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Does COVID-19 Affect the Pricing Determinants of Green Bonds? Evidence From Chinese When Bad and Evil Meets By Yaoyi Lu

“Ultraman Tiga is my hero!”

Quoted by my little brother, representing his dream, inspired by *Ultraman Tiga*, at the age of three. Out of curiosity, grandma asked how Ultraman Tiga replaced Jett in *Super Wings!*, his ex-idol, or Chase from *PAW Patrol*, the ex-ex-one. In response, my brother pointed the toy Ultraman Tiga’s sword towards the monster army all over the floor and yelled: “Because Ultraman Tiga kills bad monsters that hurt the city!” Then, the self-pretending Ultraman Tiga ran towards everywhere, followed by a big sound of falling objects.

Apart from showing my brother could be troublesome, the anecdote points out that monsters are considered bad by him. Often, bad is used unconsciously in our conversations; for example, a high schooler might say, “Life is bad; it sucks” ten times a day to express her pressure. In addition to a generally negative tone, bad has different meanings when addressing different situations. In the comment “The weather is bad,” “bad” stands for “gloomy,” while in the advice “It’s a bad idea to divulge your passwords,” “bad” means “unwise.” The “bad” used by my brother, according to the Collins Dictionary, associates with “morally unacceptable attitudes and behavior,” and “moral” embodies “principles and beliefs concerning the right and the wrong.” It is true that no one holds the exact same perspective as for what the right is and what the wrong is; as interpreted by my brother, causing damage to the citizens, which should be what the monsters do, is morally wrong.

Though many might have never heard of Ultraman Tiga, they would still find themselves agree with my brother. Consider the question: who wants to be hurt? Hurt can be both physical and mental, and both cases count here. Physical hurt is any physical damage to the body, like being beaten or shot. Mental hurt is a psychological suffering, such as a period of depression after one loses his family members or properties. In order to generate multiple layers of hurt, there should be multiple sources, be they the natural disasters, health problems, or military attack. And if the majority likes being hurt, why would there be evacuation practices since kindergarten? If the majority likes being hurt, why would there be annual medical check-ups to detect health problems early and leave patients a higher possibility to be cured? If the majority likes being hurt, why would there be air-raid shelters to protect citizens from bombs? Hence, it is

apparent that getting hurt is not liked by most of us, so we should share the similar basis as that of my brother that moral wrong causes hurt when judging whether it's morally right or wrong.

There is a special case though when it comes to the hurt. If the target of such hurt is someone who once hurt us, or the objective of such hurt is to prevent future hurt, like the behavior of Ultraman Tiga, would it still be considered bad or wrong? One can argue that the action of hurt is performed, so if we stick to the definition of bad, such behavior would be deemed bad. It is also disputable that since you have hurt me once, fairly, I can hurt you once, too. The action, thus, is based on seeking for natural rights instead of genuinely bad attitudes. With two sides holding reasonable explanations, it is hard to favor one side than the other; then, it should be logical to put the case in the in-between zone, meaning that the case can be either a demonstration of bad behavior or a not bad one, depending on the angle of the case being observed. Since such hurt cannot be categorized as entirely bad, the case could be ruled out of our consideration. And thus, bad behavior, for most cases, targets whomever is totally irresponsible to such conflict, or in other words, innocents.

If doing hurt can be motivated by the desire for revenge or self-protection, what is the motivation for bad people to hurt innocents? Human nature is the key. If we are not born as bad, without the natural desire to hurt other individuals, we would never possess the thought to hurt them. If no one has ever thought of hurting anyone, the action of causing hurt would have never happened to anybody, but it did happen, from the fight among ancient civilizations to the concurrent Russian invasion of Ukraine. As a result, we are born as bad with the natural desire to do hurt which we have done so. One may dispute that the newborns are even unable to think, how can they think about doing hurt? While it is valid that babies have limited brain development, they are nevertheless aware of what they want, often being milk, toys, hugs, and they would cry for hours to get those objects. The noise they make is annoying, and the accumulation of several months of annoyance can lead to emotional explosions, such as Postpartum Depression that many mothers have gone through.

If bad is a characteristic of human life since birth, one may wonder why the world is still functioning without everyone hurting, fighting with, or shooting each other on the street. This is because we are taught not to do so when we are young, and when we become adults, we are forced to restrain our bad desires. One possible motive for generations and generations before us to tame themselves to not act bad is that although we are born bad, at the same time, we often

fear the hurt resulting from other's bad, as mentioned earlier. The desire for bad and the fear for bad coexist in human nature, and we balance them by lessening such desire for avoiding such hurt. Hence, since little, we are taught to talk to replace our weapon of tears. Entering adulthood, we will be fined or imprisoned if we try to start violence. For those who still choose to be bad, it may be because they have neither been educated until they understand bad is undoable, especially for those with intellectual problems, or been punished enough to fear doing hurt, which one could find correlation to Alex in *A Clockwork Orange*. Alex, after being forced to see crimes of violence every day and get injected with tormenting medicine, feels nauseous whenever his desire to act bad becomes uncontrollable, and his body soon becomes feeble to be unable to fulfill his desire (Burgess).

Since there are different sources and motivations leading to different types of hurt, under those hurt varieties, various levels of suffering are created. The hurt can be slight, which may be the steal of an old wallet containing no more than 50 dollars, as the loss of such a small amount of money, probably being able to be earned back by tomorrow's work, is unlikely to decimate one's life. There is much tremendous hurt, like the effect of WWII. After WWII, there was a period of reflection when laymen, social scientists, journalists, and politicians attempted to understand what had driven the various atrocities and horrors, in the form of genocides, terrorist attacks, and mass murders, prevalent throughout the war. Since the outcome was social traumas, depriving millions of lives and making the world fall apart, WWII could be titled as the worst (= the most among the bad). Then, if all hurt is characterized as bad, the severity of the more devastating ones would be lost, since the least bad scenario is described with the same level of consequence as the worst, but the statement is self-contradictory. If something is recognized as the least bad and the other is the worst, they cannot end up being the same? Thus, to distinguish less bad behavior from the even worse ones, the concept of evil is formed to tell the difference in between – the severity of the consequences caused – and feature the most severe ones (Calder). As a result, if something is claimed to be evil, it must first be bad, as the evil is much more severe than the bad.

Then, it may be questionable why the monsters in the cartoons, burning an entire city down and endangering every resident, are not described as evil by my brother. Probably due to a lack of vocabulary, but, in a general sense, the question itself manifests the blurry boundary

between the concept of evil and bad. What determines the severity of bad behavior that may turn evil?

One most direct way to assess such severity is by looking at the number of injuries. Morally bad behavior may lead to several individuals being hurt while an evil one affects much more lives. One notorious example of evil represented from this angle could still be Alex in *A Clockwork Orange*. Not within a week, he has endangered at least seven random strangers either directly encountered by him or found by him in their houses on the street. They are a “dodderly starry schoolmaster type veck” (Burgess 13), the old man carrying books, a “slouse” and “mother slouse” (Burgess 18), the shopkeeper and his wife, a “burbling old pyahnitsa” (Burgess 21), the drunken old man, F. Alexander and Mrs. Alexander (Burgess 27), and an “old baboochka” with “koshkas” (Burgess 59), the cat lady. If Alex keeps this record of hurting 7 innocents per week, then within a year, a total of 2,555 innocents are under his threat. 2,555 lives are surely not just several.

Another detecting evil method is focusing on to what degree the person is hurt. If bad is claimed for curable injuries, such as minor abrasions or fractures, evil should correspond to death or permanent problems, like what Alex has caused. For the “slouse” and his wife, Alex beats them to a degree that they have spent a long time in the hospital (Burgess 21). For the drunken man, he is beaten until blood splashes (Burgess 28). For Mrs. Alexander, she is raped to death, and her husband has to permanently live under the shadow of her misfortune (Burgess 29). For the cat lady, she dies immediately after constant raping and beating (Burgess 62). From above, all the hurt formulated by Alex is too detrimental to victims’ lives: some cease shortly after and the remaining is maintained under an eternal cost, the mental unsettlement. Hence, it is double confirmed that Alex is evil.

If bad is described by causing physical or mental damage to innocents as driven by human nature, evil stands atop the pyramid of bad behavior with the severest hurt. So, my brother, I hope that the word ‘evil’ is now added to your vocabulary list that can be referenced when you talk about monsters. Also, don’t look up to Ultraman Tiga as a hero. What he has done could only let him be not thought of as completely bad.

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Burgess, Anthony. *A Clockwork Orange*. W. W. Norton & Company, 1962.

Calder, Todd. "The Concept of Evil." *The Stanford Encyclopedia of Philosophy*, Summer 2020, Accessed 03 Mar. 2022.

Baldwin, Buckley, And Their Exemplary Debate on the American Dream By Xiran Zeng

In Cambridge, UK, on February 18, 1965, James Baldwin and William F. Buckley Jr. debated the American Dream. Audiences packed the Cambridge Union in excitement to listen to two prominent figures. Baldwin, a novelist advocating for civil rights, argued that the American Dream is at the expense of the American Negro. Buckley, a famous conservative who founded the magazine *National Review*, argued against the motion. But this debate is not as simple as two sides of opinion. Centered around race and the American dream and representing two different political ideals, the debate between Baldwin and Buckley left lasting influence and lessons that make it an exemplary debate. Set in the UK, this debate brought the question of race in America to an international stage with nontraditional diplomatic aspects, but was ineffective in influencing the racial divide in America.

Distant Planets: The Tale Of Two American Dreams

Still affected by the Jim Crow laws that legalized segregation, the fight for civil rights was long and complex in the 20th century ("Jim Crow Laws"). In the mire, emerged many influential civil-rights advocates who aimed to save America from a terrible moral decline. While they have successfully encouraged legislative changes, like the Civil Rights Act that banned discrimination in 1964, the struggle against racism continued ("Civil Rights Movement"). Confronting the scorching flames of white supremacy and resisting its suffocating demoralization, activists utilized their anguish to call for action. Among them, Baldwin was a warrior equipped with his words and pen.

Though born in Harlem, Baldwin moved to France at the age of 24 to concentrate on his writing without the suffocating racism in 20th century America (Liukkonen). His experience abroad enabled him to observe his birthplace with an objective concern, as reflected in many of his writings. Growing up in a Harlem ghetto, Baldwin was forced to see the inescapable reality of African Americans. His family, menaced by their "relationship toward [their] own blackness," was a victim of the realities they had to face (Baldwin). Determined to resist the system of oppression towards African Americans, Baldwin "kept returning to America, both in his books and in his travels," putting himself "on the front lines of a civil-rights battle" (Bellot). Attending

congresses, publishing essays, and participating in marches, Baldwin became a prominent figure in the civil rights movement (DKDmedia).

Buckley, on the other hand, was born into a wealthy family in New York. He received his education at Yale and founded *National Review*, a conservative journal, in 1955 (Britannica). His political ideologies reflected that of his mother, who thought “white people were intellectually superior to black people” (Bellot). Though opposing the demoralization and “servile” treatment of African Americans, Buckley saw segregation as “part of southern culture” (Bellot). In his editorial “Why the South Must Prevail,” published in the *National Review* in 1957, Buckley opposed enfranchising African Americans because of their “Negro backwardness,” claiming that “the White community will not permit [integration]... [and] will not count the marginal Negro vote” (Buckley).

Given their drastically different backgrounds, it would not be difficult to imagine how Baldwin and Buckley would encounter a clash in views. That was also what the students of Cambridge anticipated – the unfolding of an epic debate.

Crossing Orbits: The Call Of Jeremiah

After the brief speech by two student representatives of Cambridge University, Baldwin walked up the stadium in an uproar of applause. Introducing Baldwin as “the star of the evening,” the commentator excitedly remarked on the “tremendous enthusiasm from all sides of the house,” all anticipating “the voice of actual experience” (Baldwin and Buckley).

Baldwin started by saying he, again, found himself “in the position of a kind of Jeremiah,” the “weeping prophet” (Baldwin; Roat).¹ “Who will listen to me? Their ears are closed so they cannot hear,” Jeremiah had mournfully asked, and Baldwin echoed (Buccola 253). The proposition of the house is a “loaded question,” Baldwin said, that depends on one’s sense of reality and assumptions that “we hold so deeply as to be scarcely aware of them” (Baldwin). Though this statement may not have been directed at Buckley, one could not help but detect a reflection of him within. Baldwin and Buckley represented two different sets of beliefs and two different political stances: one spoke “as one of the people who the Western system of reality has most attacked,” and the other a supporter of such reality. Buckley could not personally experience the “great shock” Baldwin described that comes when one “discover that the country

¹ This is original content from the debate. Transcription referenced in New York Times.

which is your birthplace...has not...evolved any place for you” (Baldwin). He would not understand the helplessness felt by the victims of white supremacy, as they realize that “nothing you can do will save your children from having the same disaster and from coming to the same end,” falling into an endless cycle of being demoralized.

By using “you” and “your ” in his speech, Baldwin brought the listeners into his perspective. He then shifted his point of view by speaking from the first perspective. When addressing the prompt, Baldwin said very seriously: “I picked the cotton, I carried it to the market, I built the railroad under someone else’s whip for nothing. For nothing” (Baldwin). Though he didn’t pick the cotton, Baldwin was talking about empathy and legacy. His ancestors were the victims of slavery, exploited in establishing the American economy, society, and politics. Their contribution cannot be erased because the scar remains, and the demoralization continues.

Besides cataloging the oppression experienced by African Americans, Baldwin also talked about how racism backfires on white supremacists, whose “moral lives have been destroyed by the plague of color” (Baldwin). He suggested that “one cannot dehumanize another without at the same time dehumanizing oneself” (Baldwin) Using the example of Sheriff Clark, infamous as the “symbol of southern brutality,” Baldwin illustrated how pitiful it must be for one to be so haunted by race to become a monster to other human beings.

To Baldwin, the question was less about whether the American Dream is at the expense of the American Negro; rather, it was whether Americans could “accept [their] history:”

Until the moment comes that we, the Americans, are able to accept the fact that my ancestors are both black and white, that on that continent we are trying to forge a new identity, that we need each other; that I am not a ward of America, I am not an object of missionary charity, I am one of the people who built the country – until this moment comes there is scarcely any hope for the American dream.

The audience, previously hushed by the power of this speech, now stood for an ovation as Baldwin forged through the walkway packed with students back to his seat. While Buckley remained seated with composure, he had foreseen his defeat in this debate, yet “he was not about to surrender his pride” (Buccola 266).

“The American community has refused...to treat him other than as a Negro,” Buckley said as he surveyed the audiences in the Union, “almost everywhere he goes, [they] treat him

with the kind of unction, with the kind of satisfaction that a posturing hero gets for his flagellations of our civilization, so that he quite properly commands the contempt he so eloquently showers upon us” (Buckley). By saying this, Buckley had revealed another subtler sort of resentment to African Americans, who, in his opinion, earned respect solely based on their skin color. “It is quite impossible in my judgment,” Buckley continued, “to deal with the indictments of Mr. Baldwin unless one is prepared to deal with him as a white man” (Buckley). Buckley was addressing the “surrounding protections” he believed African Americans had gotten because of how they “suffered at the hands of [his] race” (Buckley). To these comments, Baldwin raised his eyebrows high: Buckley had corroborated Baldwin’s sense of relation to Jeremiah – it was as if Buckley had not listened to Baldwin’s speech at all.²

Buckley had thought Baldwin was “charging against America,” saying “we do not have any ideals” and aiming to “jettison our entire civilization” (Buccola 271; Buckley).³ This is not true. Baldwin intended to examine the Western civilization critically, not disregard it entirely. But Buckley, much engaged in his own opinion, saw Baldwin as a destroyer of his system of beliefs. African Americans, Buckley said, “have done a great deal to agitate a moral concern,” “slipping into some sort of Procrustean formulation which ends up by urging the advancement of the Negro much less than the regression of white people” (Buckley). Though recognizing the “race problem in America,” Buckley retracted to the conservative-safe-place by emphasizing that the complexities of the “problem” make it “insoluble” (Buckley; Buccola 288). Moreover, Buckley blamed the complications on “many individual American citizens,” thus directing attention away from the racism ingrained in America’s social structure (Buckley; Buccola 289). This well-chosen rhetoric acquitted the inherently racist system in America and made the reformers’ efforts seem misdirected and unreasonable. Upon cataloging the good qualities of America, Buckley condemned African Americans’ effort to “overthrow... our civilization.” Instead, he advised them to “take advantage of those opportunities which do exist” (Buckley). Buckley, as Baldwin had voiced against, was discouraging the acknowledgment of America’s history and encouraging contentment for what the American Dream had offered.

² See Appendix B.

³ “Is There a Case for Segregation?,” Open Mind transcript, James Baldwin Papers, Schomburg Center for Research in Black Culture, Manuscripts, Archives and Rare Books Division, New York Public Library.

Diplomatic Significance

Unsurprisingly, the evening ended with Baldwin's victory, voted 544 to 164 (Brockell). He later said to reporters that, although he didn't enjoy the debate, he was "glad to be here" (Buccola 301). Similarly, Buckley often retold the story years afterward, calling it "the most satisfying debate I ever had" (Brockell). Addressing the media following the debate, he was still stubbornly rooting for his claim: Baldwin only won because the students voted "to express solidarity with the Negro" (Buccola 307). Around that year, however, Buckley seemed to have gone through a gradual shift in opinions. While before he viewed African Americans as "less advanced," he became more "sympathetic towards the cause of civil rights" (Felzenberg). In the 1960s, the violent behaviors and moral corruptions of Southern white supremacists were rampant. Observing politicians' scheme to attract voters by inciting racial resentment, Buckley redirected his reproof toward them, condemning their "recalcitrance" that made federal intervention inevitable (Felzenberg). This change primarily contributed to Buckley's attitude alteration. Still, the debate may have also been an instigation: it encouraged a peaceful conversation where people of different worlds met to share their ideas, acting as a gesture towards greater understanding. In that sense, the debate was very diplomatic.

The Cambridge University students present at the debate were also contributors to the diplomatic atmosphere. They were the delegates – though not voting for a policy, their engagement showed the global concern about America's racial inequalities. While Baldwin and Buckley were the main speakers, the presence of the students made the debate more significant by raising it to the international stage. Along with other events, this debate indicated that racism wasn't just a domestic issue anymore – the world cares about racial equality.

Failures

On the contrary, Baldwin seemed to undergo an unfavorable opinion change after the debate. In the summer of 1965, he again confronted Buckley on a talk show on "Open End." Though that encounter was neither transcribed nor recorded, Baldwin reflected on his experience in an interview, admitting his newfound skepticism for the usefulness of dialogues: "I still hoped people would listen. But Bill's a bully, he can't listen... I should have beat him over the head with the coffee cup" (Buccola 358). What "concerned [him] most" in the debate came true:

We are sitting in this room and we are all – at least we like to think we are – relatively civilized; we can talk to each other, at least on certain levels, so that we can walk out of here assuming that the measure of our enlightenment, or at least our politeness, has some effect on the world. It may not.

Baldwin was right. The racial tension and violence in America following the debate proved the exchange of ideas as trivial and ineffective. In fact, on the day of the debate in Cambridge, Jimmie Lee Jackson, a black protestor “trying to protect his mother” was killed by the police (Klein). On February 21, 1965, three days after the debate, Malcolm X was shot dead. Baldwin had disagreeing views with Malcolm X, but he was still outraged at the loss of a potential leader (Buccola 302). Then on March 7, in response to the death of Jackson, peaceful demonstrators marched for Black civil rights from Selma to Montgomery (Klein). The police so severely beat them that the event came to be known as “Bloody Sunday” (“Civil Rights Movement”).

Footage of the violence was aired across the nation. People were appalled, and protestors pushed for racial equality and voting rights. They “galvanized public opinion and mobilized Congress to pass the Voting Rights Act” (Klein). Regrettably, at that chaotic time, the outbreaks of violence became more useful and influential than peaceful debate.

During these times, Buckley had been publishing articles in the *National Review*. He saw the cases of violence corroborating his point: racial relations could only be improved “with less democracy,” where “responsible conservatives” could lead and “disempower racist demagogues,” quelling the “disreputable ‘primitives’ whose support for segregation is rooted in racial animus” (Buccola 311). This opinion is similar to what he expressed during the debate: “what is wrong in Mississippi is not that not enough Negro have the vote but that too many white people are voting” (Buckley). Later in the years, he was asked whether he regretted his past convictions. With an affirmative answer, Buckley said he erred in thinking federal intervention unnecessary, instead of in his racist views. He confessed “his wrongness about what the country could have done, not saying anything about what he and others should have done” (Buccola 364). He was committed to white supremacist views and “elite rule” throughout the times. The debate may have been influential and inspirational to future generations looking back, but at the moment, it didn’t change much. “Moral righteousness” was powerless in front of political power, and polite discourse was insufficient to change one’s rooted beliefs at that turbulent time.

These failures of the debate elicit wonders at the power of peace in front of savagery. Peaceful exchanges are ideal, but history is repeatedly demonstrating how inadequate they have been. When the war rages with shouting men and thrashing swords, who can hear the cry of Jeremiah?

A Legacy

The questions the debate posted, as well as its resonance, last. The political stance Baldwin and Buckley each represented are still relevant. While patriotism meant to the former to “require a constant criticism... on the ways we are falling short of our ideals,” the latter viewed it as the act of guarding the institutions and ideals against the groups threatening them (Green). The self-examination Baldwin suggested is “a way of thinking and being in the world” that he left us. He doesn’t believe that a “perfect world” would emerge in the future, but he believed in working towards it (Buccola 368). Even when he was disappointed by the inability of peaceful dialogues to make changes, Baldwin “prescribed love” – the “battle,” the “war,” and the “growing up” – “in the face of the human conundrum at the root of our trouble” (Buccola “The Great Debate”)⁴ Such lessons, as well as the failures and successes of this debate, make it an invaluable exemplar for modern times.

⁴James Baldwin, “In Search of a Majority,” in Morrison (ed.), *Collected Essays*, p. 220.

Work Cited

"The American Dream and the American Negro." *ProQuest Historical Newspapers*, p. 32. *New York Times*, www.nytimes.com/images/blogs/papercuts/baldwin-and-buckley.pdf.

Accessed 6 Feb. 2022. Originally published in *New York Times*, 7 Mar. 1965.

This is a transcript of the debate between Baldwin and Buckley, published in the *New York Times* in 1965, about a month after the debate. This source helped me double-check the information I took from the debate. I used this source when the audio was muffled in the video but I need the speakers' specific wording.

However, some sections are left out: it is known that this transcript is incomplete, and shortened for publication. Baldwin and Buckley, in fact, both disagreed with this transcript, saying that NYT does not have their permission to publish this.

Therefore, a transcript at the back of the book *The Fire is Upon Us* also helped me confirm the speakers' words.

Baldwin, James. "The Black Scholar Interviews: James Baldwin." *The Black Scholar*, vol. 5, no. 4, 1973, pp. 33-42. *JSTOR*, www.jstor.org.ezproxy.webb.org/stable/41065644. Accessed 30 Dec. 2021.

Transcribed from the interview of James Baldwin in *The Black Scholar*, this source provides insights into Baldwin's opinions to many interesting questions. It recorded how he talked about and gave suggestions to the civil rights movement in America. This source cleared up Baldwin's perspective on civil rights issues and provided insights into how Baldwin viewed his background and family in the context of the civil rights movements.

