in SRT studies is severely lacking.' Furthermore, it states that the majority of previous studies have failed to adequately measure and profile any potential side effects or daytime impairment of SRT or CBT-I, which could pose possible further problems to the therapy, hence possibly making it unsuitable for my investigation. On the other hand, a selective number of results produced by the trials showed positive results as shown above by the difference in the highlighted scores. Furthermore, the majority of 'Effect Size (ES) scores for sleep diary parameters were greater than 0.6,' (Miller et al., 2014) displaying medium-to-large treatment effects. 'For total sleep time (TST), a small improvement was found by the end of treatment, consistent with previous CBT-I studies as seen by the difference in Table 2. Ratings of sleep quality were found to improve in the only study that reported these. For comparison, the weighted effect sizes for the control condition did not reveal significant improvements across SRT studies. For example, the weighted ES was extremely small for the following variables:' (Miller et al., 2014)

- Effie R

"ADDRESSING THE PLASTIC WASTE PROBLEM REQUIRES A FUNDAMENTAL CHANGE IN THE INTERNATIONAL REGULATION OF HOW PLASTICS ARE MADE AND DISPOSED OF" DISCUSS.

AWARDED RUNNER-UP PRIZE IN THE FITZWILLIAM COLLEGE LAND ECONOMY ESSAY PRIZE

Since the invention of plastics in 1907 (National Geographic, 2025) plastic has become embedded into our daily lives – woven into our clothes, used to package our food and floating in the air we breathe. What was once commended as a 'miracle material' has become one of the 21st centuries largest environmental crises. An estimated 8 billion tonnes now contaminate the earth (The Guardian, 2026), of which only 9% is recycled (OECD, 2022) highlighting how current recycling campaigns and national bans remain insufficient, addressing only a small fraction of a problem that poses a detrimental threat to both the environment and human health. Moreover, micro and nano plastic have been detected in nearly every part of the human body and are linked to health risks like cancers and metabolic disorders while plastic production itself generates planet warming greenhouse gas emissions (Lee-Emery et al., 2025). Plastic pollution is most commonly conceptualised as a waste management issue. From this perspective, the main cause is our inability to effectively manage the plastic waste and prevents its release into natural environments (Wagner, 2021) however this waste orientated approach risks depoliticising the problem by emphasising management rather than upstream regulatory responsibilities. Consequently, the plastic waste problem cannot be addressed solely through improved waste disposal but rather requires a fundamental overhaul of how plastics are produced, designed and managed across their entire lifecycle. This recognition is reflected in ongoing negotiations for a legally binding global plastic treaty nevertheless despite its anticipated benefits, no agreement has been reached after three years of negotiations (INC-5.2). This essay will therefore examine the range of approaches, spanning binding international regulation, market-based mechanisms such as the removal of fossil fuel subsidies, material innovation through bioplastics and systematic frameworks including circular economic models, that combined could constitute a comprehensive response to the plastic crisis, assessing the extent to which each offers a viable and scalable solution.

Existing international frameworks have proven inadequate in addressing the full scale of the plastic crisis. Currently, The Basel Convention, UNCLOS and MARPOL are designed primarily around waste management and marine pollution rather than upstream production control leaving significant regulatory gaps that allow plastic production to continue growing largely unchecked. The Basel Convention's Prior Informed Consent (PIC) procedure which requires exporters to obtain written consent from importing countries before any transboundary movement of hazardous plastic waste can take place (Dixon,2025) exemplifies this inadequacy. In principle, PIC is designed to give importing states – particularly those with limited technical and regulatory capacity – the ability to make informed decisions about whether to accept or refuse waste shipments. This mechanism is intended to prevent the involuntary transfer of hazardous plastic waste and to empower disadvantaged countries within the global waste trade regime (Gündoğdu et al., 2025). However, its scope and effectiveness are limited as it only applies to specific categories of categories of plastic waste with many mixed, contaminated or low value plastics – so called 'hidden plastics' - still able to be exported into low-income countries largely unregulated due to classificatory ambiguities in the convention's definitions. MARPOL, meanwhile, focuses on regulating 'both deliberate and accidental marine discharge of plastics from vessels', (Chang and Saqib, 2025) rather than terrestrial plastic production or consumption. UNCLOS establishes broad obligations to protect the marine environment by preventing and controlling pollution from any source (Chang and Saqib, 2025) but lacks specific, binding mechanisms necessary to address plastic pollution at scale. Crucially, none of these frameworks meaningfully constrain the continued growth of plastic production which is projected to reach more than a trillion tonnes in 2060 (The Guardian, 2026). Even will full compliance with existing obligations the root cause remains entirely pointing to a fundamental design flaw of international plastic governance which is that it has been constructed around managing the consequences of plastic rather than preventing its proliferation in the first place.

