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A ART**C** CLIMATE**D** DEMOCRACY**E** ECONOMICS**F** FILM**G** GENETICS**H** HISTORY**M** MUSIC**P** PSYCHOLOGYANDREW HOBBS
HEAD MASTER

PROLOGUE

I AM VERY HAPPY TO HAVE BEEN ASKED TO WRITE AN INTRODUCTION FOR THIS FIRST EDITION OF TESSERA, A NEW AND EXCITING DOWNSIDE PUBLICATION.

I am enormously grateful to the members of the School community, pupils and staff, who have so generously contributed and taken the opportunity to share their thoughts and ideas on such a diverse range of subjects. I am especially grateful to Paul Jones, the editor, for embracing and driving forward the project with such energy, enthusiasm and creativity.

Academic study in schools has increasingly been reduced to utility – knowledge and training in skills for personal success and material prosperity. At Downside we consciously resist this utilitarian approach and the intention of *Tessera* is to celebrate intellectual exploration and discovery for their own sake. The implication of the title (a tessera is a mosaic tile) is that each piece of work stands as a separate entity, but makes a vital and unique contribution to the overall picture. It is an eclectic and exciting collection of work. This reflects our principles as a Benedictine school. We uphold and advocate the value of each individual so that he or she can flourish and thereby contribute most fully to building a harmonious and purposeful community.

Each of the essays contained in this first edition of *Tessera* extends to us an invitation to think afresh and open our minds. I think St. Benedict would approve. In his Rule he urges us to commit to becoming searchers for the truth, through adopting an attitude of ‘openness to growth and change’. St Benedict insisted that ‘all the community should be summoned for consultation because it often happens that the Lord makes the best course clear to one of the younger members’. It is humbling to read work of such depth and quality produced by our pupils and a poignant reminder that we should recognise how ambiguous the dividing line is between who is teaching and who is learning.

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REPUTATIONAL DAMAGE AND MARGARET D'ANJOU

THE RISE, FALL AND RISE AGAIN OF MARGARET D'ANJOU

THECLA RICHARDSON

MARGARET D'ANJOU WAS BORN IN 1430. SHE GREW UP WATCHING HER MOTHER RULING IN THE ABSENCE OF HER FATHER, PROVIDING HER WITH 'AN EXTENDED LESSON IN HOW CAPABLE A WOMAN COULD BE WHEN CALLED UPON TO WIELD AUTHORITY FOR AN ABSENT HUSBAND OR SON'

(Castor 2010, p. 322). She married the Lancastrian King Henry VI in 1445 in accordance with the 1444 Treaty of Tours, which sought to end the Hundred Years War. 'The making of peace was her *raison d'être* as England's queen' (Castor 2010, p. 330); however, 'the gender system theoretically denied that a woman could ever hold political power' (Maurer 2003, p. 5). Whilst the queen was expected to play a public, intercessory and mediatory role, she was 'not supposed to rule' (Maurer 2003, p. 13).

When Henry VI fell into a catatonic stupor in 1453, Margaret endeavoured to rule in the place of her husband and her son. This initiated the political conflict which then became the Wars of the Roses in 1455. Margaret assumed the position of the *de facto* leader of the Lancastrian forces in an attempt to secure the inheritance of her son. However, he was killed at the Battle of Tewkesbury in 1471. Described as 'almost dead for sorrow' (Myers, p. 315), her life lost purpose. She retreated to France and died eleven years later; an indigent, forgotten queen of England.

Throughout Margaret's lifetime, she was viewed as a strong woman by her Lancastrian supporters. This is corroborated in the Paston Letters. However, according to Yorkists she was seen as an evil adulteress with an illegitimate son. Her exclusion of Richard of York at the Great Council in 1455 and bills of attainder against Yorkist nobles did not help. The overthrow of the Lancastrian government undermined her further, until Henry Tudor (as a Lancastrian) became King and Margaret's profile waned. Much later, William Shakespeare cast her as a villainous *femme fatale* in *Henry VI* and *Richard III*. It was the definitive portrayal for many years, having the same effect on Margaret's reputation as Spielberg did with sharks.



The marriage of Henry VI and Margaret d'Anjou. Coloured etching, February 1793. Credit: Wellcome Collection

'Beauty, wit and a lofty spirit of courage'

Margaret was the daughter of a minor French nobleman, 'renowned in France for her beauty and wit and her lofty spirit of courage' (Gristwood 2012, p. 14). She emerged onto the international stage through her marriage to King Henry VI and her actions became scrutinised. The marriage provided initial ammunition; the price of the ceremony was 'an exorbitant £5500' (Gristwood 2012, p. 15), at odds with the English belief in 'a queen not worth ten marks' (Gristwood 2012, p. 16). However, England was the weaker partner and therefore unable to make demands regarding the 'quality' of the French bride. Her reputation was established as a 'foreigner and 'high spending queen' (Gristwood 2012, p. 39), but 'Margaret portrayed herself as the king's subordinate, which was what was needed in the short term' (Gristwood 2012, p. 51) but this undermined her authority as consort.

Things changed with the King's mental collapse, which needed decisive action. Margaret published her 'Five Articles' in January 1454, a proposal to become regent which 'appalled the nobility' who believed the queen should play a more passive role and shifted towards the 'side of York' (Cook 1984, p. 23). Margaret was determined to 'safeguard her husband's kingdom as her mother did during her father's absence' (Castor 2012). Furthermore, her French traditions convinced Margaret of her legitimacy.

Her proposition for the 'establishment of a regency with full royal powers' (Pollard 2000, p. 142) was rejected by the Council, unsurprisingly, given their prejudice against the French and women. There was also precedent:

previously the lords of the King's Council governed when the anointed king was incapacitated. In short, the Council did not trust Margaret to rule, and granted the Protectorship to Richard, Duke of York. Margaret disagreed and defied political and gender expectations. She invested royal authority 'in the triumvirate of king, queen and prince, with herself at its centre' (Castor 2010, p. 354). The 'Blood Chronicle' at the Bodleian Library shows her power: 'the realm stood most by the queen and her council' in 1456 and 'it is to be noted that every lord in England at this time durst not disobey the queen'. Contemporary chronicler John Bocking observed 'the queen is a great and strong-laboured woman... she spareth no pain to sue her things to an intent and conclusion to power' (Gristwood 2012, p. 51).

However, Bocking was Norfolk gentry, a supporter of the Lancastrian cause, which may indicate bias.

As Margaret's military strength increased, so did the Yorkist rumours: the queen was a serial adulteress; the son was illegitimate, Edward was a changeling. Yorkist partisans found the rumours convenient in 'undermining the queen's public standing' and her claim (Castor 2012, p. 370). Moreover, the Yorkists insisted she was 'conspiring with Charles VII... the national enemy' (Erlanger 1961, p. 164).

Once Edward IV usurped Henry VI, he declared that 'the Frenchwoman's' rule had been a 'great injustice and oppression' (Erlanger 1961, p. 219). This expedient act tainted the memory of the former queen, neglecting her contribution to the realm. In addition, Margaret experienced 'a haemorrhaging of support for her cause in the south-east' (Castor 2010, p. 365) due to her militarisation in the Midlands and North-West. Her unpaid forces terrorised northern settlements. The Yorkist sympathisers and the majority of London's citizens 'had ample evidence of... the queen's implacability in pursuit of those who opposed her' (Castor 2010, p. 375). However, many Northern and Scottish nobles were loyal to her attempts to regain the throne. Margaret secured the support of Louis XI during the 1470 Angers Agreement. This led to an unlikely alliance between Margaret and the Earl of Warwick, the man who had played an instrumental role in her fall from power. Other nobles were 'sorry for their ruined kinswoman – and [were] careful to avoid her' (Erlanger 1961, p. 194), being unwilling to risk the wrath of Edward IV by interfering.

After the readeption of her husband in 1470, Margaret's status shifted again: 'the Yorkist government's faults gave the Lancastrians a measure of popularity' (Erlanger 1961, p. 159). However, the Yorkist view remained unchanged: a despicable, usurping adulteress.

'Free, but penniless and purposeless'

Margaret became 'an irrelevance' (Castor 2010, p. 400) after defeat at the Battle of Tewkesbury. Edward IV allowed her to return to France in accordance with the Treaty of Picquigny where she became a political liability to Louis XI, who wanted an alliance with Edward IV. He seized her ancestral lands and resources, leaving her 'free, but penniless and purposeless' (Castor 2010, p. 401). She died in 1482.

King Henry VII's objective was to unite the two warring houses and establish a unifying Tudor dynasty. His marriage to Elizabeth of York helped. Chronicles written after 1485 are carefully crafted to point towards the accession of Henry VII as 'the successful conclusion to a century of civil war' and recontextualise what was 'just another usurpation' (Finn 2012, p. 48). As a result, the life of Margaret d'Anjou remained a minor footnote in the popular imagination.

My view of Margaret d'Anjou persisted unchallenged into the twentieth century.



There were some dissenting voices: chronicler Polydore Vergil wrote 'Anglica Historia' for Henry VII, 'to weave the Tudor dynasty into the larger tapestry of national history' (Finn 2012, p. 48). Vergil described Margaret as 'imbued with a high courage above the nature of her sex', 'a woman of sufficient forecast, very desirous of renown, full of policy, counsel, comely behaviour, and all manly qualities' (Gristwood 2012, p. 12). He challenged contemporary notions of gender. Furthermore, Vergil noted 'that [she] exceeded others of her time as well in beauty as wisdom' (Gristwood 2012, p. 14). In the same way that Henry VI's 'image as a model of saintly otherworldliness emerged after his death' (Maurer 2003, p. 39), Henry VII wanted to praise Margaret – the queen consort of the last Lancastrian king, which in turn strengthened his legitimacy. However, there remained a tension between the view held by Yorkist and Lancastrians.

Shakespeare's 'She-Wolf of France'

Shakespeare depicted her as a Machiavellian adulteress who instigated war and is implicated in the death of Richard of York.

Shakespeare relied on 'creatively embroidered English chronicles' like Edward Hall's. The playwright's negative portrayal of Margaret was published in 1591, with little protest against his defamation of her character.

Shakespeare's Margaret torments York about the death of his son before killing him. In reality, she was elsewhere. As the historian Katherine Lewis states, 'Margaret becomes notorious in Shakespeare's play as the 'she-wolf of France' (Bragg 2018). This fictitious scene 'is disastrous for her reputation because that's the bit that everybody knows' (Bragg 2018). Posterity has damned Margaret as the murderous villain, yet the scheming Edward IV has not been branded with the same stigma; both due to gender but also because Yorkists were 'deft at turning an enemy's fame into infamy' (Erlanger 1961, p. 177).

In essence, Shakespeare vilifies her as an unwomanly, sadistic predator. This representation emerged 'entirely from hostile propaganda' (Pollard 20, p. 151) and is evidence of the Yorkist influence. The bard denounced her as a 'false Frenchwoman', exploiting the enmity between France and England.

Furthermore, Shakespeare believed that the Duke of Suffolk and Margaret were lovers, writing of Suffolk's pursuit of Margaret, and their affair. Shakespeare reflected opinion and sought to appeal to a mass audience and the monarch. Margaret was a convenient villain.

Helen E. Maurer claims that 'no one nowadays reads Shakespeare for history' yet 'a surprising number of historians and non-historians alike are influenced by Shakespeare' (Pagalaccio 2016, p. 7). Clearly, Shakespeare's work has had a long-standing effect upon Margaret's reputation. Tudor and later audiences understood the historical references and those who have encountered Shakespeare's tetralogy view Margaret with more hostility.

'Shakespeare's view of Margaret persisted unchallenged into the twentieth century.'

The Shakespearean representation of Margaret remained static throughout this time period despite the Victorian fascination with the Elizabethans. Meyerbeer's 1820 opera *Margherita d'Anjou* depicts Margaret in a similar way, perhaps confirming that the victors write history.

Shakespeare's interpretation remained unchallenged; there was 'still plenty of room for, and need of, an adequate study of Margaret d'Anjou', and it wasn't until the latter half of the 20th century that revisionist historians began re-examining the life of Margaret, dispelling myths of affairs and illegitimacy as propaganda. Amongst academics, she is not a villain, but a determined woman who fought to protect her family. Additionally, revisionists have identified historiographical reasons why Margaret has been perceived in a negative way: 'anything written about them later is coloured by hindsight, and the early days of Marguerite's career tend to be lost in the urgent clamour of events just ahead' (Gristwood 2012, p. 18). For example, later writers were forced into following propagandists, 'their depiction of Margaret is so powerful – culminating with lacerating virtuosity in Shakespeare's portrait of the "she-wolf of France" – that it has become almost impossible not to see her through the wrong end of the historical telescope' (Castor 2010, p. 339). Moreover, 'most of the sources, however, because they were composed after 1461 or by Yorkist sympathisers give a misleading view of the unpopularity of the queen' (Pollard 2000, p. 160). Christine Carpenter clarifies: 'many twentieth and twenty-first century accountings are remarkably close to the historical chronicles, the same chronicles upon which Shakespeare relied' (Pagalaccio 2016, p. 8).

Changing attitudes to the social position of women has led to rehabilitation. Whereas in previous centuries the concept of a woman exceeding her social expectations was readily accepted as unnatural, this attitude has changed, alongside a resurgence of interest in women's history, such as in Castor and Gristwood's books.

However, the revisionist view has flaws. Some argue that historians have been selective. For example, Harris' 2005 review of Maurer's *Margaret d'Anjou: Queenship and Power in Late Medieval England* describes the work as 'an avowedly revisionist and feminist study of Margaret d'Anjou'. Some argue that the revisionist interpretation of Margaret as a strong, independent woman is as ideological and subjective as Shakespeare's portrayal.

What is clear is that the reputation of Margaret d'Anjou has changed dramatically over time, with Shakespeare the catalyst: 'Although historians have long since rejected Shakespearean excess, it is the view that still prevails' (Maurer 2003, p. 2). It is possible that public opinion eventually may differ from Shakespeare's depiction of her as a 'vengeful and a violent woman' and a 'bitch' (Pagalaccio 2016, p. 7). Margaret had qualities which nowadays would be viewed as admirable. In short, well-behaved women seldom make history. What is certain about Margaret d'Anjou is that 'few queens of England have so divided opinion' (Gristwood 2012, p. 12). **T**

In short, well-behaved women seldom make history. What is certain about Margaret d'Anjou is that 'few queens of England have so divided opinion'

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M

ART AND THE RUSSIAN REVOLUTION

MUSIC IN THE AFTERMATH OF THE RUSSIAN REVOLUTION

ARAM SOLA-INARAJA

**‘IN THE NAME OF OUR
TOMORROW, BURN
RAPHAEL TO ASHES,
DESTROY MUSEUMS,
TRAMPLE DOWN THE
FLOWERS OF ART’¹**

The Russian Revolution of 1917 had a seismic effect on politics and society, but also cultural forms. This was especially evident in the field of music, which was seen as a defining element of a new Soviet culture. There followed a tension between the legacy of classicism and new forms of modernity, and a tension regarding how Russian music should sound and feel. Four different organisations emerged with different ideas about the way forward for music. They sought to rationalise pre-revolutionary culture and the kinds of music they wanted a new Soviet culture to be built upon. After the Revolution, modern art and music were the two main creative and formalist pillars. However, creative intensity in Russia did not start with the February and October Revolutions.

‘The proletarian mind should be enriched with the knowledge of all wealth created by mankind’²

The central element of the Russian creative furnace was ‘The Five’, also known as ‘the Mighty Handful’, including Borodin and Mussorgsky. Russian artists were a key part of the proto-modernist movement across the globe, through poets like Vladimir Mayakovsky and painters like Vasily Kandinsky. However, the Revolution interrupted and altered the development of arts, music and literature in the new Communist Russia, through an uneasy dichotomy between opposition and support for the new order. For instance, Sergei Rachmaninov left Russia in December 1917 despite his recent appointment as the Director of the Conservatoire of Moscow. The Revolution ended his career in Russia, and he went to Paris and New York to an ecstatic reception. However, he still felt Russian and during his 25 years in exile he composed only six pieces.



Similarly, Stravinsky was in exile in Switzerland. He did not return until after his 80th birthday when he was invited by the regime to visit his country. Stravinsky's influence on Modernism was profound, his ballet and orchestral work *The Rite of Spring* was written for the 1913 Paris season of Sergei Diaghilev's Ballets Russe. It shocked the world and signalled a new and uncompromisingly kinetic and visceral art form. Prokofiev, one of the great Russian composers, left at the beginning of the Revolution, eventually returning in 1936. He knew that the regime applied censorship to artists: however, he did believe that they would not apply it to him. He suffered humiliation and interference in his work.