Baldwin, James, and William F. Buckley, Jr. "James Baldwin vs William F Buckley: A Legendary Debate from 1965." 18 Feb. 1965. *Youtube*, 13 Aug. 2019, www.youtube.com/watch?v=5Tek9h3a5wQ. Accessed 25 Dec. 2021. Speech.

This is the original video recording of the debate between Baldwin and Buckley in 1965. This source is often cited in the analysis of the debate. This video clip is the most direct recording of the debate, providing valuable information. By listening to how the speakers argued their stances, I was able to think about word emphasis, nonverbal expressions, as well as how the camera angle reflected the

thoughts of the audience. Two transcripts, one from New York Times and another from the book *The Fire is Upon Us*, were used to confirm the speakers' words.

Buckley, William F., Jr. "Why the South Must Prevail." *Wordpress*,
adamgomez.files.wordpress.com/2012/03/whithesouthmustprevail-1957.pdf.

This is a pdf of Buckley's writing, "Why the South Must Prevail," which was published in the National Review in 1957. This primary source gives a good impression of Buckley's point of view in 1957, acting as evidence of his racist thoughts. I used this source to quote and show Buckley's opinion. This source also acted as a good comparison to how Buckley's opinion changed later.

Secondary Sources

"Baldwin-Buckley Race Debate Still Resonates 55 Years on." *PBS*, uploaded by Zachary Green, 16 Feb. 2020,
www.pbs.org/newshour/show/baldwin-buckley-race-debate-still-resonates-55-years-on.

This video clip is an interview with Nicholas Buccola, who wrote a book about the debate between Baldwin and Buckley titled *The Fire is Upon Us*. Buccola talked about the importance and relevance of the debate, which I referenced in my paper.

Bellot, Gabrielle. "The Famous Baldwin-Buckley Debate Still Matters Today." *The Atlantic*,
www.theatlantic.com/entertainment/archive/2019/12/james-baldwin-william-f-buckley-debate/602695/. Accessed 6 Feb. 2022.

This source analyzed an important portion of the debate and provided information on the background of Baldwin and Buckley to suggest why they would be motivated to state their point. It talked in detail about Baldwin and Buckley before the debate, like their differences and how they clashed. This information helped me understand Baldwin and Buckley's lives before the debate.

Britannica, The Editors of Encyclopaedia. "William F. Buckley, Jr." *Encyclopedia Britannica*, 20 Nov. 2021, <https://www.britannica.com/biography/William-F-Buckley-Jr>. Accessed 8 January 2022.

This is a brief overview of Buckley. I used this source to find a timeline and information to provide information about Buckley's background.

Brockell, Gillian. "William F. Buckley Jr. vs. James Baldwin: A racial showdown on the American dream." *Retropolis*, special issue of *The Washington Post*, www.washingtonpost.com/history/2019/09/15/william-f-buckley-jr-vs-james-baldwin-racial-showdown-american-dream/. Accessed 29 Dec. 2021.

This article introduces Baldwin and Buckley in the context of the debate, with special insights from political scientist Nicholas Buccola who published a book about this debate. I found this source helpful when writing about the aftermath of the debate. It included responses to the debate in America, as well as how the speakers themselves talked about it.

Buccola, Nicholas. *The Fire Is upon Us: James Baldwin, William F. Buckley Jr., and the Debate over Race in America*. Princeton, Princeton UP, 2019.

Written by Nicholas Buccola, this book is a detailed review of the debate between Baldwin and Buckley. Not only does it have a thorough analysis of the debate itself, but it also included events before and after the debate. At the start, Buccola gave a detailed record of Baldwin and Buckley's backgrounds and how they affected their opinions. Then, he discussed the debate, examining the speakers' word choices. Lastly, he provided information on how the speakers reacted to the debate afterward and why it is significant. I used this source a lot to support my analysis.

Felzenberg, Alvin. "How William F. Buckley, Jr., Changed His Mind on Civil Rights." *Politico Magazine*, 13 May 2017, www.politico.com/magazine/story/2017/05/13/william-f-buckley-civil-rights-215129/. Accessed 6 Feb. 2022.

This is a source that thoroughly documented how Buckley had changed his mind about civil rights. It analyzed how Buckley had changed from being extremely to showing sympathy for the civil rights movement. It also provided context about the civil rights movement of that time era. This source was used when talking about the aftermath of the debate. It showed how Buckley may have been influenced.

History.com Editors. "Civil Rights Movement." *HISTORY*, A&E Television Networks, 27 Oct. 2009, www.history.com/topics/black-history/civil-rights-movement.

This source gave thorough information about the important events in the civil rights movement. I used this source, especially the Bloody Sunday section, in my paper to talk about what happened after the debate and how the debate may have affected the civil rights movement.

History.com Editors. "Jim Crow Laws." *HISTORY*, A&E Television Networks, 28 Feb. 2018, www.history.com/topics/early-20th-century-us/jim-crow-laws. Accessed 6 Feb. 2022.

This website gives detailed information about the Jim Crow Era, including its laws and some significant events. This website is not biased because it is documents facts. Information from this website is used in the introduction of this paper, where an overview of the historical context of the debate was given.

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This is a short biography of James Baldwin that includes concise summaries and quotes of his famous works. This is a secondary source, with biographical information recorded by someone else. The information I have taken from this website is not biased because a lot of other sources corroborate the point. This source is referenced for the reason for Baldwin's relocation to France.

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This source introduced Jeremiah and explained why he was the "weeping prophet." Baldwin referenced Jeremiah in his speech, so this source helped me understand what he meant during the speech.

University, Linfield. (2020). The Great Debate: James Baldwin, William F. Buckley, Jr., and the Civil Rights Revolution. *James Baldwin Review*. 6. 13-27. 10.7227/JBR.6.2, https://www.researchgate.net/publication/345416022_The_Great_Debate_James_Baldwin_William_F_Buckley_Jr_and_the_Civil_Rights_Revolution

This essay, written by Nicholas Buccola, is a shortened version of his book *The Fire is Upon Us*, which is about the debate between Baldwin and Buckley. This concise source is used in context with the book. I found the Aftermath section especially helpful, as it talked more about how Baldwin reacted to the debate, as well as his opinions in general about the civil rights movement.

"Chez Baldwin." *National Museum of African American History and Culture*, Smithsonian, nmaahc.si.edu/explore/exhibitions/chez-baldwin. Accessed 26 Dec. 2021.

A digital collection about James Baldwin.

James Baldwin Project. DKDmedia, jamesbaldwinproject.org/index.html. Accessed 6 Feb. 2022.

This is a website from a film that documented many great sources about James Baldwin. The "About Baldwin" section was mainly used, specifically the timeline, biography, and bibliography.

Coney Island: A Playground for Tired Souls By Zhiyu Lin

The subtitle declared “[Coney Island is] the Only Place on Earth Where Folks Do Exactly the Opposite of What They Do Elsewhere” on a 1913 New York Times spread about Coney Island (“WHY DO PEOPLE GO TO CONEY ISLAND? A MYSTERY SOLVED; It's the Only Place on Earth Where Folks Do' Exactly the Opposite of What They Do Elsewhere, and They Go There Because Coney Has Capitalized the Latent Insanity in Mankind”). While this review might have been humorous, the curious statement was not an inaccurate description of the island, as the extraordinary experiences created by its amusements made people act and feel differently. Coney Island’s modern amusement culture was catalyzed by the World’s Columbian Exposition 1893, which introduced the Ferris wheel and other modern entertainment technologies (Adams-Volpe 22). They would later inspire the opening of the island’s renowned amusement parks—Steeplechase Park in 1897, Luna Park in 1903, and Dreamland in 1904 (Adams-Volpe 24-25). Dance halls were another popular destination in Coney Island, as they allowed young men and women to socialize in an intimate setting (Heart of Coney Island). Although these amusements attracted a mix of classes, one peculiar thing could be noticed: comportments changed, and the formal scaffoldings of the 1900s society disintegrated. Henry Mayer attempted to capture this topsy-turvy world in his 1914 cartoon “Impressions of Coney Island” (Mayer). This work appeared in *Puck*, a prominent humor magazine primarily for rich white men, so the illustration likely catered to their viewpoints (“Puck Magazine”). Using bright, cheery colors, Mayer illustrated nine scenes that each satirized some individual characteristics of Coney Island that together exuberate sanguine silliness (Mayer). Mayer’s cartoon suggests that Coney Island liberated the public from the rigid responsibilities and social structures of everyday life: the amusements impressed visitors with thrilling and creative attractions, made entertainment financially accessible to all, shared an exotic world, and teased repressed sexuality.

Coney Island’s amusement park rides treated tourists with risky, out-of-the-ordinary experiences. Ranging from a human carousel to a fun mirror to a rollercoaster-shaped train track, amusement park facilities sprawl across Hy Mayer’s *Coney Island Impressions*, suggesting the prominence of whimsical entertainments on the island (Mayer). In the bottom right corner, an exhausted woman leans into her date: “After having been chuted, reeled, jounced, bounced, flopped, tickled, looped, rouletted – ‘Jimmy, it was a poifact day’” (Mayer)! The exclamation

implies that bizarre and breathtaking ride experiences made the woman feel lighthearted. A photo of the “Loop the Loop,” a roller coaster ride from Luna Park in the 1900s, illustrates how visitors like the woman would have been “looped” counter-gravity, inciting a rush of adrenaline (Detroit Publishing Company). This intense sensation would force the rider to forget any troubles in their lives and have fun for a moment. Another working woman, Agnes M., recounted her German friend’s similar affections for amusement parks’ rides: “When we had been on the razzle-dazzle, the chute and the loop-the-loop, ... I asked her how she liked it. She said: ‘Ach, it is just like what I see when I dream of heaven’” (Peiss 115). The sigh illustrates the exhilarating experiences of the attractions delighting her so much that they reminded her of heaven.

Besides electrifying rides, Coney Island’s amusement parks also offered visitors opportunities to transform their quotidian roles into their dream personas. For example, on the left of *Coney Island Impressions*, a fat, aged man is bemused by his tall, handsome reflection in the funny mirror (Mayer). This silly depiction suggests that people could be an idealized version of themselves through Coney island’s flattering innovations. Luna Park’s architect Frederic Thompson conveyed a similar intention in a 1915 sketch of Toyland, his amusement park project for the Panama Pacific Exposition (Register 265). The sketch depicted an attraction called “The Wishing Well,” and its description reads, “the place where/fat people can get thin/thin people can get fat/small people can get tall/tall people can get small/or anything they wish.” As its name suggests, Thompson envisioned The Wishing Well as a place where people could temporarily escape bleak realities and be “anything they wish.” In addition, Mayer’s cartoon presents a photograph of a couple “posing as aviators” (Mayer). Although the cartoon does not guarantee such an attraction, the middle-class at the time did have an affinity for scientific developments (Peiss 131). Since the plane was an exciting developing technology, it is possible that amusement parks would provide dress-up opportunities to fulfill tourists’ fantasies of becoming an aviator.

Regarding pricing, Coney Island rejected the stratified social structure by making its inland activities affordable to all tourists. In Mayer’s cartoon, a family of seven crowds around a table labeled “BASKET PARTIES WELCOME” while their waiter tries to remember, “did that party order six or seven straws with this lemonade” (Peiss 131)? Six or seven people sharing one lemonade and bringing their food baskets to a restaurant highlights the family’s frugality. Satirizing the restaurant’s tolerance of this socially scorned behavior, Mayer hints that Coney Island is an excellent place to thrift inexpensive leisure. As for amusement parks, Dreamland’s

1904 general admissions fee cost only 10 cents ("Coney Island History | Luna Park"). According to the U.S. Department of Labor, 10 cents in 1904 is about \$3.25 today, the cost of a cup of coffee (Webster). This price would have been affordable even for the lowest-wage earning class. Similarly, Steeplechase Park ensured everyone knew of its inexpensive fares: a photo of its main entrance in 1904 reveals the slogan "10 hours fun for 10 cents" (Heart of Coney Island). These low prices would open up Coney Island's amusements for working-class tourists, creating a diverse population on the island.

However, the cost of getting to Coney Island was not so welcoming. In 1903, the Brooklyn Rapid Transit opened a Coney Island Express line that ran straight from the Brooklyn Bridge to amusement parks (Feinman). The train appears as a rollercoaster in Mayer's cartoon, and the caption "a suggestion to the B.R.T." confirms its identity (Mayer). Although the new line facilitated travel, B.R.T. was notorious for its high fees. In 1904, The New York Times reported that "Over a hundred Brooklyn persons on their way to Coney Island last night were roughly handled by employees of the Brooklyn Rapid Transit when they refused to pay a second fare" ("B.R.T. TO GIVE REBATES FOR EXTRA 5-CENT FARE; Coler and Winter Agree to Have a Case Tested. BE PATIENT, SAYS GAYNOR The Justice Counsels Passengers to Pay a Second Fare -- Road's Officers Arrested. B.R.T. TO GIVE REBATES FOR EXTRA 5-CENT FARE"). This incident highlighted how the corporation insistently kept its fares high despite public resentment, making transportation harder for low-wage New Yorkers to afford.

The amusements in Coney Island also entertained New Yorkers with an array of exotic sights of foreign culture and advanced technologies, satisfying their curiosity for the unknown. For example, Mayer's cartoon, a small man rides a comically large elephant, captioned, "How it feels to ride an elephant" (Mayer). By exaggerating the size difference between man and elephant, Mayer suggests that riding an elephant was a funky experience where the rider feels elevated very high up. This curious interaction with a foreign animal carried city-dwellers away from their contemporary setting and into the exotic continents of Africa and Asia. Meanwhile, Luna Park capitalized on the mysterious outer space. One of Luna Park's advertisements depicts their signature ride, "a trip to the moon," with a dozen tourists looking out of "the world famous airship 'Luna'" ("Coney Island History | Dreamland"). Luna Park invites tourists into mysterious outer space by creating a moon-exploring setting. Although NASA would not start its moon-landing project until 1961, the "trip to the moon" advertisement demonstrates Americans'

precocious interest in the moon and the unknown (Spudis). Besides the attractions, the amusement parks themselves appeared as a spectacle: on Luna Park's opening night in 1903, The New York Times reported that "[Luna Park's developers] have created a realm of fairy romance in colored light, so beautiful that the rest of Coney Island will have to clean up and dress up, if it is to do business" ("Coney Island History | Luna Park"). Although Thomas Edison's electric systems started powering Manhattan in the 1880s, only 2% of America was electrified by 1910 (Hasen). Therefore, an entire amusement park lit up in colorful lights in 1903 must-have exhibited a rare and dazzling spectacle.

In the dance halls and the amusement park, men and women set aside social propriety and indulged in flirtatious interactions. Mayer captured the coquetry in a human carousel where couples danced the tango, as suggested by the caption "Why not a Merrytangoaround" (Mayer). The couples' rosy cheeks insinuate tipsy flirtation, and the belts that bind them together suggest sexual intimacy. However, tango was still shunned from formal balls during the 1910s. In 1914, The New York Times reported that "because Capt. Glover of Company L of the Tenth Regiment, in White Plains, has put a ban on the tango and other new dances, it is said that the annual military ball will be abandoned here" ("Ban on Tango Ends a Ball"). The rejection of tango by someone of high military standing exemplifies the upper class's contempt for the sexually suggestive dance. Since *Puck*, where Mayer's cartoon is published, also had a broad, wealthy, white male readership, it is likely that "Merrytangoaround" shared Capt. Glover's scorn ("Puck Magazine"). Nevertheless, the pleasure-seeking youth turned a blind eye to dance halls' notoriety: "[The girls] know the bad reputation for some of them," Belle Israel observed in 1909, "but the dancing floor is good, there are always plenty of men and there are laughter and liberty galore" (Peiss 126). Many amusement park activities also encouraged "innocent" teasing. A 1913 The New York Times review of Luna Park reported an incident where a girl's hobble skirt rode up during a donkey ride designed for just that purpose. Although she was initially embarrassed, "she smiled back at the crowd and started up the mountain, saying as she went, 'Oh Lord, if mother could see me now'" ("WHY DO PEOPLE GO TO CONEY ISLAND? A MYSTERY SOLVED; It's the Only Place on Earth Where Folks Do' Exactly the Opposite of What They Do Elsewhere, and They Go There Because Coney Has Capitalized the Latent Insanity in Mankind")! The girl's shameless confidence suggests her excitement in momentarily dismissing her indoctrination of chastity.

Mayer's cartoon depicts a utopia where careless fun overtook the serious, rigid society: Coney Island's silly attractions, eye-opening spectacles, and flirtatious dances rendered everything lighthearted, while its inexpensive amusements offered leisure options to all classes. Coney Island's approach was a success: by 1909, an astonishing 300,000 people visited Coney Island in a day ("CONEY ISLAND'S BIG CROWD.; More Than 300,000 Visitors, Some of Whom Met with Mishaps). This popularity could also be attributed to the reduced work hours by almost 16 percent between 1900 and 1920 since the working class made up a big crowd on the island (Hunnicut 311-318). As more people experienced the liberation of Coney Island, America slowly recognized the importance of leisure time and amusements and populated the country with theme parks still frequented today, like Disneyland and Six Flags. At the end of an exhilarating day in Coney Island, Americans realized that while it's essential to work hard and abide by social standards, sometimes a tired body needs to be revitalized in an excursion to a world of fun, free spirits.

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**Investigating the effect of potential width and bias on the quantum tunneling of an electron through varying GaAs/Al_xGa_{1-x}As heterojunctions by Katherine Xie, Himani Mishra¹, Aadhish Iyer Ramanathan¹, Arsh Shergill^{1*}, Orhun Ciftcioglu^{1*}, Samih Qureshi^{1*}
Corresponding Author: Ludmila Nikolaeva¹**

Keywords: quantum tunneling, nanoelectronics, transistors, semiconductors, heterostructures

Abstract

Quantum tunneling is a prominent issue in the nanoelectronics industry as it limits the miniaturization of transistors. In the present paper, we better understand the factors that enable tunneling in transistors and determine the optimal conditions in which transmission is least probable. We alter the width and bias of a one-dimensional, rectangular potential to investigate the effects on the transmission probability of an electron through GaAs/Al_xGa_{1-x}As heterojunctions with varying Al alloy compositions. For each respective energy level of the electron from 0.1 to 0.4 eV, including 0.25 eV, we numerically calculate the transmission coefficient (T) through the piecewise constant method for varying barrier width from 1 nm to 10 nm and bias from 0 to 3. We also calculated the impact of varying GaAs/Al_xGa_{1-x}As compositions by testing concentrations of Al from 0.1 to 0.9. Plotting our data, T exponentially decreases as barrier width increases, and T steadily increases as the bias increases until it plateaus at a bias of 2. For varying Al compositions, large changes in the transmission coefficient are achieved when barrier widths are small and the composition of Al is low. When both varying biases and compositions are tested, lower compositions of Al have lower transmission coefficients, until this trend flips at a bias of 1.5. Our findings can be used by manufacturers to minimize the effects of electron leakage in transistors and provide insight into the quantum behavior of electrons.

Introduction and Theory

Within the past few decades, the size of transistors has reached the nanoscale to meet the demands of increasingly advanced computations. Smaller transistor size enables such computations as it increases transistor density, which subsequently improves the switching speed due to the shorter distances that electrons and holes travel between a semiconductor junction. Additionally, smaller transistors operate under lower supply voltages, presenting another

advantage.¹ However, this miniaturization trend has been limited in recent years. Sub-30 nm scale of gate lengths, for some transistors, may be subject to a reduction in voltage from leakage and produce misintended currents that ultimately affect the transistor's ability to perform accurate calculations due to the effects of quantum tunneling (QT).²

QT is a phenomenon in which an object has the probability of tunneling through a potential barrier. If the barrier is assumed to have a higher potential than the energy of a quantum object can overcome, it is theoretically impossible for the object to penetrate through by the laws of classical dynamics. The wave-particle duality nature of the object results in a decaying, but non-zero wave function within the barrier and a non-decaying wave function after the barrier. Thus, through Born's interpretation, there is a probability of locating the quantum object both within and after the barrier despite its initial limitations.³

In recent years, the GaAs/Al_xGa_{1-x}As heterojunction was one of the most extensively studied semiconductor pairs. Wang et al.'s band offset research in heterojunctions served as a solid foundation for recent experimentation. The band offsets were calculated specifically for the heterojunction GaAs/Al_xGa_{1-x}As. The data was collected with increments of 0.1 for the Aluminum (Al) concentration in Al_xGa_{1-x}As, where x represented the composition parameter. As the concentration of Al approached 1 the valence band continued to increase linearly and the conduction band started to vary after a concentration of 0.4. This resulted in the band gap representing a linear progression until 0.4, where after the progression symbolized an exponential curve.⁴

In our study, we better understand the factors that enable tunneling in hot-electron transistors (HETs) and determine the optimal conditions in which transmission is least probable. We alter the width and bias (tilt) of a rectangular potential to investigate the effects on the transmission probability of an electron through GaAs/Al_xGa_{1-x}As heterojunctions with varying Al compositions x increasing at increments of 0.1. For each electron energy level, we use a Python program to numerically calculate the transmission coefficient T . T may be conceptually understood as the ratio of wave function probabilities, as follows.

$$T = \frac{\int_{-\infty}^{+\infty} |\Psi_{transmitted}(x)|^2 dx}{\int_{-\infty}^{+\infty} |\Psi_{incident}(x)|^2 dx} \quad (1)$$

The transmission coefficient may also be theoretically derived for a rectangular potential. We consider three regions of a singular rectangular potential: I, II, and III.

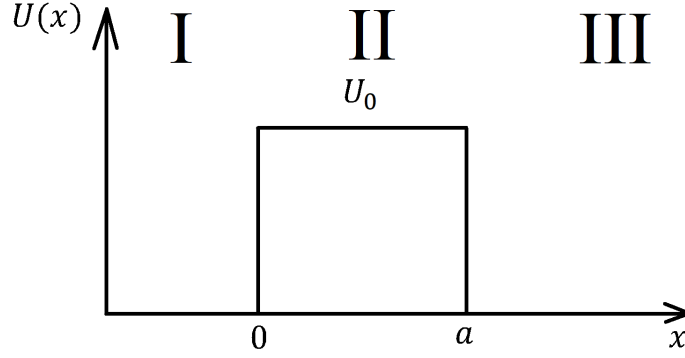


Figure 1. System regions.

Solving the time-independent Schrödinger equation for these regions results in Ψ_I , $\Psi_{II,a}$, Ψ_{III} , as follows.

$$\psi_I(x) = Ae^{ik_0x} + Be^{-ik_0x}$$

$$\psi_{II,a}(x) = Ce^{k_a x} + De^{-k_a x}$$

$$\psi_{III}(x) = Fe^{ik_0x}$$

$$k_0 = \sqrt{\frac{2mE}{\hbar^2}}, \quad x < 0 \text{ or } x > 0$$

$$k_a = \frac{\sqrt{2m(U_0 - E)}}{\hbar}, \quad 0 < x < a$$

Applying the respective boundary conditions of each region and the restriction of a continuous wave function will result in the following system of equations.

$$A + B = C + D$$

$$Ce^{k_a x} + De^{-k_a x} = Fe^{ik_0x}$$

$$Aik_0 - Bik_0 = Ck_a - Dk_a$$

$$Ck_a e^{k_a x} - Dk_a e^{-k_a x} = Fik_0 e^{ik_0 x}$$

$$2A = (1 + \frac{k_a}{ik_0})C + (1 - \frac{k_a}{ik_0})D$$

$$2Ce^{k_a x} = (1 + \frac{ik_0}{k_a})Fe^{ik_0 x}$$

$$2De^{-k_a x} = (1 - \frac{ik_0}{k_a})Fe^{ik_0 x}$$

The system may be combined into a single equation.

$$\frac{Ae^{-ik_0 x}}{F} = \cosh(k_a x) + i\left(\frac{k_a^2 - k_0^2}{2k_0 k_a}\right)\sinh(k_a x) \quad (2)$$

Born's interpretation is applied to find the transmission probability. Multiplying Equation 2 by its conjugate will result in the derived equation for T .

$$T = \frac{|F|^2}{|A|^2} \text{ (see Equation 1)}$$

$$T = \frac{1}{1 + \frac{U_0^2 \sinh^2(k_a a)}{4E(U_0 - E)}} \quad (3)$$

Methods

We simulate an electron in a one-dimensional three-region system with a singular rectangular potential as shown in figure 1.