Reform of these frameworks is politically fraught largely due to the divergent interests of the states involved. For petrochemical producing nations, plastic production represents a significant source of economic output, employment and export revenue creating strong institutional incentives to resist binding production controls. As key states are unwilling to address the primary cause of plastic pollution through reductions in production negotiations for a legally binding Global Plastics Treaty have been stalled with no agreement reached after three years of negotiations (INC-5.2) reflecting the complicated conflicting interests of nations pushing for binding production caps and those resisting upstream regulatory intervention. his deadlock is compounded by the structural power of the petrochemical sector itself, which benefits from substantial government subsidies that artificially lower the cost of virgin plastic production. The International Monetary Fund estimates that fossil fuel subsidies globally run into the trillions of dollars annually, and since virgin plastics are derived from fossil fuel feedstocks, these subsidies effectively undercut the economic competitiveness of recycled and bio-based alternatives, reducing the financial pressure on producers to innovate or transition (IMF, 2025). As long as virgin plastic remains artificially cheap, market-driven solutions will struggle to gain traction. Understanding and navigating these competing political and economic interests is therefore essential to building the broad international coalition necessary for any agreement that effectively balances upstream, midstream, and downstream action.

One of the key challenges in addressing the plastic waste problem is the unequal distribution of its environmental and social impacts. The persistence of transboundary plastic waste exports from high income to low-income nations under the pretence of recycling which regulatory frameworks driven by lower costs and inadequate local regulations has been widely described as 'waste colonialism' and it results in severe

consequences. In June 2025 alone, UK plastic waste exports to Asia surged dramatically, with 3.3 million kilograms sent to Indonesia and 6.8 million kilograms to Malaysia, where the waste was often burned, dumped or processed under unsafe and unregulated conditions (Dixon,2025). Such practices pose detrimental health risks to workers and local communities who are exposed to toxic emissions from burning plastics with long term health issues such as cancer, endocrine disruption and chronic respiratory diseases (Samantaroy, 2024). These as not isolated incidents but reflect a systematic pattern enabled by the limitations of the Basel Convention's PIC mechanism which fails to capture the full range of plastic waste flows. The inequalities produced by this system are not incidental but structural: developing nations who bear a disproportionate share of the environmental and social burden of global plastic consumption tend to advocate for stronger binding controls while wealthy petrochemical producing states continue to resist them, entrenching existing power imbalances within global governance. Scholars increasingly argue that justice orientated principles such as the polluter pays principle which holds that those responsible for generating pollution should bear the financial costs of its management, alongside sustained support financial and technical support for low-income countries, are essential to rebalancing responsibility to ensure that those most responsible for plastic production bear a greater share of responsibility and financial burden (OECD, 2025;Gündoğdu et al., 2025). Without this redistribution of burden, any regulatory framework risks reproducing the same inequities in a new institutional form.