Even though the greatest and best known composers fled the country or were dead when the Revolution broke out, the legacy that those composers left in Russia shaped new artistic development after the triumph of the Bolsheviks. However, the desire for 'newness', and a distinct break from the past, led to a tension between creativity and destruction.

Proletkult and the Communist ideals

Immediately after the Revolution of February 1917, Proletkult was created. This association was mostly formed by amateur club members and it encouraged people to get involved in music, with Communist ideals always in mind. Some of their members experimented with proletariat 'common sounds', such as machinery, but with limited success.

Others were involved in the composition of rousing songs and populist music. However, the most famous composer of the Proletkult was Arseny Avraamov, who composed the *Symphony of Sirens*. With a growing canon of mostly simple songs, it fitted perfectly with their aim: to bring music to the proletariat. The music which they wanted the proletariat to know and the USSR culture to be built upon was one which rejected the old 'bourgeois' forms of music which were in place during the Russian Empire.

When the Civil War came to an end, the Communist Party began to distance itself from the Proletkult's project for Soviet music, with Lenin arguing that Soviet culture had to take into account 'pre-revolutionary' music. In December 1920, Proletkult was brought under the umbrella of Narkompros, the Commissariat for Education and Culture. Nevertheless, the core organisation of amateur clubs ran under the protection of Trotsky until 1923, at which point the Russian Association of Proletarian Musicians (RAPM) was founded. This association shared some points with the Proletkult in how to build a new Soviet music. They rejected all forms of 'pre-revolutionary' music, with the exceptions of some composers who were deemed acceptable because of a 'spirit of their art' (Hakobian, 2017). However, they accepted the music of the 'bourgeois' when they were fighting against feudalism as they believed it had a 'cheerful' tone. RAPM argued that the decay of 'bourgeois' music occurred when full capitalism was achieved.

The RAPM distanced themselves from the Proletkult because they did not want the works to be attributed to composers, but to use the music produced by the composers in this association. They differed with press and public opinion. While the Proletkult had some journals, the RAPM ones were more aggressive towards their opposition. They attacked and accused the opposition of being anti-proletariat. After 1929, when Lunacharsky resigned from Narkompros direction, 'The Proletarian Musician Journal' of the RAPM started to attack the ACM and other musicians with all its force. The ACM were overwhelmed and in a short period of time it ceased to exist on a functional level. From 1929 onwards, the RAPM gained power and their musical project began to dominate the cultural outlook of Russia.

Futurists: speed, machinery, violence, youth

Narkompros and personalities such as Anatoly Lunacharsky opposed the remorseless eradication of 'pre-revolutionary' music. The organisation was full of enthusiastic artists who were excited to be changing the world and looked up to Lunacharsky who stood for what they believed. He wanted to reform Soviet music through a gradual transformation and not the wholesale eradication of 'pre-revolutionary' music. Many leading members of Narkompros were 'futurists' and were open towards the revolutionary ideals. The group included Arthur Lourié, head of MUZO. He promoted modern music as well as the reformations of conservatoires.

Nevertheless, he did very little to introduce and publish other music apart from his own. In 1921, he resigned and left the USSR for ever. Lunacharsky and Narkompros subsequently transformed the musical organisation in the USSR. They nationalised conservatoires and made sure opera theatres had a sustainable future. Up until 1929, when Lunacharsky resigned, Narkompros was an essentially independent organisation that worked to increase the cultural knowledge of the proletariat. Lunacharsky's resignation led to assimilation within the Communist state apparatus.

The Association of Communist Musicians had a similar approach to Soviet and 'pre-revolutionary' music. This association was formed by the top musicians, composers and critics. Some of them supported Communists because they saw in the revolutionaries the opportunity to create freely, without barriers and it became known for an avant-garde approach. However, from 1923, when it was founded until its dissolution in 1932 by the Central Committee of the Communist Party, the ACM and its members were attacked by the RAPM journals and critics. However, the ACM had extensive international links, enabling them to bring international artists to Russia and export Russian musicians abroad. This led to a strange tension: ACM members were attacked at home but well-received abroad, whilst international artists were celebrated. The ACM believed that Soviet culture had to be pushed all ways and explore unknown paths. In the end, RAPM won the battle for influence.

For this reason, they abolished all cultural organisations and took centralised control. This enabled the rigid application of censorship and a shift towards propaganda apparatus. The RAPM's rejection of 'pre-revolutionary' music had become engrained in Soviet culture and held firm as the dominant ideology. The revolutionaries tackled music without a plan, exploring the avant-garde and the music of the past in a whirlwind of creativity. However, they were no match for the organised and driven reactionary forces of the RAPM. Music then became no different to other aspects of the USSR: the ruling order of the Party controlled every element of society.

Soviet style and the reformation of literary and artistic organisations

It is clear that post-1917, revolutionaries saw music and composition in wildly different ways. Proletkult or the RAPM pursued a Soviet style, marginalising previous musical legacy and seeking to redefine Russian musical identity. In stark contrast, ACM and Narkompros believed that new Soviet music had to be created but with regard to pre-revolutionary pieces and with an appreciation of all types of music.

From 1917 to 1927 the focus for the Communist Party was economic recovery and not cultural forms. However, the death of Lenin and the end of the New Economic Policy led to a shift towards cultural definition and control. The Party did not like the tensions between the ACM and the RAPM as it meant they did not have control. **T**

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Books (Please)! In All Branches of Knowledge by Soviet artist Alexander Rodchenko, 1924. © ITAR-TASS News Agency / Alamy Stock Photo



A poster by El Lissitzky for a post-revolutionary production of the drama *Victory Over the Sun*. The multilingual caption reads: 'All is well that begins well and has not ended'. 1920–21, published 1923

¹ (Hakobian, 2017, p. 22)

² (Hakobian, 2017, p. 23).

GENETICS, CRISPR AND ETHICS

DAISY MATTHEWS

THE CONCEPT OF EDITING HUMAN DNA TO CREATE 'SUPERHUMANS' WITH ENHANCED MEMORY, EXTENDED LIFESPANS AND EXTREME PHYSICAL ABILITY IS A RECURRING THEME IN SCIENCE FICTION.

Novels such as *Never Let Me Go* by Kazuo Ishiguro (2009) depict a bleak dystopian future of cloned sub-humans forced to donate their organs to the superior human race. However, this idea has only recently become a reality; the results of the first edited human embryos in US history were published in August 2017 (Mitalipov, S et al, 2017). This procedure used CRISPR-Cas9 technology to correct a pathogenic gene mutation in human embryos.

Mistakes made with genetic editing technology could cause irreversible damage to future generations. The precision and efficiency of CRISPR has brought it to the forefront of genetics since it was first successfully adapted in 2013 (Multiplex Genome Engineering Using CRISPR/Cas Systems, 2013). Clinical tests using CRISPR in animals have been positive. Richard Piercy at the Royal Veterinary College in London used CRISPR to ameliorate the effects of Duchenne muscular dystrophy (DMD) in dogs (Piercy, R, 2018), which restored up to 92% of the dystrophin expression in the dog's heart tissue. Applications for humans are controversial, raising complex issues of responsibility.

CRISPR is a segment of DNA first identified in *E. coli*. CRISPRs serve as a part of the bacterial immune system, keeping a record of any viral RNA that has been introduced. It is a palindromic sequence of nucleic acids followed by their complementary bases in reverse order. For example, 5'GGCC 3' and 3'CCGG 5'. The 5' and 3' refer to the carbon atoms that each nucleotide is attached. Cas9 is an RNA-guided endonuclease that recognises and 'cuts' target areas of DNA. The guide RNA has complementary bases to those of the target DNA, which ensures that Cas9 targets the correct areas of DNA in the genome.

CRISPR: Clustered Regularly Interspaced Short Palindromic Repeats

The cell then attempts to repair this 'damaged' DNA, and during this process alterations can be artificially introduced. CRISPR accuracy has been questioned, with research suggesting it can lead to 'large deletions and more complex genomic rearrangements at the targeted sites'.

(Kosicki, M. et al. 2018.) A solution to this may be found in a different endonuclease: Cas12A. A study exploring the specificity of CRISPR-Cas12A suggested that it may be better.

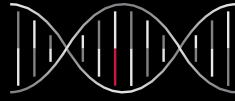
CRISPR is used to edit the genetic code of an organism. It is precise, cheap and efficient. However, its accessibility and low cost has allowed amateur scientists from around the globe to carry out worrying experiments. 'Biohackers' emerged shortly after the discovery of CRISPR. Josiah Zayner, a former biochemist at NASA became the first person to use CRISPR to alter their own genes in 2017 (Pearlman, A, 2017). In response to Zayner's experiment, CRISPR researcher Robin Lovell-Badge responded in a *New Scientist* interview that his experiment was 'foolish'.

The main reason for the use of CRISPR in human embryos is to improve the quality of life. For in-vitro genetic engineering to be justifiable there must be evidence to suggest that it leads to healthier lives. A study modelling changes in very early human embryos suggested that DNA editing could extend lifespan (Oliynyk, R.T, 2018).



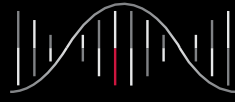
WHAT IS CRISPR?

1



Sickle cell disease is caused by a single DNA letter mutation.

2



Scientists create a strand of guide RNA that matches the mutated DNA sequence.



3



Cas9 (molecular scissors) is mixed with the guide RNA. The RNA/Cas9 mix is injected into the patient.

4



The guide RNA identifies the mutated DNA that causes sickle cell disease. The Cas9 cuts out the affected sequence.

5



Scientists insert a healthy DNA sequence to replace the mutated sequence.

This is a simplification of the CRISPR-Cas9 treatment and is used for illustrative purposes only

‘...genome editing interventions to influence the characteristics of future generations could be ethically acceptable, in certain circumstances.’

This was done by simulating the risks of developing diseases such as Alzheimer’s or heart disease. Oliyntyk concluded that ‘gene therapy would be beneficial in both delaying the age of onset and lowering the lifetime risk’ (Oliyntyk, R.T, 2018). However, Ali Torkamani, of the Scripps Research Institute, California stated: ‘There is a trade-off: reduced your risk for coronary artery disease, increased risk for other disorders’. The knowledge of long-term effects of alteration is not sufficient for confident practical use. Oliyntyk suggested synthetic genomes are a possible answer to this issue. The UK Nuffield Council on Bioethics concluded that ‘genome editing interventions to influence the characteristics of future generations could be ethically acceptable, in certain circumstances’.

Is germline gene editing necessary?

A study carried out by Zhanqi Dong and his colleagues at the State Key Laboratory of Silkworm Genome Biology in China showed that CRISPR-Cas9 inhibited the replication of Bombyx mori nucleopolyhedrovirus (BmNPV) in silkworms (Dong, Z., 2018). The treatment was efficient and only attacked the foreign DNA of viruses. However, the scientists acknowledged the risk of CRISPR modifying silkworm DNA instead and damaging the organism. A similar anti-viral treatment has also produced results in tobacco plants; a different CRISPR protein, CRISPR/Cas13a, interfered with RNA viruses targeting the plant. (Aman, R et al., 2017). It is therefore unlikely that people would be willing to risk a child’s health with potentially inaccurate gene editing technology.

Some prominent bioethicists see embryo selection as a viable alternative. Henry T. Greely, Stanford University, argues that ‘Human germline editing is unlikely to happen soon because it has risks but almost no benefits.’ (Greely, H.T., 2017). He references the use of preimplantation genetic diagnosis (PGD); where embryos can be ‘safely’ screened for genetic conditions then re-implanted. A study carried out by Esther Velilla suggested there were difficulties performing certain techniques correctly when screening for aneuploidy (Velilla, E, Escudero, T, Munné, S., 2002). However, more recently the risks of PGD have been shown to be similar to risks involved in IVF, including Ovarian Hyperstimulation Syndrome (OHSS), infection and miscarriage (Genetic Alliance, 2016).

He Jiankui’s experiment

In 2018 China claimed to have created the world’s first genetically engineered babies. CRISPR-Cas9 was used to modify embryos, making them HIV resistant. The response has been negative, and concerns have been raised around the legality and ethics of the process. Much of the controversy arose from the chosen target gene. There was no indication of a higher risk of HIV. Experts argued the treatment was not medically necessary (Baltimore, D, 2018). Others suggested that anti-retrovirals are better than CRISPR at HIV prevention.

This raises another issue. There is almost no knowledge of what CCR5 does outside its role in HIV infection. The protein receptor is also expressed in the brain and can influence neuronal survival; it modulates immune response. There is little research on the consequences of removing the CCR5 gene. Despite this, Jiankui claimed his work will help ‘millions of families with inherited or infectious disease’ (Jiankui, H, 2018).

Public opinion

Public opinion on genetic engineering is surprisingly optimistic. A *New Scientist* survey revealed that 80% of people believed genetic engineering could cure or eradicate diseases. However, the primary concern raised the concept of ‘playing God’ when editing the human genome. This contrasts with a survey carried out in the US where 68% said the prospect made them worried, while 49% were enthusiastic about genetic engineering (Funk, C et al., 2016). In a National Academies report on embryo editing the fear of eugenics was acknowledged: ‘these concerns should be considered; public debate must take place’ (Pei D et al., 2017).

Do humans have the right to alter the genome?

The meaning of responsibility in this context implies authority to modify and use genetic information. However, often the genetically edited individual will not make the decision. The unborn child cannot control whether their DNA is changed, but this does not necessarily give the parents the right to alter their genes.

Whilst we accept that murder is wrong, and that the fundamental reason for the use of gene editing technology is to extend the lifespan and improve quality of life, the inaccuracies of the technology may result in the opposite. Modifications could lead to medical complications and a shortened lifespan. Until the risks are reduced significantly, it is irrelevant whether humans have the ‘right’ to alter their genes.

Greely stated that laws on gene editing and statutory bans in Europe are sufficient. However, governments like China have been criticised for their handling of these issues; ‘...they [China] do not have good structures for implementing many laws... or the desire to prevent attempts’ (Greely, H. (2018). Ergo, moral issues arise not from the inherent danger of using gene editing technology, but from mis-regulation and abuse of potential.

‘Crispr could in principle be used to boost the expected intelligence of an embryo by a considerable amount.’


An additional risk is the price of CRISPR/Cas9. Expensive technology could create a biological rift in society. Companies such as 23andMe have already shown the significant economic potential. Genomic Prediction is a company currently researching CRISPR. Genomic Prediction do not share data openly (Angrist, M. et al (2006). The number of CRISPR patent applications has risen significantly, increasing from less than 5 in 2006 to over 150 in 2014.

What human characteristics are morally acceptable to alter?

There are many possibilities for future uses of CRISPR. The elimination of hereditary diseases, for instance, is promising. However, the use of gene editing technology for cosmetic purposes, or to alter intelligence could become a reality. The NOTCH2NL gene that kick-started the growth of human brains 3–4 million years ago was identified in 2018. A researcher at University of Minnesota, James Lee, argued that ‘Crispr could in principle be used to boost the expected intelligence of an embryo by a considerable amount’ (Kozubek, J (2016).

He also acknowledged that genetic variance can be associated with multiple genes; this a practical obstacle in the application of CRISPR in this context. As Richard Dawkins (1976) stated in *The Selfish Gene*, ‘There is no gene which single-handedly builds a leg... Building a leg is a multigene cooperative enterprise’. However, Jennifer Doudner, co-inventor of a CRISPR-Cas9 method states, ‘HCRISPR technology potentially gives us a tool to make such changes.’

‘There is no gene which single-handedly builds a leg... Building a leg is a multigene cooperative enterprise.’

The consensus is predominantly that genetic engineering technology, specifically CRISPR, is not ready for use in humans. It requires well-designed, robust and legal definition. In vitro genetic editing could be medically and ethically justified with the correct regulatory infrastructure. CRISPR-Cas9 could become an affordable and effective method of avoiding unnecessary illness. However, without sufficient ethical boundaries in place, it could result in a dystopian world where an unaltered human is an abnormality. It is important to remember that many significant advancements have faced ethical controversy: the first heart transplant caused anxiety. As a society, we need to decide whether the use of genetic engineering for cosmetic and intellectual enhancement is acceptable. If handled carefully, in vitro genetic engineering could greatly improve our quality of life. 