The transmission coefficient T was solved through the time-independent Schrodinger equation numerically by the piecewise constant method.⁵ The piecewise constant method divides the potential into N barriers, in which the energy of the potential can be considered constant as an estimation.

For our numerical calculations, we set the potential energy at 0.5 eV arbitrarily and relative to the electron energies. We tested electron energies less than 0.5 eV because, for

electron energies greater than 0.5 eV, the electron would have greater energy than that of the potential, almost always resulting in tunneling. We obtain the electron effective masses from an open-source database.⁶ The effective masses used are as follows.

GaAs	0.063
Al_xGa_{1-x}As	$0.063 + 0.083x$

Table 1. Effective electron masses from the NSM archive.

Results and Discussion

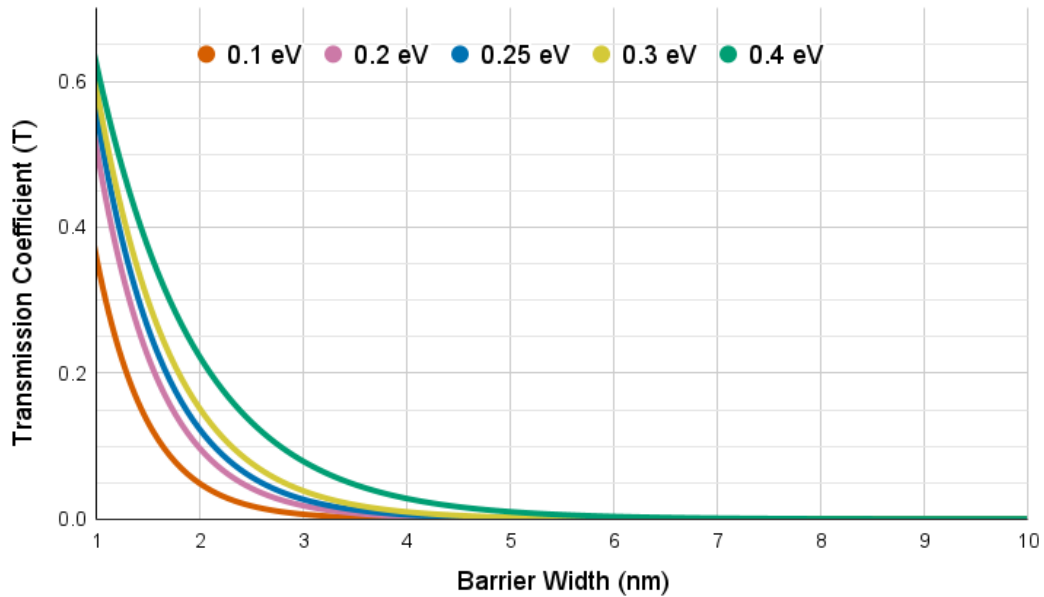


Figure 2. The transmission coefficient decreases exponentially with barrier width for five electron energies.

We found that the transmission coefficient decays exponentially as the width a increases. Compared to other statistical models, an exponential model produces R^2 values closest to 1 and is thus the best representation of our data and the expected relationship.

Electron Energy	Exponential Regression	R ²
0.1 eV	$2.62e^{-2a}$	0.999
0.2 eV	$2.68e^{-1.66a}$	0.998
0.25 eV	$2.52e^{-1.51a}$	0.998
0.3 eV	$2.3e^{-1.36a}$	0.998
0.4 eV	$1.74e^{-1.03a}$	0.999

Table 2. Regression summary for varying barrier width on T for five electron energies.

Both the derivation of T through a singular potential barrier and the implications of a localized decaying wave function and exponential decay with an increasing barrier width. Equation 3 gives the same conclusions upon mathematical reasoning.

Krenzlin et al. describes a similar relationship with a freely propagating wave-packet through a square potential, in which transmission successively decreases with increasing barrier width. Specifically, the integral of $|\Psi^2|$ with respect to the time-step of Krenzlin et al.'s simulation proves to be much larger for narrow barrier widths.⁷

Likewise, Sousa et al. have consistently demonstrated that transmission has a strong, exponential dependence on the channel width between two L-shaped quantum semiconductor wires, regardless of the position in which transmission was calculated.⁸ This is an indicator that an exponential relationship between transmission and barrier width may be expanded to models beyond a singular rectangular barrier.

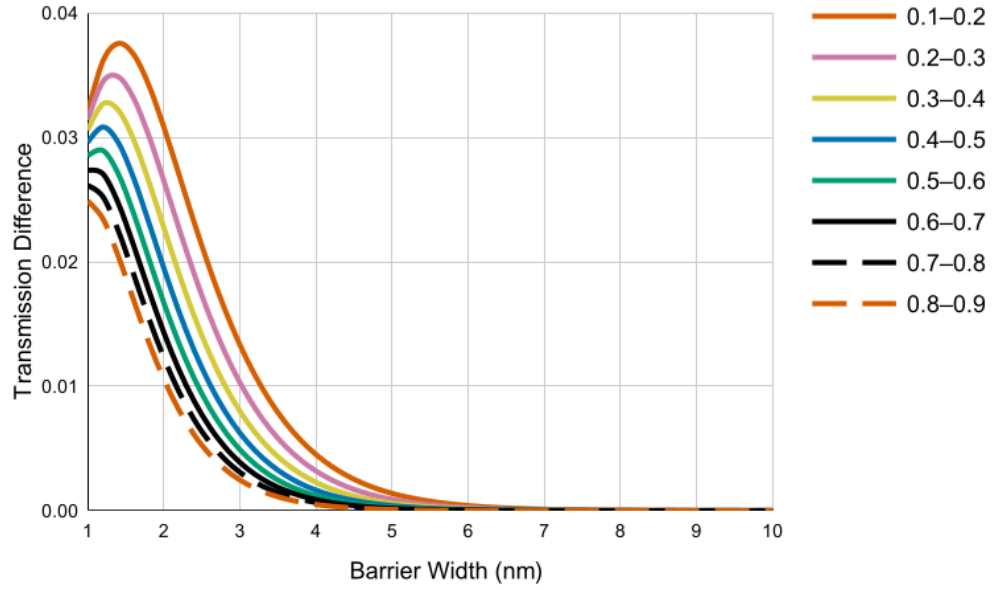


Figure 3. ΔT between each increment of x is plotted with barrier width.

We also analyzed the difference in T for each 0.1 increase in Al composition x . These results have shown a declining, nonconstant change in transmission with each successive 0.1 increase. The 0.1-0.2 series has the largest average ΔT , as represented by the steepest curve. We can therefore conclude that the most significant changes to the transmission may result from the lower spectrum of widths and a smaller Al composition.

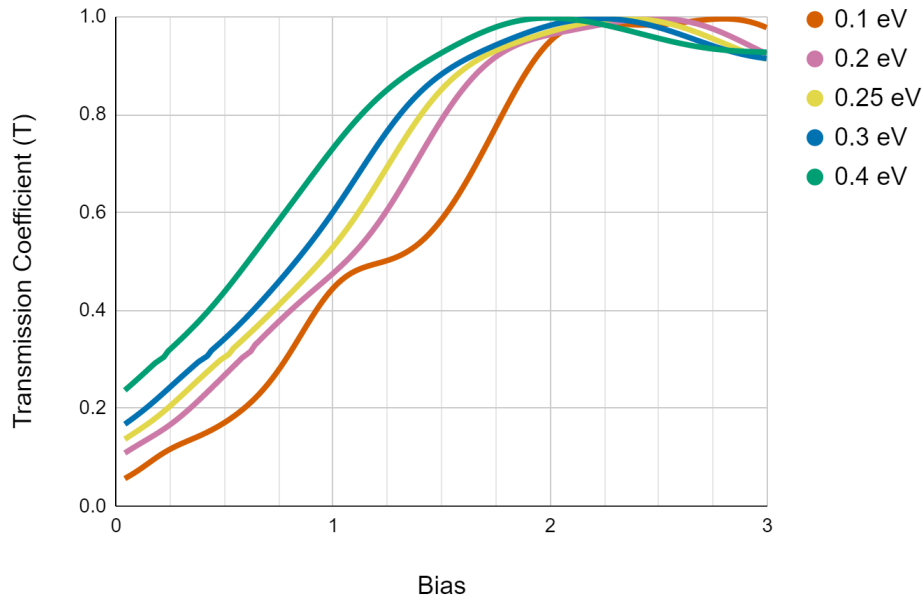


Figure 4. A general increase in T with bias is shown for five electron energies.

Depending on the energy level, T plateaus at a maximum value of 1 with increasing bias (2.16 for 0.5 eV and 2.48 for 0.2 eV; the other energies near $T=1$ somewhere in between said values). We observe fluctuation in the graphs prior to the plateau. However, these fluctuations become less prominent as the energy level increases (0.1 eV has the most dips and spikes, while 0.5 eV has the least). After the plateau, the T values were generally greater for smaller electron energies. It is worth noting that certain biases resulted in a division-by-zero error in our Python program. A closer examination is needed to resolve this issue.

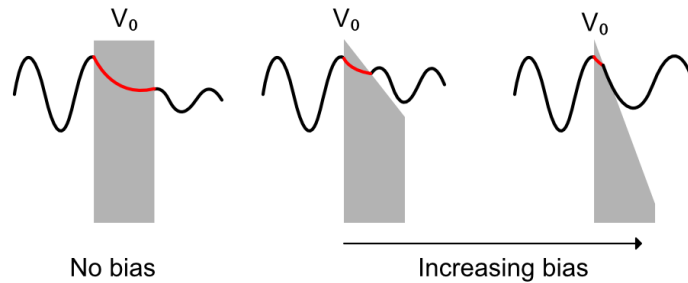


Figure 5. A schematic representation of the decay of a wave function through different biases.

We expect the transmission coefficient to approach 1 with increasing bias due to its relationship with the barrier width, or the depletion region. In a transistor, a decrease in the

depletion region results from the forward biasing of the potential barrier, which subsequently provides less time for the electron to decay within the barrier. Thus, the likelihood of the electron appearing in the region past the barrier, represented by the amplitude of the wave function, increases due to a decrease in necessitated energy for passing the barrier.

Our findings agree with Tuomisto's research on positive biasing, where the effective barrier width decreases as positive bias increases.⁹ They concluded that differences in T of about two orders of magnitude can be explained by a change in barrier tilt of ± 2 V, which aligns with our findings. As bias increases, the average barrier height decreases, and therefore the transmission probability increases.

In our results, we found that the transmission coefficient decreases with increasing Al mole concentration. This can be seen in figure 5.

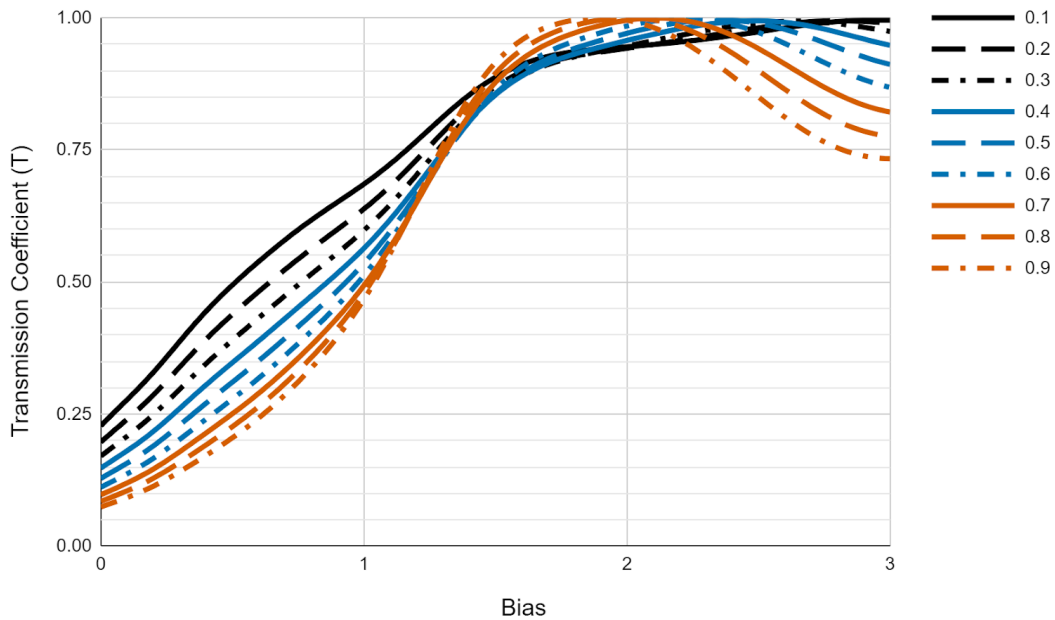


Figure 6. T is generally higher for higher compositions of Al until a bias of around 1.5

Wang et al. showed a direct linear relationship between the band gap of $\text{Al}_x\text{Ga}_{1-x}\text{As}$ with respect to the Al concentration x . The increase in band gaps makes it harder for electrons to tunnel through since the energy of the barrier increases. This results in an increasing relationship between the band gap and barrier energy.

These results found in Wang et al. agree with our findings.⁴ However, in the graph above, we see that this trend flips at a bias of 1.5. This may be due to the decrease of relative barrier width since relative barrier width decreases as bias increases. In this region, the increasing Al mole concentration gives more space for electrons to move, which results in an increase in the transmission coefficient.

Reed et al. also measured the effective mass of the electron when it tunnels in a GaAs/AlGaAs barrier/InGaAs quantum well heterostructure. The calculated InGaAs effective mass is inversely proportional to the tunneling peak voltage, which is the voltage when the resonant frequency makes one's way through the system. The effective mass of the InGaAs is inversely related to the derivative of the resonant peak voltage with respect to the magnetic field.¹⁰ In our case, the amplitude of the electron tunneling increases. This is close to our results since the transmission coefficient decreases as the Al mole concentration increases (except when the bias is around 1.5). This shows that there may be a direct relationship between the resonant peak position and the transmission coefficient since both decrease with increasing composition, which would provide further insight into our results.

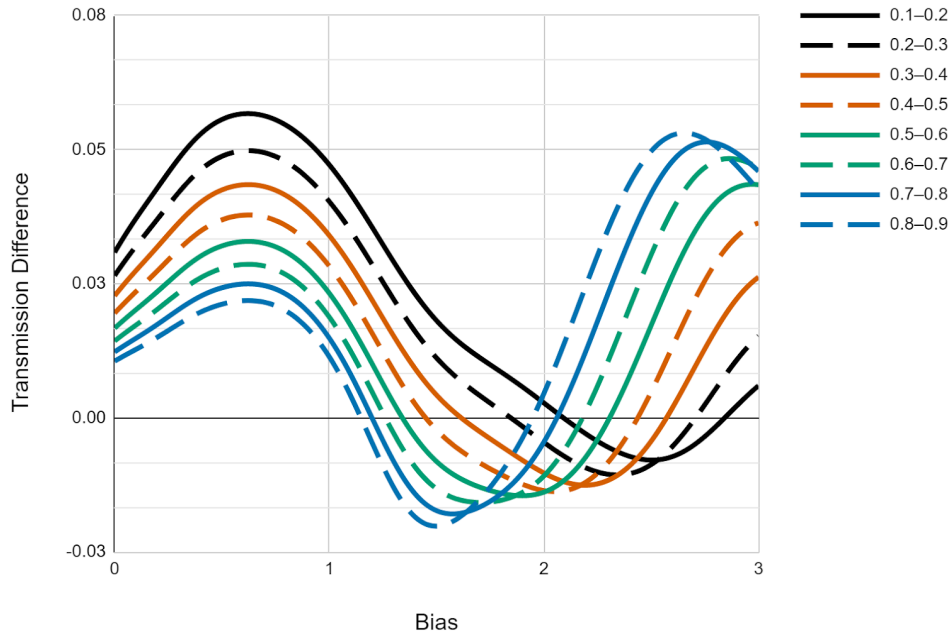


Figure 7. The difference in transmission is plotted with bias for each increment in x .

Finally, we analyze the degree of differences in the transmission coefficient with increasing bias. Each series represents a 0.1 increment in x . We observed a nonconstant change as bias increases as well as when x increases due to ΔT both increasing and decreasing throughout the graph. The average difference between T seems to be more prominent for lower Al concentrations until a bias value of about 2. This relationship is reversed after this point around a bias of 2. Between biases of 1 and 3 negative ΔT can be observed for all graphed intervals and within this range the ΔT is generally less extreme due to the smaller negative amplitude in figure 6.

Conclusion

Our current research provides insight into changes that must be made to reduce electron leakage in transistors. In the present paper, we examined how changes in barrier width and bias in varying GaAs/Al_xGa_{1-x}As heterojunctions affect electron leakage. The results of these experiments can inform engineers and manufacturers the most optimal conditions and materials for transistors. For example, our findings on how the transmission coefficient of electrons changes as the barrier width changes gives manufacturers a dataset which can be used to identify the smallest width that has an acceptable magnitude of electron leakage. Additionally, analyzing the width data alongside bias and composition can help assess which factors are most effective at preventing tunneling. To build upon our current hypotheses, more projects must be completed in the future, including testing on real transistors and experimenting with different semiconducting pairs.

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Urban Slum Gentrification In The Global South-Guangzhou Urban Village By Huang Wanwen

Due to the rapid globalization and international division of labor, an increasing number of global cities emerged in the past decades, especially in Asia, such as Guangzhou, Singapore, and Manila. To attract international capital and talent, global cities need to maintain the efficiency of cities and urban scenery that fits the international standard of appreciation. To achieve so, they go through slum clearance and urban redevelopment, which usually involve gentrification, displacement, and eviction. In this process, rural-urban migrant workers are “major losers”, deprived of their “rights to the city”. Therefore, there is an urgent need to focus on the acute risk of displacement faced by them.

Taking urban villages in Guangzhou as examples, this essay attempts to unveil the necessity of urban villages to rural-urban migrants in China and call for a shift of policy focus to improving living conditions in slums rather than demolishing them. As the capital city of Guangdong Province, Guangzhou is one of the important industrial cities in China’s Pearl River Delta Region and of the earliest cities open for global capital in China.

Urban slums provide migrant workers with affordable housing at convenient locations to rent. Commonly, the housing in urban villages is divided into small sections, about 10 square meters per room, with only one bed and basic living facilities for sharing. For example, in Shipai village, the largest urban village in Guangzhou, the monthly rent is about 500-600 RMB, about 80% lower than the rent at similar locations.

In addition, urban slums are very close to migrants’ workplaces. Shipai village’s residents usually work in electronic device factories, shopping centers and entertaining stores near the village. According to my interview with a resident, she mentioned that, instead of renting a place with better housing condition that is far from her workplace, she preferred living closer to save money and time spent on transportation.

Moreover, urban villages offer migrant workers important social networks and support, which is hard to find elsewhere in Guangzhou. For example, restaurants in Shipai village are dominantly Hunan cuisine and migrants could speak their own dialects with fellow migrants. Temples and ancestral halls are commonly found in urban villages of migrants’ religions and cultures. In this way, although housing conditions in urban villages are inadequate, they offer migrant workers affordable places near their workplaces and important social support. Thus,

urban villages play a significant role in providing urban services for the social reproduction of migrant workers in global cities.

However, despite the importance of urban villages to migrant workers, many of them were demolished for real estate projects. The government of Guangzhou started demolishing urban villages for urban redevelopment projects since the 2000s. In 2016, the government released a masterplan of urban renewal and started a large-scale urban village clearance campaign. Since the amount of compensation exceeded the local government's fiscal capacity, the state invited real estate developers to the process. Compensation and displacement plans were largely negotiated between landlords and developers, leaving migrant workers who rented the housing no power to intervene. In other words, no party was kept accountable to protect migrant workers' interests and neither could they form a collective power strong enough to make themselves a major stakeholder in this process and voice their interests. By the end of June 2020, about 57 old urban villages reconstruction projects have been approved in Guangzhou.

Migrant workers are major losers in urban slum clearance process. First, migrant renters are evicted from urban villages by demolition, and it is extremely difficult, if not totally impossible, for them to find other affordable places in global cities. According to a survey conducted in Hangzhou, China, two out of every ten migrant workers encountered eviction when their urban villages were redeveloped. To rent another place, their rental costs usually increased significantly. For instance, for Wulian urban village in Hangzhou, the average rent for migrant workers was 700-800 RMB per month in 2016 (Frontiers in Public Health). However, after their village was demolished, they had to spend 1,200-1,500 RMB on rent. In fact, many of the evicted migrants were not financially capable of continuing working in the city: 30% of them suggested considering returning to their home village in rural areas. Demolishing urban villages increases barriers for migrant workers to stay in cities, resulting in a potential drop in labor force. More importantly, the lack of affordable housing excludes migrants from enjoying the triumphs of cities that they have helped building.

Second, the clearance of urban villages took away migrant workers' social support system. Urban villages are residential clusters for migrant workers, where they could easily find other migrants of their origins, religions, and dialects. Such networks give migrant workers a sense of belonging and emotional support that help them deal with unfamiliar cities and reduce stress induced by separation from their family. Without urban villages, migrant workers are spatially

separated from each other in their leisure time, resulting in increased level of loneliness and other psychological discomfort.

Looking at various cases around the world, it can be agreed that interventions from civil societies and community organizations played critical roles ensuring that the least advantaged groups in slum clearance processes receive fair treatment. For example, the government of Manila developed Quezon city to accommodate migrant settlers whose informal housing were demolished in Manila's urban redevelopment projects. The government built a strong network between community-based organizations, family and corporate foundations and other non-government organizations to aid urban poor communities mentally and financially. From 1992 to 2007, nearly 9000 families have been resettled with financial aid and establishment of communities under Urban Poor Affairs Office (UPAO) which was created under mayor's office to supervise the demolition process (Habitat International). The case of Quezon city in Manila provides valuable lessons for the government of Guangzhou. The state cannot solely rely on private developers, who is largely driven by profit-driven logics, for slum redevelopment projects. Government should partner with civil society and community organizations that represent migrant workers' interests to make sure the least advantaged group are not worse off in this process. In other words, government should provide an infrastructure for migrant workers to articulate their rights and advocate for their access to adequate housing and well-being. Migrant workers renting urban villages are the biggest losers in slum clearance projects, but they contribute arguably the most to the development of Guangzhou. The invisibility of migrant workers in urban redevelopment process indicates a larger problem about how cities view migrant workers, their rights and what they deserve. Our planet is inevitably an urbanized one. How to distribute the costs and benefits of cities is at the heart of social sustainability of our planet.