What a genuinely reformed system should look like, then, is not simply a stronger or more comprehensive version of existing frameworks but a fundamentally different approach organised around the full plastic lifecycle and grounded in principles of equity and shared responsibility. In the short term, reform my begin with closing the classificatory loopholes in the Basel Convention, extending PIC to cover all categories of plastic waste regardless of their composition or market value and mandating proper emissions controls and a global scale treatment standard at all plastic handling facilities globally (Dreyer et al., 2025). With significant and targeted investment in waste collection and processing infrastructure in marginalised communities in the Global South However, scholars acknowledge that many existing establishments would struggle to meet these standards given the inherently toxic and non-circular nature of many plastics (Dreyer et al., 2025). Additionally, while these reforms, while necessary, do not themselves constrain production volumes. A binding Global Plastics Treaty must therefore also address upstream issues directly including eliminating plastics such as PVC and polystyrene which are non-recyclable in favour of more easily recyclable materials like PET and polypropylene and reducing fossil fuel subsidies helping to remove the artificial price advantage that virgin plastic enjoys over sustainable alternatives (Lee-Emery et al., 2025). Extended Producer Responsibility (EPR) schemes represent another essential tool where companies are held financially and operationally accountable for their products across their entire lifecycle from design and production through to collection, recycling and disposal thereby internalising environmental costs that are currently externalised onto undeserving and vulnerable communities. Improving the quality and ambition of recycling itself is also essential. Environmentally Sound Management (ESM) of recycling as defined under the Basel Convention sets standards requiring that plastic is handled in ways that protect human health and the environment through the recycling process, including safe working conditions, emissions controls and proper

treatment of residual waste (Basel Convention,2019). Expanding ESM compliant recycling infrastructure to a global scale, particularly in middle and low-income countries, would not only improve environmental outcomes but help legitimise recycling as a genuine component of the solution rather than a mechanism for offloading waste under false pretences. The circular economy offers a broader systematic framework within this measure can be coherently integrated. The vision of the circular economy is that rather than treating plastic as a linear resource that moves from production to disposal it prioritises closed loop systems in which materials are kept in use for as long as possible, waste is minimised by design and economic value is separated from resource consumption. It has gained increased recognition as a way to tackle the plastic problem systematically with influential institutions including the World Economic Forum, Ellen MacArthur Foundation, McKinsey & Company and the European Union promoting the idea (Wagner, 2021). Complementing these structural reforms, increased investment in bioplastics which bioplastics plastics made of bio-based or biodegradable materials (Shukla, Khan and Paolo Roccaro, 2025), could reduce the sector's dependence on fossil fuel derived plastic. However currently bioplastics account for under 0.5% of global plastic production as a result of the high economic costs of manufacturing and limited industrial composting infrastructure and widespread misperceptions about their real-world degradability risk generating false reassurance without meaningful environmental benefit. Additionally increasing production of bioplastics may cause conflict of land use and supply of food stock. (Crippa et al., 2020; Khan and Paolo Rocero, 2025). Consequently, making large scale production challenging as there is little incentive for producers to switch to these plastics. In combination, these approaches reflect the central insight that the plastic crisis has no single solution and that meaningful progress requires an integrated framework that simultaneously addresses production, design, economics and justice and that holds the most powerful actors in the plastics system genuinely accountable for its consequences.

In conclusion, the evidence makes it clear that improvements in recycling and waste management alone are ultimately inadequate as a solution to the plastic waste problem. Even in the wealthiest nations, the majority of plastic produced escapes the recycling system entirely (Geyer, Jambeck and Law, 2017), while developing countries, despite generating comparatively less waste, disproportionately absorb the environmental and public health consequences, a structural injustice captured by the concept of waste colonialism and enabled by the failures of existing frameworks including the Basel Convention's PIC mechanism. This profound inequity alone exposes the moral bankruptcy of relying solely on ineffective downstream waste management solutions. As this essay has demonstrated, the existing framework of international plastic governance, including Basel, MARPOL and UNCLOS, was designed around managing the consequences of plastic rather than preventing its proliferation. Furthermore, deadlock surrounding the Global Plastics Treaty negotiations reflects the enormous, vested interests of petrochemical producing states and fossil fuel industries that benefit from producing virgin plastic. The root cause lies upstream in the way that plastics are designed, manufactured and consumed in the global market that currently externalises the true cost of production onto countries and ecosystems least responsible for the problem. Addressing the problem requires transformational reorientation of global plastics governance around its entire lifecycle. A legally binding global plastics treaty which is equipped with measurable production caps, mandatory design for recyclability standards and Extended Producer Responsibility obligations would compel producers to internalise these costs rather than passing them on (Willige, 2025). This must be complemented by reduction of fossil fuel subsides, the scaling up of Environmentally Sound Management compliant recycling infrastructure in the Global South, greater investment in bioplastics and circular economy principles that prioritise keeping materials in use and decoupling economic growth from resource consumption. The tools exist, the frameworks are identifiable, and the economic logic is clear. What remains is the political will to deploy them and the determination to hold the most powerful actors in the plastics system genuinely accountable for its consequences.

