THE IB TIMES

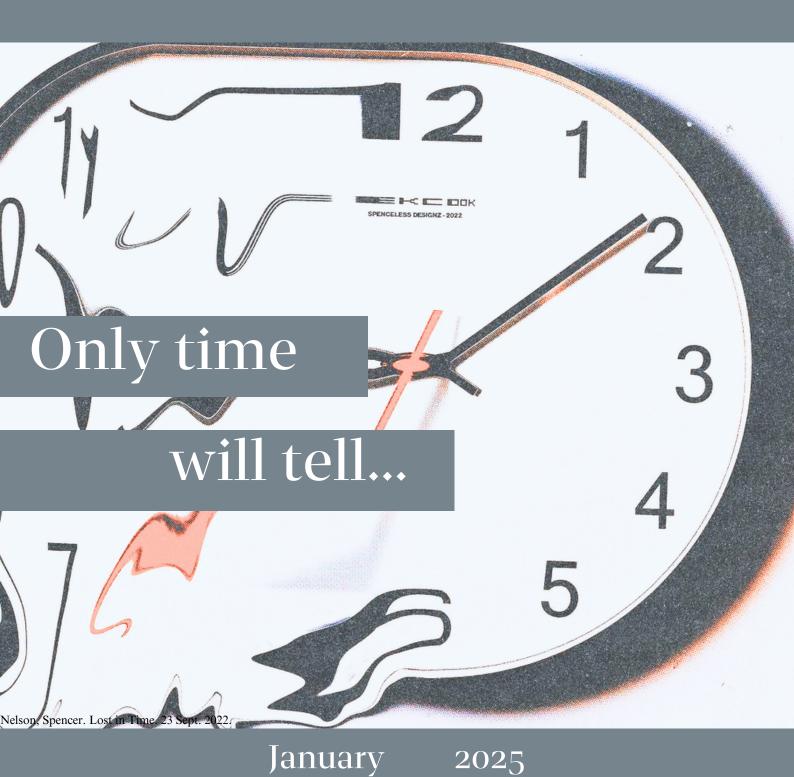


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Back and forward in time. Time Travel in Fiction

Author: Asya Chub

From the early days of the science fiction genre, the ability to manipulate time has been an occurring theme. From H.G. Wells' The Time Machine to Christopher Nolan's Interstellar, the audience could witness characters defining the definition of the present moment. How did this intriguing trope come to be?

The mythological origins of time travel

It might be surprising, but time travel is not a recently created concept, as it has been present as early as in ancient myths. Ancient Greek myths describe two personifications of time, Chronos and Kairos, as quantitative and qualitative natures of time.

The less abstract concepts are found in one Hindu epic, the Mahabharata, which describes the journey of King Kakudmi in search of a perfect partner for his daughter. In his and his daughter's search, they meet the creator god, Brahma, who, to their surprise, tells them that while they were searching, hundreds of years have passed on Earth.



Balarama with His Consort Revati. Opaque watercolor, gold, and Silver on Paper, 19AD. Gift of Jane Greenough Green in Memory of Edward Pelton Green.



Heikichi, Matsuki. Princess and Urashima Tarō Arrive at Hōrai Island. 1899,

The Japanese legend of Urashima Tarō tells the story of a fisherman who travelled to the sea kingdom after saving a disguised sea princess. As it turns out, for the three days he spent in the magical realm, it turned out to be three hundred years in his village.

Similarly, the mythical realm that precedes the passage of time is mentioned in an Irish legend of Niamh and Oisín. The mighty warrior, Oisín, falls in love with the princess, Niamh, from the Land of Eternal Youth, and spends three years there, while three hundred years pass in his homeland.



Elvery, Beatrice. Niamh of the Red-Gold Hair, Illustration to a Collection of Tales from

Modern literature

The 18th century brings a few literary works featuring characters being transported into the future, such as Samuel Madden's Memoirs of the Twentieth Century, Louis-Sébastien Mercier's Memoirs of the Year Two Thousand Five Hundred, and Johan Herman Wessel's Anno 7603. All the works use some type of magical time travel.

Later, with the evolution of the science fiction genre started by Mary Shelly's Frankenstein, 19th-century prose often explores the past as well as the future.

Hans Christian Andersen's The Galoshes of Fortune depicts one of the characters travelling to 15th-century Copenhagen and back by wearing the magical boots.



Mark Twain's A Connecticut Yankee in King Arthur's Court transports the main character to 528 A.D. Elizabeth Burgoyne Corbett describes the year 2472 society in which the main character finds herself in New Amazonia: A Foretaste of the Future.



Stratton, Helen. "Illustration to 'the Goloshes of Happiness' in a Collection of Anderson's Fairy Tales." The Fairy Tales of Hans Christian Andersen, Philadelphia Lippincott., 1899. Accessed 22 Jan. 2025.

Perhaps one of the most popular depictions of time travel by technical means appears in The Time Machine by H. G. Wells, in which a character called Time Traveller invents the titular time machine and travels to the year "Eight Hundred and Two Thousand Seven Hundred and One A.D."

From the 20th century and up to the present, the concept of time travel inspired the plots for a vast range of authors, from H.P. Lovecraft to Terry Pratchett.

Film, TV Shows, and Games

The film industry has undeniably popularised the sci-fi genre, with time travel being a recurring theme. The first film featuring time travel is a 1921 adaptation of Mark Twain's novel directed by Emmet J. Flynn. Some of the most well-known films include Planet of the Apes, the Back to the Future film series, The Terminator, Groundhog Day, Interstellar, and many more.



arl Formes and Harry Myers in a Connecticut Yankee in King Arthur's Court (1921). 1921, www.imdb.com/title/tt0012067/mediaviewer/rm2173422848/?

ref =ext shr lnk. Accessed 21 Jan. 2025.



Struzan, Drew. Back to the Future. 1985



The Library of Congress. "B.B.C. Dr. Who Lost in Time & Space." Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA, Photograph Print, 2010. Accessed 22 Jan. 2025.

As for television, it is necessary to mention Doctor Who, a series starting in 1963 and continuing to this day, featuring an alien, The Doctor, travelling through space and time in a blue police box. The sci-fi show Star Trek also has a lot of episodes dedicated to time travel.