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THE SYMBIOSIS OF MUSIC AND FILM

THE USE OF MUSIC AND SOUND IN FILM

BRONTE TUCKER

I am a cinephile and I enjoy watching extraordinary films. However, I have begun to question what it is that creates emotion and passion, that makes people see more than just a picture and feel 'something'.

The key element in an audience's emotional reaction is music and it is a rich area of critical enquiry, with theorists exploring music as a third dimension to the two-dimensional screen. Hoffman states that 'music can put a judgement on certain movie scenes', shaping and creating sensations. Alongside the use of music is the antithesis: the use of silence.

Diagetic and Non-Diagetic

It would be appropriate to look at some techniques used in film music scoring. Diegetic sound is music within the 'imagined world of the characters'². Or put simply, music the characters can hear. Music only the audience can hear is non-diegetic. When these fictional and non-fiction realities collide, it makes things interesting and sometimes funny. For example, in *Home Alone* (1990) the abandoned Kevin contemplates his plan, whilst sitting in church listening to 'O Holy Night'. At the same time, the score adds depth and emotional gravity; the combination assures that the untutored spectators of the mass movie audience will have access to the desired expressive quality³.

The Leitmotif

Hoffman⁴ observed that leitmotifs have been used 'since the early days of film music'. A well-known example is John Williams' 'cello shark' from *Jaws* (1975). Audience recognition creates fear: the shark is coming! *Star Wars* (1977) features 'Princess Leia's Theme' which recurs when she appears. According to Levitin, it creates 'perspective, foreground and background, and ultimately emotion'⁵.

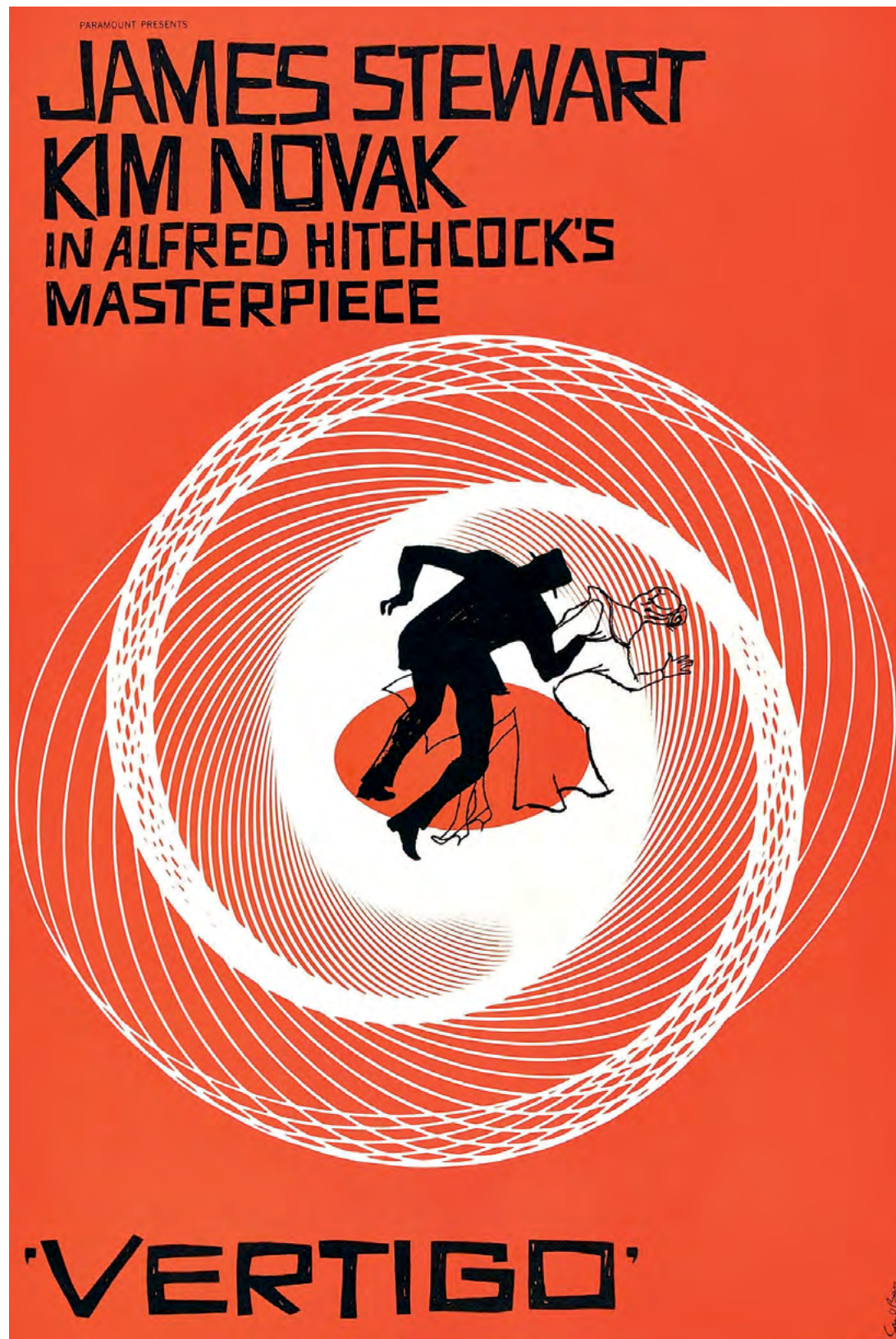
© Pictorial Press Ltd / Alamy Stock Photo

JAWS



Two notes on the cello = exceptionally scary shark music.

Poster for the 1975 Universal Pictures film, *Jaws*. Artwork created by Roger Kastel.



Within the leitmotif there is often a further layering, as in Leonard Bernstein's *West Side Story* (1961), where the song 'Maria' contains an augmented fourth, adding intensity. Levitin writes that this 'interval' was banned by the church as the 'work of Lucifer' or 'diabolus in musica'. Similarly, Frith discusses how the chord of the seventh gives a 'feeling of restlessness, dissatisfaction and suspense'⁶.

Is silence better?

In many films, there is music leading up to a key event or moment. Quite often, the music will stop just before the climax, creating anticipation, as in *The Woman in Black* (2012) where the main character is peering behind a door. There is a build-up of music as he approaches, then silence, creating fear and anxiety. It serves to intensify the emotion within the audience, creating emotional vulnerability in the absence of the guiding hand of music. In *Oliver!* (1968), silence is used differently, where musical silence intensifies the diegetic sounds that are heard and therefore strengthens our emotions, particularly with reference to the nasty Bill Sykes. Similarly, in *The Silent Child* (2017), an Oscar-winning film about a deaf girl, the lack of music or sound accentuates the central character's isolation. It allows empathy; the audience understand her isolation.

From movies to talkies

The era of the silent movie utilised music for a specific function. Projectors were very noisy; music had a 'masking' function in addition to helping 'illustrate and explain action'⁷. Music created mood, but over time was used to support the narrative and add nuance and tension. The first study of film music by Hugo Munsterberg, a Harvard psychologist, suggested that music maintained interest, reinforced emotion and contributed to the aesthetic experience. Munsterberg saw music and film as symbiotic. *The Artist* (2011) is a relevant (modern) example, where music leads us from one scene to the next. Paradoxically, the ending, with no music, seems somehow artificial.

The advent of 'talkies' in 1927 with *The Jazz Singer* raised questions over the need for musical accompaniment. However, Eisenstein⁸ reasserted the value of music in his collaboration with Prokofiev and together they showed that 'large scale orchestral music was going to be a powerful component in making films more exciting, frightening and emotional'⁹, with Frith arguing that the collaboration moved the use of music away from 'novelty, voyeurism and spectacle'¹⁰.

Mood music and the art of Composition

Diegetic and non-diegetic sound is the key to the creation of mood and atmosphere. The film score composer needs to be able to understand how mood is established and how the music will affect the audience. The film score composer should be mindful of 'inducing mood, communicating meaning, cuing memory, creating a sense of reality, and contributing to the aesthetic experience'. This suggests that music is responsible for our feelings. Bernstein stated that music must 'mean the same thing to composer, performer, and listener, otherwise communication would be impossible'¹¹. In effect, it is a shared language, an additional component of the grammar of film, alongside editing and cinematography, for example.

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Home Alone (1990)
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Jaws (1975) Directed by S. Spielberg

The Jazz Singer, (1927)
 Directed by A. Crosland

Raiders of the Lost Ark (1981)
 Directed by S. Spielberg

Schindler's List (1993)
 Directed by S. Spielberg

The Silent Child, (2017)
 Directed by C. Overton

Star Wars (1977)
 Directed by G. Lucas

Vertigo (1958)
 Directed by Alfred Hitchcock

West Side Story (1961)
 Directed by R. Wise and J. Robbins

The Woman in Black, (2012)
 Directed by J. Watkins

¹Copland, 1941, (in Juslin and Sloboda, 2001, p.253)

²Juslin & Sloboda, 2001, p.253

³Carroll, 1988 in Frith, 1998, p.106

⁴2019, n. pag

⁵2006, p.18

⁶1998, p.105

⁷Palmer, 1980 in Juslin & Sloboda, 2001, p. 250

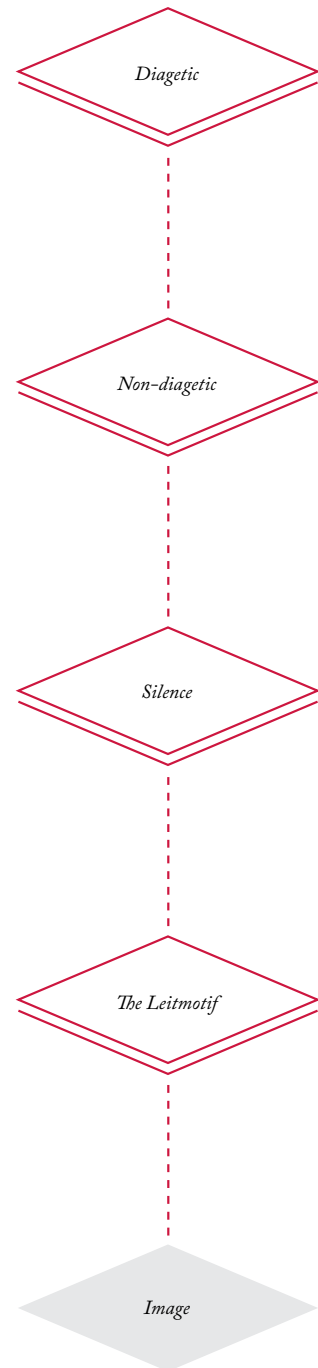
⁸Juslin and Sloboda, 2001, p.253

⁹Goodall, 2013, p. 291

¹⁰1998, p.116

¹¹in Frith, 1998, p.104

THE LAYERS OF MUSIC AND SOUND IN FILM



Graham¹² suggested that ‘a composer’s job is to get inside the drama. If he can’t do that he shouldn’t be writing the music.’ It is absolutely necessary that a composer is able to portray the emotion within music. Cook, 1994¹³ argued that ‘music... creates coherence, making connections that are not there in the words or pictures; it even engenders meanings of its own. But it does all this, so to speak, silently.’ It is a nuanced and fantastic concept: music in film has a hidden power that is paradoxically silent.

Many classical composers have created film scores, including Saint-Saens, Britten, Shostakovich and Copland. Goodall, (2013, p. 292) describes cinema as a lifesaver for classical music, citing John William’s *Schindler’s List* (1993). Other composers who exemplify this craft are: Bernard Hermann (*Psycho* (1960), *Vertigo* (1958)), John Williams (*Jaws* (1975), *Jurassic Park* (1993), and Hans Zimmer (*Gladiator* (2000)). All of these composers have the ability to create an emotional response.

‘The way I listen to my records is for the sound of them – not the chords or lyrics – my first impression is the overall sound’

Paul Simon

Film music seeks to intensify the inner thoughts of a character, invest a scene with terror, grandeur or mystery; lift dialogue into the realm of poetry; and link together the screen and the audience. Film scorers use music for its ‘narrative effect, to propel the action forward or hold it back’, where music ‘helps us to place ourselves in the unfolding story’¹⁴. Some studies have been undertaken regarding how we hear music. Tagg stated that the act of listening tests the extent to which people hear instrumental music ‘narratively’ rather than ‘emotionally’¹⁵. He looked at whether interpretations are shared – asking if ‘everyone hears a melody as angry’. Levitin goes on to say that ‘music manipulates our emotions, and we tend to accept, if not outright enjoy, the power of music to make us experience these different feelings’.

Steven Pinker a cognitive psychologist, looked at the effect of music in a different way, arguing that music ‘pushes buttons for language ability and the auditory cortex, the system that responds to the emotional signals in a human voice crying or cooing, and the motor control system that injects rhythm into the muscles when walking or dancing’. However, he goes on to say that ‘music is useless’ compared to language, vision, knowledge or social reasoning. Pinker seems to suggest that music exists simply for the pleasure it gives, rather than having any capacity to influence thought¹⁶.

¹²1985 (in Frith, 1996, p.114)

¹³(in Frith, 1996, p.114)

¹⁴Frith, 1998, p.122

¹⁵1998, p. 122

¹⁶Levitin, 2006, p. 249

¹⁷Juslin & Sloboda, 2001, p. 250.

¹⁸1998, p.113

‘GREAT FILM SCORES ARE THE ONES IN WHICH MUSICAL AND NARRATIVE LOGIC, STRUCTURAL AND SYMBOLIC MEANINGS ARE INTEGRATED’

When music and images are combined, it creates a greater clarity of feeling; ‘for example, experiencing the emotion of relief requires an object of that emotion, such as a safe arrival after a treacherous journey’. This text suggests that ‘through the use of emotional codes, film music has taught us how to see, while film images have taught us how to hear’¹⁷. It seems to state that music doesn’t make us sad but makes us feel sadness. It implies that music transcends common ideas and creates the bigger picture, the shape and depth of our feelings. The working assumption of film scorers is that they use music to arouse feeling, which the audience then interprets according to the film’s narrative. We are first made to feel and then given a reason for doing so. In this way, music is dominant, despite our apparently passive reception.

Frith stated that ‘great film scores are the ones in which musical and narrative logic, structural and symbolic meanings are integrated’¹⁸. We need to understand that a film score is more than music alone, but is made up of several layers. These layers each contribute an aspect to the emotion and it is actually only when we take apart these layers, that we truly understand the importance of each of them. **T**

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ASYMMETRIC SHOCKS AND CHAOS

MATEUSZ KAPUSTKA

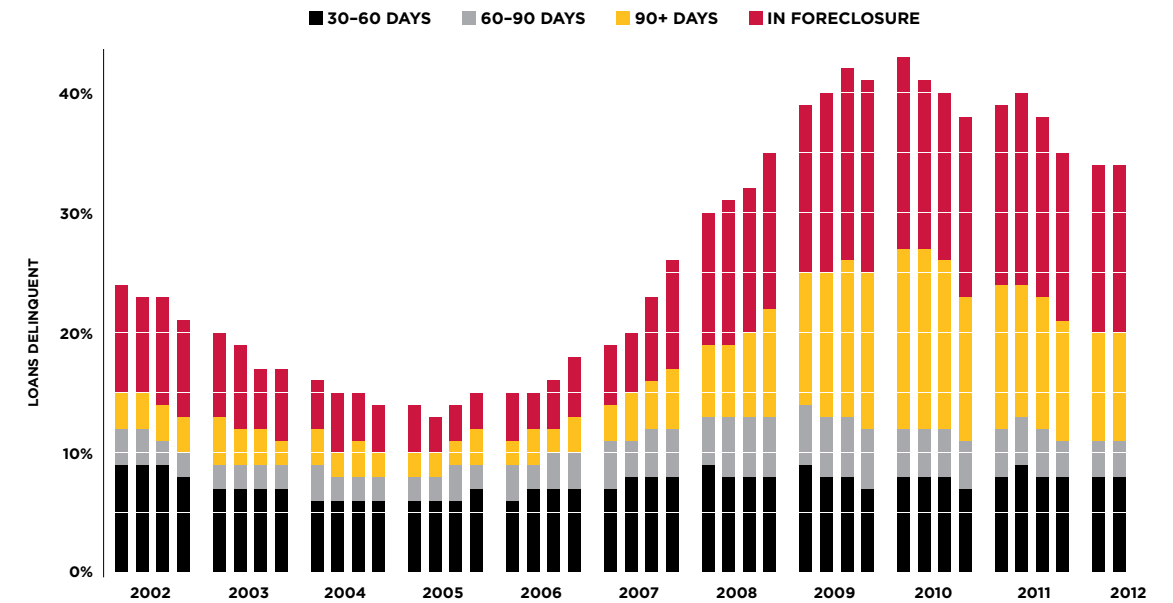
A COMPARISON OF GOVERNMENT RESPONSES TO THE FINANCIAL CRISIS

The financial crisis of 2008 is often attributed to the collapse of Lehman Brothers. However, the turmoil was rooted in a number of factors, some common to previous crises, others new. The Lehman Brothers hypothesis suggests it was an 'all-American crisis', but this is a misconception which obscures the reality of interconnection. In doing so, it also misdirects criticism (Dowd, 2008) when the crisis was global, and especially European and North Atlantic. The financial crisis was an asymmetric shock which caused chaos (Talani, 2016). Not only did the European Union suffer from the lack of capital inflow from America, but also from a debt wave within the member states.