- Molly C

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TO WHAT EXTENT IS DESALINATION A SUSTAINABLE SOLUTION TO WATER SCARCITY IN BAHRAIN CONSIDERING ENVIRONMENTAL AND ECONOMIC FACTORS?

INTRODUCTION

Water covers approximately 70% of the earth's surface, however only 3% of this is freshwater and two-thirds of the freshwater is frozen and locked in glaciers or is inaccessible. As a result, 1.1 billion people worldwide lack access to potable water, showing how in modern day society the global issue of water scarcity is a pressing global concern (World Wildlife Fund, 2025). The problem of water scarcity is intensified by effects of climate change. Climate has a major impact on freshwater through evaporation and increased demand for water (SEPA, 2015). As a result of this issue, United Nations is trying to take action as an example of the international development goals around water. These goals are outlined in the United Nations Sustainable Development Goal 6: Clean Water and Sanitation (United Nations, 2023).

BACKGROUND AND CONTEXT

A prominent example of water scarcity is in The Kingdom of Bahrain. Bahrain is made up of 40 islands, with only 9% being land and the remaining 91% covered by the Persian Gulf. (Food and Agriculture Organization of the United Nations, 2023). Bahrain has one of the lowest endowments of freshwater sources in the world making availability scarce. The average annual rainfall in Bahrain is around 80 mm, and its evapotranspiration is around 1850mm, meaning that Bahrain loses more than 12x the water it gains from annual rainfall each year (Forsyth, 2019). There is also no freshwater in Bahrain except from groundwater, as there are no rivers as there is not enough water flow to create any rivers or riverbeds (Dodd, 2021). This highlights how water scarcity is real in Bahrain and why it is a relevant issue.
As a result, in Bahrain 88% of the potable water in Bahrain comes from desalination, this is approximately 300 million cubic meters produced, while the other 11% comes from groundwater (Al-Zubari, 2014).

This essay explores the research question: To what extent is desalination a sustainable solution to water scarcity in Bahrain considering environmental and economic factors? To explore the sustainability of desalination, this essay combines ideas and methods from both Economics and Chemistry.

DESALINATION IN BAHRAIN

The Al-Dur desalination plant

Desalination is the process of removing salt and other minerals from sea water (dictionary.cambridge.org, 2020). There are two main types of desalination, reverse osmosis (RO) and distillation, and the types used in Bahrain are: multi-stage flash distillation (MSF), multiple effect distillation (MED) and reverse osmosis (Fanack Water, 2021). In the Al-Dur desalination plant the method used is Reverse Osmosis (Suez, 2015).

The Al Dur plant is a combined power and water project that generates water (218,000 m^3 of water/day) and electricity (1,234 MW a day). It utilizes the seawater from the Persian Gulf to employ Reverse Osmosis to produce potable water (Suez, 2025) ….

ENVIRONMENTAL IMPACT OF DESALINATION

Brine disposal

Reverse Osmosis is an effective way of creating potable water from sea water however large-scale plants like Al-Dur have negative environmental impacts. These impacts are due to the brine produced and its ways of being disposed, as well as the energy used to power the plant.