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Technology- An Excuse For Nastiness By Fei Xia

Introduction

When parents say hurtful things to their children to inspire them- though kids feel unfair and angry- are the parents nasty? When a sports coach asks his team to do overwhelming physical exercise - though the teammates feel exhausted and uncomfortable- is the coach nasty? Based on the definition of nastiness exclusively, it is nasty if the behavior brings unpleasant feelings to others. However, these cases highlight the possibility of good people behaving in a seemingly wrong way and the absurdity of addressing nastiness as a life-long quality a person or population possesses. We constantly pursue a sense of belonging, acceptance, and morality (Pinker, 2017). As such, it is only valid for us to behave in a reactionary way when confronted with an environment that contradicts our beliefs. This is consistent with cognitive dissonance research (Festinger, 1957), which shows that when faced with conflicting attitudes and beliefs, we react to remove the discomfort. As for other scenarios, people would not ultimately change their behaviors that they do not deem wrong. Therefore, people's traits are not changing in both cases but are instead reacting to the specific situations. However, it is concerning that people seem to receive more unpleasant responses and therefore suffer from mental health issues. Among all factors, scientists focus on technology - a factor that develops along with an increased frequency of neuroticism (Seabrook1 et al., 2016).

Thus, in this essay I'm going to explore the recent societal personality change and argue that this phenomenon may result from fast-developing technological change instead of a transformation of human inner qualities.

An Alienation Of Feelings

Technology's use directly impacts human cognitive alienation from reality physically and mentally ("How technology and social isolation," 2021).

The lack of instant physical feedback in online communication hinders people from appropriately communicating online as they do in reality. Therefore, they wrongly detect unnecessary nastiness in others. The cause of this misapprehension lies in the different methods of socializing virtually and they do realistically. When people communicate online, emojis and notation marks replace the importance of facial or bodily expressions. For instance, capitalization

substitutes shouting; multiple exclamation marks represent shock (Paradice,2007). However, emojis are not an efficient communication method due to their ambiguity. People from different cultural backgrounds with various personal interpretations may use the same emoji differently (Bich-Carrière,2019). For instance, the emoji that some identify as clapping hands may be interpreted as prayer. According to the study done by Berengueres and Castro (2017), the sender's feeling could be 26% different from the receiver's when it comes to negative emojis. Therefore, the conveyance of information via emoji is an unreliable one(Bai et al., 2019).In the studies done by the Department of Communication (2002), participants report more frequent misunderstandings in computer-mediated communication than in face-to-face communication. For example, it is harder for people to distinguish by simply interpreting their notes if their friend is being sarcastic or offended through social media. (Kruger et al., 2005) This lack of understanding might lead to unintentional nastiness observed by the other end. Indeed, not that nastiness has increased in our society as a whole, but a lack of familiarity with this new way of socializing.

According to the online disinhibition effect, people feel less constrained online than in person due to the anonymity of the internet and develop empathy deficit (Terry & Cain, 2016). For example, while empathy is the key to establishing healthy patient-provider relationships, recent studies have shown that accompanied by technology, expressions of empathy reduce in healthcare scenarios (Neuwirth, 1997). In a crossover study conducted by the Gunma University Hospital, researchers compared video telemedicine consultations by doctors and patients communicating through computer monitors in two separate rooms with face-to-face consultations. Their results showed that empathetic utterance is less evident in teleconsultations, suggesting that technology hindered the participant's ability to express empathy appropriately (Liu et al., 2007). In this case, technology makes people less aware of the importance of empathetic behaviors by situating them in a safer communicating environment. As people gradually adjust to this method that lacks the necessity of being empathetic, they subconsciously speak in displeasing ways. Especially for cases between doctors and patients, empathy is essential for patients to feel the doctors' awareness and attention. Otherwise, patients would think that the doctors are not trying their best and are nasty, therefore inducing the risk of patients' incompliance and malpractice litigation (Falvo & Tippy, 1988; Howard B. Beckman, 1994).

Although we behave the same way, the internet filters us with nastiness by inefficient delivery of information. Thus, the transmission of information via technology could hinder the process by which people receive and convey stimuli to achieve optimal communication.

A Prevalence Of Bias

Bias or wrong implications are magnified online due to the inclusiveness and frequent display of the internet. The availability heuristic refers to a specific type of cognitive bias by which people judge how likely an event is to happen based on how frequently they have appeared (Esgate, 2008). This cognitive bias exacerbates due to the growing availability of information due to high frequency and the ease of retrieval, resulting in our incorrect interpretation of more nastiness. A simple case could be that people are afraid of flying while the risk of driving a car is much higher. In addition, the annual risk of dying in a plane crash is 1 in 11 million, while that of motorbikes is 1 in 5000 (Ropeik, 2006). To explain further, Lichtenstein et al. (1978) found that the causes of death reported in the press are estimated to have higher frequencies than reality. While heart disease causes 85% more deaths than accidents, almost 80% of those surveyed thought otherwise. Moreover, according to a study conducted on 108 undergraduates, vivid information is more affectable regarding rooting in people's memories. Notably, people are more likely to react toward colorful and concrete sources with pictures. Therefore, it is reasonable that as bad news and behaviors are presented in the forms of pictures and videos frequently online, people will recall that information more easily. In another case, personally experienced events are also more likely to be readily available than those told by third parties. (Strack, 2002) For example, people remember things they have read or watched better than those rephrased by others. Regardless of the event's content which involves nasty behaviors, high-frequency showcase, vivid presentation, and personal experiences contribute to the availability of events in people's minds, resulting in a plausible higher estimation of the likelihood of nastiness.

In addition to the effects of fixed impressions, most people could also behave nasty towards themselves and others, driven by intellectual inferiorities. What is more upsetting is that, as unrealistic beauty standard becomes the primary trend, people follow them blindly. A study by Juliana Houldcroft (2017) suggests a higher reckoned credibility for posts with more likes, implying a vicious cycle of the formation of stereotypes. Strict beauty standards with

unaccountable likes and praises are thereby further promoted before we realize their toxicity by advertisements and films in which mostly only fit and attractive people star. (Athwal et al., 2018) This ridiculous gender stereotype deepens more than ever on social media, leading to self-comparisons and dissatisfactions with body images, eventually low self-esteem. For instance, research has suggested a relationship between media exposure and women's body disturbance, with severe cases of developing eating disorders to pursue the ideal body shape promoted by fashion magazines and celebrities (Shelly et al., 2008; Holland & Tiggemann, 2016). A defense mechanism could explain this phenomenon -introjection, defined by the Apa Dictionary of Psychology that people would imitate what they adore or are insecure about to alleviate the sense of inferiority. In addition, many hateful comments publish below those posts of young and healthy girls due to a sense of jealousy and inferiority. Moreover, in the interviews conducted by The Guardian's Mahita Gajanan (2015), many young women struggle especially to appear perfectly fit in their Instagram photos.

To conclude, the wide diffusion of social media magnifies specific ideas. It negatively unifies people's thoughts, which seeds the wrong estimation of nastiness and insecurity-induced nasty behaviors.

An Implication Of Stress

However, this kind of internet bullying is not uncommon. There are also other reasons behind the sudden outburst of online "trolls". In the 3-year-span of lockdown, people report suffering from more neurotic emotions, according to a KFF tracking poll (Nirmita & Panchal 2021; 2022). This situation is mainly because of the uncertainties of life during the lockdown – schools shutting down, and people are forced to stay at home ("2020 COVID-19 state restrictions", 2021). Nevertheless, some factors originate in internet addictions that worsens during lockdown. When nomophobia (No Mobile Phone Phobia) becomes a word (King et al., 2014), when 90% of the US citizens deem the internet as essential during covid (McClain et al., 2022), an international overuse of the internet begins. The study from TAŞ (2019) shows a positive correlation between internet addiction and stress levels. As people are forced into a virtual lifestyle, their stress levels and mental health are also at risk. Relating back to nastiness, observed by a higher reported frequency of cyberbullies (Cuncic, 2022), there seems to be a causal relationship between these two phenomena – stress and nastiness.

According to the Pew Research Center research, about 59% of teenagers in America report being cyberbullied or harassed, resulting in different mental health issues (Anderson, 2020). However, a small group of bullies may not always be voluntary or conscious of their actions. The bullies we refer to here are those who do not regularly post hateful comments. According to the concept of projection, people project strong negative feelings they experienced in real-life to non-threatening others if the bullies would not receive any physical harm (Lindberg, 2018). This reaction is a self-defensive natural behavior triggered by intellectual discords. Due to the non-transparency of the internet, people were made invisible and irresponsible, therefore invincible. Specifically, as for the senders, they would not be legally punished or exposed. They could even leave the refutes unread to avoid guilty in face-to-face confrontations. In this way, many of them are irresponsible with their languages. However, as for the victims, they cannot take any action to yield compensation, nor could they get away with the presence of nastiness as the internet conserves them permanently ("Cyberbullying: 6 reasons why it is common", 2021).

Regarding both perspectives, netizens are relatively innocent and non-threatening beings. Therefore, they could do nothing to yield recompense. Thus, when people are intrinsically struggling, it is easier to place this distress elsewhere, such as on innocent online accounts. Bullying in these cases does not indicate an implicit evil character. However, the stress displacement, to people the bullies thought was not menacing to get comfort, and the result triggered. A great example of online projection could be an angry employee responsible for replying to emails after work. He could not punish the boss. Instead, he posted irritative comments below his boss's Instagram anonymously so that the user would not post physically threatening actions on him in real life. Here, he projects his strong dissatisfaction to his non-threatening boss to eliminate his psychic discontent.

Thus, the uproar of cyberbullies is not unrooted. There is an impulse driving everyone mad these days other than inferiorities, which is stress that could come from uncertainties and incidents in life. Consequently, people treat the internet again as an absolute asylum and emotional exit due to its distinctive, stable traits compared to reality, exacerbating this vicious cycle.

Conclusion

To summarize the argument, people are not becoming nastier. However, there are more substantial incentives within the epoch of the internet that exposes the nasty sides that have long existed in our bodies- our consciousness. There has always been a debate about whether people are born good or bad philosophically (Aglietti, 2022). However, it is recognized that people are driven by and develop following our natural impulses, illustrated by the instinct theory (Loewald, 2017). Therefore, though our decisions and behaviors vary, our essence of living is universal and unchanged. As technology matures, more obstacles and allure that threaten, mislead, or contradict our instincts are present. Nastiness appears mostly due to constant self-adjustment and self-defense of consciousness and, implicating our weak and gullible sides of human nature in front of influential powers of technology.

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Toxic Addiction: An Analysis of TikTok's Algorithm By Aditya Jain

Abstract

Social networking platforms have experienced rapid growth and have potential to serve as forums for productive discourse. However, ethical concerns have emerged regarding how such platforms play a role in polarization in efforts to maximize user engagement and attention retention. This research focuses on TikTok, a rapidly growing social media platform, and evaluates the ethicality of the platform's algorithm regarding its influence on polarization. The ethical analysis in this research is oriented towards the behavioral economic concepts of nudge and choice architecture. Specifically, this research explores the prevalence of polarization on TikTok and algorithmic nudge transparency among users. This study of high school students who use TikTok found that the high frequency of polarizing content being displayed to users and the lack of understanding among users of the impact of TikTok's algorithmic nudges are key ethical issues regarding the platform's recommendation algorithm.

Introduction

The advent of the Internet signified the beginning of a shift in accessibility of content and global interconnectedness. Physical barriers in communication and exchange of ideas were broken, and individuals could interact with those around the world in an unprecedented manner. A key channel for individuals around the world to connect that evolved with the growth of the Internet is social media platforms. Platforms such as Facebook and Twitter have become hubs for individuals around the world to share their ideas with each other, serving as forums for discourse on diverse matters.

Yet, despite the accessibility and diversity of content available on social networking platforms, a primary concern that has been raised with such platforms is that of polarization—the sharp division of a population into opposing groups that hold contrasting beliefs on a matter. Algorithms that social media platforms employ to maximize user engagement and retain user attention by selectively choosing what content is displayed to users are often criticized for their role in creating a severe dichotomy in user viewpoints, furthering polarization. The role that social media platforms play in intensifying divisiveness has become an ethical controversy regarding whether social media platforms use exploitative and manipulative algorithms to increase profits at the expense of polarization. While algorithms that orient around engaging

users are inherently crucial to the success of any social networking platform, identifying the extent to which social media algorithms in the status quo prioritize engagement over healthy discourse is key to understanding the ethicality of social media algorithms. Thus, the researcher sought to explore the extent to which social media users believe platforms utilize polarization as a means of obtaining engagement, which can guide an ethical analysis of social media algorithms.

The researcher decided to focus specifically on analyzing TikTok, a popular social media platform with 1.2 billion monthly active users (Iqbal). While the platform's large user base expresses its success, TikTok has not escaped ethical controversy regarding its role in polarization. In fact, ethical concerns regarding TikTok's algorithms may have more significant implications than concerns about other platforms due to TikTok's young user base—over 40% of its users are between the ages of 16 and 25 (Duke). With TikTok serving as a primary channel for youth to consume content and communicate with others, the ramifications of an unethical algorithm that sparks divisiveness would be severe. This led to the researcher's decision to analyze the ethicality of TikTok's algorithm by studying teenage users' perception of the platform's role in polarization.

Literature Review

In an analysis of literature on social media, a discussion of the platform architecture and the behavioral nudges that it drives as well as the ethical considerations are key points that emerged out of this research. In this literature review, these key points are discussed in more detail to provide the context of the research findings.

Choice Architecture and Nudges

The purpose of the design and algorithms that social media platforms employ can be explained through the concept of a “nudge,” an idea put forth by behavioral economists Richard Thaler and Cass Sunstein. Nudges are interventions that push individuals towards a certain action or decision, and they are the result of choice architecture—designing or presenting choices in a manner that influences such choices (University of Chicago News). While nudges are often used to promote actions that are beneficial for the individual being nudged, this isn't always the case. Certain bad nudges, or “sludges” as coined by Thaler and Sunstein, utilize friction and difficulty

to steer people away from an action that may benefit them. The manner in which nudges are used and their impact ultimately depends on the choice architecture that a platform utilizes.

Social Media Algorithmic Nudges

The choice architecture and nudges that social media platforms employ can be studied through analyzing the algorithms that these platforms use to decide what content should be shown to users. Social networking platforms commonly use popularity-based algorithms that optimize for user engagement, often by displaying similar content among networks of like-minded users (Barrett et al.). Such algorithms are often based on structural similarity, strengthening connections within well-defined communities that share similar views (Santos et al.). The type of content that such algorithms display to users can have powerful impacts, as shown in a study by Kramer, Guillory, and Hancock, published in the June 2014 *Proceedings of the National Academy of Sciences*. This study found that Facebook users who were exposed to positive posts were more likely to make a positive post, while Facebook users who were exposed to negative posts were more likely to make a negative post—a phenomenon called emotional contagion (Kramer et al.). This study concludes that the type of content a user is shown can impact their emotions and opinions, demonstrating the significant influence social media algorithms possess.

TikTok Algorithmic Nudges

While TikTok utilizes an algorithm that has a similar purpose to those of other social media platforms, in the sense that it is intended to maximize user engagement, TikTok's algorithm is unique in several ways that tie to how the platform nudges its users. For instance, while many social media platforms use algorithms that rely solely on active online behaviors such as following and liking, TikTok's algorithm goes beyond surface-level active behaviors and factors in passive behavioral patterns to provide a hyper-responsive recommendation system (Zha). This recommendation system algorithm is far stronger than the linear and incremental feeds that other platforms such as Facebook and Instagram use, and TikTok's auto-discovery engine is able to retain users' attention for extended periods of time—the key to the platform's success (O'Brien).

Ethicality of Nudges

While social media platforms have succeeded due to their effective algorithms, ethical concerns have arisen regarding how the nudges that these algorithms use to keep users engaged may contribute to polarization. A primary concern is that social media platforms create an “echo chamber,” exploiting biases that users possess by showing users content that conveys viewpoints similar to their own. In that environment, users are drawn to opinions that become increasingly extreme and contrast more severely with opinions on the other end of the spectrum. This concern is validated by a study of over 17,000 individuals conducted by Ro’ee Levy, which found that Facebook’s algorithm may increase polarization by limiting the extent to which users are exposed to news outlets that convey viewpoints opposing their own (Levy). The ethical issue of polarizing echo chambers is even more severe for TikTok, as the platform’s hyper-efficient recommendation system intensifies the “filter bubble” effect—reinforcing existing beliefs rather than exposing users to new information that may contradict existing beliefs—and thus decreases the diversity of content and viewpoints that users see to a greater extent than other social media platforms with more traditional algorithms (Zha).

While there is controversy regarding whether it is morally just for social media companies to profit off of exploiting user biases to maintain users’ attention, another ethical issue arises in the form of algorithm transparency. Social media platforms such as TikTok are often secretive about how their content-ranking and recommendation algorithms function. This becomes ethically problematic as Sunstein emphasizes that nudges should be transparent rather than covert in order to be ethical (Fusaro & Sperling-Magro).

Summary

Ultimately, existing literature highlights several ethical issues that arise with the algorithmic nudges that TikTok uses for maximizing user engagement and attention retention. These ethical issues are further studied in this research through obtaining an understanding of how TikTok’s user base perceives the platform’s role in polarization in order to analyze the ethicality of TikTok’s algorithm.

Methodology

This research sought to explore the extent to which TikTok users believe the platform’s algorithm displays polarizing content to increase user engagement and attention retention, which would provide insight into the ethicality of TikTok’s algorithm in relation to polarization. TikTok

was chosen as the focus for this research because of its untraditional and uniquely strong algorithm that has been a central factor in the platform's success.

The data for this research was drawn from a March 2022 survey of high school students who were asked various questions about their TikTok usage and their experience with polarizing content (Jain). High school students were chosen as the sample for the survey because TikTok has a user demographic that skews towards younger ages than other social media platforms, so high school students were an appropriate age group to serve as survey respondents. Jain's survey, which used Google Forms to improve reach and accessibility, utilized skip logic and had a range of between six and 11 questions, depending on respondents' answers to the initial questions. Questions were presented in a combination of multiple choice and short-answer formats to provide respondents with flexibility to communicate their perception of polarization on TikTok. The survey was distributed between March 17 and March 22, 2022, via email to 51 high school students who attend school in the California San Francisco bay Area. All 51 individuals who received the email regarding the survey completed the survey and their responses remained anonymous, with demographic data being collected but no identifiable information being requested or given. The original research proposal was not reviewed by an Institutional Review Board for human subjects research because the school does not have this type of research review committee. Therefore, the research, including data collection, was done with oversight by teachers and administration to ensure that survey respondents would not be harmed by their participation in the study. Prior to distributing the survey, the researcher conducted two pilots with non-participating high school students to receive feedback and make revisions to improve the research questions. Purposive sampling was used to determine the 51 survey respondents, as participants were selected based on their ability and willingness to share their experience of using TikTok as well as their accessibility to the researcher. The survey sample consisted of high school students who had access to technology and were familiar with social media platforms, so the sample was qualified to provide their perceptions through the survey.

There are several limitations to the survey sample that must be considered in order to properly interpret the results of the survey. Regional demographics of the California San Francisco Bay Area, the area in which the survey was conducted, led to the sample having a skewed ethnic background. The majority of survey respondents were Asian Americans, and the lack of ethnic diversity in the sample may have decreased the sample's reliability as a

representation of TikTok's user base. Additionally, the survey sample was skewed toward a high socioeconomic status, meaning there was less representation for those who have a background of lower socioeconomic status. As socioeconomic status may influence individual interests, individuals of differing socioeconomic status may have dissimilar experiences using a social networking platform such as TikTok, which could cause perceptions of polarization on TikTok to not be equitably represented in the sample for those of lower socioeconomic status.

This sample thus best represents the perceived role that polarization plays in the experiences of California high school students from upper-class socioeconomic backgrounds on TikTok.

Findings

The 51 survey respondents were asked whether they use TikTok. While 78.4% of respondents expressed that they use TikTok, the 21.6% of respondents who indicated that they do not use TikTok were prompted to explain why they do not use the platform. Common words or phrases included in these responses are displayed in the word cloud in Figure 1, with larger text indicating more frequently used language in responses.



Figure 1: Reasons for not using TikTok

Out of the 78.4% of participants who responded that they use TikTok, 92.5% expressed that they believed TikTok has polarizing content. This subgroup of respondents who use TikTok

and believe that TikTok has polarizing content was asked about the extent to which they use the platform and the frequency at which they see polarizing content. Their responses, sorted by the amount of time they spend on TikTok daily, are shown in Figure 2 below.

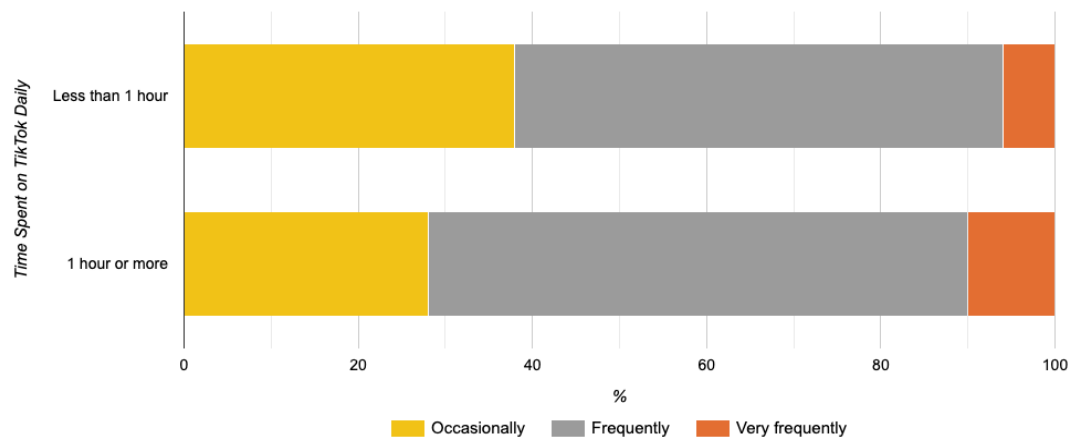


Figure 2: Frequency of seeing polarizing content by time spent on TikTok daily

Respondents were further prompted to express how they believed polarizing TikTok content influenced their use of the platform, with influence being measured in two forms—impact on likelihood to engage with content and impact on time spent on the platform. Their responses are displayed in Figure 3 below, where E represents the perceived impact on the likelihood of engaging with polarizing content and T represents the perceived impact of polarizing content on the amount of time spent on TikTok.

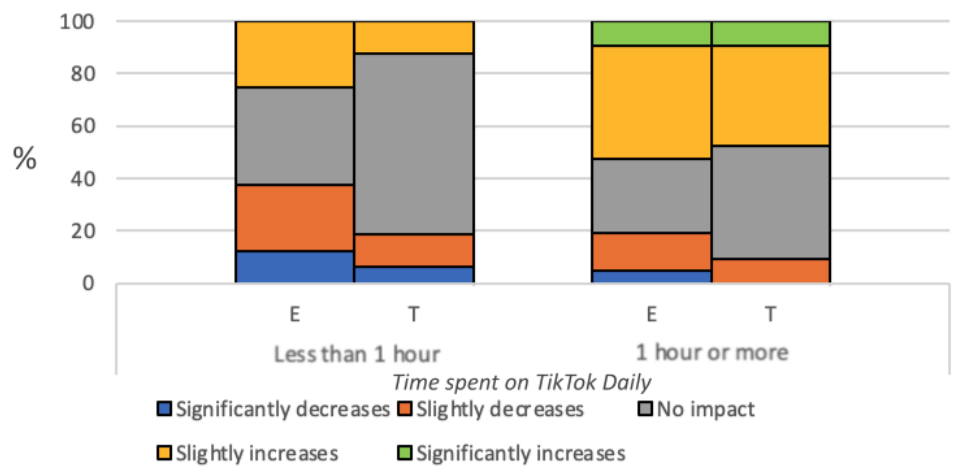


Figure 3: Influence of polarizing content on TikTok use by time spent on TikTok daily

Overall, of the survey respondents who use TikTok and believe that TikTok has polarizing content, 8.11% expressed that they are much less likely to engage with polarizing

TikTok content, 18.92% expressed that they are slightly less likely to engage with polarizing TikTok content, 32.43% expressed that polarizing TikTok content has no impact on their engagement with such content, 35.14% expressed that they are slightly more likely to engage with polarizing TikTok content, and 5.41% expressed that they are much more likely to engage with polarizing TikTok content. In this same subgroup of participants, 2.70% responded that polarizing content significantly decreases the amount of time they spend on TikTok, 10.81% responded that polarizing content slightly decreases the amount of time they spend on TikTok, 54.05% responded that polarizing content has no impact on the amount of time they spend on TikTok, 27.03% responded that polarizing content slightly increases the amount of time they spend on TikTok, and 5.41% responded that polarizing content significantly increases the amount of time they spend on TikTok.