There was, of course, an intense human cost. In the U.S nearly two million citizens were fired in four months (Havemann, 2009). The luckier ones 'just' received high wage cuts. In some countries wages decreased by over 40%. Economies struggled with a perfect storm of high inflation, unemployment and plummeting share prices.

Economist Casey Bond (2013) argues that it was the 2007 credit bubble and housing market crash which led to recession. However, the real cause of the downturn was the federal government's response to the 9/11 terrorist attacks — particularly, the Fed's decision to cut U.S. interest rates to 1%, making borrowing cheap. Some economists have criticised the Fed. However, Greenspan still supports the move. Nonetheless, the housing bubble was a key catalyst.

Americans taking on more debt because of cheap credit had an impact on two deficits at that time – budget and trade. Adam Tooze (2018) believes that it was one of the major causes why the market erupted. The subprime 'free candy party' (Seetharaman, 2018) started to close when housing prices fell in 2006 and homebuyers began defaulting on their loans. Banks, investors and insurers lost capital through a shortage of money. The ensuing recession saw global trade shrink almost a sixth of the global GDP rate. Banks did not have enough assets to cover their debts. The crisis dragged down house prices by nearly a third (Amadeo, 2018). Falling stock and house prices reduced consumer consumption, investment fell causing aggregate demand to shrink. Business and consumer borrowing collapsed, leading to a decline in output and increased unemployment, whilst consumption fell further among laid-off workers. Housing 'starts' declined by 75% and inflation hit a 17-year high.



SUBPRIME LOANS: MORTGAGE DELINQUENCIES AND FORECLOSURES BY PERIOD PAST DUE

The response in Spain

Spain suffered from the crisis directly, whilst also experiencing a burst housing bubble. From 2001 until 2008, the estate market grew by 221% (Linde, 2017, p. 4). This kept the government's budget in surplus and relaxed supervision allowing corruption and law violations within the banking system (Hidalgo, 2012). Banks hid losses, misleading investors.

The crisis saw the economy contract by 3.7% in a year, with expansion and contraction until 2014 when the government declared theoretical recovery. The banks and institutions required a significant bailout, but due to additional national debt the government applied for a 100 billion euro rescue package (BBC, 2012) from the European Stability Mechanism (ESM).

Adult unemployment was 26.7% and 57.4% for youth (Weisbrot, 2014). Some argue this was because of an endemic inflexible market that causes structural unemployment, even during a boom (Pettinger, 2015).

The enormous deficit in current accounts and accumulated external private debt (Kwaak and Wijnbergen, 2017) prevented a swift recovery. As the real estate bubble exploded, Spain used the bailout to convert the private debt to public (Kwaak and Wijnbergen, 2017). Instead of creating consumer confidence and relaxing leverage constraints, the programme affected government bond yields (see Graph) in 2011. As a result of the bailout Spain owns the majority of the banks, with debt at 94% of GDP in 2013. Alongside that, according to Van Wijmbergen (2017) the ECB decided to buy Spanish and Italian

bonds to bring down borrowing costs. This failed: Spain reached the highest borrowing costs since the launch of the euro (BBC, 2012).

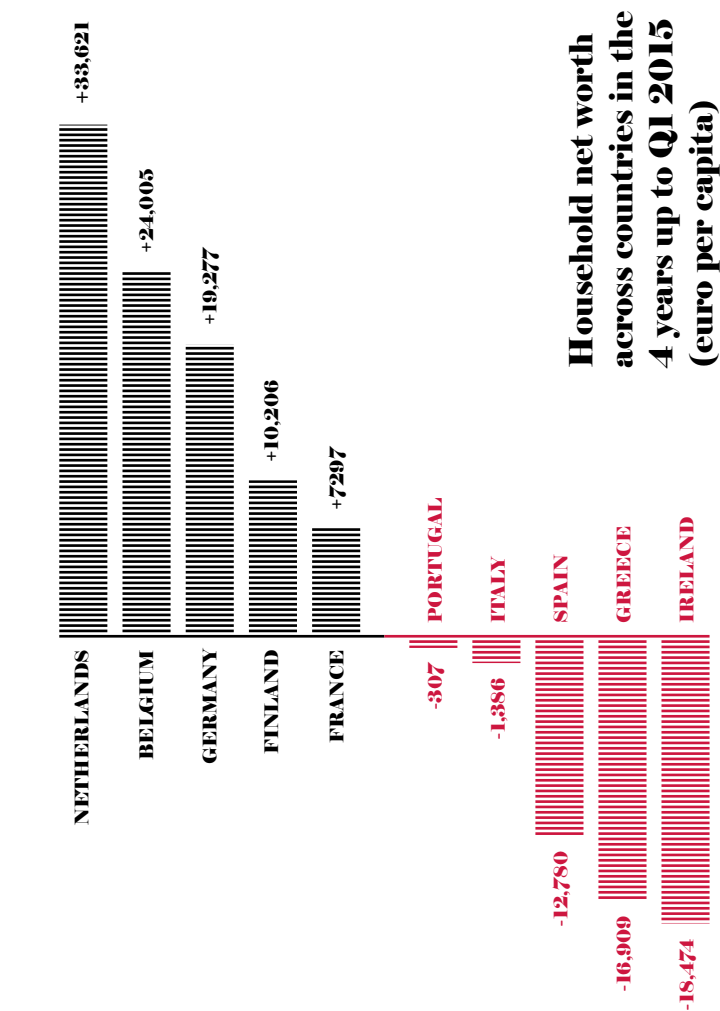
Moreover, imposed austerity measures contributed to a rise in unemployment and severe austerity led to protests in major Spanish cities. However, the government restructured the financial system through supply side policies aimed at reducing 'bad lending' and unnecessary complex instruments. This included an ambitious consolidation programme to reduce the public deficit and restore business confidence (Pettinger, 2015). Finally, the country managed to increase trade profitability by 4%, the biggest increase in Europe. However, there remains continued high debt and high unemployment.

Ireland

In 1988 Ireland was the poorest nation in the EEC. During the early 90s it undertook structural reforms, resulting in a booming market (Kenny, 2014) fuelled by exports and capital inflow (Croke, 2012). Many firms moved their HQ to Ireland where they could pay lower taxes. Ireland went on to form a similar financial bubble as the USA and Spain. In late 2007 aggregate demand and housing prices fell considerably. GDP contracted sharply by 13.5% in two years and banks were left with negative balance sheets (CSO, 2008). The situation of the ‘Celtic Tiger’ was poor and some commentators believe it was worse than in Greece (Wijffelaars and Loman, 2015) partly because of emigration rates; by 2012, 100,000 citizens had left.

The government decided to provide a guarantee to all depositors in Irish banks, costing three times the GDP. Debt increased and the government established the National Asset Management Agency (NAMA) to redesign the Irish financial sector (Croke, 2012). NAMA was responsible for buying the debt of the banks in exchange for government bonds. This plan, although successful, was criticised by Joseph Stiglitz, a Nobel Prize winner. He argued it was unfair that taxpayers’ money was spent on failing banks.

The key to Ireland’s recovery was the recognition of a ‘five dimensional’ crisis; banking, fiscal, economic, social and reputational (NESC, 2009), and a subsequent ‘five-dimensional’ response.



For instance, taxes increased but with exemptions for those on lower income. Hence, to maintain business confidence corporations were provided with tax support, job creation was prioritised and second home owners taxed. These measures were aimed at reducing inequality.

Despite the noble aims, Dublin requested a bailout from the EEC. consumer confidence improved with Ireland enjoying a modest economic recovery in early 2012 (see Graph).

By December 2013 Ireland had paid all debts and loans – the first and only country to do so to date (Eichengreen, 2015). The decision to restructure the financial sector and fix public finances using cuts and stimulus was successful. Unemployment went from 15.1% to 10.7% (Wijffelaars and Loman, 2015). By 2014, the Irish economy was creating nearly 4,000 new jobs every month, exports were rising to record levels, and more than 1,200 companies had returned (Kenny, 2014). The country became the fastest growing state in Europe and attracted a lot of investment by its 20% GDP growth rate in 2015.

There was no perfect recovery from the crisis. While Ireland’s measures may be considered as one of the best recoveries, it still needs a financial strengthening and growth in real wages. This country managed to combat the crisis unlike any other. It has achieved nearly every macroeconomic objective it set while other victims of the crash were struggling. They did this by combining focused austerity with risky measures; lowering corporation tax, restructuring the market, recapitalising banks, job creation and sustained investment. Ireland borrowed, but repaid quickly. Due to careful financial management the country was able to pay the debt very fast. However, if this strategy was taken by all Eurozone countries the crisis would worsen because of the difficulties with repayment. When it comes to the Eurozone specifically, economists propose uniting fiscal policies. However, this is very unlikely to happen as countries would require a certain level of sovereignty which this scheme would not provide.

There isn’t an optimal solution, but many lean towards the Irish model. However, the European Monetary Union requires restructuring to make sure that countries do not accumulate debt due to excessive borrowing. **T**

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D

DEMOCRACY VS A SECOND REFERENDUM

GEORGIA BOLTON HEADS WHERE OTHERS FEAR TO TREAD... INTO THE BREXIT

GEORGIA BOLTON

The Brexit referendum that took place on 23 June 2016 was implemented by the Prime Minister at the time, David Cameron. He was leader of the Conservative Liberal Democrat coalition in 2010. The Prime Minister was under great pressure from the UK Independence Party (UKIP) and Eurosceptics in his own party which led to Mr Cameron, in 2013, promising a referendum on the EU membership if the Conservative party won the 2015 election¹. This action was arguably taken in the belief that a win would negate the issue for future generations, particularly on the Conservative side of the Commons.

The result of the Brexit vote was a leave majority of 51.89%, compared to the 48.11% who voted to remain a member of the European Union.²

A second referendum has been widely campaigned for in response to the closeness of the vote and to subsequent difficulties in carrying out the mandate 'of the people'. Different people have different reasons why they support such an action, but it has been made clear that the main reason for this

campaign is the supposed ambiguity associated with enacting the leave majority in 2016. As stated by Caroline Lucas: "Brexit means Brexit" means nothing until we know what the terms of the deal will be.³ Many argue, on both sides, that the debate gets to the heart of our notions of what democracy is.

A democratic government was defined by Abraham Lincoln as a 'government of the people, by the people, for the people'. This is derived from the roots of the noun 'democracy'. It comes from the Greek and means 'rule by the (simple) people'. Its modern definition is a 'form of government, where a constitution guarantees basic civil rights, fair and free elections, and independent courts of law'. It could be argued that the most democratic action a government could take, on the basis of a conflation of these definitions, is giving the vote to the people. In the sense of a second Brexit referendum, it is argued that it would allow for people to vote on a future for Britain, with them being more aware of the consequences than they were in 2016.

The corollary of this would suggest the first referendum was undemocratic, due to voters not being aware of what they were voting for or the impact of leaving the EU. Since, over almost three years, Britons have lived with the short-term consequences of the leave majority experienced in 2016, it is believed that the electorate is now more educated and aware of the wider issues of leaving the EU, in reality, as opposed to a binary choice enacted on a ballot paper. This forms part of the basis for a democratic second referendum.

The debate regarding a second referendum as democratic is not limited to the information gap between government and the electorate but can also be related to the status of the vote held on 23 June 2016. This was technically an 'advisory referendum'. This means that legally 'government nor parliament have to do anything about the first referendum'.⁴

¹(The Economic Times, n.d.)

²(The UK in a Changing Europe, n.d.)

³(The Week, 2019)

⁴(Full Fact, 2016)

It is conducted in order for parliament to see where society is at on the matter being discussed, and legally nothing needs to be done about the result. However, from a political perspective it can be dealt with in many ways. One way, the method that is relevant here, is conducting a second referendum, also known as a confirmatory referendum. This is where the electorate is able to re-vote on the matter, now with supposed greater knowledge and understanding of the implications. It is believed that there was failure in duty by the government in not thinking through the implications of the original Brexit referendum, and is thought it can be amended by another referendum, with the electorate being more informed. Neither the government nor parliament is under any legal obligation to act on the original 'advisory referendum'. Therefore, one could argue the obvious means of deciding how they will respond is by a second confirmatory referendum; it would be arguably undemocratic to deny the electorate this.

That being said, it was never made wholly clear about the status of the first Brexit referendum, even politicians debated the issue though the result of 23 June was mandatory. Both leave and remain operations were campaigned as though the result would define the future relation of Britain with the European Union. As part of David Cameron's remain campaign, pro-EU leaflets were sent to every household in Britain, costing £9 million of taxpayers' money.

Within this leaflet, it clearly states 'This is your decision. The government will implement what you decide.'⁵ This strongly implies that this original referendum was more than purely advisory, it was a decision the government were going to respect and implement. This would therefore imply that the argument for a second referendum to be democratic due to its confirmatory status would be invalid. Britain's 'democratic' government should respect and act on the result of the 23 June vote. David Cameron believed that this vote was the vote which would decide Britain's relationship with the Union; this was illustrated when he stood down as Prime Minister when his campaign did not take the majority. The leave majority was obtained by the people, for the people. From definition, not acting upon this result would be undemocratic.

Legal and political technicalities aside, holding a second referendum would set a precedent for future votes of a similar nature. It would eliminate the integrity in the electorate's voice and would suggest that polls could be continuing to be held on the same matter until 'voters vote the 'right way'.⁶ People who are arguing for a second referendum are corrupting democracy. The United Kingdom's government could not continue to hold its status as democratic if this second vote is put through. It would deliver an alluded sense of democracy, providing a larger information gap between the electorate and those in power.

A referendum is 'a general vote by the electorate on a single political question which has been referred to them for a direct decision'.⁷ The result of the original Brexit referendum gave the direct decision. However, the second vote is still being discussed, and this definition of referendum could also be manipulated here, to suggest such a vote undemocratic. There is much ambiguity on the contents of this second referendum. The 2016 poll cards gave two options: 'leave/remain'.⁸ This allowed for a direct decision. On the contrary, the question in the second referendum is still unclear. It is believed that there are three obvious options to deal with the matter: 'Theresa May's deal, Brexit with no deal, or remaining in the EU after all'.⁹ These outcomes do not provide a binary decision. Holding a second referendum even with a binary choice would be arguably undemocratic; but holding a referendum with multiple outcomes is more than just undemocratic, it is questionably corrupt and fraudulent. It defies what is publicly understood about a referendum. Neither government nor parliament can change what is believed by a referendum in an attempt to again obtain the 'right vote'. Being undemocratic is not the largest risk a second referendum would run, it is how it would undermine democracy, and then the issue of when government must say no. The line would be invisible.

⁵(GOV.UK, 2016)

⁶(Green, 2016)

⁷(English Oxford Living Dictionaries, n.d.)

⁸(Open Learn, 2018)

⁹(Institute for Government, n.d.)

¹⁰(BBC.co.uk, 2005)



'LEGALLY GOVERNMENT NOR PARLIAMENT HAVE TO DO ANYTHING ABOUT THE FIRST REFERENDUM'

Over the last three years, the demographic of the electorate would have changed. Younger bodies of those able to vote would have increased in size, as the demographic would have shifted to more people being older than 18. It is known that the younger generation is, on average, more politically left than the older generation. Not only would there be more young in the electorate, there would also be fewer old. The political stance of the many in our current year would be different to that in 2016. Those old enough to vote in 2019 would have only been 15 in 2016, when the original Brexit referendum took place. On average, the 15-year-old is not politically aware, and therefore their vote in the supposed second referendum would be influenced by the short-term impacts of the original vote. There is no doubt that these implications have not shown the impact of Brexit in the best light, thus influencing the younger, more easily manipulated voters against seeing what would be best for Britain in the long run. Politics is always a short-term issue. Political parties are voted in for no longer than five years¹⁰, but this referendum was a generational matter. It would be unjust and undemocratic to allow people to vote on a long-term matter when their view would be clouded by the short-term impacts. The short-term and long-term of Brexit must be kept separate, and the long-term must be the basis of the decision for Brexit.