Brine is formed through reverse osmosis where the water diffuses out, leaving a high salt concentration. The removal of brine is a key step in desalination, as brine can cause serious issues to marine life as well as non-aquatic life. If the brine is kept and stored and then has a random spillage, the sodium in the brine is a natural dispersant and can swell the soils and this means that the soil structure will be lost once dispersion occurs (Meehan, 2017). The brine also has a negative effect on plants as it impairs the plants' ability to take up water and nutrients. "Salts from brine impair plants' ability to take up water and nutrients. High salt concentrations in the soil restrict the plants' ability to take up water despite adequate water being available in

the soil. This causes the plant to exhibit symptoms of drought due to an osmotic effect, which causes water to move from areas of low salt concentrations to areas of high salt concentrations" (Meehan, 2017).
To avoid these occurrences brine must be restored into the seas however it can also cause damage to marine life "The impacts on marine life are primarily due to almost doubling the salt concentration and the total alkalinity. The heavily concentrated brine solution discharged into the sea from the desalination plant has the potential to kill marine organisms and cause damage to the marine population." (Boyé and Cgedd, 2020). Therefore, it is vital to take extra precautionary steps before releasing the brine into the seas. As stated in section Reverse Osmosis due to the similar ionic composition between the brine and the seawater, no pretreatment is needed. The only difference between the brine and seawater is the concentration of water therefore differing techniques are used to dilute the brine.

In Bahrain they have not found an effective way to use the brine so that it does not have such a harmful effect. Currently the main way that they treat brine is by discharging it back into the sea. For instance, the Al-Dur desalination plant in Bahrain discharges brine directly into the adjacent marine environment, which has a pernicious effect on marine-life (Anwar Al-Osaimi et al., 2019). Newer desalination plants may be constructed in a way that simplifies brine management, and the high-salinity effluent is diluted with lower-salinity brine, and then this effluent is diluted by using cooling water from power plants (Al-Saidi et al., 2024).

INNOVATIVE USES OF BRINE

Although Bahrain is not using the most sustainable methods in removing brine, there are new innovative ideas in which brine from desalination can be used or recycled so that its effect is less pernicious.

One model is from a group at MIT who proposed a direct electrosynthesis to produce sodium hydroxide and hydrochloric acid from desalination brine, and this would be done as "the water is split to produce hydrogen (H+) and hydroxide (OH-) ions, which are then combined with the brine stream to produce NaOH and HCl" (IChemE, 2019). The NaOH produced can then be recycled and reused, to help pre-treat the water going into the desalination plant, as it changes the pH of the water preventing fouling of reverse osmosis membranes (IChemE, 2019). As well as the NaOH being used, so can the HCl, as it could be used for cleaning as well as being used in chemical production as a hydrogen source (IChemE, 2019).

There are also alternative models however they all come with drawbacks. For example, brine can be used in irrigation and agriculture, but this requires the brine to have a relatively low total dissolved solids (TDS) concentration and be free from toxic constituents. This can then be used on salt-tolerant plants without causing osmotic or ionic toxicity. Another model is to recover and sell solid salts commercially from the brines this is done through crystallisation. Brine can also be used in industrial cooling plants, such as in cooling towers. Cooling towers require large volumes of water; therefore the brine can replace the freshwater demand. The cons that come along are that the increased salt concentration can reduce heat transfer efficiency this can promote scaling and cause foaming within the system (Samco, 2020).

EVALUATION AND SYNTHESIS

When evaluating the sustainability of desalination in Bahrain, both the chemical and economic perspectives provide necessary points of view. From the chemistry side, RO desalination offers an effective way to produce potable water within a region of no rivers as well as minimal rainfall. It generates a significant environmental cost; this includes brine discharge that harms marine ecosystems as well as high carbon emissions from the high-energy processes. While alternative technologies such as MSF and MED are also good alternatives, RO remains the most efficient method currently available, although it still comes with its drawbacks. From the economics side, desalination has enabled Bahrain to meet water demand and stabilise living standards however this is only through subsidies that create long-run fiscal strains and reduce efficiency. Importing water offers some environmental and economic benefits, but large potential political problems make it less viable than domestic desalination. Overall desalination in Bahrain is a partially sustainable solution, as it ensures immediate water security and economic stability, but weakens the long-term sustainability through the environmental strain and reliance on subsidies. Its potential future sustainability depends on improvements such as using renewable energy to power the plants, as well as better brine management, and introducing restrictive subsidies. Future scientific advances: low-energy desalination membranes; solar-powered plants; or large-scale brine recycling methods, as well as alternative options like wastewater reuse and harvesting, could also reshape both the economic and environmental dimensions of Bahrain's water security. RO desalination is currently the best and most reliable option for Bahrain. It has the potential to become more sustainable if new technology and better policies are introduced for restriction, especially since Bahrain faces acute water scarcity.