Both western and eastern animation touch the subject of time travel, for example, the American TV show Futurama, created by Matt Groening, or Link Click, a Chinese web series directed by Li Haoling or Japanese animated series Puella Magi Madoka Magica written by creative team Magica Quartet.



Shaft Animation Studio. The Blu-Ray Cover Art of Puella Magi Madoka Magica. Accessed 22 Jan. 2025.

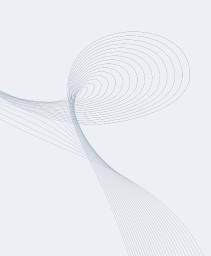
The first game to centre on time travel was Chrono Trigger, published by Square. Created later, Nintendo's Legend of Zelda game series revolves around the player going back in time to defeat the main villain. One of Sega's Sonic the Hedgehog game series, Sonic '06, features characters Blaze the Cat and Silver the Hedgehog, who travel between the past and the future together with the main characters.



SonicTheHedgehogBG. Sonic the Hedgehog HD Wallpaper: Blaze, Shadow, and Silver Unite. 2014, wall.alphacoders.com/big.php?i=416514. Accessed 22 Jan 2025

The purpose of time travel

Time travel is a convenient plot device that helps authors shape the world of their story. The possibilities of time travel plots are endless and can exist not only as a background for the story but also shape the story itself. Often, the futuristic or historical setting is chosen to create some form of social commentary that is simple for the audience to interpret, as they relate to the character that finds themselves in the new society. It also explores the themes of the consequences of personal decisions and allows us to imagine the countless what-ifs. From the early time travel stories, portray the passage of time, the universal human experience.



Futurism in art... What's the point of stillness? Author: Maja Witkowska

"There is no more beauty except in struggle. No master-piece without the stamp of aggressiveness. Poetry should be a violent assault against unknown forces to summon them to lie down at the feet of man"

- Manifesto of futurism, art.7, 1909, Filippo Tommaso Marinetti

Speed, movement, war... no women and museums? Many when introduced to the word futurism expect something related to advanced technology and space progression so vast one could not comprehend the basis. They would more or less be correct – to be precise, futurism is an artistic movement originating from 20th century Italy, that focuses on dynamism, vitality, speed, power of machines and restlessness. It means that everything futuristic would be shown during motion, no statues should be interpreted as being still, no paintings shown as serene and every happening to portray chaos, noise and violence.

Where it all started...

It's 20th February 1909 and the parisian newspaper Le Figaro publishes a manifesto by the Italian poet Filippo Tommaso Marinetti. It focused on glorifying war, chaos, industry, machinery and the process, belittling tradition and old institutions to the social uproar. It showed in a very aggressive way how Marinetti sees the future in new technologies, violence, space and motion. Shortly he began earning support from artists like Umberto Boccioni or Gino Severini, later spreading his agenda abroad (mostly Europe and Russia where the beginnings of Art Deco began shortly after).

Here are the main concepts of the manifesto, with most important parts in bold:

- We intend to glorify the love of danger, the custom of energy, the strength of daring.
- The essential elements of our poetry will be courage, audacity, and revolt.
- Literature having up to now glorified has exalted a pensive immobility, ecstasy, and sleep. We intend to exalt aggressive action, feverish insomnia, the racer's stride, the mortal leap, the punch, and the slap.
- We declare that the splendour of the world has been enriched with a new form of beauty, **the beauty of speed**. A race-automobile adorned with great pipes like serpents with explosive breath... **a race-automobile which seems to rush over exploding power is more beautiful than the Victory of Samothrace**. (Victory of Samothrace is a statue of the glorified goddess, pure and angelic is the symbol of victory and prosperity)



Victory of Samothrace.190 B.C. Paris, France.

- There is no more beauty except in struggle. No master-piece without the stamp of aggressiveness. Poetry should be a violent assault against unknown forces to summon them to lie down at the feet of man.
- We are on the extreme promontory of ages! Why look back since we must break down the mysterious doors of Impossibility? Time and Space died yesterday. We already live in the Absolute for we have already created the omnipresent eternal speed.
- 9. We will **glorify war the only true hygiene of the world** militarism, patriotism, the destructive gesture of anarchists, the beautiful Ideas which kill, and the scorn of women.
- 10. We will **destroy museums**, libraries and **fight against moralism**, **feminism** and all utilitarian cowardice. The horizon; large breasted locomotives bridled with long tubes, and the slippery flight of aeroplanes whose propeller has flag-like fluttering and applauses of enthusiastic crowds."

(Manifesto of futurism, 1909, Filippo Tommaso Marinetti)

Painting and sculpture

Dynamism of a Dog on a Leach, 1912, Giacomo Balla

This painting shows a close up on a woman's legs and her Dachshund walking down a city sidewalk made by combining all the motion during some span of time. This artwork was created upon a shot from a chronophotographic gun that allows one to compress a couple of photos/moments into one. Main concept of futurism was to show this one motion onto canvas. The movement is clearly portrayed in the legs, tail, ears of the dog, the leash and woman's legs. The use of different opacity, stacking, repetition and painting the same part under different angles allows us to imagine that the dog is trotting.



Dynamism of a Dog on a Leach, 1912, Giacomo Balla

The parabolic curves of the leash show how dynamic those moments combined into one are and we can clearly interpret that the idea is to express speed and chaos. The woman's legs that reach far behind and in front of her show the process of developing power to move. Contrasting lines in the background under a weak angle show that the road is travelled so quickly that the human eye cannot comprehend the speed.

Tom Lobbock wrote an amazing summary of this piece:

"Even without these multiplication and motion effects... would be doing something that's novel. There aren't many previous paintings that present us with such an abrupt close-up. Balla takes the kind of subject that Impressionism had specialised in...but he picks out only a single detail, an almost randomly chosen clip, and makes it the focus of the whole picture...a trivial subject is made into the main event".

Unique Forms of Continuity in Space, 1913, Umberto Boccioni



Unique Forms of Continuity in Space, 1913, Umberto Boccioni

This is honestly one of my favourite sculptures. It perfectly portrays how human muscles behave during motion. The figure powerfully walks forward, its form deformed by the high speed its travelling in, the material, plaster, adds to its forceful and heavy demeanor making the observer overwhelmed. Its helmet-like head alludes to war-hungry futurists, lack of arms or rather the presence of similar to flame "wings" ripping out of its back show restlessness, change and constant, powerful movement.