However, this change in demographic could be manipulated in support of a second referendum. It has been previously stated that Brexit is a long-term matter, with long-term impacts. This means that it would be the younger generation who will be impacted, and the most democratic action a government could take is giving this decision to the people it will affect. A democratic government is one for the people, by the people. The people who will be affected by Brexit are those who were unable to make the decision in 2016.

A democratic government, one ruled by the people, is what the United Kingdom government claims to be. The 51.89% majority experienced in 2016 suggests that the people want to leave the European Union. If the UK wish to continue its status as a democratic country it must respect this, and this was said in the campaign by both leave and remain.

Despite the arguments in support of a democratic second referendum, one must conclude such an action to be anything but this. It would set a precedent for future matters, taking the integrity from the electorate and start the corruption of the noun democracy. It would suggest that any matter of government could be repeated until the correct majority is reached, but also the opinion of those who can newly vote would be corrupted by the short term 'chaos' the un-exercised vote has suggested. This would result in a more uneducated and unaware electorate who would be voting for the short-term. Brexit is what the future of Britain is about, and this is what was originally voted for as it was believed to be the best long-term stance Britain could take. Therefore, doing anything but carrying out the result from the 23 June 2016 referendum would be undemocratic. **T**

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C

THE YOUTHFUL FACE OF CLIMATE CHANGE

DAISY MATTHEWS

**GRETA THUNBERG
AND THE ACTION
PRINCIPLE**

GRETA THUNBERG HAS BECOME AN OVERT REPRESENTATION OF DISCONTENTED YOUTH. THE HOPE SHE HAS INSPIRED IS IN BINARY OPPOSITION TO A GROWING SENSE OF HELPLESSNESS AND DISILLUSIONMENT SHOWN BY YOUNG PEOPLE IN THE FACE OF A CLIMATE CRISIS.

She embodies a refreshing perspective that is untainted by political motive, celebrity influence or economic gain. Her message is harsh, yet much-needed: 'We're facing an immediate unprecedented crisis that has never been treated as a crisis and our leaders are all acting like children. We need to wake up and change everything.'¹ Her call to action is like that of previous climate change activists, but with one main difference. There are no theatrics, no dramatic demonstrations, there is only a young girl sitting outside the Swedish parliament, in quiet defiance of those in power. It is no surprise that this resonated with so many people: it is difficult not to feel shame when faced with a young girl who may no longer have a future due to the actions of a select few within an older generation. Many people recognise that it is her generation that will be profoundly affected by the impact of climate change, and this is what makes her message so powerful. After Greta's speech to MPs at the Houses of Parliament, some high-profile politicians stated the urgent need for legislative change². But it is difficult not to feel sceptical in the wake of these statements. Greta is the perfect political tool: support of her message could easily boost a politician's career and acts as an immediate gesture of rhetorical support, without any underlying action. Despite this, the future of her campaign looks hopeful. However, only concrete actions can be an indication of genuine success.

¹Thunberg, G (2018) <https://twitter.com/gretathunberg/status/1056829065469026304?lang=en>. Accessed 7th May 2019
²Thunberg, G (2019) Speech to the UK parliament. <https://www.youtube.com/watch?v=rYNM4rsnNEM>. Accessed 3rd May 2019

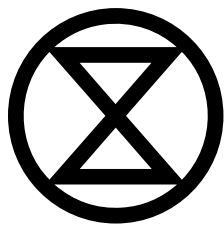


³Thunberg, G (2018) "School strike for climate – save the world by changing the rules." <https://www.youtube.com/watch?v=EAmmUIEsN9A>. Accessed 3rd May 2019

Greta's aims are to take short-term, systematic steps towards reducing carbon emissions. She favours these changes over altering individual lifestyle choices. Whilst these do have an impact, real and substantial change can only occur with the passing of new laws. She has been especially vocal about the reduction of carbon emissions in Sweden in accordance with the Paris agreement, arguing that other countries should follow. Alongside her activism in Sweden, she has openly criticised the UK shale gas fracking industry, the expansion of the North Sea oil and gas fields, the expansion of airports, and the planning permission for a brand-new coalmine in the UK³. These views are shared by many current climate activism groups; Greta has joined Extinction Rebellion, 350.org and Greenpeace to amplify her message of immediate action. In this sense, Greta's influence does not come from radical ideas that separate her from other climate activism groups. They are the same ideas that activists have been promoting for decades: reduce carbon emissions, reduce fossil fuel use and increase the use of renewable energy.

However, it is the context of her message that gives it such a great impact. When people watch Greta's speeches, they do not see an educated climate scientist or an influential politician, but a young person who will be directly affected by the actions of those more powerful than her. Suddenly the message of preventing climate change becomes emotionally charged and gives a face to the anonymous, voiceless masses who will ultimately be affected.

There is a risk that the level of coverage given to climate change issues in the media will have the opposite effect intended. Like news coverage of Brexit, the sheer volume of information in the media surrounding the topic can make it overwhelming and eventually cause a sense of fatigue. This may affect her message and how it resonates with people. Climate change has been the topic of attention for so long now that no matter who is campaigning, the effects are not pronounced. However, recently climate news has been focused on dispassionate statistics, facts and numbers.



For example, the report published by the Intergovernmental Panel on Climate Change (IPCC) displayed some unpalatable truths about climate change⁴, but news outlets cherry-picked the shocking statistics to make the story more dramatic. Few people have read the full report compared to the number of people who watched Greta's speech at the UN Climate Change Conference.⁵ This does not mean that Greta's words alone can catalyse action against climate change. However, she takes the same facts published in the IPCC report and humanises the effects they will have; in other words, she combines the cold, hard facts of climate change with human emotion, creating a compelling message.

There is criticism of Greta. Her age has been the subject of both positive and negative attention, with some stating that she is too inexperienced to have a say in issues as complex as climate change. However, Greta 'owns' her lack of education in the field of climate science. She cites the lack of success of scientists who have been repeating the message of climate action for decades when responding to those who believe only scientists should speak out on the issue. In her speech to the UN secretary general António Guterres, she states that 'Some people say that I should study to become a climate scientist so that I can "solve the climate crisis". But the climate crisis has already been solved.'⁶ Undoubtedly Greta's age is a significant factor in the attention she has gained.

It has propelled her message and inspired young people around the world. But it might also be a critical factor in deciding whether her message is truly taken seriously. Unfortunately, it appears that some governments have reacted in a paternalistic manner. They support Greta for caring about the issue of climate change, but ultimately have no intention of making real changes. It does little more than 'save the reality principle'; talking becomes conflated with doing, action doesn't happen. The narrative would likely be different if Greta was a middle-aged, highly educated man. However, a middle-aged, highly educated man would probably not have gained the level of attention that Greta has received. It appears that whilst her age and inexperience have propelled her to a certain level, those same qualities are, to an extent, holding her back.

Despite numerous criticisms, there may be some evidence that change may already be in effect. Her achievement in launching school strikes is significant. These strikes have put pressure on governments around the world and her vocal support of the Extinction Rebellion movement helped to legitimise demonstrations in London. In a report by the *Guardian*, it was suggested that Greta has 'helped push the climate issue higher up the UK political agenda than at any time since the 2008 Climate Change Act'⁷. This is no small feat when considering the UK government's preoccupation with Brexit in the last few years.

However, this statement also highlights a worrying trend. In 2008 climate change was brought to the top of the political agenda, but politicians and the public lost interest and, 10 years later, no meaningful change has occurred; carbon emissions have decreased by 0.15%⁸. In contrast to the goal of cutting CO2 emissions by 80% by 2050, this does not look promising. It is difficult to tell whether Greta's movement will meet the same fate as previous movements. The periodic increase and decrease in interest surrounding climate change is unhelpful and perhaps damaging to such movements; short-term goals are often implemented and achieved, but long-term goals are neglected due to fluctuating interest.

One factor that could significantly impede Greta's capacity to bring about change is the worrying rise in 'climate change deniers'. Like the so called 'flat earthers' and 'anti-vaxxers', climate change deniers represent a new wave of conspiracy theorists who are intent on discrediting mainstream scientific fact. They attempted to slander Greta after the success of the school strikes in Sweden.⁹ Some accuse her of receiving money from various organisations, other accuse her mother of constructing an elaborate PR campaign for her new book. Although these accusations seem outlandish, the effect of these deniers is having a substantial impact on climate change action. High-profile deniers such as Sarah Palin and Donald Trump have a much larger effect than those trying to smear Greta, and so it appears that this issue goes above Greta. Rather than directly contradict her, climate denial runs the risk of drowning out her message as the climate change discussion degrades into an unnecessary argument over insignificant issues. It is typical of the 'disrupter' movement and the specious arguments surrounding 'fake news'.

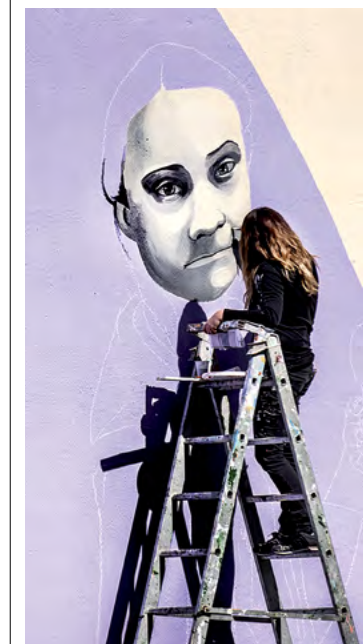
Ultimately, Greta Thunberg has significantly increased the level of interest in the climate change issue, especially in young people. This is a vital step towards inciting political and legislative change; public support often results in political backing, and political backing can often result in legislative change. Although the motives behind Greta's political support may not be ideal, it could catalyse change regardless. Her message is not revolutionary, but her approach is. Her influence has propelled it into the political agenda. Few activists have managed to get past the stage of public support – but Greta has received high-profile political support in the UK which is vital. It is too early to predict whether words of support will materialise into lasting change, but there is no sign of Greta's movement slowing down. The important phrase in this question is 'bring about'. No matter how many speeches she makes, she cannot force political and legislative change. As a 16-year-old girl she has encouraged politicians and those in power to make those changes. It is now up to those in power to decide our future. **T**

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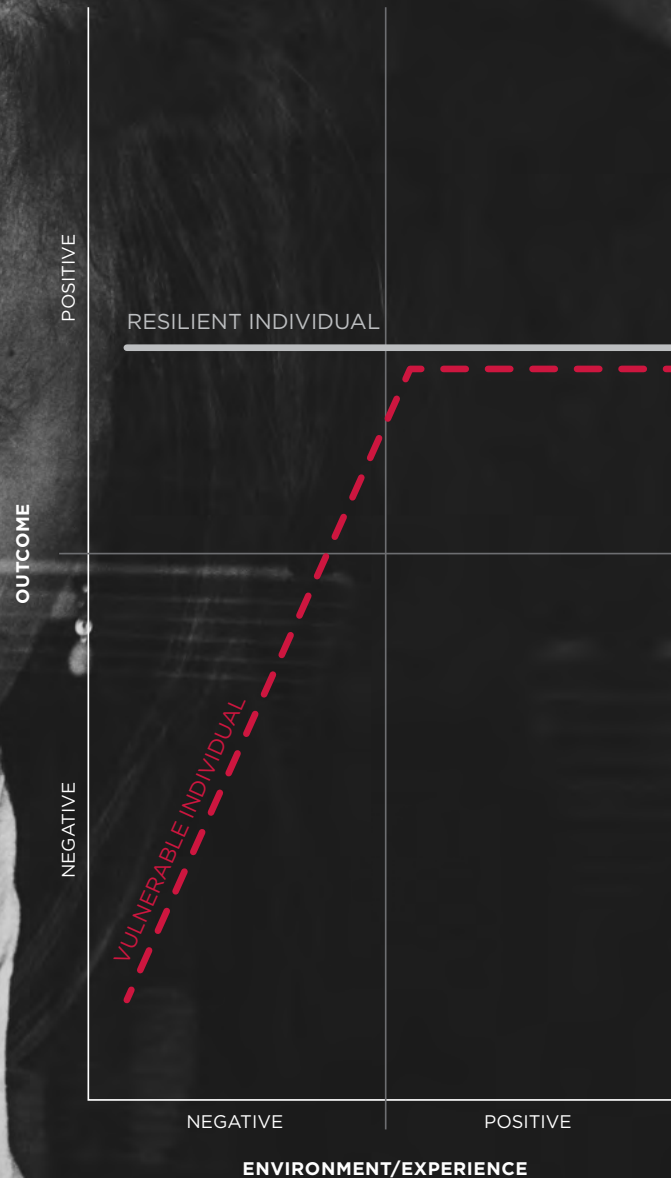
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A girl on a ladder begins a mural depicting Greta Thunberg.

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DIATHESIS-STRESS/ DUAL-RISK MODEL



P

ADDICTION: DISEASE VS CHOICE

LOUIS MORROGH-BERNARD LOOKS
AT CURRENT THINKING BEHIND
THE SCIENCE OF ADDICTION

THE DEFINITION OF ADDICTION - OR IN THIS CASE, SUBSTANCE ADDICTION - CONSISTS OF TWO POLARISED VIEWS: AUTONOMY VS DISEASE.

A disease is a condition that negatively affects part or all of the function or body of an organism. A view supported by the BDMA (the Brain Disease Model of Addiction). The free will and determinism debate argues that behaviours are caused by preceding factors and are thus predictable. Environmental determinism explores how the physical environment predisposes societies towards development trajectories that present illusions of choice. Environmental determinists might see addiction as linked to environmental and socio-economic factors. Biological determinism looks at genetic or other factors. The opposite of determinism is blame: individuals make choices.

The Diathesis-Stress Model is also relevant. It attempts to define a disorder as a result of interactions between predisposing vulnerabilities, being genetic or environmental, and the potential co-apparent stress caused by real life experiences (Hillman, 2018).

Determinists argue that because we are not aware of environmental causes of our behaviour, we believe that we choose how to act.

The DSM-V (The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) lists 11 symptoms, including wanting to cut down or stop using the substance but not managing to, continuing to use, even when it causes problems in relationships and using substances again and again, even when it puts you in danger.

Another commonly used set of criteria is the ICD-10. There are some common denominators of criteria, found in both sets:

- Difficulties in controlling substance-taking behaviour (2, 9 in the DSM-V)
- The presence of withdrawal (11 in the DSM-V)
- Progressive neglect of alternate interests (7 in the DSM-V)

Psychology has six central paradigms. These include cognitive, psychobiological and behaviourism, with the latter being important to the addiction debate.

Determinism is a spectrum, as most things are. 'Hard' determinism argues that our actions are due to influences around us (Westacott, 2018). Essentially: our choices are an inevitable reaction to our situation. It is incompatible with free will. 'Soft' determinism involves the same basic ideas: we are shaped by our influences and experiences but human free will can shape our choices.

The brain disease model of addiction

The BDMA describes addiction as a disease of the brain. This model is controversial due to the lack of animal or neuroimaging evidence (Volkow, 2016) in support of the hypothesis. However, as a hypothesis it cannot be discarded.

Addiction is defined as a disease by the majority of medical associations. Accordingly, it is caused by a combination of behavioural, biological, and environmental factors.

This is similar to type 2 diabetes and obesity. Both are diseases yet their ultimate cause is a choice that involved the consumption of a substance. If obesity is a disease, then so is addiction.

Perhaps it is easier to picture a scale with free will at one end and disease at the other. Things that sit purely on the end of the disease definition are, for example, allergies. Addiction cannot purely be a disease, but is not a choice. Marc Lewis, a neuroscientist, quotes a letter from an ex-patient meth addict whom he believes will never recover:

'I AM UNSURE OF WHAT TO DO OR WHERE TO TURN NEXT... I DON'T KNOW WHAT I AM MORE AFRAID OF, BEING SICK PHYSICALLY AND DYING, OR STAYING HIGH, FALLING APART MENTALLY AND FOR THINGS NEVER TO CHANGE...I WISH THERE WAS AN ANTIDOTE'

(Lewis, 2015, p. 17)

Neuroimaging studies of people with addiction have shown physical changes in areas of the brain that play major roles in judgement, learning and behavioural control. The meth addict clearly feels that her drug using is out of her control, yet there is no antidote. Such a self-destructive choice implies that their brain is dysfunctional. An investigation into the effects of marijuana use (Luciana, 2016) proved that recreational use affected neurological pathways.