- Rio B

TO WHAT EXTENT DOES EXERCISE SLOW DOWN THE EPIGENETIC AGEING IN MAMMALS USING A MICE MODEL, AS MEASURED BY A DNA METHYLATION CLOCK?

INTRODUCTION

In recent years, studies of longevity and the mechanisms of biological ageing have started to challenge its inevitability. One of the areas of research that seems especially promising is epigenetics – the changes to gene expression that do not alter the DNA sequence and can be influenced by environmental factors, such as exercise, diet and smoking (Hurle, 2025). One of the most studied epigenetic mechanisms is DNA methylation, which involves the addition of methyl groups (CH3) to cytosine bases of DNA sequence which can either repress or activate the expression of genes. With age, this process results in predictable shifts in patterns of methylation that scientists have utilized to develop DNA methylation clocks, also known as epigenetic clocks, to precisely calculate an organism's biological age by analysing the methylation pattern at specific CpG sites (Horvath, 2013). Alterations in epigenetics is one of the nine hallmarks of biological ageing - a universal process that happens across all species and is commonly defined as a progressive decline in physiological function over time that increases vulnerability to disease and death (López-Otín et al., 2013.). In this essay, I will be investigating "To what extent does exercise slow down the epigenetic ageing in mammals using a mice model, as measured by a DNA methylation clock?"

The investigation analyses data from publicly available methylation datasets from Mus musculus (house mice) skeletal muscle that compares mice that underwent a four-week endurance training program with sedentary controls. I have chosen to use secondary data due to the practical limitations of a school laboratory, as primary experimental data could not be collected to answer my research question effectively. A murine-tissue specific DNA methylation clock (Meer et al., 2018) was applied to the data to estimate the epigenetic age of the mice before and after the intervention. I chose this specific methylation clock because it was strongly compatible with the CpG sites present in the used dataset and it was created specifically for mouse data. I then performed an unpaired one-tailed t-test to statistically evaluate the significance of the effect that exercise had on epigenetic ageing of the mice.

I have chosen this topic due to my fascination with the idea that we may be able to slow down and impact some aspects of biological ageing of an organism on a molecular level. I am especially curious about the effect the environmental factors, such as exercise, can have on our epigenetic ageing, which could potentially give individuals power to promote longevity and prolong their healthspan with non-invasive, non-pharmaceutical interventions. This area of research has far-reaching implications: prevention or delay of the development of age-related diseases and extension of lifespan.

EPIGENETICS OVERVIEW

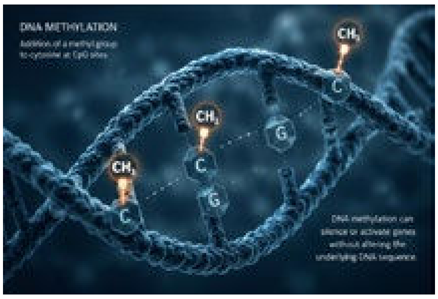
Epigenetics is the study of changes in gene expression that do not involve alterations to the underlying sequence (Hurle, 2025). These changes in gene expression are controlled by four molecular mechanisms: histone modification, chromatin remodelling, noncoding RNA (ncRNA), and DNA methylation. These mechanisms regulate gene expression in different ways: histone modification refers to how tightly the DNA is wrapped around histones, which dictates whether a gene is available for transcription; chromatin remodelling modifies the structure of chromatin (the DNA–protein complex) to make genes more or less accessible to the transcription machinery; ncRNAs are RNA molecules that regulate the expression of genes by degrading or preventing the translation of messenger RNA (mRNA) to effectively stop gene expression; lastly, DNA methylation involves the addition of methyl groups to silence or activate genes (Wu et al., 2023). In the essay I will be focusing on DNA methylation, as it changes in predictable patterns that can be used to estimate a person's biological age.