Some, like the art critic Barry Schwabsky, say that the form we see isn't a combination of human movements but the wind that the form moves through, it's made of forces that, like fluid, wrap around the form and create a mysterious and fatiguing feeling (the bronze sculpture was made after the artist's death but also well portrays the heaviness of resistive forces acting upon the figure). Boccioni personally notes: "these days I am obsessed by sculpture! I believe I have glimpsed a complete renovation of that mummified art". He creates this piece to show his anti- past views that show how traditionalism and culture should change, best disappear.

Architecture

Città Nuova (New City), 1914, Antonio Sant'Elia

While it is a drawing, I decided to label it as architecture as it conveys the sheer concepts of futuristic architecture.

This image shows how Sant'Elia shows his idea of a perfect futuristic city. It is ever so dynamic, with technology on every step, elevators reaching clouds, modern and optimized space planning. There are trains and underground means of transport (our depiction of metros) that enter the complex with unimaginable speed. There are multiple vertical and diagonal lines that Antonio names as "dynamic by their very nature".



Città Nuova (New City), 1914, Antonio Sant'Elia

This modern and futuristic project was unfortunately for many not completed as World War I broke out and like his fellow futurists, Sant'Elia decided to enroll into the Italian army where he died proudly fulfilling the futuristic idea of dying from the hands of chaos and war.

Some actual buildings expressing futuristic and modernistic values...



Lingotto factory in Turin, 1923



Villa Figini by Luigi Figini in Milano, 1935.



Gehry, Frank. Walt Disney Concert Hall. Los Angeles, USA.

As we all know, New Year is a time of change. Everyone is making their New Year's resolutions, setting goals, and trying to change something. Along with the start of the New Year, every fashion freak starts to wonder what will be in trends this year and what new events we should start looking forward to. Here, I'm introducing all the most important information from the fashion world.

First of all, let's talk about trends. The main trend this year will be BOHO STYLE. And from classic elegance boho to very girly one to finish with very popular lately (thanks to Kate Moss's VS FASHION SHOW performance to the song I Love Rock 'n Roll by Joan Jetta) boho rock style. This trend is predicted to stay with us for long and is already visible on the runways of many fashion houses like Isabel Marant, Alexander McQueen and even Chloe. Boho style will dominate Pinterest and will be seen more on the streets.

Boho style will dominate Pinterest and will be seen more on the streets.

So what colours of boho will be on this year? Mocha Mousse was named the color od 2025. Since autumn was a season of strong and dark colours, 2025 will be dominated by light, girly colours like pink and beige. And spring 2025 will be actually the season of pink, especially baby pink.

But what about clothes and shoes? This year we will be wearing lace. Any tops, dresses, skirts or even thighs will be a very hot trend this year. "Balloon skirts" will be replaced with long, massive, netting skirts.

When it comes to accessories, still on will be trendy for some time now vintage city bags inspired by balenciaga and miu miu models. Also when it comes to bags and their size we will be seeing lots of big bags, because "The bigger bag the better". Belts are also going to be in, just to make your look more interesting. In 2025, a boho outfit with a chunky belt will be fire. Also, we will be wearing big chunky jewellery, and big bracelets will be on.

2024 was definitely a cheetah-print year but this year it will slowly disappear deemed as a "microtrend", but slowly we will start to see more and more of the deer print. Continuing the topic of different prints and textures, sequins, fringes and studs everywhere will also be very trendy. By that I mean having them basically everywhere: on bags, shoes, tops etc. The more textures and prints we will match in one outfit the better it will look.

Let's talk about shoes now. Huge comeback will have wedge sneakers especially those inspired by Isabella Marant shoes. They will look good in casual stylisations but also in more elegant, girly ones.

2025 will definitely be the year of experiments and maximalism in fashion. It will give us a lot of space to show out true self.

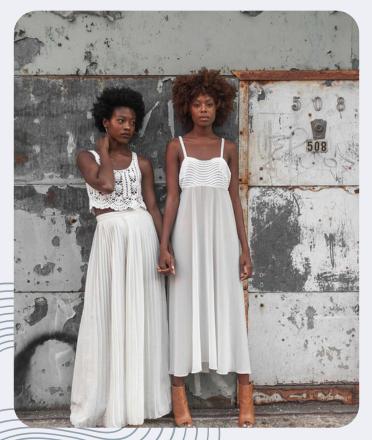
But what events will take place in 2025?

As always there will be 4 fashion weeks: in Paris, in NYC, in Milan and in London. Of course, everyone is looking forward to the Met Gala, which will take place on 5th May 2025 at the Metropolitan Museum of Art in New York. The theme of this year's Met is "The Style of Black Men". We are eagerly waiting to see all of the stylings. This year will be especially significant for Met and Anna Wintour because the gala will be celebrating its 30th birthday. We are really interested in all the surprises Anna will prepare for us.

After the comeback of the Victoria's Secret Fashion Show last year, obviously, we want to see it this year as well, We'll be really pleased to see all of our favourite models back in one place again, wearing these amazing costumes and wings of course!

Its going to be the 30th anniversary of the Gucci brand renaissance this year and one of the debut runways of the $\sqrt{\text{er}/y}$ famous designer Tom Ford. His autumn/winter 1995 collection was quite unique. The first outfit (a green shipt unbuttoned up to the belly button) inspired Madonna to wear a turquoise version of it at the MTV Music Video Awards in 1995.

To sum up, I think 2025 will be a really interesting year full of fun and joy that fashion and all the events connected. with will bring us.



Nappy.co. "Women in Bohemian Clothing," Https://Www.nappy.co/, 2017. Accessed 26 Jan. 2025.