Discussion

Several important points can be drawn from analyzing the findings of the survey. The responses from participants explaining why they do not use TikTok largely use diction with negative connotation that depicts the platform as an unproductive yet irresistible forum for discourse. Words such as “addicting” and “toxic” are used by respondents to characterize the platform, suggesting that the platform can be harmful to its users—a central point of concern for the ethicality of TikTok and the algorithm behind it. Further, these short-answer responses demonstrate a trend of consumer awareness, as the respondents who indicated that they do not use TikTok recognize their vulnerability to becoming attached to the platform through nudges and the platform’s strong recommendation algorithm. However, it is important to note that this form of consumer awareness comes from non-users of the platform rather than users themselves. Understanding the extent to which TikTok users are aware about the presence of polarization on the platform and its impact on their activity is key to determining where the platform’s algorithm stands in terms of two ethical considerations—the extent to which the algorithm boosts content that promotes polarization and the extent to which the algorithm is understood by the platform’s users.

At first glance, the trend of high consumer awareness seems to continue for TikTok users, as 92.5% of respondents expressed that they believe TikTok has polarizing content. Further, users who spend more than an hour on TikTok reported seeing polarizing content more

frequently than users who spend less than an hour on TikTok, demonstrating that more active users are able to identify that their content feeds become increasingly populated with divisive content. This suggests that there is algorithmic transparency present to some extent, as users who spend more time on the platform notice how the algorithm displays polarizing content with increasing frequency. However, this does not necessarily demonstrate that the function of polarizing content as algorithmic nudges is transparent to users. Further, the apparent awareness of highly active TikTok users to the frequent polarizing content they are being exposed to brings up the question of why these individuals continue to use the platform to such a great extent even when they know that it tends to feed them divisive content that makes for unproductive discourse.

Looking deeper into the responses of TikTok users who reported that the platform has polarizing content provides insight into the algorithmic nudge transparency and the reasoning for users sticking with the platform even when aware of its high frequency of polarizing content. A positive correlation was found between the amount of time spent on TikTok daily and the likelihood of engaging with polarizing content, suggesting that highly active users recognize that polarizing content nudges them towards engagement. This supports at least a basic understanding among users of algorithmic nudges, as the respondents were able to recognize how divisive content can be used to retain their attention and engage with the platform. Despite this demonstrated understanding of algorithmic nudges among users, over 50% of respondents expressed that they believe polarizing content has no impact on the amount of time they spend on TikTok. The failure to draw a connection between engagement and time spent on the platform may be explained through a self-serving bias, as respondents largely expressed that polarizing content influences them to engage more with TikTok but did not express that such influence carried over into the time they spend on the platform. The disconnect between user perceptions of platform engagement and time spent on the platform in relation to polarizing content may serve as a sort of psychological friction, which Thaler and Sunstein warned could be used by detrimental “sludges” that push individuals away from beneficial actions. The friction created by decreased user awareness of how polarizing content shapes the amount of time for which they use TikTok may trap users into continuing to use the platform with the awareness of its divisive content and their increased engagement with it but with the perception that it does not impact the

time they spend on the platform, leading to individuals being nudged to continue using the platform without being drawn away by the polarization it sparks.

The perceptions of TikTok polarization expressed by the survey respondents provide an evaluation of the ethicality of TikTok's algorithm on the basis of algorithmic nudge transparency and the prevalence of polarizing content on the platform. Participant responses make it clear that polarizing content is widely present throughout TikTok, especially for more active users on the platform, suggesting that there is a positive correlation between time spent on TikTok and exposure to divisiveness. While this poses an ethical concern on its own merit as users may be detrimentally impacted psychologically by the widespread polarization on the platform, the issue is exacerbated when algorithmic nudge transparency is considered. Despite respondents expressing awareness of how algorithmic nudges play a role in displaying polarizing content as individuals recognized a link between polarizing content and higher levels of engagement, the lack of expressed awareness regarding how such nudges influence the time individuals spend on TikTok suggests that users do not understand the full extent of the impact of such algorithmic nudges. The inability of users to recognize the relationship between engagement and time spent on TikTok hints that psychological friction may cause users to follow detrimental "sludges" without a full understanding of the algorithmic nudges that TikTok utilizes. Thus, it can be determined that algorithmic nudge transparency is not fully possessed by users who are being exposed to polarizing content on TikTok, violating a requirement put forth by Thaler and Sunstein for the ethicality of nudges. A high presence of polarizing content on TikTok and a rather low understanding of the algorithmic nudges that users experience on the platform ultimately validate ethical concerns regarding the platform and its role in polarization.

Conclusion

This research demonstrates that TikTok's algorithm faces ethical issues with regard to the prevalence of polarization on the platform and the lack of algorithmic nudge transparency among users. While TikTok users and the population of individuals who consume content online as a whole are growing increasingly aware of algorithms and other techniques that companies use to retain their attention, a complete understanding of the algorithmic mechanisms that platforms such as TikTok use is necessary for an ethical experience on such platforms. Until such a level of understanding and awareness is achieved among consumers, social networking and content

consumption companies will continue to thrive but at the expense of the second-order effects of polarization and division.

The implications of this research stretch beyond TikTok, other social platforms, and even the Internet as a whole. Thaler and Sunstein's concept of a nudge and choice architecture apply to a multitude of aspects of our daily lives. From food choices to career choices, nudges and choice architecture are employed in a variety of settings that continually push individuals towards specific actions and decisions. Although nudges can be helpful in many contexts, this research demonstrates that nudges must factor in ethical considerations in order to be in the true best interest of the individuals being nudged. While the researcher focused on evaluating the ethicality of TikTok's nudges through the two factors of the prevalence of polarization and the transparency of algorithmic nudges, different factors will shape the ethicality of nudges in other platforms and other industries. Further research must be done to identify the diverse sets of ethical requirements for nudges in contexts such as food labels and career pipelines. Additional research should also be conducted to explore TikTok polarization across different age groups to identify how age demographics shape individual experiences with and perceptions of TikTok's algorithmic nudges. Such research will help develop an understanding of how companies can implement nudges in an ethical manner that advance both their interests and the interests of their consumers.

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Impact of Online Learning on Students' Academic Performance By Daniel Volodarsky

Abstract

COVID-19 had a tremendous impact on the educational system throughout the world. As the lockdown occurred, schools transitioned from an in person teaching method to a fully remote method for a year and a half. Adjusting to studying online can be difficult for many students since this style of education was not a typical practice in the elementary, middle and high school setting until the Covid-19 pandemic occurred. Thus, most students have become accustomed to the previous learning standard of in person education. A face-to-face classroom is the traditional way of studying which most students are accustomed to. Having to learn how to study through a technological platform has created different problems for students such as difficulty with concentration, connections with students as well as teachers, and comprehension of the subject (Khobragade, Sujata Yadneshwar, et al). Khobragade et al, explain in their research that 74.5% of students in their experiment felt that they were not motivated for online learning and 62.7% had poor communication with their teachers. In the present study, students were asked for a self-evaluation about whether they prefer online learning or in-person learning and how their grades have been impacted before and after the global COVID-19 pandemic. By the end of the study, results showed that the majority of students said that in-person learning allowed them to understand and remember the material more clearly than those who were studying online. However, the overall score results varied from student to student when it came to academic performance before and after the global pandemic.

Throughout the recent Golden Age of Technology, the utilization of computerized or online learning has been a topic of major debate. It is argued that online learning is less efficient than in-person learning due to students feeling that connecting with their teachers was difficult and resulted in students feeling less “mattered” (Vaillancourt). According to Vaillancourt, more secondary schoolers that were educated online felt that they mattered less during the pandemic than after. There are many colleges that operate on a complete remote experience where it is possible to receive a degree that is of equal standing to a degree from an in-person college. However, the debate stems from whether online learning and in-person learning provide an equal experience in students being able to grasp materials and have an overall fulfilling education. Most participants of the experiment stated that they felt they learned more during in-person learning; before and after the COVID-19 pandemic's lockdown. Many of the questions were

based around students' grades before and after the pandemic and whether they preferred online learning or in-person learning.

Method

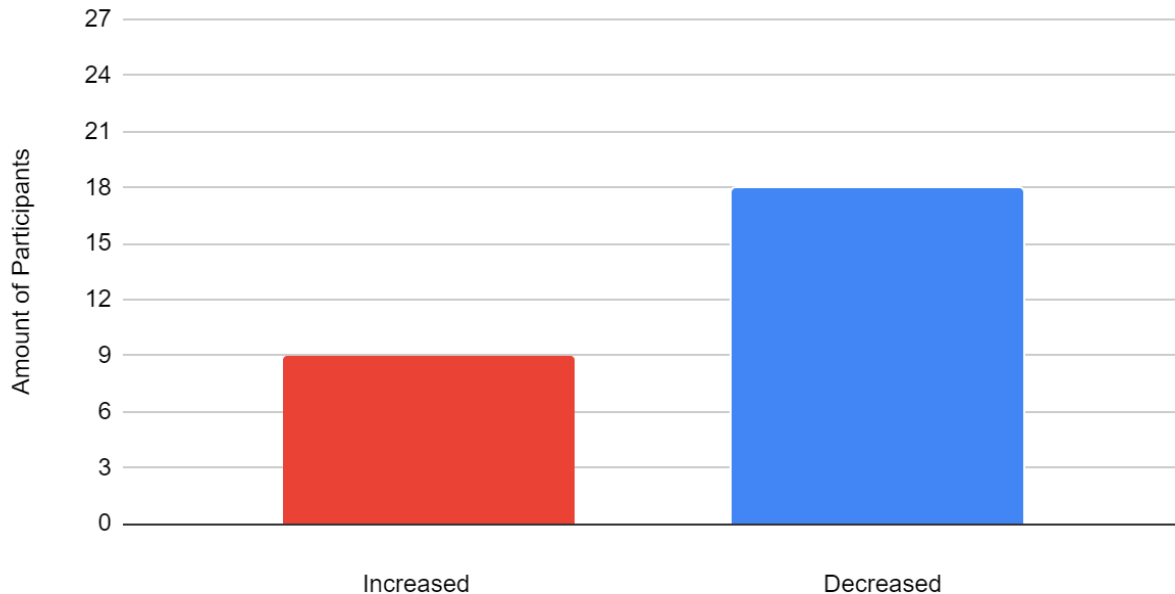
The sample consisted of 27 randomly picked students at Susan E. Wagner High School who were divided amongst 7 different lunch periods. Each student consented to participate in this survey according to [American Psychological Association](#) (APA) guidelines. Each group consisted of 7-8 students per lunch period. I received permission to conduct this study by the Assistant Principal of Organization, Mrs. Daniella Susino who allowed me to interview any student of my choosing who consented to participating in my study according to the APA guidelines of ethics.

Results

At the beginning of my experiment, I proposed that for the majority of students their overall grades have decreased due to online learning. I created a series of questions which are listed below. For each question the same 27 students were asked, and no other variables were changed. In the case that one of the participants was a freshman, I inquired about their previous years of education. The following graph contains the results after asking the first question about whether grades during online learning improved from when the student was last in-person.

Question #1

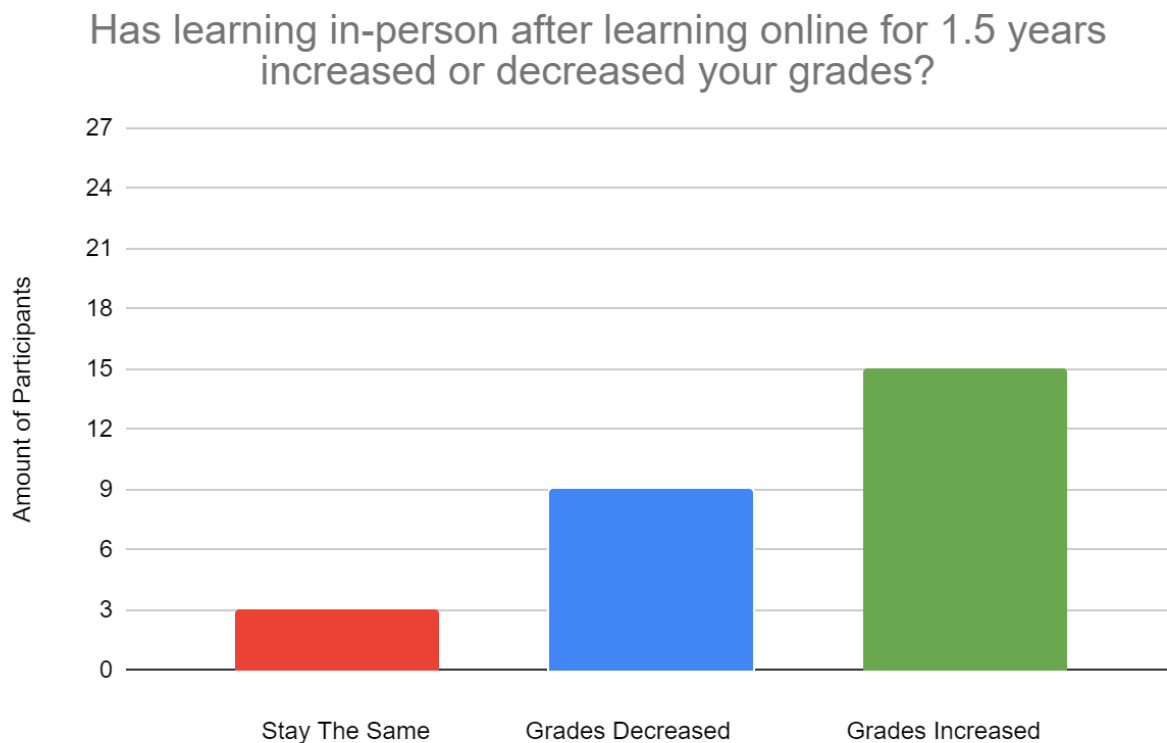
Has learning online improved your grades or lowered them from the last time being in person?



The number of students whose grades increased and decreased was, in ratio, 9:18 respectively. Not a single student reported that their grades have stayed exactly the same. The proposed hypothesis was incorrect, and the grades of most students increased. This increase in grades does not correlate to the level of a student's knowledge or how much they retained from that year. The fact that their grades increased could be due to learning online was easier due to confounding variables such as cheating, easier assignments, less exams, and less pressure from teachers.

Question #2

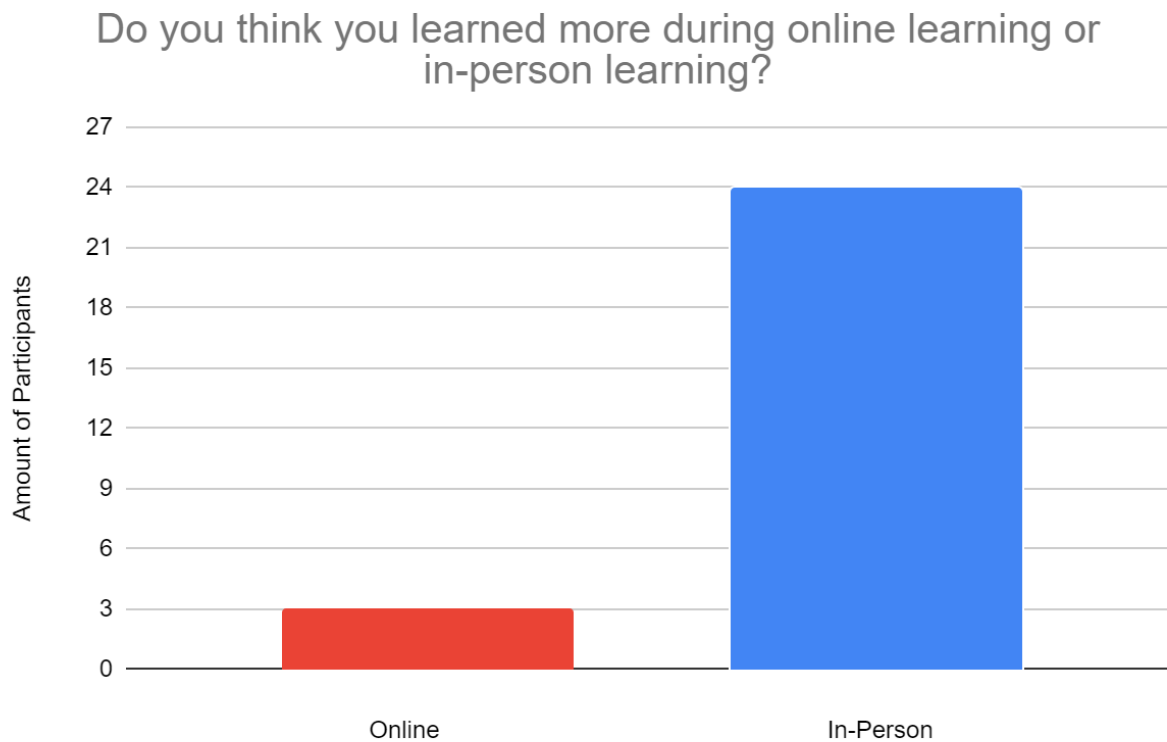
The following graph tested the improvement or decline of grades after learning online and was the second proposed question during the experiment. The proposed hypothesis was that grades would improve.



The results conclude that grades mostly increased although the skew of increased versus decrease was not as large as in the previous question. In this part of the experiment many participants were unsure of the change of their grades which could have led to no difference in grades or an unrecognizable difference whether grades increased or decreased. However, the proposed hypothesis was correct, and grades did improve based on a majority.

Question #3

The following question asked the participants whether they learned and retained more information during online learning, or in-person learning based on the last year and a half being online and this year being in person. The same 27 participants were tested.



In the third and final question in the study an overwhelming majority of participants claimed that they learned better in-person which matched the presented hypothesis. Only a small portion (1/9) of students chose that studying online made them learn better.

Discussion

After asking these three questions it can be concluded that learning online was less beneficial for the majority of students since the majority (89%) claimed that they learned less, although their grades, for the most part, were better.. This can be countered by the results of the second proposed question since most grades were better than online grades, however this may be

coincidental. It should be taken into consideration that teachers may have assigned less work, created a less rigorous curriculum for the class, as well as possibly curved grades. According to the results, most students did not prefer to learn online and so it can be argued that online learning is not the most viable option for learning and retaining information as well as that online learning is less efficient than in-person learning. Research has shown that about 43% of students, according to the cited experiment, found online learning to be an efficient form of teaching and 57% found that it is less efficient. (Mahendra, Jaideep, et al)

Changes that can be made in this experiment in the future are a higher participating sample, a more diverse sample ranging across multiple high schools, more statistical questions to ensure any confounding variables are eliminated, more questions about the quality of education in online or in-person, and more detailed questions about the rigor of classes taken. More studies need to be done to ensure that this experiment was not coincidental with the students of Susan E. Wagner but was uniform throughout the world. It is also important to think about the effects of hybrid learning, a mix of both virtual learning and in-person learning. According to Vallée, Alexandre et al, hybrid learning functions better than traditional only in-person learning in the field of medical education. This may also apply for other fields of study.

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Fundamental Analysis of Apple's Stock By Anthony Wei

Introduction

Apple is a company founded in 1976, by Steve Jobs, Steve Wozniak, and Ronald Wayne as a business partnership. As one of the largest multinational technology companies, the company specializes in designing, manufacturing, and marketing smartphones, computers, tablets, and other accessories (SEC.gov).

Apple sells smartphones, computers, tablets, and other accessories, and it also provides a variety of services. The company provides advertising platforms for the third party it's own company. For example, AppleCare helps repair and replace damaged or lost devices, while the Cloud service provides a storage space to keep customer's content up to date across multiple Apple devices. Digital applications in the devices help customers discover music, videos, and games. Customers can also pay quickly with the help of Apple Pay (What is Apple?)

Millions of customers use Apple products on a day-to-day basis. Apple is one of the largest companies in the world, with a market of nearly 2.5 trillion dollars (Yahoo Finance). Many investors view Apple as a "safe haven" when it comes to parking in their cash position into an asset. After all, what is the likelihood of Apple declaring bankruptcy anytime soon? The purpose of this article is to provide an unbiased fundamental analysis on the valuation of Apple's stock price using financial statements that are published on the Security and Exchange Commission's annual 10K report. First, we will analyze critical risk factors and competitions that Apple is currently/will be facing in the future, and how these might exert a negative pressure on the company's stock price. We will then compare Apple's past stock performances (short-term and long-term) and highlight some of the key factors that contribute to the stock's price fluctuations. Next, we will look at Apple's financial statements, primarily the balance sheet and the income statement, to determine the financial health of the company over the past fiscal years. Finally, we will use the data from these financial statements to generate the stock's price target in the next 3-5 years. By the end of this article, investors should be able to apply these concepts and subsequently perform their own fundamental analysis on *any* company's stock price.

Risk Factors and Competitions

To determine a company's stock price in the next five years, it is critical to consider the company's risk factor and competition. Risk factors are causes responsible for disrupting business activities, goals, and expectations. Depending on the risk factor, it will most likely negatively impact a business's ability to operate. Some of the common risk factors among all companies are market fluctuations and competition. In our example, Apple is the leading technology company; however, Apple is also known for its high pricing on products. This creates the risk of aggressive price competition, because other tech companies can provide products that are cheaper than Apple. (SEC.gov). Apple is also known for its frequent introduction to new products and services, where many products are almost repeats of the old product and the new products function almost exactly the same. The company's products and services may be affected by design and manufacturing defects that could materially adversely affect the company's business and result in harm to the company's reputation. Apple is also struggling against Rapid adoption of technological advancement by competitors, notably Huawei's 5G (SEC.gov). Initially, Apple is the leading company in terms of developments in technology, but in recent years, more and more companies are starting to imitate and surpass Apple's technology. This results in the company may be unable to compete effectively in these markets where products and services are highly competitive and subject to rapid technological change. Another huge factor is the environment of the market. The company's operations and performance depend significantly on global and regional economic conditions and adverse economic conditions can affect the company's business. The company depends on component and product manufacturing and logistical services provided by outsourcing partners, many of which are located outside of the U.S. For example, in 2021, Apple was forced to slash its product, iPhone 13, because of over 10 million chip shortages due to the pandemic. The company's business can be impacted by political events, trade and other international disputes, war, terrorism, natural disasters, public health issues, industrial accidents and other business interruptions (SEC.gov). For example, Apple stopped selling all products and limited the functionality of its service as a response to Russia's invasion of Ukraine. All of these risk factors have negatively impacted Apple's growth, but these risk factors only have mere effects due to Apple's dominance over the market.