Epigenetic modifications have mitotic heritability, meaning they are passed down from parent to daughter cells during mitosis. Moreover, epigenetic memory refers to cells' ability to maintain the specific gene expression patterns over time, often across cell division, through heritable and stable chromatin modifications, allowing cells to preserve their differentiated identity (Bird, 2007). This is significant for the investigation, as it suggests that exercise may introduce new changes in DNA methylation that will be stable and maintained over time, potentially leading to long-lasting, age-delaying effects of the intervention.

Furthermore, changes in epigenetic mechanisms are dynamic, as they can occur in response to environmental exposures, such as exercise, diet, stress, smoking, and many other factors (Feil and Fraga, 2012). This is essential for this investigation as it supports the hypothesis that environmental factors, such as exercise, can introduce changes in methylation that influence epigenetic ageing.

DNA METHYLATION

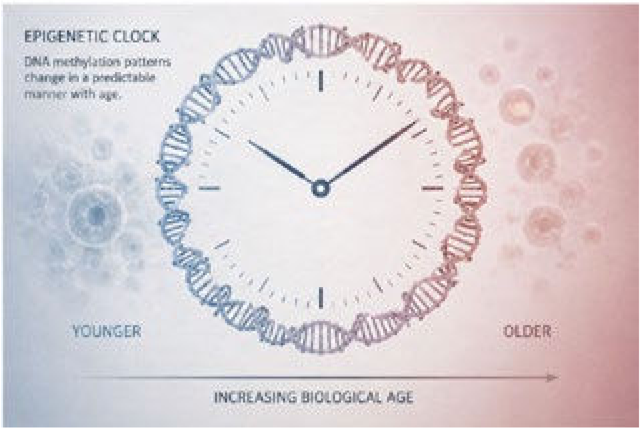
DNA methylation refers to the addition of methyl groups (-CH3) to the 5th carbon of cytosine. This addition usually occurs at CpG dinucleotides – a DNA sequences where a cytosine base is followed by a guanine base that are connected by a phosphate bond. Methylation of promoter regions results in gene silencing, whereas methylation of the bodies of the gene can lead to both enhanced and silenced gene expression (Bird, 2002). It is important to note that DNA methylation does not alter the underlying DNA sequence, it only affects the expression of the genome. DNA methylation is regulated by a family of enzymes called DNA methyltransferases (DNMTs); these enzymes catalyse the addition of new methyl groups during the cell differentiation and in response to environmental exposures and maintain the existing methylation patterns during the replication of DNA (Smith and Meissner, 2013).



With age, DNA methylation patterns change in a consistent and predictable manner. There are two most significant changes to methylation patters that are associated with ageing: global hypomethylation and promoter hypermethylation. Global hypomethylation is an overall decrease of DNA methylation levels across the genome, particularly in intergenic and non-coding regions of DNA. Hypomethylation impacts the structural integrity of the genome, and can lead to genomic instability, activation of transposable elements (these are "jumping genes" that can relocate and copy themselves within the DNA sequence which can disrupt gene regulation (De Cecco et al., 2013)) and increased risk of mutations. Moreover, promoter hypermethylation refers to an increased, abnormal methylation of certain gene promoter regions, particularly the tumour suppressor genes, which leads to silencing genes that regulate vital cellular processes like cell division, apoptosis, and DNA repair. Both of these changes increase the risk of cancer and age-related diseases (Fraga and Esteller, 2007). Because of the predictability of these changes, DNA methylation patters are considered to be the most reliable biomarker of biological ageing, making it the most suitable marker of ageing for the investigation.