Balenciaga. "Balenciaga Leather Le City Medium Bag." Ft.com, 2025,



 $\label{lem:pantone} Pantone. \quad \text{``Mocha Mousse Outfits.''} \quad Pantone, \quad 2025, \quad www.pantone.com/color-of-the-year/2025?srsltid=AfmBOorbeQ-qfJx26mYE2pfNX6z83P5_Fc-45sxSeI35xpZLXPL6aT8U. Accessed 26 Jan. 2025.$

Cultural trends: Will today's fads become tomorrow's classics? Author Nadia Michalik

In a society driven by rapid technological advancements and ever-shifting tastes, cultural trends emerge and fade at an astonishing rate. Each generation experiences the rise of cultural phenomena that shape its identity. From fashion to music and social media, what captivates society today may either vanish without a trace or become a defining characteristic of future generations. What, then, determines whether a trend evolves into a timeless classic or merely a fleeting fad? Let us explore some of the prevailing cultural trends of our time and consider their potential for lasting impact.

Fashion: Y2K Revival - Nostalgia or a New Classic?

Fashion is well-known for its cyclical nature, with past styles reappearing in modern interpretations. One of the most notable trends making a significant comeback is the Y2K aesthetic. This style is defined by shiny fabrics, low-rise jeans, crop tops, velour tracksuits, and futuristic accessories that harken back to the early 2000s. Influencers, celebrities, and even high-end designers have wholeheartedly embraced this trend, solidifying its place in Gen Z wardrobes. Iconic figures such as Britney Spears, Paris Hilton, and memorable characters from Mean Girls serve as lasting inspirations for this revival.

Music: The Resurgence of Retro Sounds and Vinyl

The music industry has also embraced nostalgia. Synthwave and disco-inspired beats are topping charts, and vinyl records, once considered obsolete, have made a remarkable comeback, despite the dominance of streaming platforms. They are heavily influencing current pop music, with Meghan Trainor and Bruno Mars' pop hits, creating a fusion of old and new that resonates with listeners. From All About That Bass to Made You Look, Trainor takes us to rhythms straight from the 1950s. Mars' tracks like Just the Way You Are and Talking to the Moon feature comforting background harmonies that bring back a feeling of nostalgia.

Will it last?

The return of vinyl taps into the desire for tactile, authentic experiences in an increasingly digital world. Its superior sound quality and physical collectability ensure that vinyl will likely remain a niche favourite, but its resurgence as a mainstream trend may eventually diminish. More and more people go back to relics and choose physical media as a superior leisure. Retro-inspired music has staying power as long as artists continue innovating rather than merely copying past sounds. Iconic genres like jazz, blues, and rock evolved through reinvention, securing their place as classics. Analogue warmth with digital precision is what attracts people to old-school sounds, making them irreplaceable in the music industry.

Social Media: The Short-Form Video Revolution

Social media is one of the most dynamic areas of cultural evolution. TikTok has reshaped the way society consumes content, with short-form videos dominating the landscape. Other platforms, such as Instagram and YouTube, have followed suit by introducing reels and shorts, respectively. The short-video format fosters creativity, accessibility, and instant virality.

Will it last?

Bite-sized content aligns perfectly with the shrinking attention span among people and the demand for quick entertainment. While the format is likely to stay, individual platforms may not endure. The staying power of short and engaging videos depends on the platform's ability to innovate, maintain user engagement, and avoid regulatory challenges. The majority of content on the internet is based on Artificial Intelligence with its rapid development. Algenerated music and art are transforming creative industries, posing questions about originality and authenticity.

What Makes a Classic?

While no formula guarantees a trend's future success, there are certain factors that increase its chances of becoming a classic. For instance, trends that capture the spirit of an era or reflect significant social movements often endure. Think of how the peace and love imagery of the 1960s became iconic. Another crucial aspect is adaptability of a trend. Longevity requires evolution. Trends that can be reinterpreted across different generations, like denim or vinyl records, have greater staying power. Classics evoke strong emotions or memories. Music that brings nostalgia or fashion that reflects personal identity often stands the test of time.

Predicting the future of cultural trends is an art rather than a science, but certain patterns and principles can guide our understanding. Today's fads may seem temporary, but with the right combination of innovation, relevance, and adaptability, they could become the next great cultural classics. Whether it's fashion, music, or social media, only time will reveal which trends will define the future - and which will be forgotten. In the meantime, the best way to engage with trends is to embrace the excitement of the present while keeping an eye on the evolving tides of culture.



Fey, Tina, editor. "Mean Girls." Refinery29.com, directed by Mark Waters, Paramount Pictures, 2025, www.refinery29.com/images/10086927.jpg? format=jpg&width=680&height=680&quality=80. Accessed 26 Jan. 2025.



How to 'have time'? What is stopping you from being well organised and how to fight the feeling of time slipping through your fingers?

Author: Karolina Niewiadomska

Have you ever been put in a situation in which it seemed like no matter what you would do, you would not be able to do it overly in the manner of your own satisfaction? Or even that you would not be able to do it completely, since you have run out of time somehow? I bet that you have and that, in fact, it happened much more than a lot of times. And the unfortunate truth would be, that you have been put in such a situation by no one, but by yourself.

There is no need to be an expert to see that the day slowly has become too short to function for, not only the teenagers but also for the adults. Hearing about people's plans is slowly becoming hearing about people's goals, since realizing plans is now commonly considered a challenge in order to not have enough time.



Hough, Suzanne . Pen Art, pin.it/TuB5IpBIB. Accessed 26 Jan. 2025

Thus, there is a question: how to actually, have time'?



"An Unususal Clock." Pinimg.com, 2025, i.pinimg.com/736x/26/1f/20/261f204c22c376d51e8ece1454e33 95b.ipg. Accessed 26 Jan. 2025.

Step one: Find the thieves of time, hidden in your routine.

Having time is an ability. An ability which one can gain. The first step of the journey of gaining it, is a recognition of what is confining you. So before you focus on an actual elimination of your bad habits, find them. Whether it's spending too much time on social media, or too much time rotting in bed after your alarm clock has rang, the key step is to know what you are willing to fight. Missing that step could be tantamount to later eliminating something that we, indeed, need or should have in our routine.

Step two: Before you eliminate, reduce.

There are cases in which elimination of our bad habits or the thieves of time is not really an option, even though we would love it to be. To illustrate, not having that Instagram account sounds like a lovely option. But on the other hand you have your algorithm showing you a mass of videos of people cooking, that you have started treating as your constant source of inspiration. Through the months, or even years that you have had your app downloaded you have grown to be addicted to those topics, in the sense of including them in your lifestyle on a daily basis. Eliminating them from your life would make your day seem like it is lacking. Therefore, reducing would be simply just a healthier option. It is really important to still keep that reduction in mind, though. Since scrolling, types of apps are the most addicting ones as well.