In conclusion, analysis of whole brain grey matter volume densities has shown density increases in the hypothalamus and the amygdala (an area of the brain shown to play an important role in processing emotions), implying that the drug is associated with deviations in choice-making circuits and behavioural impulsivity. Opioids lead to an increase in inhibitor proteins. This leads to the activation of potassium ion channels and inhibition of calcium ion channels. This along with multiple other neural alterations contribute further to the opioid effects, triggering long-term dependence, tolerance, and withdrawal.

The rat park experiments

Further evidence backing up the Disease Model was a series of experiments into drug addiction that were conducted in the 1970s. These were published between 1978 and 1981 (Alexander, 2001). These experiments were carried out for the purpose of backing up his hypothesis that addiction is not induced by drugs, but instead by the lack of emotional bonds to other people, places, or any other sort of social activity – a form of escapism.

There were two drop dispensers. One was water, and the other a sweetened morphine solution. The 'isolated' rats chose to drink the solution containing psychoactive drugs. The rats continued to self-administer in the face of aversive stimuli (in this case an electrocution to the foot). Animals self-administer psychoactive drugs in high frequencies, opioids for example.

This is reinforced by neuroimaging studies of dopaminergic reward circuits, and how they vary in 'normal' and 'addicted' brains. One cannot control one's own dopamine system. The rats in this case have no bond to anything other than morphine; some harmed themselves in the process by electrocution. On a larger scale, people can control their choices, but not how their own brains and bodies respond.

Alexander created a bigger enclosure, the so-called 'rat park'. The rats had tunnels to vary their experience and were with other rats; they could form bonds. The rodents chose not to drink the drug-laced solution. Alexander concluded that he had demonstrated that addiction was not caused by drugs. Addiction was a possibility for both groups of rats, yet only the isolated rats fell into it. He claims it was thus situational. The rats that were holed up in cages became addicted due to their environment and so took the drugs, having nothing better to do, thus their neurochemistry was altered, but the rats in rat park, through the eyes of a determinist, were not going to become diseased. We now know that drugs alter pathways in the brain.

Biological factors

Biological determinism is the belief that most human characteristics and 'choices', both physical and mental, are determined at conception by hereditary factors (Allen, n.d.). The idea of genetic vulnerability to drug addiction is supported by several familial, adoption and twin studies. It is very difficult for scientists to find these genes as the vulnerability is most likely caused by multiple genes, and it is known that the more genes necessary for a disorder, the more difficult it is to detect. The Harvard Twin Study of Substance indicated a vulnerability formed by both environmental and genetic factors (Tsuang, 2001). It strongly suggests the presence of genes leading to susceptibility to addiction, and therefore strengthens the disease definition.

Vietnam veterans

In May 1971 two men, Robert Steele and Morgan Murphy, visited Vietnam. They returned having found out that up to 20% of the soldiers present were in fact addicted to heroin. It was also revealed that 35% of the soldiers had tried heroin (Janos, 2018, p. 3). At this time, heroin was viewed as an irreversible addiction.



© Stuart McMillan – <http://www.stuartmcmillan.com/comic/rat-park/>

The accepted belief at the time – that a heroin addiction was unrectifiable – was shaken as it was found by the office that only 5% of the soldiers held onto their administering habits upon returning home after the war. Researchers concluded that ‘addictions could dissolve if there was a radical change in the environment’ (Clear, 2018).

Psychologist David Neal hypothesised that this was because physical environment shapes behaviour: ‘for a smoker the entrance to their office building – where they go to smoke – becomes a powerful mental cue to perform that behaviour’ (Neal, 2006).

The opponent process theory

Opponent Process states that emotions act in opposite pairs: pleasure juxtaposed with withdrawal. For an addict, the brain tends to compensate for the stress of drug intake when surrounded by environmental cues by producing an opposite chemical response to the changes the drug would bring about (Cummins, 2014).

Endorphins are neurotransmitters that make us feel good when attached to opiate receptors in the brain. Heroin releases morphine which attaches to opiate receptors. The brain decreases the amounts of chemicals being released, creating the opposite of a ‘high’. This is a part of the homeostatic function of the body, trying to prevent changes to the chemical balances of the body. This also forms part of the withdrawal complex.

It could be argued that one of the reasons that veterans were able to quit their habits upon returning to the US after the war was that they lacked the environmental cues that would bring about the opponent-process ‘mechanism’. It might be one reason why the majority of veterans stopped using heroin upon returning.

This does not support a disease definition. They chose to use heroin in a warzone, but when away from trauma they choose to stop (Addiction Campuses, 2018). This challenges the BDMA. For most addicts it is impossible to avoid their cues. Rather than avoiding cues, maybe the answer is to find coping methods to be able to ignore the cues. This could then link into forms of treatments that are complementary to addiction.

Cognitive behavioural therapy

One of the main ways in which addicts are treated is by cognitive behavioural therapy. This type of treatment helps a person remove ‘self-sabotaging thoughts which fuel drug or alcohol abuse’ (Addiction Campuses, 2018).

It often works in tandem with rehabilitation and a new environment. In this case – to argue for the BDMA – one could argue that the very context of veterans returning had a therapeutic effect on their addiction. On the other hand, the other 5% who didn’t stop administering and the 15% who relapsed within the first year should not be dismissed; it is not as if they all cured themselves.

Chip Somers is an ex-addict who runs a charity providing treatment for those struggling with substance abuse. At a lecture he spoke of how his upper-middle-class upbringing centred on a nuclear family was partly responsible for his vulnerability to addiction. He lived in a home with unsupportive parents and a tense atmosphere. He was molested at his prep school. He left home, went to London, had nowhere to sleep and began using drugs. The fact he mentioned his circumstances implies that he believes these factors increased his vulnerability to addiction. In some sense his childhood trauma of being molested may have affected his future.

Somers tried marijuana, and it was an initial choice. He was prone to addiction; he did not choose to become addicted. In an interview, when asked to describe his ‘rock bottom’, he said ‘I was supposed to be looking after my daughter who had come to me saying she was hungry ...I eventually managed to borrow a tenner off someone and went straight away and bought drugs with it... Came home a few hours later to find my daughter crying and afraid’ (Somers, 2013). This was one of the reasons he began to try and recover. He fits the BDMA: he put drugs before his daughter’s safety.

‘disease of the mind and body’

Conclusion

It is difficult to argue against the fact that an initial choice is made to take a drug. However, it is also possible to argue that this choice can be situational. For instance, due to social and economic status. This may be a form of escapism or the environment. It is unlikely for someone randomly to have a sudden urge to go out and buy some drugs. There is always an influence.

Addiction can be brought about by the repetition of voluntary behaviours. This is bolstered by neuroimaging studies that give us proof that our brains change in response to chemicals, creating long-term changes in the way we act. This aligns itself with the definition of a disease. Addiction is negatively affecting the function of the brain, altering behaviour. A disease is not something we do to ourselves, and in the case of addiction something is physically happening to us; this pushes the definition more towards the disease end of the scale.

It is also suspected that there could be a genetic vulnerability in some people, lending itself to the disease definition as this is beyond our control. The study mentioned earlier was a large sample (8000 people) with a positive correlation of results, implying that multiple susceptibility genes do play a part in addiction. Once an addiction has been initiated by the steps mentioned above, it is maintained by the environment. The cues associated with the utilisation of the drug, whatever they may be – an object, a place, a person – creates cravings due to the alterations, chemically, in the brain by the drugs. These cravings increase the probability of the individual taking yet more drugs and thus worsening the condition of the addict.

Addiction is commonly called a ‘disease of the mind and body’. This is most likely the case. People with substance abuse problems make illogical decisions, they may even know the effects that this will have, yet manage to go forward and carry out these actions. This appears to be beyond individual control – hence rehabilitation centres. Everyone is different and benefits from different treatments and due to this it is unlike any other disease; it requires mental support just as much as it does medication. The disorder is difficult to define. There may be an aspect of soft determinism in the sequence of events that leads to the disorder: the act of becoming addicted in the first place is even less of a free choice than naturally suspected.

Addiction is not purely a disease nor a choice. It is a disorder that arises due to an initial action that is down to the individual, but is influenced by predisposed environmental and situational factors. This leads to a decline in ability to make the ‘right’ choice. It then becomes a fully-fledged disease that is extremely hard to recover from. It needs to be treated as a disease to develop therapies and remedies that will eventually be able to cure the disease. That is, if a cure is possible. **T**

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A

JOHN SLOAN AND THE ASHCAN SCHOOL: AMERICAN SOCIAL REALISM

REPRESENTATIONS OF WORKING-CLASS MEN IN THE REALIST PAINTINGS OF JOHN SLOAN

DR RACHEL SANDERS

John Sloan's *Pigeons*, painted early 1910, was rejected by the National Academy of Design from their exhibition held in March of that year. Sloan noted in his diary, 'I rather thought [it] had a chance to pass.' Instead it went on display at the Exhibition of Independent Artists. *Pigeons* provides a view of rooftops across a street. The slightly ramshackle quality of the tenements, the plain brick and metal fire escapes locate us in a working-class neighbourhood. New York's skyline is a secondary interest here; taller buildings frame a stretch of blue-purple winter sky against which McKim, Mead and White's old Pennsylvania Station, and the church spire of St John the Baptist can be seen. However, the viewer's eye is drawn to a small flurry of activity in the centre of the painting that relieves a fairly rigid scene composed almost entirely of vertical and horizontal lines. A stocky male dressed in shirtsleeves, braces and hat is training his racing pigeons. The flock of birds, captured in various stages of flight, form a downward spiral that vaguely echoes the sweep of his flag.

At a distance behind him a young boy watches, seated on a chimney stack, hands in pockets, legs dangling. Snow forms small drifts against the brickwork, hidden from the raking winter sun that throws harsh lines across the fronts of the buildings. Whilst the outer edges of the canvas are casually painted – almost scrubbed in dark hues in the lower corners – the centre of the picture surface is detailed in a broad spectrum of colour, notably the sunlit bricks, the main aesthetic conceit. As a whole the painting does not exploit harmonies or complementaries, the tonal weighting is uneven and the focus off-centre, all of which heighten the sense of realism.

Pigeon racing was introduced to the USA from Europe in the 1870s and became a widely enjoyed sport among New Yorkers. The lower classes, particularly immigrant groups, were associated with this relatively inexpensive hobby that created mess and smell in the communal living space.



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The establishment of the American Racing Pigeon Union in 1910, which set out rules for competing, attests to its popularity and pigeon coops atop tenement blocks were a common sight. The heart of Sloan's picture is the specificity of the moment, when the bustle of the metropolis melts away and peace is found. Nothing is really happening. There are no obvious romantic trappings, no man-child bonding moment; in fact we are uncertain of the nature of the relationship. We can make assumptions, but Sloan does not prompt or seem to require narrative speculation. Contextual knowledge will, of course, inform our interpretation, but pleasure is created through Sloan's ability to communicate a heightened realism in which we share.

The viewing position is crucial to his success with this. We are at the same level, as if from a neighbouring window. Our proximity is indicated through the cropping of the scene – we are of the same space, the same class.

Sloan was the last of a circle of friends, including William Glackens, George Luks and Everett Shinn, to relocate to New York on the heels of their mentor Robert Henri. Collectively they are known as the Ashcan School, along with George Bellows who exhibited with them for the first time at the 1910 Independent Exhibition. They were America's first realist group. They depicted subjects that indicated broad changes in culture and society, challenging 19th-century morality, prejudices and ideas of respectability.

They painted people on the social margins and scenes that encapsulated the city's pace and fabric with a previously unseen sensibility.

In his seminal survey of early 20th-century American art Milton W. Brown speculated that 'the lack of a tradition of social criticism in art which confined realism at that period to a colourful documentation of city life' accounted for the lack of militancy in Ashcan art. He also discussed a mutually beneficial exchange between the artists' fine and graphic art. Ashcan artists contributed illustrations to periodicals, ranging from *Harper's Weekly* to *Mother Earth*. Significant amongst these for its politics, the abundance and quality of its imagery and its role in forging a national left-wing aesthetic was *The Masses* (1911–17).

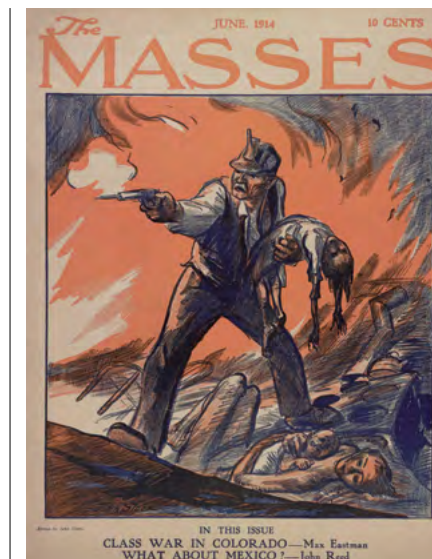
Launched as a monthly magazine of 'art, literature, politics and science', *The Masses* was sympathetic to the American Socialist Party.

Unlike other members of the group, Sloan almost exclusively pictured the working-classes, but *Pigeons* is a fairly atypical piece in that men rarely featured in his etchings, and there are only a few oil paintings in which women are not the primary focus, although those that do forefront men are palpably realistic all-male worlds, of leisure rather than labour. The lack of attention given to the working man is curious considering firstly, their political sensibilities, secondly, their aesthetic priorities and thirdly, the rhetorical focus on masculinity among contemporaries. Pre-1917 the working man was central to the American left as an agent of political change or an aspirational embodiment of a heightened life experience. New York was a city under construction and sizeable workforces were required. The male labourer was in constant view. Concerns that white-collar work, along with modern urban living, diminished masculinity were rooted in class in the face of the growth of organised labour amongst the 'robust' lower class and the massive influx of immigrants of 'vigorous' races.

The few images of working-class males bring into focus attitudes towards the relationship between art and politics. Socialist Party member Sloan was the most political. His wife Dolly was remembered as a 'rabid socialist'. Sloan offered his talents to the cause, contributing political cartoons and drawings to periodicals, but was most heavily involved with *The Masses*.

In his diary he mocked a friend who thought 'Socialism is a good thing but will 'hurt individuality'. He also stated, 'no man could do good work and not be [a socialist]' and was scathing of 'the ignorant listless moneyed class'. Politics evidently affected his views on art and yet he struggled to marry the different aspects of his practice with his politics.

Pigeons invites observation of its subject but differs from Bellows' *Men of the Docks* (1912), an unusual work in that manual labour is the focus, whereas most Ashcan images minimise its presence. A group of longshoremen, collars buttoned against the cold, stand with a pair of packhorses in front of a freighter. The Manhattan skyline emerges through clouds and smoke. In the foreground the dockers look left to something out of frame, as one man with shoulders hunched and head down departs in that direction. Zurier and Robert Snyder suggest audience uncertainty of what is witnessed reminds us of the precarious existence of the unskilled men who anxiously await employment. Edward Wolner also points to 'urban symbiosis' as a concern of the piece; a 'cross-river drama' created to underscore the city's dependence on both brawn and brain. Formal elements assist in this reading, not only the plunging perspective of the freighter and the warehouse that essentially turn the mid-ground into a tunnel, but also the use of red which pulls the eye from the dockside cleat and the faces of the stevedores, along the freighter's plimsoll line to the distant skyscrapers.



Cover of the June 1914 issue of *The Masses* by John Sloan, depicting the Ludlow Massacre. © Everett Collection Historical / Alamy Stock Photo



Men of the Docks by George Bellows, 1912

©Vivia Decarli / Alamy Stock Photo

‘idealistic anarchists are people who look at a ladder and want the top rung without working their way up.’