During the course of the pandemic, Apple's component suppliers and manufacturing and logistical service providers have experienced disruptions, resulting in supply shortages that

affected sales worldwide (Bloomberg, 2021). The company's retail stores, as well as channel partner points of sale, have been temporarily closed at various times. In many cases, as stores and points of sale have reopened, they are subject to operating restrictions to protect public health and the health and safety of employees and customers.

Apple's Stock Performance (1-year and 5-year charts)



Figure 1. One-year Performance of Apple's Stock Price from July 2021 through July 2022
(Source: WeBull)



Figure 2. Five-year Performance of Apple’s Stock Price from July 2017 through July 2022
(Source: WeBull)

We cannot ascertain the current financial health of a company solely based on historical performances. With that being said, it doesn’t necessarily mean that past data is rendered useless for future evaluations. Many investors like to compare between the 1-year versus 5-year stock performances to learn about the market cycles and perform technical analysis to forecast future pricing using trendlines and moving averages. While this report does not entail any technical analyses to make price projections, we will use some of the chart patterns to reflect on macroeconomic variables that influenced the stock market movements.

The 1-year price performance can be both useful and misleading data when evaluating the fundamentals of a company (**Fig 1**). The truth is, one year is insufficient to make any profound judgements on the core valuations of a company. Particularly in 2021, the stock market overall has experienced massive fluctuations and volatility. Part of this was because the Federal Reserve Bank has lowered the Federal Fund Rate (a.k.a. The national interest rate) to zero and helped stimulate the national economy via quantitative easing—purchasing bonds and

mortgage-backed securities from investors (Ellevest, 2021). From June 2021 through December 2021, the price of Apple has experienced substantial gains, growing from a price floor at nearly \$130/share to the high of \$180/share. Starting from January 2022 however, the Federal Reserve Board started discussing prematurely terminating its quantitative easing program and subsequently started to raise interest rates at a rapid pace (CNBC, 2021). On top of this, the entire world's economy experienced significant deceleration in its GDP (Gross Domestic Products) when Russia declared war on Ukraine, which created huge amounts of fear and uncertainty about the stock market's future performances. The stock market has entered a bear market, which is defined as a >20% decline in the S&P 500 index, and the price of Apple has been fluctuating near its 52-week low floor pricing at \$135 (Yahoo Finances). If anyone were to make any conclusions about Apple's stock performance using the 1-year chart without any macroeconomic context, it's easy to conclude that Apple is a very volatile stock with massive sideways fluctuations. In reality of course, the macroeconomic policies played a major role in Apple's price performance over the past fiscal year (2021-2022).

On the other hand, the 5-year price performance provides a much broader landscape of Apple's growth and future earning potential (**Fig 2**). Between 2017 to early 2020, Apple's stock price has increased from approximately \$27/share to nearly \$80/share, which is nearly a 3-fold increase. According to the charts, Apple's price fell substantially from February 2020 to April 2020 because this period marked the beginning of the COVID-19 pandemic. But what's incredible is that Apple's stock price started to skyrocket during the stay-at-home period of time. This is largely because new retail investors started to pile into the stock market and started buying shares of technology companies like Apple, Amazon, Facebook, and Google. On top of that, Apple has earned substantial amounts of quarterly revenue because its product sales have reached all-time-highs, as more and more people started purchasing Apple products during their stay-at-home mandates. Altogether, a 5-year price performance provides a much more accurate portrayal of a company's potential for growth because we can visually see more historical context. However, even a 5-year price performance data will *never truly* help investors speculate on future price projections because nobody can truly time the stock market. Altogether, Apple's stock value, product performance, and services performance had increased significantly over the last few years, and we predict that Apple will continue to perform phenomenally over the next

5-10 years. In the next following sections, we analyzed some of Apple's financial statements to fully understand the company's financial health as well as its growth projections.

Apple's Balance Sheet

The first component of my fundamental analysis pipeline begins with the balance sheet. A company's balance sheet is one of the three core financial statements that provide a company's assets, liabilities, and shareholder equity. We can obtain the company's balance sheet directly from the 10-K annual report found in the EDGAR website. The balance sheet will report data from the past three years. For example, if you are looking up the balance sheet for Apple in 2022, you would be able to acquire data from 2019, 2020, and 2021. In this example, we will compare between 2020 versus 2021 for simplicity.

The first component of a balance sheet is assets, which is any resource owned by an economic entity. Below is an Excel spreadsheet containing data directly imported from the SEC website (**Table 1**).

			2021	2020
Current Assets				
Cash and Cash Equivalents			34,940	38,016
Marketable Securities			27,699	52,927
Net Accounts Receivable			26,278	16,120
Inventories			6,580	4,061
Vendor non-trade receivables			25,228	21,325
Other current assets			14,111	11,264
Total current assets			134,836	143,713
Non-Current Assets				
Marketable Securities			127,877	100,887
Net Property, Plant, and Equipment			39,440	36,766
Other non-current assets			48,849	42,522
Total non-current assets			216,166	180,175
Total Assets			351,002	323,888

Table 1. Total Assets for Apple in 2020 vs. 2021

This is data directly imported from Apple's 10-K annual report (Please note that these numbers are in *millions of dollars*. i.e., 14,111 = \$14,111 million dollars, or \$14.1 billion dollars) The first category that we should primarily look at is *cash and cash equivalents*, which is also known as the company's emergency reserve. Apple's high cash reserve gives investors the

confidence that Apple can pay off its liabilities whenever necessary. Just like how any one of us can face an emergency situation at any point, corporations can also face emergencies as well. When comparing between 2020 and 2021, Apple's cash reserve did drop from \$38,016M to \$34,940M. Current marketable securities (stocks, bonds, CDs, and commodity contracts that can be readily deployed into cash within the fiscal year) also reduced from \$52,927M to \$27,699M. At a first glance, these figures might freak out some people—why is the company reducing its cash position? However, if you take a look at the non-current asset section, there is an overall net increase from \$180,175M to \$216,166M, suggesting that the company is increasing its *long-term* financial positions.

We can also look at net accounts receivables and inventories, which are simply credits owed to the company. From 2020 to 2021, this value has increased from \$16,120M to \$26,278M, suggesting that many consumers are purchasing Apple products on credit. When Apple exercises the right to collect money from their consumers, this value will be converted into cash & cash equivalents. Additionally, we should also try to look for companies that don't have too much value in inventory. A high value in the inventory category may suggest that the company is having a difficult time selling those products. Apple usually doesn't have a problem in this category because their products are constantly in high demand.

Other than that, when we compare the total assets between 2020 and 2021, there is a net increase from \$323,888M to \$351,002M. This is phenomenal for a company like Apple. Even though its market capitalization is over \$2.5 trillion dollars, Apple is consistently growing and expanding, and this is mathematically reflected by its assets.

The other side of the balance sheet would be the liabilities and shareholder's equity. Liabilities include any form of debt that the company owes, while shareholder's equity represents how much the shareholders of the company have invested into the business.

Current Liabilities				
Accounts Payable			54,763	42,296
Other current liabilities			47,493	42,684
Deferred revenue			7,612	6,643
Commercial Paper			6,000	4,996
Term Debt			9,613	8,773
Total Current Liabilities			125,481	105,392
Non-current Liabilities				
Term Debt			109,106	98,667
Other non-current liabilities			53,325	54,490
Total non-current liabilities			162,431	153,157
Total Liabilities			287,912	258,549
Shareholder's Equity				
Common stocks and additional paid-in capital			57,365	50,779
Retained earnings			5,562	14,966
Accumulated other comprehensive income			163	-406
Total shareholder's equity			63,090	65,339
Total liabilities and shareholder's equity			351,002	323,888

Table 2. Total Liabilities and Shareholder's Equity for Apple between 2020 vs. 2021

Comparing between 2020 and 2021, the total liabilities have increased from \$258,549M to \$287,912M (**Table 2**). Many people would generally have a negative viewpoint towards a company with increasing debt. However, this is a perfectly normal process in the business cycle. After all, if a company is producing more and more products, the cost of upkeep, maintenance, labor, and capital would all increase, which is directly reflected in the liabilities portion of the balance sheet. As long as the total assets exceed total liabilities for consecutive years, there is good faith in the company's financial stability. And of course, the remaining gap between the assets and liabilities would be the shareholder's equity.

Apple's Income Statement

After reading through the balance sheet, we can proceed to look at the company's income statement, which is a financial statement that summarizes all income and expenses over a given period (e.g., one fiscal year).

			2021	2020	2019
Net sales					
Products			\$ 297,392.00	\$ 220,747.00	\$ 213,883.00
Services			\$ 68,425.00	\$ 53,768.00	\$ 46,291.00
Total Net Sales			\$ 365,817.00	\$ 274,515.00	\$ 260,174.00
Cost of sales					
Products			\$ 192,266.00	\$ 151,286.00	\$ 144,996.00
Services			\$ 20,715.00	\$ 18,273.00	\$ 16,786.00
Total cost of sales			\$ 212,981.00	\$ 169,559.00	\$ 161,782.00
Gross Margin			\$ 152,836.00	\$ 104,956.00	\$ 98,392.00
Operating Expenses					
Research & Development			\$ 21,914.00	\$ 18,752.00	\$ 16,217.00
Selling, General & Administrative			\$ 21,973.00	\$ 19,916.00	\$ 18,245.00
Total Operating Expenses			\$ 43,887.00	\$ 38,668.00	\$ 34,462.00
Operating Income			\$ 108,949.00	\$ 66,288.00	\$ 63,930.00
Other Income			\$ 258.00	\$ 803.00	\$ 1,807.00
Income before provision for income taxes			\$ 109,207.00	\$ 67,091.00	\$ 65,737.00
Provision for income taxes			\$ 14,527.00	\$ 9,680.00	\$ 10,481.00
Net income			\$ 94,680.00	\$ 57,411.00	\$ 55,256.00

Table 3. Apple's Income Statement for 2019, 2020, vs. 2021

This is Apple's income statement directly imported from the SEC EDGAR website (**Table 3**). Let's start with the net sales. According to the 10-K report, Apple's primary products are iPhones, Mac, iPad, Wearables, and Home and Accessories. Apple's primary services include Apple Music, Apple TV+, Apple Arcade, Apple News+, and Apple Fitness+. When comparing the total net sales between 2019, 2020, and 2021, we can see that the net sales have increased substantially. This isn't surprising because throughout the latter half of 2020 and 2021, many people have adopted Apple products into their daily lifestyle during the stay-at-home COVID shutdown.

Of course, a net increase in revenue doesn't mean anything if the net cost to manufacture those goods and services have increased equally, if not more. In Apple's case however, the net increase in the cost of goods and services does not appear to be substantial compared to the increase in the net revenue. This can also be reflected when we compare the gross margin percentages between each fiscal year. Gross margin percentages can be calculated by taking the net profit divided by the net revenue.

	<u>2021</u>	<u>2020</u>	<u>2019</u>
Net profits	\$152,836 M	\$104,956 M	\$98,392 M
Net revenue	\$365,817 M	\$274,515 M	\$260,174 M
Gross Margin %	41.8%	38.2%	37.8%

Table 2. Apple's Gross Margins between 2019 and 2021

As we can see, the gross margin percentages have been steadily increasing every year for the past three years, which indicates that the company is generating increasing profits. A high profit margin is key to a company's financial health—companies will allocate this cash to re-invest into their companies for growth, pay out dividends to shareholders, pay off liabilities, and/or increase cash reserves.

Analyst's Current Ratings and Estimates

As stated previously, Apple is an American technology company that specializes in electronics, software, and online services. It is one of the five mega-cap technology companies, alongside Microsoft, Facebook, Amazon, and Google. Apple designs and manufactures smartphones, tablets, personal computers, accessories, and other related software products and services. Its top products are iPhones, Mac, iPad, AirPods, Apple TV, and Apple Watch. Apple also offers various services, such as AppleCare, Apple Pay, Apple Music, Apple Fitness, Apple News, as well as other cloud services to store and maintain customer's content up to date. This company has revolutionized modern-day technology, and it is believed Apple still has much more capacity for future growth. Bulls (Those who typically have an optimistic outlook) believe that Apple is constantly innovating with novel software upgrades, and the company is projected to continue its revenue growth as Apple Pay, Apple Watch, Apple TV, and AirPods become more and more adopted. The iOS operating system has been consistently ranked as the top of the pack in terms of customer loyalty, engagement, and security (Morningstar).

Despite the positive growth outlook for Apple, we cannot rule out important risk factors that Apple is currently (and will continue to be) facing over its lifetime. Bears believe that Apple is far behind in artificial intelligence (AI) features, notably Siri voice recognition, compared to Google and Amazon. Many investors believe that integration of AI is a crucial development when delivering premium services to their customers (Morningstar). A buggy AI system can easily denigrate Apple's reputation, especially when the AI makes mistakes when it comes to performing essential tasks. Furthermore, Apple products tend to be on the expensive side compared to other alternative products. While Apple's decision to maintain a premium pricing strategy would prevent gross margin compression, Apple could potentially face reduced sales growth when their product pricing becomes more and more unaffordable to many customers.

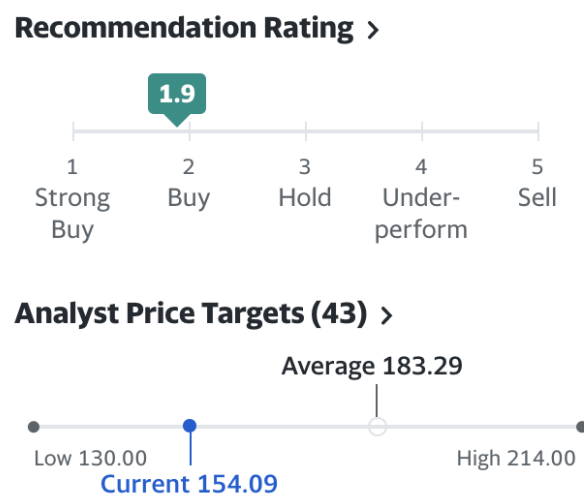


Figure 3. Current Analyst's Ratings and Price Target for Apple's Stock

According to expert analysts, Apple is currently rated as a **1.9** (1=strong buy; 5= sell), which implies that Apple is hovering between a buy and a strong buy (Yahoo Finance). Analyst's price target as of April 2022 is \$183.29, which is a significantly higher price than the current trading price.

Financial Summary Report

It is also essential to understand some of the important corporate metrics prior to performing a full-scope fundamental analysis of a company. Websites like Yahoo Finance can provide up-to-date information about every individual stock's financials every trading window.

In this section, we will focus on five core elements of a stock's financial summary report: Volume, Market Capitalization, Beta, P/E Ratio, and EPS.

Volume isn't necessarily a corporate metric that helps determine a stock's price, but it provides very vital information about the stock: its liquidity (Investopedia). Stock transactions are only possible if there is an equal balance of supply and demand for that stock. The greater the trading volume of a stock, the more likely probability that your transaction will become executed by another individual/institution. In this example, Apple's trading volume from the last trading day was approximately 91.3 million shares, indicating that 91.3 million worth of share quantities were traded in the open market. Apple has one of the highest trading volumes in the stock market community.

Market capitalization is a proxy for the net worth of a company in the stock market's perspective (Investopedia). Mathematically speaking, a company's market capitalization is determined by multiplying the current price of a stock by the total number of issued shares by Apple. Because market capitalization is subject to the underlying stock's price variations, it constantly changes on a daily basis. But because of Apple's historically stable volatility, its market capitalization currently hovers around 2.2 trillion dollars. It is important to realize though, that market capitalization doesn't 100% correlate to its net worth. But when choosing companies to invest in, Apple is a very attractive stock because it is literally the largest company in the nation by market size and capitalization.

In the stock market, β refers to the measure of a stock's volatility relative to the S&P 500 index (Investopedia). S&P 500 is an index that tracks the performance of 500 top companies in the United States. Because it's a well-diversified index fund, it's deemed as one of the safest investment vehicles. In addition, the S&P 500 is used as a reference standard to quantify the risk-level of individual stocks. If a stock has a β equal to 1.0, then the price performance of that stock moves in parallel to the S&P 500 (If the S&P 500 rises 5% for the year, this stock would also rise by 5%). If a stock has a β less than 1.0, it is deemed less risky but at the same time, it will provide significantly lower returns than the S&P 500. On the other hand, if a stock has a β greater than 1.0, it is deemed riskier but at the same time, it will provide significantly higher returns compared to the S&P 500. These stocks usually experience high price volatility because many investors actively trade in and out of these stocks. Because Apple has a β of 1.20, its price performance is approximately 1.2 times more volatile compared to the S&P 500. This doesn't

necessarily mean a bad outlook for Apple—a healthy growth company should have a higher β value, albeit too high value can indicate that the company is overvalued.

Earnings-per-share, or EPS, is a proxy for valuing a company's stock. A company's EPS is determined by fluctuations in quarterly/annual earnings and the total number of shares outstanding (Investopedia). EPS can be boosted by either increasing its earnings or reducing its share counts through stock buybacks. There isn't necessarily a magic number that dictates a good EPS, but in general, many investors would like to see companies surpassing their expected EPS reports. The main limitation of using EPS to value a company's stock is that EPS is calculated using net income. The net income of a company is influenced by many factors, including tax & interest payments, non-operating expenses, depreciation, and amortization. Because of these huge variations that influence the company's net income, EPS doesn't quite reflect the health of the business, and thus, it's not the best parameter to value a company's stock. Furthermore, companies can always manipulate their EPS by changing the number of shares outstanding.

Finally, the P/E ratio is calculated as the current price of the company's stock divided by its recently reported EPS (Investopedia). Apple's P/E ratio is calculated as 22.34. One way to think about this is that for every \$1 of earnings in Apple, investors are paying \$22.34, or a multiple of 22.34. In general terms, P/E ratio provides information on whether a company's stock is trading at higher valuations or lower valuations. The lower the P/E ratio, the more undervalued a company. Like EPS, P/E ratio is at best a proxy for a company's valuation, but it will never fully reveal 100% information about a company's financial health. This is because the P/E ratio depends on the value of EPS, and as we discussed in the above section, EPS changes heavily based on the company's net income for a particular quarter. **Figure 3** indicates the financial metrics discussed in this section.

Previous Close	142.64	Market Cap	2.231T
Open	140.28	Beta (5Y Monthly)	1.20
Bid	137.35 x 800	PE Ratio (TTM)	22.34
Ask	137.39 x 1200	EPS (TTM)	6.14
Day's Range	137.06 - 140.76	Earnings Date	Jul 25, 2022 - Jul 29, 2022
52 Week Range	127.07 - 182.94	Forward Dividend & Yield	0.92 (0.62%)
Volume	91,262,371	Ex-Dividend Date	May 06, 2022
Avg. Volume	95,461,284	1y Target Est	188.92

Figure 3. Financial Metrics for Apple's Stock
(Source: Yahoo Finances)

How to Calculate Future Price Target

Now that we have looked at both the balance sheet and the income statement, we are now ready to put these data together and formulate our own price projection. This is where we can get very creative with our numbers. First, we need to determine the *future* revenue from total sales of products and services. Apple primarily generates its revenue from products like Macbook, iPhones, Apple Watches, Apple TV, AirPods, and many more. Apple also offers various services, such as AppleCare, Apple Pay, Apple Music, Apple Fitness, Apple News, as well as other cloud services to store and maintain customer's content up to date.

Next, we need to determine the total expenses, including expenses from sales, operating expenses, and interests. You might be wondering...how the heck are we able to predict future costs of goods and services? It is true that we have absolutely no control over future pricing power. But we can still make rough estimates based on expectations of profit margin. For example, if we expect Apple to earn \$650 billion dollars in net revenues, along with a profit margin of 40%, the approximate sales expense would be \$650 billion dollars * 0.60, which is roughly \$390 billion dollars on sales expense (i.e., The amount of money needed to *produce* those Apple products). The greater the expected profit margin, the lower the sales expense.

Finally, using the current trading price for \$AAPL, calculated EPS & P/E ratio, as well as the *forward* P/E ratio (Current stock's price divided by its "predicted" earnings per share in the future), we can project a price prediction in the next 5-10 years, depending on how far in the future the forward P/E ratio is calculated as. Below are two separate examples of \$AAPL price prediction in 2027 (conservative and bullish projections).

Revenue	2025 Estimates		Model Equation (X=0, 2019)	
Products	\$464,407,000,000.00		$Y = 41754000000X + 213883000000$	
Services	\$112,693,000,000.00		$Y = 11067000000X + 46291000000$	
Total Net Sales	\$577,100,000,000.00			
Expenses		Expense Margin	Profit Margin	
Expense on Product Sales	\$255,423,850,000.00	0.55	0.45	
Expense on Service Sales	\$61,981,150,000.00	0.55	0.45	
Operating Expense	\$86,565,000,000.00	0.15	0.85	
Total Expenses	\$403,970,000,000.00			
		Tax Rate		
Net Income	\$173,130,000,000.00	0.21		
Taxes	\$36,357,300,000.00			
Net Income after Taxes	\$136,772,700,000.00			
Total Shares Outstanding	16,410,000,000			
EPS	\$8.33			
Current Price	\$137.56			
P/E Ratio	16.50446032			
Forward P/E Ratio	23.6			
Target Price in 2025	\$196.70			

Figure 4. Spreadsheet for a Conservative Price Target

This is an example of a conservative fundamental analysis for \$AAPL stock price in 2025 (**Fig. 4**) First, we must identify the major categories of revenues. Apple primarily makes revenue from its product sales and services. Next, we want to develop an equation that best approximately models the revenue growth. In this conservative model, I am going to assume that Apple's revenue grows in a linear trajectory. The 3 data points that we are going to use are the revenue numbers for the years 2019, 2020, and 2021, which you can easily find from the SEC EDGAR website. I set the 2019 value as $x=0$ and set the 2019 revenue number as the y-intercept. Finally, I can determine the average slope of the linear equation by subtracting the revenues from 2021 and 2019 and dividing by two years. Using this equation, we can make an approximate estimate for the total net revenue by plugging in $x=6$ (year 2025) into the equation ($x=6$ because $x=0$ starts in 2019).

What about the cost side of the income statement? Remember, it's very impractical to acquire an estimation for expenses related to product manufacturing and development. But we

can still make a general estimation based on *expense* and *profit margin*. Based on our above calculations, Apple attained a 41.8% profit margin in 2021. In my conservative price projection model, I assumed a profit margin of 45% by 2025. This means that the expense margin is 55% (100% - 45%). I also assumed a 15% expense margin for the operating expenses (All expenditures that are not directly contributing to product manufacture). Taking these together, the projected net income for Apple in 2025 would be approximately \$173B.

Let's not forget about corporate taxes, which is 21% as of 2022 (FTB.ca.gov). After subtracting 21% from the net income, the *adjusted* net income *post-taxes* is approximately **\$137B**. This is the number that we will be using to calculate the 2025 projected EPS. In order to calculate the EPS, we need to divide the net income by the total number of shares. As of 2022, Apple has issued a total of 16.4 billion outstanding shares (Yahoo Finances). Thus, according to this conservative price projection model, the anticipated 2025 EPS is **\$8.33**.

We are almost done! Now we just need to multiply this EPS by the forward P/E ratio. The forward P/E ratio uses the expected future earnings of a company, and it indicates how much investors are prepared to pay for the company's future earnings. We can look up the value of any company's forward P/E ratio online. According to Nasdaq.com, Apple's forward P/E ratio sits at **23.6** (Nasdaq.com). Finally, in order to determine that golden price target, I simply multiply the 2025 projected EPS by the forward P/E ratio ($\$8.33 * 23.6$), which equals \$196.70. This is my conservative price target of \$AAPL in 2025, and all I needed to obtain this value was an Excel spreadsheet. Now let's examine more bullish price projections.