Step three: Beat procrastination.

Procrastination is what actually takes time away from you, forming an illusion of it in your head, when in fact it is the thing that makes moments slip through your fingers the most. Beating it is perhaps the hardest step of finding your time, but also a very healing process. For instance, when you have something planned or something that you need to do, your head immediately forbids you to do anything unrelated to it, that is time consuming and as a consequence you end up doing nothing at all. Procrastinating is anticipating the right moment to do what you promised yourself is going to be done. Not only does it steal your time, but it also makes your final work appear incomplete since you were most likely doing it under pressure. What are the strategies for overcoming procrastination? An american novelist, James Clear advises that the key is to hold yourself responsible for procrastinating ando also to design what you are willing to do vividly.



Salon, Kena. "Cozy Morning Breakfast." Pinimg.com, 2022, i.pinimg.com/736x/50/e9/3d/50e93d38b2622278e8fd29d728e6ee5 2.jpg. Accessed 26 Jan. 2025.

Step four: Create a routine and be consistent.

The reason for time seeming so elusive and hard to reach may also be lacking a routine. If every day you wake up at a different time with different things to do, unsure what to eat for breakfast or if you are ready for school, creating a routine should absolutely be a must-do for you. Routine is what helps you to feel in control. It is not about planning every step and every minute you will do after you wake up. It is about seeing the picture of your day in your own head, so that you know where the empty spaces, unfilled with time, are hidden. Setting a routine after finding the thieves of your time, reducing the bad habits (or fully eliminating them) from your life and also beating the procrastination, is going to be an effortless process which is absolutely worth the revolution it may cause in your life. While creating your plan it is good to include at least half an hour per day for the free study session, so for the general study of things that are not your obligation. It helps you build consistency while not having the feeling of duty so that your work is more productive. It can be thirty minutes right before your school or thirty minutes right after your school. It can be fifteen minutes in the morning and fifteen minutes in the afternoon. It is really helpful when working on assignments with long deadlines. Paying attention for thirty minutes each day is paying attention for almost four hours a week. During this period of time you can have your essay written, a project made and many more, so that then, when the deadline is up, you don't have to do it during a one, exhaustingly long study session.

Being a teenager is a short experience full of everything happening everywhere all at once, which may cause a strong feeling of overstimulation. With the time passing rapidly, being well organised and having your life in control is the key to fighting it. The steps will help you gain the ability of having time so that you can combine your school life with social life and not feel so lost in the haywire journey of life.

"The Silent Symphony: Riemann's Mysterious Zeta Function"

Author: Joanna Makowska

"The most beautiful thing we can experience is the mysterious.

It is the source of all true art and science."

— Albert Einstein

What is the hardest way to earn a million dollars? The answer lies in solving one of the Millennium Prize Problems. Proposed in the year 2000 by the Clay Mathematics Institute, these seven problems represent some of the most profound and challenging questions in mathematics. Among them stands the Riemann Hypothesis, a puzzle that has baffled the brightest minds for over a century. Despite countless attempts, it remains unsolved to this day, offering not only a \$1 million reward but also the chance to unravel the mysteries of prime numbers and the very fabric of mathematics itself.

What is the Zeta Function?

Since the time of Leonhard Euler, mathematicians have been fascinated by the relationship between the continuous world (real numbers, analytic functions) and the discrete world (natural numbers, prime numbers). It turns out that discrete objects, such as natural and prime numbers, can be described through infinite sums and products that unify these two seemingly different domains. The Riemann zeta function was one of the first functions of this kind to be studied extensively. Euler made groundbreaking discoveries about it, such as:

1. Proving that for s>1, the zeta function is convergent and can be defined as an infinite series:

$$\zeta(s) = \sum_{n=1}^{\infty} rac{1}{n^s} = rac{1}{1^s} + rac{1}{2^s} + rac{1}{3^s} + \cdots$$

"Riemann zeta function." Wikipedia, The Free Encyclopedia, https://en.wikipedia.org/wiki/Riemann_zeta_function. Accessed 6 Jan. 2025.

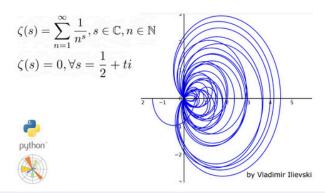
To understand why the series converges, note that the terms 1ns decrease rapidly for s>1. A series is convergent if its partial sums approach a specific value. Similarly the Euler product converges to a finite value for s>1.

2. Discovering its connection to prime numbers through the Euler product formula:

$$egin{aligned} \prod_{p \,\in\, \mathbb{P}} \left(rac{1}{1-rac{1}{p^s}}
ight) &= \prod_{p \,\in\, \mathbb{P}} \left(\sum_{k=0}^{\infty} rac{1}{p^{ks}}
ight) \ &= \sum_{n=1}^{\infty} rac{1}{n^s} = \zeta(s). \end{aligned}$$

Euler product." Wikipedia, The Free Encyclopedia, https://en.wikipedia.org/wiki/Euler_product. Accessed 6 Jan. 2025

Euler showed that the series and the product formula describe the same function—these representations are equivalent. This groundbreaking discovery revealed a deep connection between prime numbers (discrete) and mathematical analysis (continuous). Building on Euler's foundation, Bernhard Riemann, in the 19th century, wondered what would happen if the zeta function were allowed to take complex inputs s=a+bi. Like Euler, he observed that the series converges when Re(s)>1. However, by using tools from complex analysis, Riemann extended the definition of the zeta function to all complex numbers s (except s=1) through a method known as analytic continuation. In essence, analytic continuation is a powerful technique that extends the domain of a function beyond its original definition while preserving its fundamental properties. He also proved key properties of the zeta function, such as its symmetry, derived from the functional equation. This extension allowed Riemann to explore the zeta function in entirely new ways, leading to profound insights into its structure and connection to prime numbers.



"Riemann Zeta Function Explanation." iSquared Magazine, https://isquared.digital/assets/images/reiemann_zeta_explanation.png. Accessed 6 Jan. 2025.