Bellows' longshoremen are suited to physical labour, but the lack of heroic affectation is made starkly apparent when compared to the men who stretch and flex their well-worked muscles in Thomas Anshutz's *Ironworkers – Noontime* (1880), one of few American precedents of the labouring lower classes. Anshutz idealises the virile lifeblood of the nation. Bellows' realism points to the integral role of the working-class male in the modern capitalist economy – yet it presents no political challenge. Notably, there is no sense of unity between the men and none is created with the audience. Cropping pulls us into the scene but the viewing line, slightly above the heads of the men closest to us, positions us as observer and we are invited to read the objects and the interactions (here unconfined by the picture space). ‘Temporal compression’ is the useful term John Fagg applies to this abundance of component parts that are particular enough to sustain claims to accuracy. The suggestion of the momentary was a priority of Ashcan realism, an element of its modernity, but it is routinely a whole comprised of detail that produces discursive effect and invites assessment that is a familiar audience experience.

The Masses magazine featured a range of image types including journalistic illustrations, figure studies, realist drawings, political propaganda, cartoons and caricatures. It offered access to a wide audience and freedom to experiment. This freedom blurred boundaries between Ashcan fine art and that which became *The Masses* contributions.

Why Don't They Go to the Country for a Vacation?, published August 1913, is exemplar of the interaction between practices as it was also worked as the painting *Cliff Dwellers* (1913). Both works present a composite that details the freneticism, deprivation and lack of privacy experienced in a Lower East Side neighbourhood, and in both cases the accumulation of detail is calculated to encourage social commentary to the extent that it belies the sense of the momentary.

The Masses realism, like Ashcan realism, predominantly pictured working-class lives in a loose, unrefined, seemingly emotive style and calculated compositions that suggested ‘slice-of-life’ but in fact created narrative space that invited assessment of the subject. There are examples that ‘achieve genuine human empathy’ by surmounting this ‘self-consciously distant tone’. These, I would argue, are equivalents to paintings such as *Pigeons*. Becker's *Harbinger of Spring* graced the cover of the May 1916 issue of *The Masses*. The periodical prided itself on the quality of its reproductions; considerable space was absorbed in half, full and double page images. Illustrated covers were the norm, often front and back and generally printed in black with one or two additional colours from 1912 onward. Becker described his subject as ‘a peddler concerned with sales, especially since his product has a temporary existence. Naturally his face didn't reflect the joy that the romantic blossoming of flowers brings to the face of a well-to-do-purchaser.’

‘His women are sexually alluring, but the works are not merely voyeuristic and they are not politically neutral.’

The middle-aged street vendor dressed in flat cap and waistcoat cradles the pots of flowers he is hawking in the crook of his arm. With right hand raised to his mouth to amplify his sales pitch, his pose and facial features are further animated by the overprinting in bright red. Becker provides no further detail; perspectival space is eliminated. The decision to crop the man at the waist and elbow, and place him close to the picture plane creates intimacy. The print exudes familiarity and comity rather than scrutiny and assessment.

Sloan's presentation of working-class men in *The Masses* tends to be very pointed in content, many expressing sympathy for strike action. An image more akin to Becker's *Harbinger of Spring* is *The Bachelor Girl* (February 1915). Sloan habitually depicted attractive, active, self-possessed proletarian women asserting new roles for themselves in modern society. His engagement with women as principal subject matter was consonant with American high art tradition, but the manner in which he presented them was anathema to genteel society. His women are sexually alluring, but the works are not merely voyeuristic and they are not politically neutral. Patricia Hills has shown that Sloan's women are agents of change and that ‘the covert meaning of many of his paintings of women is the desire for purification, redemption, and regeneration in a world here and now. It was the same wish as that of idealistic socialists, to which Sloan was giving visual form.’

Sloan's aesthetic position was not clear cut and its formulation was complex. As a close personal friend and a respected artist and theoretician, Henri's influence on Sloan was extensive. From the mid-1890s Henri embraced philosophical anarchism; his views incorporated the ideas of Emerson, Whitman, Bakunin, Morris and Tolstoy. He shared the views of Emma Goldman, co-founder of the Ferrer Centre, that art was ‘a powerful disseminator of radical thought’ and the artist was to be an instructor. Sloan thought Henri's politics impractical stating ‘idealistic anarchists are people who look at a ladder and want the top rung without working their way up’.

The anarchist leanings of Henri and Bellows made it easier to reconcile artistic freedom with political conviction, than the socialism of Sloan, who struggled. This tension existed in Sloan before he joined *The Masses*, and was likely exacerbated by his involvement. On 9 June 1909 he wrote in his diary:

‘Will the great mass of the workers, when they find the power of the united vote, stand for differences in the rewards between their ordinary labour and mental labour? Of course all will have every necessary [sic] to existence, and comfort – but should not the higher faculties have some higher reward? Or is this feeling in me, only a surviving view of the present upper class feeling?’

While relishing free expression, *The Masses* sought to raise class-consciousness; while aspiring to artistic individualism it sought to collectively motivate. Discord resulted, not just personal conflict but among the editorial board as a whole. Sloan left the magazine in 1916 following a strike action supported by a number of artists including Davis. He later complained ‘The editors wanted to keep hammering on propaganda and the satire lost its subtlety.’ Eastman retaliated by accusing the strikers of being ‘art-for-art's-sakers’.

Sloan was committed to depicting the world he knew. He avoided picturing the worst of New York's squalor. When the editor of *The Call* requested Sloan make his workers ‘more starved and emaciated’ he refused. Socialist Party member Charles Wisner Barrell of *The Craftsman*, supported Sloan's avoidance of ‘terrible, heart-wringing poverty’ and ‘abstract human wretchedness’. Sloan's actions and statements suggest a man uncertain of his social position and developing political awareness.

Looking to the world around him Sloan often selected scenes for which there is no art historic precedent. Among these are the paintings of working-class men such as *Pigeons*, *Fishing for Lafayettes* (1908) and *McSorley's Bar* (1912).

Sloan favoured picturing the cheap nightclubs and restaurants possessed by the lower orders over the glittering spectacle of opulent urban entertainments. McSorley's is no exception, a saloon famed for good ale, raw onions, pet cats and no women. Sloan's painting is a masterly exercise in blacks, greys and ochres; the result is rather austere. Positioned at a slight distance from the bar, our eye is drawn to the white shirts and aprons of the staff before it meanders around the rest of the room. We observe, not as voyeur but as fellow patron, the memorabilia on the wall, the lone drinker at the far end of the bar, the two men closest to us deep in conversation, one thrusting his arm forward towards the other's chest as if to make a point, his companion relaxed with foot raised, beer in hand, elbow on the bar, listening intently – probably the union men as Sloan remembered them. As with *Pigeons*, there is no extended narrative. The activity is insular. It is an image of camaraderie; a specific clientele – middle-aged working men in jackets, shirtsleeves, bowlers and boots – in a specific location, wholly at ease in this moment of daytime leisure. Sloan described McSorley's as 'a place where the world seems shut out – where there is no time'. He has effectively captured this. Conservative critics sought to cast him in the Hogarth tradition but Sloan railed against this, writing to the *Evening World* critic challenging the comparison. *McSorley's Bar* was submitted to the Armory Show of 1913, with a list price of \$500; it did not sell.

The images of working-class men produced by Ashcan and *The Masses* artists, with few exceptions, share one common trait, the flinty mood that pervades them – depicting men seems to have been a serious business. The adjective frequently applied to Sloan's practice is warmth, and while that suits his smiling view of women the male subjects elicit something closer to unity. One could speculate that the political potential of images of labouring men was identified and to permeate them with warmth and joviality may have been counterproductive to the socialist cause. Sloan's varied approach to picturing the working classes evidences the deep-seated dialogue between fine artist and magazine illustrator, roles informed by cultural debates driven by different politics that drew conclusions which would never fit together comfortably. But the discord this created in Sloan appears, on occasion, to have allowed him to see beyond the 'class apart' vision that frequently shaped his work. These images diminish the 'temporal compression' that prompts the audience to respond to the internal dynamics with an assessing narrative of their own. They simplify, diverging from the traditions of high art composition and the collective memory of the dominant classes. **T**

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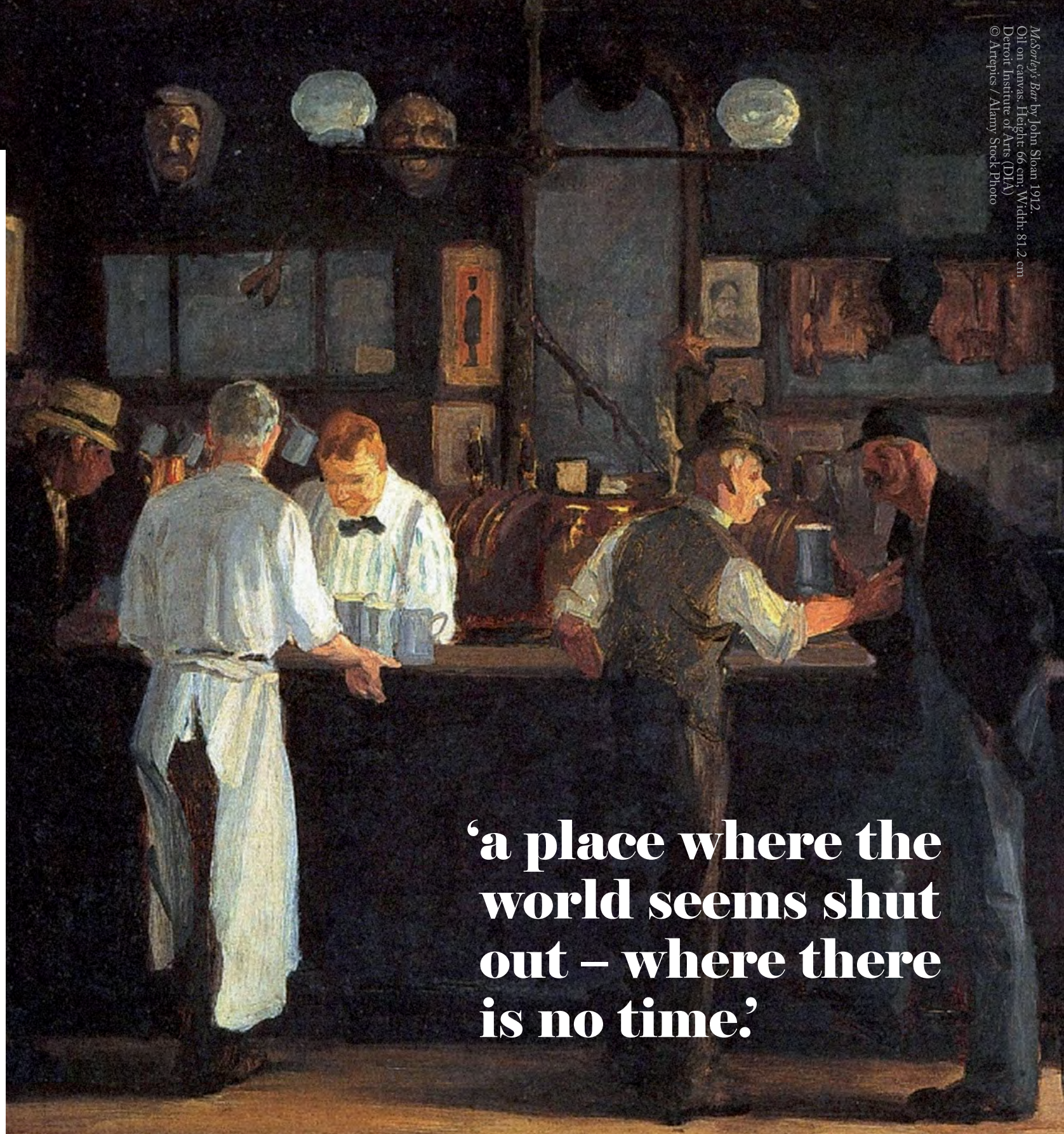
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‘a place where the world seems shut out – where there is no time.’

VICTOR FRANKL'S SEARCH FOR MEANING

BETH MITTON

BETH MITTON ADDRESSES THE CONTRADICTIONS OF FINDING MEANING IN TIMES OF UNIMAGINABLE HORROR

There are many factors which affect the degree of prominence afforded to historical figures. There are many examples of people in everyday life who triumph in adversity as they face individual challenges and overcome them. These personal achievements display the strengths and weaknesses of character. By exploring another's personal qualities demonstrated by their actions and decisions we can learn a lot from their experiences and the lessons they might wish to portray. This is illustrated in an intense way by the life of Victor Frankl, a neurologist and a psychiatrist, born in Vienna in 1905.

Following the outbreak of the Second World War, Frankl became one of 2.7 million Jews deported to concentration camps in Poland, along with his family, including his wife and parents. From 1942 to 1945 he spent time in four concentration camps; Theresienstadt, Auschwitz, Kaufering and finally Türkheim.

Victor Frankl was liberated by American soldiers on the 27 April 1945 from the appalling conditions he had faced throughout his time in the multiple concentration camps. However, his parents were murdered in the camps, along with the majority of his other family members. He discovered in August 1945 that his brother and wife had been murdered in Auschwitz. The experience of the camps, along with the scale of bereavement, created an overwhelming trauma for all Holocaust survivors, including Frankl.

The aftermath of the Holocaust was devastating. It is held up as a singularly genocidal and evil episode in history, with the tensions and scars still evident. In the immediate aftermath, the numbers of refugees and displaced were significant. The direct effect on prisoners was catastrophic, leaving not only negative physical impacts as a result of malnutrition, but also haunting psychological pain.

Frankl's suffering as part of the diaspora became the driving force for his life's work. As he later commented, on his return to Vienna, 'the flood gates had opened', and by 1946 he had completed his first treatise on the subject of trauma: *Trotzdem Ja Zum Leben Sagen: Ein Psychologe Erlebt das Konzentrationslager (Saying Yes to Life in Spite of Everything: A Psychologist Experiences the Concentration Camp)*. By the time of his death in 1997, he had published 30 books, lectured at 209 universities on five continents, and had been the recipient of 29 honorary doctorates from universities. He was a visiting professor at Harvard and Stanford.

Frankl's life is notable for remarkable restraint in the face of profound trauma. Not only did this allow him to reconcile his past and cope with trauma, but ultimately to flourish on a personal level.

However, he reached outwards, dedicating his life to promoting, investigating and understanding 'meaning'. Starting with his first text which explored survival of the Holocaust, he quoted, 'What man actually needs is not a tensionless state but rather the striving and struggling for some goal worthy of him. What he needs is not the discharge of tension at any cost, but the call of a potential meaning waiting to be fulfilled by him.' He claims that by finding personal meaning in his experience he was able to endure his predicament, thus displaying both his perseverance and determination. The book was translated into 24 languages and went on to sell over 12 million copies worldwide.

This research, in turn, helped others because it provokes people to incorporate his responses to trauma, his reshaping of experience, into their quotidian existence. His work encourages us to find potential meaning within our lives no matter how absurd, unjustified or challenging a situation we might be in. It moves outwards from the phrase, 'what is to give light must endure burning', a phrase which promotes confidence, allowing people to persevere with their problems, and to frame things within a universal struggle.

The ability to respond to life in a positive, or at the least accepting way, by finding 'meaning' in our actions, enables us to be empowered, to look forward with optimism to the future. Victor Frankl's optimism within horrific circumstances is a noble and reassuring goal.

Some might argue that optimism is a form of self-deception, unrealistic as a way of solving problems. However, Victor Frankl developed a theory of logotherapy which reshapes this view: an optimist is someone that acknowledges and accepts external reality even at its worst, saying 'Yes!' to life including its inherent problems. Optimism as a tenet of quotidian existence has many practical uses. For example, it is often a valued quality for a job; employers search for employees who are not only equipped with practical skills, experience and knowledge but also for an enthusiastic attitude within the workplace and for the organisation's future. Optimism is considered a valued attribute. It counteracts cynicism and is a force for good. It is not unrealistic to find hope in the darkness.

Logotherapy is based on the idea that we are motivated by finding 'meaning' in the face of life's many challenges. Known also as the 'Third Viennese School of Psychology,' it is used as a treatment for a variety of mental health disorders including substance abuse, post-traumatic stress, depression and anxiety. It is a palliative that helps a patient find their purpose via hope and 'logos'; the Greek word for meaning.

An important element of logotherapy is responsibility, which is viewed as the 'essence of existence', and the most important aspect of education. It provides the mechanisms to make decisions. This ability to make decisions is important as it enables us to take responsibility and therefore to fulfil our potential: 'the world is in a bad state, but everything will become still worse unless each of us does his best'.