Revenue	2025 Estimates		Model Equation (X=0, 2019)	
Products	\$482,407,000,000.00		$Y = 44754000000X + 213883000000$	
Services	\$136,693,000,000.00		$Y = 15067000000X + 46291000000$	
Total Net Sales	\$619,100,000,000.00			
Expenses		Expense Margin	Profit Margin	
Expense on Product Sales	\$241,203,500,000.00	0.5	0.5	
Expense on Service Sales	\$68,346,500,000.00	0.5	0.5	
Operating Expense	\$92,865,000,000.00	0.15	0.85	
Total Expenses	\$402,415,000,000.00			
		Tax Rate		
Net Income	\$216,685,000,000.00	0.21		
Taxes	\$45,503,850,000.00			
Net Income after Taxes	\$171,181,150,000.00			
Total Shares Outstanding	16,410,000,000			
EPS	\$10.43			
Current Price	\$137.56			
P/E Ratio	13.18696363			
Forward P/E Ratio	23.6			
Target Price in 2025	\$246.18			

Fig 5. Spreadsheet for a Bullish Price Target

This is an example of a bullish price projection. If you compare the model equation from the previous, conservative fundamental analysis, the slope is a bit higher. This results in both net product and service sales to increase from \$577B to \$619B dollars. I also increased the profit margin target from 45% to 50%, resulting in lower net total expenses. Given that the corporate tax rate stays constant, this results in a higher net income *post-taxes*, which subsequently increases the 2025 predicted EPS value. Using the same forward P/E ratio, I was able to calculate a target price of **\$246.18** by 2025, which is approximately 25% higher than my conservative price target!

In reality of course, there's A LOT more calculations that need to be factored in. There is a reason why financial analysts spend weeks researching companies and using complicated algorithms to project their price targets. I admit that my spreadsheets are grossly oversimplified and make huge assumptions. However, I believe that these exercises encourage me to actively browse the SEC website, read through the company's financial reports, punch in the numbers on my own, and make these price estimates. If you're a long-term investor and you strongly believe in the success of your stock picks, I highly encourage you to create your own spreadsheet and perform these calculations on your own.

Conclusion

In this study, we took a closer examination at one of the world's biggest companies and analyzed the many factors that may affect the companies growth and economic value. Which leads us to the conclusion of how we can estimate and project a company's growth based on data and numbers. We found out that a company's stability is not only affected by one element, but numerous factors that can be seen in both the income statement and the balance sheet. First we looked at risk factors of a company and saw that companies are affected by political events, global policies, economic environment, and aggressive competition. Then, we took a look at the 1 year and 5 year price performance graph and saw that although both graphs provided a general picture of how the company has been growing, it does not provide sufficient information on how the company will be doing in the future because no one can truly time the market. Next, we looked at the different components of a balance sheet, where we looked at the assets, liabilities, and shareholder equity and how those numbers reflect on the financial stability of a company. We saw that a high cash reserve allows companies to pay off their liabilities. We looked at the income statement and saw that a high profit margin is key to a company's financial health because companies will allocate this cash to re-invest into their companies for growth, pay out dividends to shareholders, pay off liabilities, and/or increase cash reserves. Analyst ratings also give us a good idea of the earning estimates and revenue estimates. Then we used the financial summary report and looked at the volume, market capitalization, EPS, β , and P/E ratio, and we learned what each value represents. Finally, we were able to put all of these factors and values together and insert them into our equation that will give us the future price projection of the company. All of these values are an important part of the picture and without any one of these values, our price projection will not be as accurate.

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The Morality Of War Stocks By Aidan Keyes

On January 17, 1961, US President and former five-star Army General Dwight D. Eisenhower ended his term with a series of warnings about the danger of the rapidly-expanding American military industrial complex⁵. Eisenhower, the commander of the Normandy Invasion and an extremely popular figure among the military, warned that the expansion of US defense contractors and an increased military budget would ultimately become a detriment to the well-being of American citizens: "This conjunction of an immense military establishment and a large arms industry is new in the American experience, yet we must not fail to comprehend its grave implications. . . . the potential for the disaster exists and will persist".⁶

It sure seems like his remarks were largely ignored. The American defense industry raked in 697 billion dollars in profit last year⁷ and has ranked inside the top ten most profitable industries virtually all 60 years since its inception⁸. Lockheed Martin, Raytheon, General Dynamics, Boeing and Northrop Grumman make up the top 5 government contractors⁹ respectfully and are each regarded as dependable growth stocks for eager investors. Raytheon stock is up a whopping 25% in a month at the time of writing compared to the S&P average of about 1%. Northrop Grumman stock is up about 10 percent. It goes without saying that defense stocks are profitable, but the more important and often less considered question is are these stocks moral?

An argument can be made against the morality of stocks outside the defense industry too - whether you're a staunch anti-capitalist or a conscientious retail investor, there are separate questions to be asked about many popular stocks. What about Nike and worker exploitation?¹⁰

⁵ Eisenhower, Dwight D. "President Dwight D. Eisenhower's Farewell Address (1961)." January 17, 1961. Accessed March 15, 2022.

<https://www.archives.gov/milestone-documents/president-dwight-d-eisenhowers-farewell-address>.

⁶ Eisenhower, Farewell

⁷ PWC Corporation. "PwC's Global Aerospace and Defense: Annual Industry Performance and Outlook." *Pricewaterhouse-Coopers Industry Library*, 2021. Accessed March 15, 2022.

<https://www.pwc.com/us/en/industries/industrial-products/library/aerospace-defense-review-and-forecast.html>.

⁸ PWC, Industry Performance

⁹ "Top 10 Government Contracting Companies." *Govcon Wire*, September 10, 2021. Accessed March 15, 2022. <https://www.govconwire.com/articles/biggest-government-contracting-companies/>.

¹⁰ Kish, Matthew. "Reports find wage theft, verbal abuse, forced overtime at Nike contract factory." *Portland Business Journal*. Accessed March 15, 2022. <https://www.bizjournals.com/portland/news/2016/12/13/reports-find-wage-theft-verbal-abuse-forced.html>.

What about Tesla and child labor?¹¹ What about the pornography, casino and tobacco industries? What about stocks in the first place? Should we really be encouraging companies to prioritize profit for stakeholders? From a Quaker perspective it's apparent that any company involved in war or defense should be avoided. According to Quakerism, it's not enough to just avoid these stocks: Jon Watts, director of The Friends Fiduciary, says the portfolios he builds for clients also focus on active stakeholder involvement¹² and divesture from "unquakerly" endeavors. However, it's ultimately up to the individual investor to decide what they deem to be morally acceptable and what crosses the line, since the ethical implications of investing are inherently subjective. Defense stocks profit off of war and therefore violence - that is a given and isn't up for debate. It's both this and the corruption in the defense industry that make investing in it morally unacceptable.

These top five defense firms - Lockheed Martin, Raytheon, General Dynamics, Boeing and Northrop Grumman - are all good examples of everything wrong with defense stocks. Each has a strong interest in maintaining relationships with the US government, so a large portion of revenue each year goes back into lobbying and strategic donations to certain campaigns. According to Sophia Gonzalves-Brown with the Campaign Legal Center, the Federal Election Committee prevents direct donations, so the contractors skirt these rules with a carefully curated network of Super PACS and subcontractors. Furthermore, a vast majority of the donations were to campaigns who hold posts on the House and Senate armed-service panels¹³, and they're clearly paying off: Business Insider analyses of federal financial records indicate that "at least 15 lawmakers who hold powerful positions on a pair of House and Senate committees that control US military policy have financial ties to prominent defense contractors that together were worth nearly \$1 million in 2020"¹⁴. Among these contractors were Raytheon, Lockheed Martin,

¹¹ Reuters. "Tesla, Apple among firms accused of aiding child labor in Congo." December 19, 2019. Accessed March 15, 2022. <https://www.reuters.com/article/us-usa-mining-children-trfn/tesla-apple-among-firms-accused-of-aiding-child-labor-in-congo-idUSKBN1YK24F>.

¹² Watts, Jon. "Investing the Quaker Way." Interview. Friends Fiduciary. Last modified September 20, 2018. Accessed March 15, 2022. <https://quakerspeak.com/video/investing-the-quaker-way/>.

¹³ Gonzalves-Brown, Sophia. "Federal Contractors Continue to Ignore Contribution Ban and Donate to Super PACs." *Campaign Legal* (Arlington, VA). Accessed March 15, 2022. <https://campaignlegal.org/update/federal-contractors-continue-ignore-contribution-ban-and-donate-super-pacs>.

¹⁴ Rojas, Warren. "At least 15 lawmakers who shape US defense policy have investments in military contractors." *Business Insider*. Accessed March 15, 2022. <https://www.businessinsider.com/>

General Dynamics and Boeing¹⁵. Defense contractors show little regard for the boundaries established to prevent corruption in the American government.

In addition to overstepping their boundaries with campaign donations and legal involvement, defense contractors have financial ties with the United States military that promote aggression and obstruct peace. To quote retired CIA contractor Chalmers Johnson, “when war becomes this profitable, you’re going to see more of it”¹⁶. The more wars the United States involves itself in, the more weapons and vehicles they need, and the more business defense contractors get. When military decision makers make their decisions, the not-so-subtle influence of defense contractors makes a big difference. According to an article from *The Intercept*, the boards of directors of all five defense contractors include retired top-level military officers.¹⁷ These five defense contractors all played a crucial role in supplying the United States during the Afghanistan War, in which the Brown University Watson Center says 176,000 Afghans died while these top five stocks increased about tenfold¹⁸. According to William Hartung, also with the Watson Center for Public Policy, the defense industry increased lobbying personnel in the leadup to the Iraq War by more than 500%, promoting US involvement.¹⁹ The ethics of this are undeniably shoddy - defense contractors encouraging America to go to war so they can make a quick buck is not something one should feel good about investing in.

In conclusion, although defense contractors are often very profitable and attractive to unsuspecting investors, the reasons for this impressive return on investment are ethically unacceptable. In addition to profiting off of violence, defense contractors employ nefarious lobbying methods and influence the government to promote violence, something any Quaker and investor should shudder at.

congress-members-are-trading-defense-stocks-while-shaping-military-policy-2021-12

¹⁵ Rojas, Investments

¹⁶ Jon Schwartz, "Afghanistan War Defense Stocks," *The Intercept*, accessed March 13, 2022, <https://theintercept.com/2021/08/16/afghanistan-war-defense-stocks/>.

¹⁷ Schwartz, Afghanistan War

¹⁸ *Brown University Watson Center for Public Affairs*. "Afghan Civilians Key Findings." Accessed March 15, 2022. <https://watson.brown.edu/costsofwar/costs/human/civilians/afghan>.

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Review on E-cigarettes Evolution and Regulation By Thomas Jin

Abstract

Electronic cigarettes (e-cigarettes) are a type of nicotine delivery device that vaporize a solution containing flavors, nicotine, humectants, and other unidentified additives that can be inhaled by the user. E-cigarettes were first designed as a healthier alternative to conventional cigarettes, while current manufactures aggressively advertise it as a cessation option for smoking. The rise of e-cigarettes use in recent years, especially in the youth, calls for the need to critically evaluate the claimed safety of these products. Numerous studies have identified the harms of individual compounds in e-cigarettes; nevertheless, a longitudinal study on e-cigarettes' long term effect on health is still needed. This review explores the history, current market, constituents, potential harms, and the regulations of e-cigarettes around the world. From these aspects, we hope to obtain a fuller image on the safety of e-cigarettes and how governments around the world respond to this new challenge.

The History of e-Cigarettes

The first invention of the electronic cigarette can be traced back to the 1960s in the United States. Herbert A. Gilbert, a scrap metal dealer from Beaver Falls, Pennsylvania, invented the first cigarette alternative. The device, which he called the “Smokeless” (Figure 1), is a battery powered device that vaporizes a liquid that can be inhaled by the user.¹ The “Smokeless” does not contain any nicotine and Gilbert even advertised the device's potential in preventing disease and death from tobacco use. He claimed that users can “smoke their favorite food” with flavors ranging from mint to cinnamon. Gilbert patented the device in 1965 and created numerous prototypes. However, he failed to commercialize the product and the commercial potential of the “Smokeless” was unclear at the time.

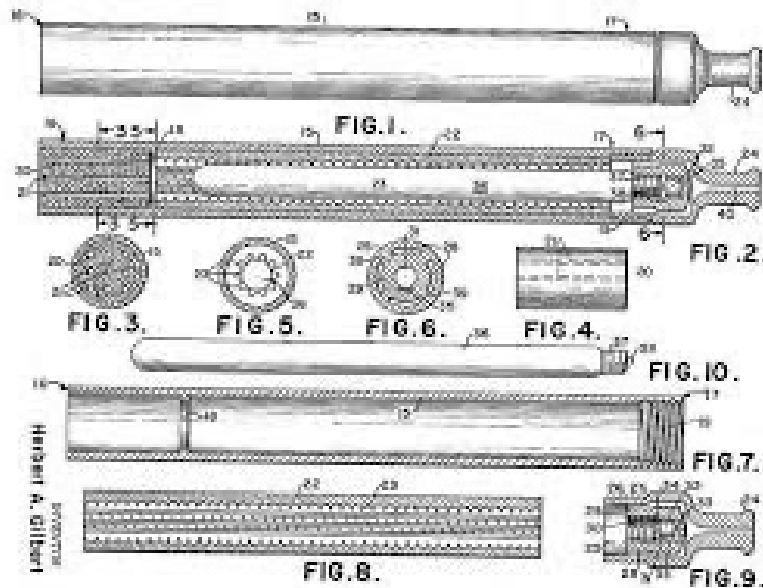


Figure 1. The “Smokeless”

From the 1980s to the early 2000s, numerous patents for nicotine inhaler devices were filed by both tobacco companies and individual inventors in the US and across the world. Many of these relied on the physical propulsion of a liquid, but a few were similar to modern e-cigarettes which emit a vaporized, inhalable solution. These devices were designed as an alternative and more convenient form of smoking in indoor areas where conventional smoking is banned. Although attempts were made to commercialize e-cigarettes, the request to market them was declined by the FDA (Food and Drug Administration) in 1998 because of it being an unapproved drug delivery device.²

The first commercially successful electronic device was created in 2003 by 52-year-old Chinese pharmacist Hok Lik in Beijing, China. The device was named the “Ruyan” which means “like smoke” in Chinese. Lik was a heavy smoker himself, and he created the “Ruyan” after his father died of lung cancer from heavy smoking. He initially developed the device to serve as an alternative to conventional smoking, aiming to create a device that would deliver a nicotine hit without the need to smoke conventional cigarettes. The “Ruyan” is made up of a battery, an atomizer, and a cartridge. The cartridge contains a mix of propylene glycol and vegetable glycerin along with the chosen flavor fragrant with or without nicotine. When inhaled, the atomizer vaporizes vape liquid inside the cartridge, creating an inhalable fume.³ “I believed that if I could use vapor to stimulate cigarette smoke, this could help me.” Lik said.⁴ However, researchers suspect that for heavy smokers like Lik, electronic cigarettes only “perpetuate

nicotine addiction” by providing “more access to nicotine” from e-cigarettes convenience. 3 years after its invention, electronic cigarettes were first introduced to Europe and the United States and eventually around the world.

Current E-cigarette Market

According to a report from 2021, the global electronic cigarette market size was valued at 17.3 billion dollars in 2021 and is projected to reach 94.3 billion dollars by 2031. The market is growing at an extremely fast rate, registering a CAGR (compound annual growth rate) of 16.8% from 2022 to 2031⁵.

Out of the three types of electronic cigarettes, the modular electronic cigarette market is projected to be the fastest growing compared to the disposable and rechargeable electronic cigarette markets (Figure 2)⁵. The reason behind this trend is primarily due to the ability for the modular electronic cigarette to be refilled which allows the user to control the power delivered from the battery to the atomizer.

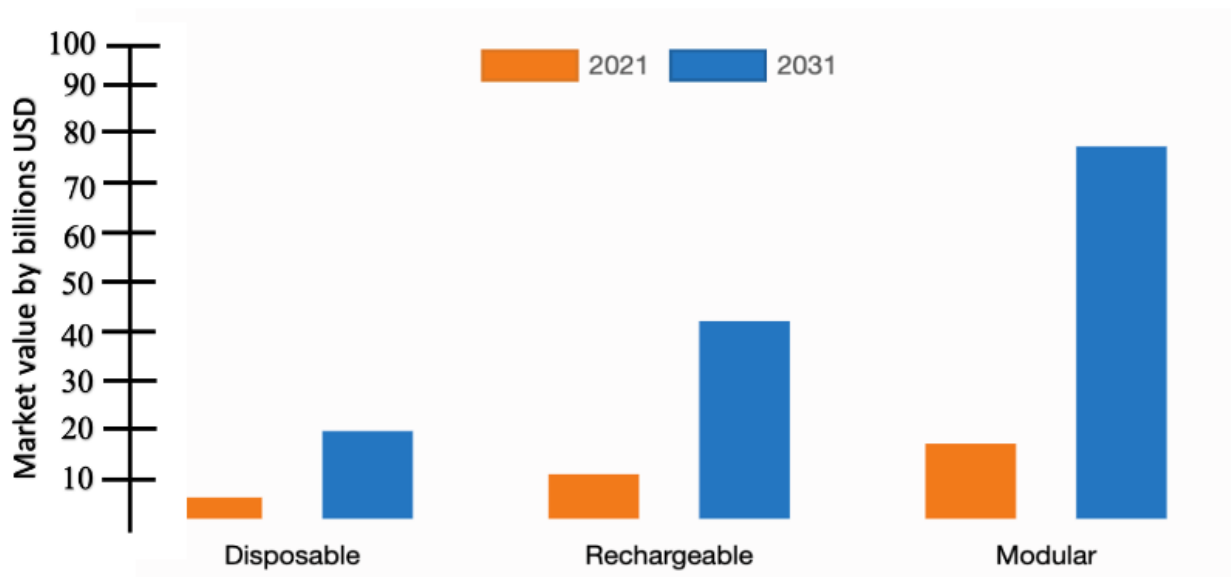


Figure 2. E-cigarette market by product

In terms of flavor, the tobacco segment is expected to be the fastest growing compared to fruit, botanical, and sweet segments. Market trends show that older users who try to substitute e-cigarettes with conventional cigarettes are still looking for that same tobacco taste while younger users would opt for fruity flavors (Figure 3)⁵.

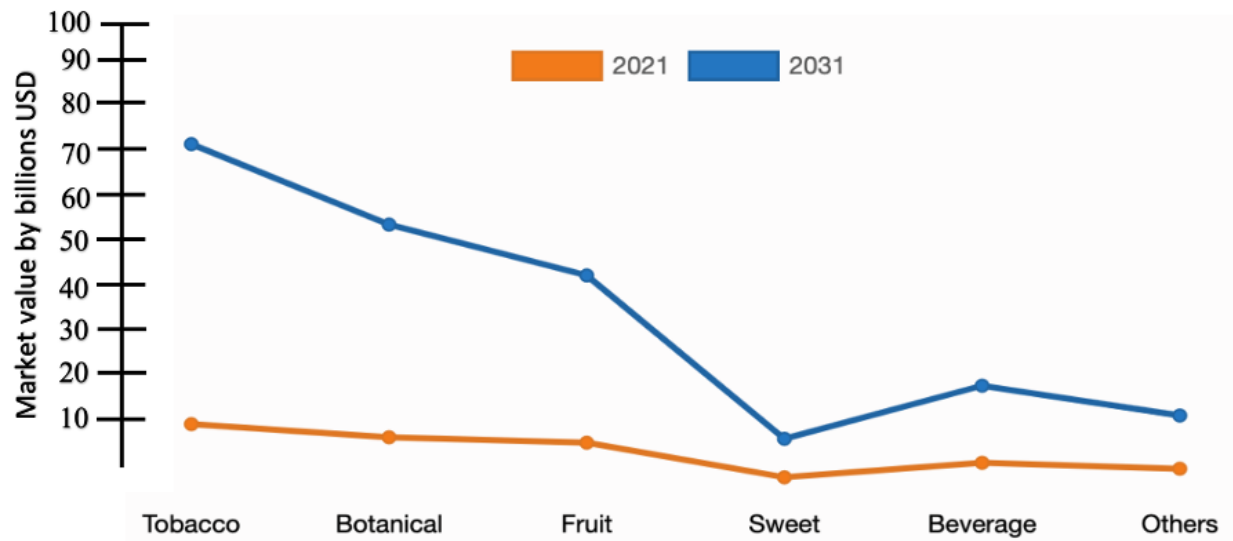


Figure 3. E-cigarette market by flavor

E-cigarette sales and distribution are mostly executed by specialist e-cigarette retail shops with the online selling channel expected to be the fastest growing segment (Figure 4)⁵.

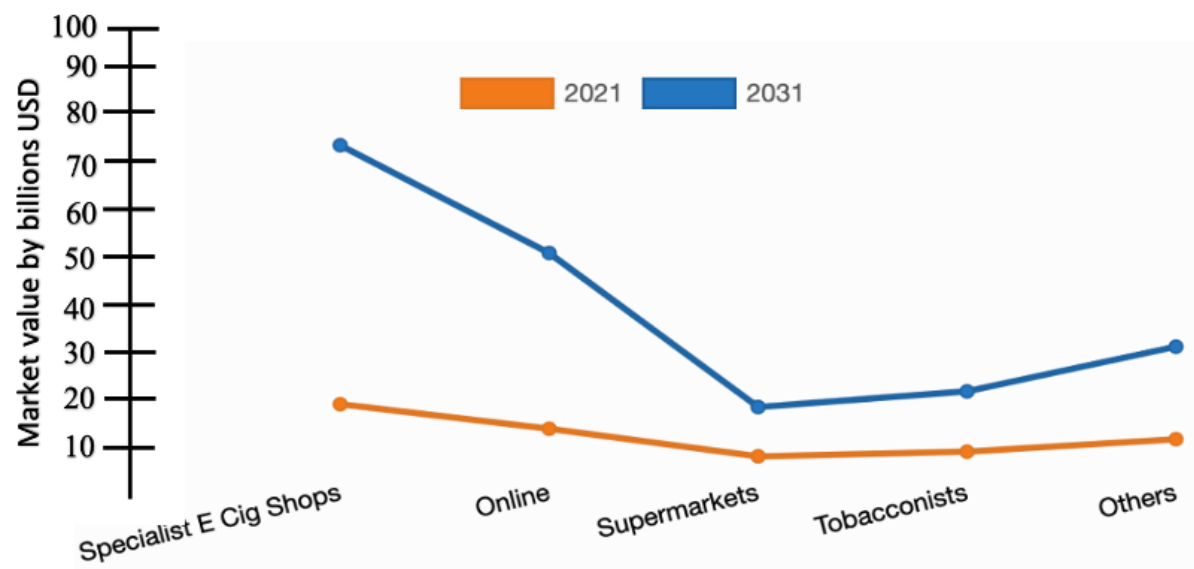


Figure 4. E-cigarette market by distribution channel

The North American market dominates the global e-cigarette & vape market with a share of over 40% in 2021 and a market size of around 7.3 billion dollars.⁶ The North American market is still expected to grow, registering a CAGR of 27.3% from 2021 to 2028. Europe exhibits the second biggest market with a CAGR of 13.17%.⁷ Within these two regions, the biggest three markets are the United States, United Kingdom, and Germany. Although e-cigarette usage is less prevalent in Asia, the market is expected to grow the fastest from 2021 to 2030.⁸

User Age Distribution

According to the WHO, there will be an estimated 55 million electronic cigarette users globally in 2021. A survey from the National Institute of Drug Abuse found that 20% of people aged 18 to 19 vape compared to 9% of people aged 30 to 49, 7% of people aged 50 to 64, and less than 0.5% of people older than 65 in the United States.⁸ What is concerning is that 15- to 17-year-olds are 16 times more likely to vape than 25- to 34-year-olds, suggesting that e-cigarette usage is very common among the adolescent population. According to the FDA, about 20% of high school students and 5% of middle school students used e-cigarettes in 2020. Nearly 12% of 12th graders, 6.9% of 10th graders, and 1.9% of 8th graders vape every day.⁹ Recent trends also show that these numbers are increasing at a faster rate than before. A survey by Bandi et.al shows an increase of smokers in all groups, especially among young adults that have never smoked before.¹¹ This suggests a rise in the number of teenagers trying nicotine products with e-cigarettes. The sudden rise in popularity of e-cigarettes among the young is a significant reason for this increase in usage. The convenience of e-cigarettes that allows it to be used unrestricted anywhere makes them very attractive to young populations. Surveys show that teenagers who want to try smoking think that e-cigarettes are less harmful than conventional cigarettes, thus resulting in an increase of “first-time” users.¹⁰ Bandi et.al’s survey also shows an increase in near-term “quitters” for conventional cigarettes switching to electronic cigarettes, showing that a major reason for e-cigarette usage in older populations is an alternative to conventional cigarettes.