The critical line: A Symphony of Zeros and Primes

The zeros of the Riemann zeta function are the points in the complex plane where the function evaluates to zero, $\zeta(s)=0$. The complex plane consists of all numbers of the form s=a+bi where a is a real part and b is the imaginary part. Zeros of this function can be divided into two categories: trivial zeros and non trivial zeros.

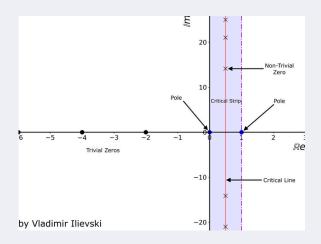
Trivial Zeros:

These occur at s=-2,-4,-6,... (negative even integers). They occur on the real axis in the negative direction.

Non-Trivial Zeros:

These are more mysterious and occur in the critical strip, where 0 < Re(s) < 1. Riemann proved there are infinitely many of these zeros.

This image illustrates the Riemann zeta function defined for complex numbers s. The key equation $\zeta(s)=0$ for s=0.5+bi highlights the non-trivial zeros, which lie on the critical line Re(s)=12 according to the Riemann Hypothesis. The plot shows contour lines representing the zeta function's behavior in the complex plane, with spirals corresponding to its oscillatory nature. Symmetry about the real axis.



"Riemann Zeta Function Explanation." iSquared Magazine, https://isquared.digital/assets/images/reiemann_zeta_explanation.pr Accessed 6 Jan 2025

The Riemann Hypothesis

The Riemann Hypothesis proposes:

All non-trivial zeros of the zeta function lie on the line Re(s)=12.

This conjecture is central to prime number theory, as it implies a precise distribution of prime numbers among natural numbers. The Riemann Hypothesis can be thought of as a symphony because it reveals the hidden harmony underlying the distribution of prime numbers. Each non-trivial zero of the Riemann zeta function contributes to this symphony like a unique note in a complex musical piece.

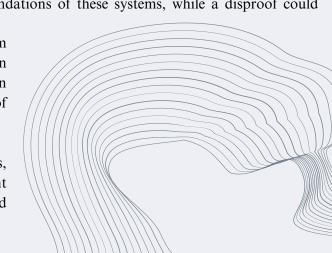
The Far-Reaching Impact of the Riemann Hypothesis

The Riemann Hypothesis has profound implications across multiple fields of science and technology due to its connection to the distribution of prime numbers and the properties of the Riemann zeta function. Many theories and algorithms in mathematics, computer science, and physics are built on the assumption that the Riemann Hypothesis is true, making its resolution critical for validating or revising these foundational ideas.

For example prime numbers are fundamental to encryption algorithms like RSA, which secure online communication, banking, and data transmission. The Riemann Hypothesis, by providing a precise understanding of prime number distribution, could lead to improvements in cryptographic systems or, conversely, reveal vulnerabilities in current methods. Understanding primes more deeply could also aid in developing new, more efficient encryption schemes. A confirmation of the hypothesis would solidify the mathematical foundations of these systems, while a disproof could necessitate a reevaluation of their security and reliability.

In physics, connections between the Riemann zeta function and random matrix theory are assumed in quantum mechanics, particularly in modeling chaotic quantum systems. These theories use the distribution of non-trivial zeros of the zeta function to explain the energy levels of quantum systems.

If the Riemann Hypothesis were disproven, many of these theories, results, and algorithms would require reevaluation or significant modification, which would ripple across mathematics, science, and technology.



"The calendar that teleports, a journey through time across civilizations."

Author: Laura Rogowska

Are there alternative worlds? Is it possible to move back in time? A new year has recently begun according to our calendar because we are in the year 2025. However, is this the case everywhere? The answer is: no. The culprit for this is the calendar, which allows us to go back in time or "move" to the future. For example, the Islamic calendar currently points to the year 1447. The Jewish calendar on the other hand, takes us into the future to the year 5785, as does the Chinese calendar, according to which we have the year 4722, or the Chalcedonian calendar, which points to the year 12026. We can also go back to the beginning of time or 13.8 billion years back, using the cosmic calendar. All of this is due to the differences in the ways different civilizations measure time however

which does not imply the existence of multidimensionality, but cultural and historical diversity.

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"April 1957." Pinterest, 2025, pl.pinterest.com/pin/85659879162711 0796/. Accessed 26 Jan. 2025.



"Babylonian Calendar." Pinterest, 2024, pl.pinterest.com/pin/42207179634618 9750/. Accessed 26 Jan. 2025.

To understand why there are different calendars, it is necessary to go back to the beginning of civilization. Early people measured time based on observations of naturephases of the moon, changes of seasons or astronomical phenomena. They used primitive methods such as drawing lines, making knots or arranging stones. Each civilization developed its own ways of timekeeping, resulting in different calendars. One of the first known calendars was the Babylonian calendar, which was created around 1790-1795 BC. The Babylonians created a system based on a 28 day month in which the day began in the evening. The Romans also played an important role in creating a system of measuring time. Their calendar initially consisted of 10 months and began in March which was the so-called Romulus year. Although this system differed from today's it became the basis for the Julian calendar, still used today in some Orthodox Churches. The Romans also influenced the naming of the months, which survives in many Germanic and Romance languages. The Mayan calendar is one of the oldest and most precise systems of timekeeping. It consists of 365 days divided into eighteen 20 day months and five additional days. Despite its antiquity, its accuracy is still aweinspiring. Today, the most widely used system is the Gregorian calendar, introduced in 1582 by Pope Gregory XIII. The reform was necessary to standardize the way time was counted and to make it compatible with the celebration of Christian holidays. It was a continuation of the work on the Julian calendar, with Luigi Lillo as the main initiator. The changes were introduced by the bull Inter gravissimas and the Gregorian calendar has been widely used eversince.