Another important aspect of logotherapy that Victor Frankl foregrounds is the capacity to choose how to respond to a situation: 'everything can be taken from a man except one thing: to choose one's attitude in any given set of circumstances'. Although we are all victims of circumstances that we cannot change, we are still free to choose our response and attitude towards to these circumstances. For instance, during his time in concentration camps, he observed that 'some of our comrades behave like swine while others behaved like saints. Man has both potentialities within himself... After all, man is the being who has invented the gas chambers of Auschwitz; however, he is also that being who has entered those gas chambers upright, with the Lord's Prayer or the Shema Yisrael on his lips.'

'What man actually needs is not a tensionless state but rather the striving and struggling for some goal worthy of him.'

This quote shows our individuality in the variety of our responses. It shows our potential for both good and potential for evil, we choose which path we take, such is the strength of our self-determination.

Viktor Frankl concludes that we 'could make a victory of these experiences, turning life into an inner triumph, or one could ignore the challenge and simply vegetate, as did a majority of the prisoners'. His studies suggest that people with purpose and meaning survived longer than those who decided to live in the past, becoming dead to the present, or who lived in a state of pessimism. These reflections show that 'between stimulus and response, there is a space. In that space is our power to choose our response. In our response lies our growth and our freedom.' There is an umbilical link between the choices we make and our potential.

Frankl's optimism and his focus on logotherapy is not without criticism. Lawrence L. Langer, a Holocaust historian, strongly disagreed with Frankl, and the narrative of his book, *A Man's Search for Meaning*. He viewed it as an inhuman approach and an insult towards the Holocaust victims. Langer took issue with what he saw as an underlying assumption: survival was predicated on a positive mindset; therefore, those who died had 'given up'. In reality, death in a concentration camp isn't 'voluntary' or avoidable. However, Langer is perhaps reducing the argument to empirical facts. Another critic of his work was Rollo May, an existential psychiatrist who argued in 1961 that logotherapy was equivalent to authoritarianism.



Despite this opposition towards his work, Viktor Frankl demonstrated resilience, continuing with his work, finding an outlet for his expression and view of trauma and recovery and helping many to live happy and fulfilling lives, often in the face of significant challenges.

Ultimately, Victor Frankl's triumph in adversity inspires us to prevail over our misfortunes, encouraging us to accept the circumstances that we cannot change, but also our freedom to respond to them. His work, including logotherapy, proves an invaluable resource to those suffering and in need of reassurance, simply through the potential for a genuine and meaningful life. He demonstrated virtuous personal qualities; despite the harrowing events he experienced, he believed in optimism as a force for good. This message is hard to argue against. **T**

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M

MUSIC, MEMORY AND MOTOR CONTROL

JOANNA DOLIWA INVESTIGATES THE BENEFITS OF MUSICAL TRAINING ON COGNITIVE FUNCTION

JOANNA DOLIWA

One of the primary goals of cognitive neuroscience is to understand interactions between development and experience and link it to structural brain changes (Penhune 2011, p.1). The brain is shaped by experience, one of which is instrumental music training. One question is whether training in early childhood induces cognitive functions and brain structural measures, with reference to motor skills and memory. Instrumental music training is a useful model for examining such interactions as it engages cognitive functions and is typically initiated at a young age (Hyde et. Al. 2009, p. 1).

According to Herholz and Zatorre (2012, p.1), music requires fine-grained perception and motor control. Therefore, we expect structural changes in motor brain areas as well as induced motor abilities (dexterity) as an outcome of practice.

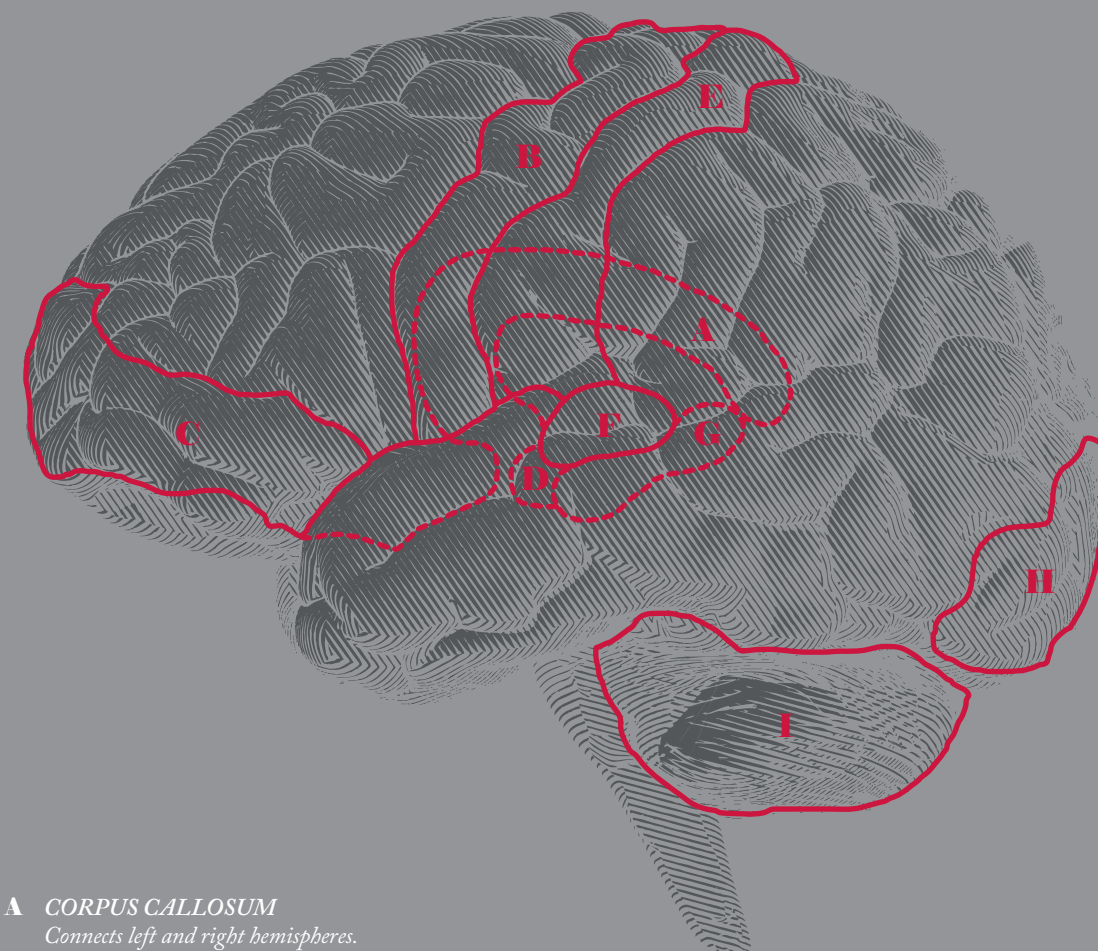
Effects are evident within M1 (primary motor cortex) and premotor cortices, involved in representation and storage of specific motor sequences. They also appear in the cerebellum.

The motor brain areas that differ between musicians and non-musicians, apart from the structural changes mentioned above, are primary sensorimotor cortex and closely related premotor and supplementary motor regions. These structures are essential for preparation, execution, and control of precise, independent finger movements. Moreover, brain deformations have also been found in the corpus callosum, likely related to the interactions between two hemispheres necessary for independent movements of left and right hand.

Hyde et al. (2009) examined the brain and behavioural changes in not previously musically trained

children receiving weekly half-hour keyboard lessons. The instrumental group significantly outperformed the matched control group. The difference also approached significance for the left hand. Instrumental children showed greater grey matter density in motor areas. These included right precentral gyrus – a motor hand area in the brain and corpus callosum likely related to the interactions between two hemispheres necessary for independent movements of left and right hand (Schlaug et al., 1997b) as well as brain regions involved in auditory processing.

Similarly, Schlaug et al. (2005) found significant differences in behavioural tests in fine motor skills directly linked to instrumental music training in the instrumental group compared to the control group. Significant behavioural motor skills development was noticed after a year.



- A CORPUS CALLOSUM**
Connects left and right hemispheres.
- B MOTOR CORTEX**
Movement, foot tapping, dancing and playing an instrument.
- C PREFRONTAL CORTEX**
Creation of expectations, violation and satisfaction of expectations.
- D AMYGDALA**
Emotional reactions to music.
- E SENSORY CORTEX**
Tactile feedback from playing music and dancing to music.
- F AUDITORY CORTEX**
The first stages of listening to sounds. The perception and analysis of tones.
- G HIPPOCAMPUS**
Memory for music, musical experiences and contexts.
- H VISUAL CORTEX**
Reading music, looking at a performer's or one's own movements.
- I CEREBELLUM**
Movement such as foot tapping, dancing and playing an instrument. Emotional reactions to music.

These included right precentral gyrus – a motor hand area in the brain and corpus callosum likely related to the interactions between two hemispheres necessary for independent movements of left and right hand (Schlaug et al., 1997b) as well as brain regions involved in auditory processing.

Similarly, Schlaug et al. (2005) found significant differences in behavioural tests in fine motor skills directly linked to instrumental music training in the instrumental group compared to the control group. Significant behavioural motor skills development was noticed after a year.

No significant changes in corpus callosum size arose at that point. However, research involving older children (9–11 years) with four years of music training (Schlaug et al., 2005) revealed increases in grey matter volume in the corpus callosum.

Highly skilled instrumentalists like Yo-Yo Ma, Maxim Vengerov, and Krystian Zimerman started their musical training before the age of seven years. This implies a sensitive period where musical training has greater effects on brain and behaviour changes, particularly on plasticity in motor cortices (Steele et al., 2013 p. 1). Most of the studies agree on a 'sensitive period', but not a critical one. Developmental plasticity can be enhanced in adolescence. Musicians who start playing an instrument in early childhood show greater plasticity in motor and auditory brain regions than those who start their training later (Elbert et al., 1995). Furthermore, the size of brain areas is shown to be related to the start of musical training.

For example, Schlaug showed that anterior corpus callosum size between musicians and non-musicians was the greatest for those who began their training before the age of seven. Recent studies have concluded that early training has its greatest effects on neural structures involved in sensorimotor integration and timing. Steele found out that early musical training has a differential impact on white matter structure and sensorimotor synchronisation performance, providing evidence for a sensitive period where experience produces long-lasting changes.

Important but not critical

Sacks (2007, p. 96) notes that, unlike with language, not receiving musical experience during age six or seven does not predict a music-less future, giving an example of his friend, who went on to study music as his major at university, but did not have much contact with music until the age of 14. Hence, taking instrumental music lessons in early childhood influences motor skills and related brain structures especially those involved in sensorimotor integration and timing but the changes can be also observed later in life although they are not as extensive.

Memory division

Apart from having remarkable motor skills, playing a musical instrument also requires memorisation of complex auditory passages. Therefore, we may hypothesise that instrumental training induces some types of memory, especially the auditory working memory which is closely linked to the nature of the practice.

Rodrigues did not find any evidence for enhanced visual memory ability in musicians compared to non-musicians. However, others found long-term musical training to be related with improvements in visual working memory on both behavioural and brain electrical activity measures. Such discrepancies may come from mistaking visual working memory with visual attention, which seems to be affected by musical training over time (Roden et al., 2014 in Benz et al., 2016, p.3) and is improved in musicians compared to non-musicians.

Tierney, Bergeson-Dana, and Pisoni (2008) tested early-trained musicians as well as frequent video game players, psychology students and early-trained gymnasts on sequence reproduction tasks which required the participants to reproduce the sequence of coloured lights. No significant differences were observed between the groups, concluding that musical experience had no effect on visuo-spatial working memory. Research suggests musically trained children and young adults have similar visual learning abilities and visual retention ability as their non-trained peers.

Working auditory memory

Instrumental music practice often requires the ability to memorise hours of auditory material, and well-trained auditory-motor precision. Therefore, we may hypothesise that working auditory memory capacity is influenced by musical training. Musicians showed better performance in working memory for musical sounds than non-musicians.

Furthermore, Tierney, found that skilled musicians (piano majors) display a greater selective capacity for reproducing randomised auditory sequences than non-musicians. Intriguingly, working auditory memory has also been shown to improve in congenitally deaf children due to early musical training. Rochette, Moussard, and Bigand (2014, p. 6) claim that although there might be other factors that contributed to the results of their experiment, music lessons were one of the main factors explaining children's performance for the [...] auditory working memory task.

Working verbal memory

One of the studies investigating the effect of instrumental training on verbal memory reported that musically trained groups of male elementary and high school students learned approximately 20% more words from a previously presented word list across three trials than their not musically trained peers (Ho, Cheung, and Chan, 2003). Both adults and children with music training demonstrate better verbal memory than their counterparts without such experience. This conclusion is further supported by brain structural data as musicians tend to have an enlarged left planum temporale compared to non-musicians (Schlaug et al., 1995 in Ho, Cheung and Chan, 2003, p.1) – a structure that primarily mediates verbal memory.

Long-term memory

Groussard noted that musicians exhibited both greater activity and grey matter density in the left hippocampus – a structure known to be related to long-term memory. The author suggests that musical practice links more to semantic memory than episodic memory.

The hours needed

According to one theory, the amount of training that would make an individual a master in playing an instrument is 10,000 hours (Levitin, 2008, p. 197). In a longitudinal study including young children (Hyde et. al, 2009), cognitive and brain structural changes were recorded after 15 months of instrumental music training. This regional structural brain plasticity occurred with only a year and three months of such training in early childhood and, as concluded by the authors, was due to this training, proves that significant brain changes are present after as little as this amount of time. Pascual Leone (2003 in Sacks 2007 pp. 94–95) demonstrated that the motor cortex can show observable changes within minutes of practising five-finger piano exercises.

Musicians tend to practice long hours until they are able to perfectly play long instrumental concertos with a huge amount of cadenzas and complex passages. Evidence suggests that training leads to significant changes in brain patterns.

Age vs amount

The greatest benefits occur when both of these factors are present – when the training is extensive and started young. Steele provided evidence that early musical training has a differential impact on white matter structure and sensorimotor synchronisation performance. Late-trained musicians did not differ from non-musicians on white plasticity measures in the corpus callosum even though receiving the same amount of training as the early-trained group. Research has been done on the longevity of the benefits in the auditory domain. White-Schwoch et al discovered that older adults who experienced early musical training but had not played an instrument for decades showed faster neural timing in speech. In short, effects of early musical training were shown to persist.

External factors

One consideration is that other factors may be behind the results. For example, children genetically advantaged in executive control functions may be more driven to music and therefore these starting musical training may undergo a process of self-selection (Benz et al., 2016). Children coming from families of lower socioeconomic status might have limited access to music teachers and less family support. These factors may discourage and result in poorer performance and brain plasticity measures.

Conclusion

Instrumental music training is a cognitive task underlying behavioural and structural changes in motor skills, working, semantic and episodic memory. It has its greatest impact when started at a young age. However, structural and behavioural changes continue into adulthood, improving verbal and auditory memory. Some effects are long-lasting, even when training has ceased.

Following the conclusion driven by Benz et al. (2016, p.4), musical engagement experience may be an inexpensive, efficient way of promoting cognitive enhancement even for all people. In short, instrumental music lessons improve motor skills and memory. **T**

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‘Conscious also of love and the joy of things and the power of going beyond and above the limits of the lagging hour’

Louis MacNeice

I have had the pleasure to edit this collection of outstanding work. It is a task more challenging than it appears, not because the work requires the heavy hand of editorial intervention, but because the quality within these pages makes me question my skills and academic capacity and rethink the relationship between teacher and pupil. The question that comes up again and again is could I have produced work of this standard, at that age (or even now)? The answer, at best, is maybe, and I would have it no other way.

Each article is a triumph of intellectual curiosity, thought and reflection and a demonstration of our Benedictine values written on a palimpsest of academic endeavour. Our values of humility, stewardship and community are woven in words to create a compelling picture of academic life at Downside. It is a collection of tiny ceramic tiles, each one a thing of compressed and precise beauty. Taken together they form an intricate mosaic of enquiry and wonder.

I wonder what topics and ideas we will explore in next year’s edition, how we might begin to capture the stimulating intellectual spirit which permeates our classrooms and corridors. I look forward to the process of collation, of feeling insecure again in the face of marvellous contributions, sensing the ‘ambiguous dividing line between who is teaching and who is learning’, and in sharing once more the joy of writing and philosophical thought.

I would like to thank the contributors, Ice House Design, Robert Fletcher and Beck Ward Murphy for their hard work and optimism throughout the process of publication. **T**

Paul Jones – Editor



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