CHRONOLOGICAL AND BIOLOGICAL AGEING

For the purposes of the investigation, it is important to distinguish the difference between chronological and biological ageing. Chronological age simply refers to the time that has passed since an individual's birth, whereas biological age is a more complex concept that estimates an individual's physiological and functional state, providing an insight into the health status of an individual. Biological age can be impacted by factors like genetics, lifestyle, and environment (Jylhävä, Pedersen and Hägg, 2017). Epigenetic ageing refers to an individual's degree of aging based on patterns of DNA methylation (Li, Koch and Ideker, 2022); for the purpose of the investigation the terms biological and epigenetic ageing are used interchangeably, as in the essay the biological age is measured by the changes in age-related patters of DNA methylation. The difference between an individual's chronological age and biological age is referred to as epigenetic age acceleration (Chervova et al., 2024). In the essay I will be investigating the effect of exercise on the biological ageing, as the rate of chronological ageing of the mice does not change during the study. Biological ageing involves nine main hallmarks, with DNA methylation being the most accurate way of calculating the biological age due to the systematic and reproducible pattern of change (López-Otín et al., 2013.)…



EXERCISE AND EPIGENETIC REGULATION

Multiple studies have shown that environmental factors, such as exercise, can cause changes in DNA methylation patterns, especially in muscle tissue (Voisin et al., 2014; Lindholm et al., 2014). These methylation changes caused by exercise in skeletal muscles are often gene specific to genes involved in mitochondrial biogenesis (such as PGC-1α), insulin sensitivity (such as gene GLUT4), energy metabolism and regulations of inflammation to help facilitate the increased physiological demand (Barrès et al., 2012; McGee and Hargreaves, 2024; Garcia et al., 2022). Recent studies show that different duration and intensity of exercise can affect epigenetics differently: acute exercise induces short term, often reversible changes in DNA methylation, whereas chronic or regular exercise can cause more stable and sustainable changes in methylation and long-term alterations in gene expression. These changes can have beneficial effects, such as decreased inflammation and increased metabolism, that reduce the risk of age-related diseases and decelerate biological ageing. (Voisin et al., 2014; Lindholm et al., 2014). This is made possible due to epigenetic plasticity of skeletal muscle, that permits it to dynamically respond to physical activity (Tian and Marsit, 2018).

Due to epigenetic memory, some changes in DNA methylation can be maintained over time. This means that in the investigation, exercise has the potential to counteract some age-related epigenetic changes by inducing beneficial alterations in methylation, leading to methylation profiles of murine skeletal muscle resembling those of younger mice and slowing down the epigenetic age acceleration (Sailani et al., 2019)…

METHODOLOGY

This investigation analyses a secondary dataset of DNA methylation to assess the effects of 4-week endurance training on the biological ageing of skeletal muscle in Mus Musculus. The biological age was evaluated by the application of Meer et al. (2018) clock to the control (sedentary) and exercise groups.

HYPOTHESIS

I have formulated the following hypothesis for the investigation of the effect of exercise on biological ageing measured by DNA methylation clock:

H0 (null hypothesis): Exercise does not reduce the biological age of mammals

H1 (alternative hypothesis): Exercise reduces the biological age of mammals

SOURCE AND DESCRIPTION OF THE DATASET

The secondary data used in this essay is a microarray dataset that comes from EMBL's EBI, accession number E-GEOD-54278. This dataset contains methylation numbers for skeletal quadricep muscle tissue of sedentary (SED) and exercise (EX) groups. The exercise group underwent 4-week regular training on a motorised treadmill. Each group included 6 male mice, all C57BL/6J strain and 13 weeks old at the beginning of the experiment, with the quadricep muscle tissue being isolated 3 hours after the last training. The data was collected from Agilent microarray platform that used probe IDs instead of CpG sites.

The control variables of the dataset included: constant temperature (22 ± 1°C), 12:12h light-dark cycle, free access to food and water for all the mice. All mice from the exercise group performed the endurance training on the same motorized treadmill for 5 days followed by 2 days of rest for 4 weeks. In order to provide a sufficient, continuous physical challenge, a training protocol was followed which progressively increased the intensity of the exercise for 30 to 50 minutes per day (Kanzleiter et al., 2015). These control variables ensured the accuracy and validity of the dataset.

This particular dataset was chosen due to the quality and clarity of the data which made it suitable for analysis. In addition, the dataset is publicly available and relevant to the organism and tissue type of the investigation. Notably, the dataset comes from EMBL's European Bioinformatics Institute, which is a reliable source of data and contains many accurate and trustworthy biological datasets

- Yeva K

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