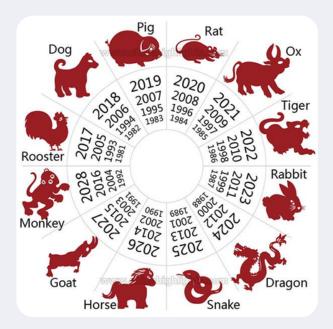
In Polish, the names of the months refer to natural phenomena and observations of cyclical changes in nature. For example, April refers to the blooming of flowers and February once meant "harsh, frosty." This is a testimony to the close connection of ancient communities with nature, which was the basis of their life and organization of time. The variety of calendars is due to different traditions, needs and ways of observing the world. The Gregorian calendar is based on the solar cycle, the Islamic calendar on the lunar cycle, and the Jewish calendar combines solar and lunar cycles. The Chinese calendar also combines these two cycles, taking into account additional months in longer periods. All of these systems are attempts to organize time and adapt it to social, religious and economic life. Is the calendar merely a tool for measuring time or is it also a record of how different civilizations understood reality? Or is it proof that our view of time will always be subjective and dependent on the culture in which we live?

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"The role of time during healing: A journey through emotional wounds and recovery"

Author: Klaudia Aksiucil



N, Chelsea. "Cool Clocks." Pinterest, 12 Dec. 2024, pl.pinterest.com/pin/4503668372620884/. Accessed 26 Jan. 2025.

"Time heals all wounds" they say. This encapsulates a universal truth that while some pain never fully vanishes, it may not seem as burdensome to bear over time. Its sharpness gradually gets dulled and our future situations always have a way of 'stitching' even the deepest emotional wounds we can form. But how does it happen? Why do we often feel like it seems to fail us, making us be discouraged that a better tomorrow isn't waiting for us? In order to understand this, we need to acknowledge the effect not only when it comes to time, but also the human capacity for growth and emotional strength.

Time as medicine for emotional pain

After facing various situations that have a negative impact on us, whether caused by loss, betrayal, or failure, the pain usually causes us to feel overwhelmed at first. Everybody is different and depending on how we process certain things, experiencing a feeling of not being able to stay calm or even finding trouble breathing properly is quite common. Grief, in particular, finds its way to attack but also consumes every corner of our minds, making it nearly impossible for us to function properly. Even though it may seem like we can't imagine a future without its shadow, as time goes by, its intensity starts to fade.

The psychological science behind healing and recovery

This process of time dulling emotional pain has roots in our psychology and biology. The steady shift happens due to the fact that time provides distance, which is crucial when it comes to healing. By allowing us to step back from the pain, it gives us the opportunity to reflect and eventually accept the fact that everything in our lives happens for a reason and we simply have to accept what has occured. From a psychological standpoint, the human brain's neuroplasticity enables it to adapt itself after trauma. Therefore, the meaning of this is that time is the medicine for recovery, too! For instance, studies of grief demonstrate that while multiple areas of the brain associated with sadness are highly active after losing a loved one, their activity decreases over time, fortunately leading to people adjusting to new realities.



LI. "Brewster Home Fashions Vintage Clock Wall Mural." Pinterest, Nov. 2021, pl.pinterest.com/pin/152981718583570392/.

Accessed 26 Jan. 2025.

What if time alone isn't enough?

It is substantial to acknowledge that even though time is the key in healing, it is not a standalone cure. For some, emotional wounds are much faster to heal, whereas for others active engagement does the trick. Depending on what we are dealing with, therapy, mental support systems or self reflection become cruicial. Time provides the framework, but we must put in the effort to heal. No one can truly help us unless we actively seek to recover.

Learning to trust the process

The healing power of time is not a promise that everything will return to the way it was, especially when thinking "after seeking help, everything will be alright overnight", but rather an assurance that life will continue. The

inner scars left behind become the hidden meaning behind our resilience, a reminder that we can heal even our deepest wounds.



Meade, Julia. "Clock Asthetic Picture." Pinterest, 9 Jan. 2014, pl.pinterest.com/pin/17873729745200820/. Accessed 26 Jan. 2025.

As I mentioned before, it's okay to feel devastated in the moment. We deserve to give ourselves peace to let time work wonders, as it allows us to step back, process what happened, and manage to find strength again. Although it doesn't necessarily fix everything, it gives us the space we need to grow and move on, instead of being stuck in a miserable hole of desire to get out of. Basically, trust that, as the singer Noah Kahan says in one of his songs: Don't let this darkness fool you, all lights turned off can be turned on. This lyric captures the essence of hope - time may not erase the darkness, but it allows us the space to reignite the light within.



New Year, New Me (Or Is It?) – The Anxiety of Growing Up"

Author: Laura Schulz

January has always been a bittersweet month for me. A month full of opposite emotions. The happiness of celebrating new year, the fear of the unknown future. What is this year going to look like? Is it going to finally be my year? The year I'm going to tell my children about? The year I will become the best version of myself? The year when I finally achieve all my goals? Should I start manifesting or is it better not to jinx it? Maybe I should start to do something with myself, maybe join a yoga class? Start to read more, lock in and become an academic weapon, eat less (or eat more), spend less money, see my friends more, take care of myself, spend more time with my family, pursue my dreams, hydrate??? Then I realise I'm not capable of doing all those things, not at once and not in one year, not in a way that wouldn't be destructive. The number of them scares me. Is there really that much wrong with my life?

The feeling is intensified by the fact that right after New Year's Day I'm celebrating the day that starts my own new year - my birthday. Is this year of my life going to be like I imagined when I was little? What if I don't experience all those things that I've seen in teenage movies? Sometimes when I meet a person that's younger but better than me at some point, I feel defective. Come on, you're already this age and can't do that? never tried that? never got that? never felt that? All these thoughts swirling in my head. I know I'm not alone in this experience, but still feel like I'm so far behind everyone.



Donovan Rachel, 'Blowing out the Candles' (Pinterest15 September 2012) https://pl.pinterest.com/pin/203436108138870552/ accessed 26 January 2025

STOP SWOARING TO THE R PEOPLE

Heindow M, 'Dont Compare Yourself to Others Quotes' (Pinterest4 January 2024) https://pl.pinterest.com/pin/1067564286655379824/ accessed 26 January 2025

So to help myself and everyone that feels that way I came up with some very logical and rational solutions. First thing that we all need to remember is that time is only an abstract concept. You know what they say, age is only a number. And numbers, like we all know, don't carry any real value (sorry math enthusiast). The time itself is something really contractual. It's normal for everyone to experience it in a different way. There are people that look much younger than they are, people that look older than they are. People that are mature for their age and adults that act like children. People that still feel young being in their seventies or people feeling like their life is already ending when they just turned eighteen. People that are math geniuses from the age of four and people who don't know the multiplication table but have their whole life already figured out. So there's no point in comparing.

The second thing is that the visions of a perfect life that we all have learned from pop culture, books, stories or even from people in our life, are (surprise!) probably all wrong. Even if saying that feels cliché, I have to remind you that it is indeed *your* life and you have to figure everything out for yourself in a way that works for you!!! Following the schemes, paths created by somebody else would never work as well as living in harmony with yourself. Don't push yourself to meet the standards that you didn't create. Be gentle with yourself. Observe what makes you happy. Follow your dreams, etc. (but for real!).



(Pinterest2025) https://pl.pinterest.com/pin/678002918937898360/ accessed 26 January 2025

Achieve your goals step by step. There's no need to rush. You have plenty of time, believe me.

"Wicked": the Timeline of a Cultural Phenomenon

Author: Tomasz Pogorzelski

On 22 November 2024 the movie musical "Wicked" premiered. This long-awaited adaptation received much praise from audiences and critics alike. Its wide acclaim, supported by the star-studded cast of the likes of Ariana Grande, Cynthia Erivo, Jonathan Bailey, and Michelle Yeoh, is proven by its staggering box office earnings on the opening weekend of \$112,508,890. This unprecedented interest in a movie from a genre usually underappreciated or even ridiculed – the movie musical – points to "Wicked's" status as a story transcending generations of viewers and temporary media trends. The recent movie adaptation is one of many iterations of Gregory Maguire's 1995 novel (itself based on Lyman Frank Baum's novel). It has undeniably sparked considerable interest in the complex timeline of this musical theatre classic. The subject matter of both "Wicked" and "The Wizard of Oz" may be a clue as to why they achieved such great success in relation to their socio-economic reality.



https://pl.pinterest.com/pin/1110700326850161492/ accessed 26 January 2025

The method of portraying an "outsider" character may serve as a litmus test for social attitudes and proclivities across literary periods. The presence of such a figure usually has great potential to make a story interesting and riveting to readers. Regardless of whether the depiction is positive or negative, many such books retain longevity and resonate with a work's audience. The same stands true for "Wicked", whose message is strengthened by media environments which routinely alienate, overlook, or even vilify outsiders.

Our story starts at the very beginning of the 20th century. 1900 saw the release of Lyman Frank Baum's most famous novel – "The Wonderful Wizard of Oz". Although the book is generally thought to be simply an entertaining narrative with the target audience of children, it has been subject to literary analysis viewing it as a parable of the Gilded Age of the USA. The novel turned out to be a hit and its success led to a musical adaptation just two years after its publication. The musical, under the shortened name of "The Wizard of Oz", was first staged at the Chicago Grand Opera House on June 16, 1902, ran for nearly 300 performances, and spawned numerous continuations and revivals. Although the story also went on to be adapted into three silent films, the most culturally significant one was the 1939 now cult classic. The movie was praised not only for its incredible musical storytelling but also its visuals thanks to the use of Technicolor film. It is therefore quite ironic that a "bland" color palette is one of the main critiques held against the 2024 movie.

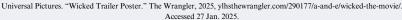
An 1995 Gregory Maguire published the first novel in his soon-to-be saga "Wicked: The Life and Times of the Wicked Witch of the West". This would prove to be a far darker, more complex interpretation of the story of Dorothy with a focus on the titular witch. The work is aimed at more mature audiences and explores themes such as discrimination, totalitarianism, and the origin of evil. In 2003 it would go on to be adapted (similarly to the story that inspired it) to a highly popular musical titled "Wicked". It premiered on Broadway in 2003 to instant acclaim. The musical later won a total of three Tony awards. Over time this tale based on a seemingly bizarre premise garnered an incredibly dedicated fanbase. The award-worthy performances of Kristin Chenoweth and Idina Menzel in the original run would go on to motivate future revivals kickstarting the careers of many promising actors. As opposed to "The Wizard of Oz", written before the world witnessed not only the dangers of totalitarianism revealed in World War II but even such global crises as the Great Depression, "Wicked" was created by an author with a capacity for more provocative analysis. Moreover, the atrocities of the first half of the 20th century contributed to a complex philosophical analysis of social groups and the process of construction and ostracization of an outsider. In particular, perpetuated in the works of Theodor W. Adorno. Gregory Maguire was therefore capable of deconstructing traditional depictions of villainy due to his awareness of the dangers entailed by a culture of "othering" individuals or groups within society.

The public reception of the most recent iteration of "Wicked" has been nothing short of a cultural phenomenon. The movie's soundtrack and casting choices have drawn many to the movie theatres, while other viewers have gained a sudden interest in the musical's decades-spanning history. In the modern world, such far-reaching spectacles have the potential to unify audiences in a manner very traditional belief similar systems congregations. Among other societal changes, the increasingly individual lifestyle prevalent modernity may act as a force blocking individuals from participating in typical community life. One may argue that it is through the art of storytelling that we can overcome the crisis of values of older belief systems. The future of the story's iteration is now quite clearly laid out. The second part of the movie saga is set to release sometime in November 2025. It is likely that this sequel will bear significance of a similar magnitude to the first part.



A view of Apollo Victoria Theatre in London, 7 October 2006, https://commons.wikimedia.org/wiki//rile:Apollo Victoria Theatre.jpg







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The original story of "The Wonderful Wizard of Oz" is rightfully considered a timeless classic, however, it came to be under circumstances far different than that of the modern world. While Baum's story was supposed to represent the glory and prosperity of the Gilded Age, "Wicked" was intended to act as a warning against pressing social threats. The 1939 movie starring Julie Andrews can be interpreted as a message of hope to economically exhausted people towards the end of the Great Depression. The story therefore acted as both a celebration and a consolation. The lifespan of "Wicked" coincides with social anxieties around matters, such as human rights violations and the rise of oppressive governments. Thus the land of Oz persists in our shared consciousness as a place within which stories constantly adapt to current events and social attitudes. Due to its ever-changing nature, only time will tell us whether the upcoming second part of "Wicked" will be more or less important to our culture. If our fears of totalitarianism and ostracization grow, we may witness even higher popularity.

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