Potential Risks of E-Cigarettes

Although vaping is less harmful than smoking, it is still considered dangerous to the body because using e-cigarettes exposes the body to harmful toxic chemicals. As vaping is relatively new compared to conventional cigarettes, no longitudinal study has been conducted to establish a cause-and-effect relationship between vaping and certain diseases. Regardless, research has shown that e-cigarettes contain cancer-causing agents such as vitamin E acetate and high amounts of other carcinogens. Research from The John Hopkins University on vape ingredients in October 2021 (Blaha) reveals thousands of chemical ingredients in vape products, most of which are unidentified.¹² Nicotine, the primary agent in conventional cigarettes and e-cigarettes, is a highly addictive and toxic substance. Substantial research has proved that nicotine raises

blood pressure and increases the likelihood of heart attacks. Researchers also believe that vaping is linked to chronic lung disease, asthma, and cardiovascular disease. Although it is too early to determine the safety of e-cigarettes, known substances present in e-cigarettes are proven to cause damage to the body.

Part.2 What Are Inside e-cigarettes

E-cigarettes are, in comparison, less harmful than conventional cigarettes. Vape liquid contains fewer contaminants than conventional cigarettes. Conventional cigarettes have been known for decades to cause diseases such as lung cancer, heart diseases, and an increased risk of death. E-cigarette aerosols produce less tar and other chemicals than conventional cigarettes. However, this is not to say that e-cigarettes are not harmful, they are just comparatively less harmful than e-cigarettes. It is important to note that the effects of conventional cigarettes have been studied for decades while many of the health effects caused by e-cigarettes are unknown. Additionally, the idea of e-cigarettes as a form of cigarette cessation lacks longitudinal evidence. As for the findings in May 2022, e-cigarettes are thought to be safer than conventional cigarettes in the amount of tar, chemicals, and longitudinal health effects it produces.

The absence of set standards worldwide for vape juice ingredients makes it extremely difficult to determine what chemicals are present in e-cigarettes. The thousands of brands of e-cigarettes all differ in their vape juice ingredients through either the concentration or composition of their vape solutions. Nevertheless, substantial research has identified the presence of a range of chemicals in the cartridges, refill solutions and aerosol of e-cigarettes. According to the National Academies of Science, Engineering, and Medicine, substances found in e-cigarette liquid and aerosols include nicotine, propylene glycol, glycerol, tobacco-specific nitrosamines (TSNAs), aldehydes, metals, volatile organic compounds (VOCs), phenolic compounds, polycyclic aromatic hydrocarbons (PAHs), flavorings, tobacco alkaloids, drugs, and many other unidentified compounds.¹³

According to a new study conducted by the Center of Disease Control, e-cigarettes usage is associated with lung injury. Chemicals and metals present in e-cigarette aerosol such as nickel, tin, lead, and diacetyl has been proven to cause damage to the lungs. Some e-cigarettes contain Vitamin E acetate which can stick to the lungs and cause injury and illnesses. A new trend has been observed relating lung injury and diseases with e-cigarette usage. A major part of damage

caused by e-cigarettes is created by nicotine. Nicotine-containing e-cigarettes can cause brain damage in adolescents and young adults. Nicotine is also associated with heart diseases and deteriorating oral health. However, more longitudinal studies are needed to confirm a cause-and-effect relationship between certain diseases and e-cigarette usage. Although they vary among different e-cigarette brands, the constituents of vape liquid can be generalized to three main categories: humectants, flavoring, and tobacco alkaloids.

Humectants

Humectants are delivery solvents to dissolve other compounds in vape liquids to produce inhalable aerosols similar to tobacco smoke. Referred to as vegetable glycerin in vape liquid formulas, the most common humectants present in e-cigarettes are propylene glycol (PG) and glycerol. Studies by scientists such as Hahn et.al have identified an average concentration of 57g/100g and 37g/100g for PG and glycerol respectively in 54 commercially available vape liquids.¹⁴ PG and glycerol are commonly used in medicines, cosmetics, and food products to absorb water and maintain moisture. The use of PG and glycerol is much more prevalent in creams and liquids rather than inhalable aerosols. Therefore, there are only a few studies that provide evidence of the toxicity of inhalable PG and glycerol.

Propylene Glycol

Propylene glycol (PG) is a clear, colorless, syrupy liquid at room temperature. It is commonly used in industries such as foods, plastic, and medicine as a moisturizer and solvent. PG has been listed as safe on the GRAS list by the FDA in 1973 for its use as a food additive. After absorption of PG orally or through skin or mucous membranes, the kidney eliminates 45 percent while the liver metabolized the remained to lactic acid, pyruvic acid, or acetone. Some studies have reported irritation after inhaling PG for a minute, but no long-term health risk has been defined. A more direct way of observing PG toxicity can be done through its use as a vehicle to deliver anti-seizure medications in children. A study by Lim et.al observed the effect of high-dose PG in children. They found that a high dose of PG can result in hyperosmolarity, lactic acidosis, hemolysis, central nervous system toxicity, and cardiac arrhythmia.¹⁵ This demonstrates a potential risk of high-dose PG toxicity from extensive vaping. Also, occupational exposure to PG can lead to certain irritations of the respiratory system. A study by Moline et.al

examined exposure to PG-based theatrical fogs in actors and performers. They found significant associations between peak exposures to PG and mucous membrane irritations.¹⁶ Certain respiratory symptoms, such as throat and nasal irritation, have also been observed. An in vivo animal study by Robertson et al. in 1947 found no effect of aerosolized PG on the pathology, respiratory tract function, histology, and hematology of rats and monkeys.¹⁷ In summary, animal studies have consistently failed to identify any significant toxic effect of PG less than several grams per kilogram per day. However, high doses of PG can produce toxic effects that can lead to osmolar changes in the blood and lactic acid formation.

Glycerol

Glycerol is an oily liquid found in naturally occurring fats and oil. It is primarily used in food, pharmaceutical, and oral care products. Similar to PG, glycerol is also listed as GRAS safe by the FDA. Glycerol is a natural and endogenous component in the human body as triglycerides and fatty acids. Exogenous glycerol is rapidly absorbed from the stomach and intestine and rapidly metabolized to α -glycerophosphate in the liver and kidneys to form glucose. It can also undergo lipogenesis to form triglycerides in the liver which can then be distributed to adipose tissues. A review by the Tourtellotte et.al administer glycerol of different concentrations in orange juice and found no observed adverse effect level for glycerol in humans greater than 2.2g/kg/day.¹⁸ Clinical studies of glycerol have shown to increase the osmotic pressure in plasma. This could cause symptoms such as dizziness, nausea, and headaches. In vivo animal studies have also demonstrated the potential toxicity of glycerol. Renne et.al found in their study that 20% glycerol administered in the diet for 4 weeks had no adverse effects. They observed an increase in kidney weight and liver enzymes in more than half of the animals. The researchers also exposed rates for 6 hours per day, 5 days per week for 2 weeks to varying concentrations from 0-3910mg/m³ of aerosolized glycerol. They found minimal squamous metaplasia for every experimental condition. Additionally, no macroscopic or systemic effects along with changes in organ weights were observed. Through this, they concluded that the lowest observed adverse effect level for irritant effects on the upper respiratory tract was 1000 mg/m³. Studies have also investigated the toxicity of glycerol on reproductive and developmental health, with no significant disruption being observed. The carcinogenicity of glycerol yielded similar results, with no significant effect of DNA damage on the sample of animals tested.

Flavoring

According to Zhu et.al,²⁰ there are more than 7,000 unique e-cigarette flavors available to e-cigarette users. Unfortunately, little is known about the exposure to flavoring compounds in e-cigarettes. Surveys have shown that flavored e-cigarette liquids are extremely attractive to younger populations. Although many of the flavoring agents are GRAS listed by the FDA in food products, the safety of these compounds can be compromised when they are aerosolized and inhaled. For example, certain sugars are commonly used in vape liquid to make sweet flavors. When these sugars are heated, it degrades and produces furans and aldehydes, which cause irritation to the respiratory tract.²¹ Other chemicals, such as pulegone, eucalyptol, diacetyl, cinnamaldehyde, and benzaldehyde can all cause adverse respiratory effects. Research has shown that exposure to cinnamaldehyde, a major chemical in cinnamon-flavored e-cigarette products, is highly cytotoxic and genotoxic. Inhalation of cinnamaldehyde can depolymerize microtubules in human pulmonary fibroblasts, decrease cell growth, alter cell morphology, break DNA strands, and lead to increased cell death.²² Exposure to another common flavoring agent benzaldehyde, used to create fruity flavors, has been linked to irritation of the eyes and respiratory passages.²³ This is critically important, as benzaldehyde is present in 75% of 145 commercially available e-cigarette refill fluids tested by Kosmider et.al. Additionally, researchers have yet to identify the effects of exposure to other flavoring agents when they are aerosolized.

Tobacco Alkaloids

The most common tobacco alkaloid present in e-cigarettes is nicotine. Most commercially available e-cigarettes that contain nicotine have nicotine concentrations of about 5%. When administered, nicotine causes the release of dopamine in the mesolimbic area, the corpus striatum, and the frontal cortex.²⁴ The increased activity of dopamine neurons makes the substance highly addictive. It also damages the body by causing an increase in blood pressure, heart rate, and a higher probability of heart disease. Although proven to have some cognitive-enhancing abilities through its use as an agonist of acetylcholine, nicotine is extremely dangerous, especially to younger populations. Research conducted by Valentine and Sofuoglu suggests that nicotine may affect the declarative memory system in an antagonistic manner. Although low doses of nicotine promote consolidation, high doses inhibit consolidation of declarative memory.²⁵ Nicotine abstinence following habitual nicotine consumption seems to

impair cognition rather than enhance it. More importantly, nicotine can interfere with brain development and might cause permanent brain damage. People under the age of 25 are especially susceptible to the harms of nicotine as the brain continues developing until 25 years old. Nicotine can kill brain cells and stop new ones from forming in the hippocampus, impairing memory. A study done by Yi et.al shows a memory decline in smokers and previous smokers in China, showing that long-term nicotine usage can negatively impact memory.²⁶

More importantly, research shows that inhaling nicotine can affect all body systems. A literature review done by Mishra et.al illustrates the many harms of nicotine on the cardiovascular, respiratory, immunological, renal, and reproductive systems.²⁷ Nicotine affects the cardiovascular system by causing the release of catecholamines such as dopamine which increases heart rate, blood pressure, and cardiac contractility. This could lead to a higher risk of vascular diseases by promoting myocardial dysfunction. The respiratory system is also affected as nicotine can cause bronchoconstriction and apnea. The simultaneous effect of these two conditions can lead to several respiratory disorders. Nicotine is associated with gastroesophageal reflux disorder and peptic ulcer disease by increasing gastric acid concentrations in the stomach. Nicotine causes smooth muscles in the intestine to relax, thus causing a decrease in the tone of the colon, gastric mobility, and lower esophageal sphincter pressure. Nicotine is known to be immunosuppressive by impairing antigen and receptor-mediated signal transduction in the lymphoid system, leading to a decreased immunological response. Research has also known that smokers have a higher risk of chronic kidney disease. Nicotine has been found to correlate with decreased glomerular filtration rate and an increase in albumin excretion of urine. Nicotine can cause glomerular inflammation and acute glomerulonephritis, leading to impaired kidney functions. In males, nicotine can cause erectile dysfunction by disrupting nitrous oxide synthesis, an important chemical in generating penile vasodilation. In females, nicotine can lead to chronic anovulation and irregular menstrual cycles by increasing follicle-stimulating hormone levels and decreasing levels of estrogen and progesterone. Maternal smoking has been proven by numerous animal studies to lead to an increased risk of growth restriction, stillbirth, miscarriages, and mental retardation.

Nicotine withdrawal is caused by nicotine cravings when a smoker tries to quit and lasts about 2 to 4 weeks. During this period, smokers may develop physical symptoms such as headaches, fatigue, dizziness, coughing, and constipation while psychological symptoms can

lead to anxiety, insomnia, mood swings, hyperactivity, and depression.²⁸ The difficulty of smoking cessation is largely due to the symptoms of nicotine withdrawal and the individual's cravings for nicotine.

Carcinogens

Carcinogens are substances that can cause cancer in living tissue by altering cellular metabolism by damaging the DNA present in cells or causing cells to divide at a faster rate than normal, increasing the chances of DNA changes and mutations. Carcinogens can suppress tumor suppressor genes which regulate cell division and replication, thus leading to infinite replications and cancer. According to John Hopkins Medicine, e-cigarettes contain a variety of carcinogens such as formaldehyde, toluene, acetaldehyde, acrolein, cadmium, lead, nickel, and nitrosamines.²⁹

Carbonyl Compounds

Certain e-cigarette liquids contain carbonyl compounds such as reactive aldehydes. Heating and aerosolizing these liquids can enhance the concentrations of these compounds or result in formation of new compounds. It is important to acknowledge the health effects when these compounds are heated and aerosolized as the new compounds formed may induce possible health effects. Multiple studies have shown that e-cigarettes emit toxic carbonyl compounds generated from the thermal decomposition of e-liquid ingredients. These compounds, such as acetaldehyde and formaldehyde, can result in various health effects in users. Formaldehyde and acetaldehyde are both classified by the International Agency for Research on Cancer as potentially carcinogenic to humans. Numerous studies such as Goniewicz and colleagues and Hutzler and colleagues found traces of carbonyl compounds present in the aerosol created by e-cigarettes.^{30,31} These studies demonstrate that certain carbonyl compounds present in e-cigarette can pose health risks to humans.

Part.3 Regulations on e-cigarettes Around the World

Since the introduction of e-cigarettes to the US, Europe, and the world in 2006, numerous regulations have been set. These regulations include a requirement for disclosure for vape juice constituents, restricting the sale of certain flavors, or a ban on marketing and advertising. In

many countries around the world, e-cigarettes are classified as tobacco products rather than therapy products. This is crucially important, as tobacco products are less prone to restriction to the major public compared to therapeutics. As of 2022, a common trend of tightening restrictions can be seen with policies regarding e-cigarettes to combat youth use. In this review, the regulations of three major regions, the USA, Europe, and China are examined to show the extent of these regulations and how they differ in different parts of the world.

USA

Before 2016, e-cigarettes were regulated as a drug delivery product and regulated independently by each state. No overarching regulations are set on e-cigarettes by the federal government, and states are free to regulate e-cigarettes however they want. This was eventually overruled by the Federal District Court in 2010, with the court explaining that e-cigarettes should be regulated as tobacco products instead. In 2016, e-cigarettes were regulated as tobacco products under the Family Smoking and Prevention Tobacco Control Act (FSPTCA) which was passed in 2009.³² The FSPTCA gave the FDA the authority to enforce federal controls on the sales of tobacco products to children, requiring companies to post ingredient lists, and require smokeless tobacco product warning labels.³³ The most important regulation is a required application submitted by e-cigarette companies before they make any claims about reduced harm or no change in harm. This application is essential for marketing a product, as the FDA now has the power to control any claims about the harms of the product to the public. Companies must apply to the FDA to keep selling existing e-cigarette products or sell new products. To regulate a tobacco product, the FDA must base the regulation on scientific evidence and consider the risks and benefits of the product on the population. The FDA delayed the deadline for e-cigarettes applications to August 8, 2022, to balance regulation with the development of innovative tobacco products less dangerous than cigarettes. Manufacturers that were on the market before August 2017 can still market their products until the applications are reviewed. Products that were not on the market prior to August 2017 could not market their products and sell freely until their applications have been approved.

Particularly, in November 2018, the FDA tightened regulations on e-cigarettes in response to a significant increase in youth use. The FDA planned regulatory policies restricting access to the sale of flavored e-liquid in retail locations and on the internet. The FDA also

launched youth prevention efforts, targeting to change youth attitudes and beliefs about e-cigarettes. The restriction on flavored e-cigarette liquids passed in January 2020 in response to an outbreak of e-cigarette use-associated lung injury (EVALI) in 2019. The FDA restricted the flavors in cartridge-based e-cigarettes to just menthol and tobacco.³⁴ The sales of non-menthol and non-tobacco e-cigarette flavors are prohibited. This restriction was aimed to decrease youth usage, as these two flavors are generally preferred by adults. However, the flavor ban did not apply to disposable e-cigarettes or other types of vaping devices. More recently in June 2022, the FDA banned all products from the popular e-cigarette manufacturer Juul. Juul is a major e-cigarette manufacturer with a net worth of 38 billion dollars and a revenue of 2 billion dollars per year. The company is appealing for the ban to be lifted, but experts estimate that Juul would be the first of many to experience a ban by the FDA.³⁵

Europe

The restriction of e-cigarettes in Europe began in December 2012 when the European Commission proposed to revise the European Union Tobacco Products Directive (EUTPD) to regulate the use and sales of e-cigarettes. 10 months later, in October 2013, the European Union voted down medical regulations of e-cigarettes and instead opted to regulate e-cigarettes similarly to tobacco products and prohibited the sales of e-cigarettes to under-18s and cross-border advertising. In February 2014, new regulations were set by the European parliament which forbids the advertising of e-cigarettes, set limits on maximum concentrations of nicotine in e-cigarette liquids, limit maximum volumes of liquids that can be sold, require child and tamper-proof packaging, set requirements on the purity of ingredients, require disclosure of ingredients by manufacturers, and empower regulators to act if regulations are violated.³⁶ These restrictions were adopted in European countries in the next 3 years, with Scandinavian countries like Sweden, Denmark, and Norway setting even tighter regulations by banning nicotine-containing cartridges. It is important to understand that e-cigarette sales of any flavor are still legal. What is different now is a stricter government eye on the sale and manufacturing of products rather than an outright ban.

China

Despite being the home of the invention of the modern e-cigarette, the control of e-cigarettes by the Chinese government is almost non-existent until 2019. At the end of 2019, the State Tobacco Monopoly Administration (STMA) banned the online sale and advertising of e-cigarettes to restrict use by minors. The government began deliberation back in March 2021 for tighter restrictions regarding the sale, requirements, and usage of e-cigarettes. The following policies are set to be enforced in October 2022. The new regulations implemented an application system for e-cigarette companies and products before they can sell in China. Products must be approved by the STMA before they can be sold. Companies must obtain a license from the STMA before they can start manufacturing and selling e-cigarettes.³⁷ The license can only be obtained if companies meet the following requirements: have the necessary technology, equipment, and funding to produce e-cigarettes, and comply with national e-cigarette industry policy requirements. Packaging must comply with national regulations to create warning signs and tamper-proof packaging. The new regulations also gave the government power to conduct inspections of companies and individuals to sell vape products. New regulations regarding the retail of e-cigarettes are also set. The regulations prohibited retailers and wholesalers from holding events to promote e-cigarettes. The locations of stores must not be in the vicinity of any kindergarten, primary, secondary, or vocational, schools.³⁸ Selling to minors is strictly prohibited. Similar to the US, any flavored e-cigarettes, other than tobacco flavored, are banned. Companies must obtain an additional license if they were to export their products. Requirements on the funding, market structure, supply, and demand are also regulated by the government. The government would now take part in setting the distribution of e-cigarette retail stores, where areas that are more developed in the manufacturing and sale of e-cigarettes can have a higher concentration of stores. Foreign funding for the retail of e-cigarettes is banned, while foreign investment in the production must undergo a strict review process. A safety test and assessment would be required and reviewed by the STMA before any e-cigarette products can be sold. 38 The STMA-approved technical standards numbered GB 41700-2022 which require companies' full disclosure of ingredients, nicotine levels, and safety standards. As can be seen, these policies help regulate an industry that was almost uncontrolled for a long period. By incorporating regulatory measures like the tobacco industry, China is giving the industry a strict legal space to exist.

Discussion and Conclusion

Invented by Hok Lik in 2006 aiming to serve as a safer alternative to conventional cigarettes, e-cigarettes should be critically evaluated for their safety and potential harms. Although research prior to 2022 did prove that e-cigarettes are safer than conventional cigarettes, it does not mean that e-cigarettes are safe; it is simply safer than conventional cigarettes. Regardless of users' intention, e-cigarettes are similar to conventional cigarettes due to their main utility as a nicotine delivery device. It is undeniable that nicotine, an addictive and harmful substance, is proven to cause adverse effects such as cardiovascular diseases in the body. Compounds that are unique to e-cigarettes, such as flavoring agents and humectants, have been proven by numerous research studies to cause health concerns. The wide availability of e-cigarettes' unique flavors breeds youth use and a higher probability of minor use. The problem becomes significantly more serious when smoking devices promote youth use. Unlike conventional cigarettes, scientists do not have a clear picture of what longitudinal health effects e-cigarettes may cause because they have only existed for a little over a decade. The presence of unidentified compounds in e-cigarettes may cause unforeseen health effects. We must acknowledge the lack of longitudinal studies on e-cigarettes and remain cautious.

It is pleasing to see countries such as the US, Europe, and China have already taken measures into limiting e-cigarette usage in the population, especially the youth. Any usage of tobacco products by minors, whether e-cigarettes or conventional cigarettes, is undeniably harmful as the health effects are often exponentially larger in young bodies. In my opinion, the policies to ban e-cigarette flavors are by far the most useful in limiting e-cigarette usage by the youth as they generally prefer fruity flavors. Policies requiring an application system are also crucially important to ensure the safety and eligibility of these products. Government supervision of the sales and manufacturing can give the attention needed to prevent youth use and unqualified products from reaching the public. Although an outright ban may seem unjustifiable in current circumstances, the concern and dedication by governments to attempt to limit a harmful substance like e-cigarettes is satisfying to see.

The steps to raise awareness of the harms of e-cigarette use and decrease youth usage should not only be done at a macroscopic level but also at a microscopic level. A major problem that causes large-scale e-cigarette proliferation among the youth is a lack of proper support and prevention infrastructure. Cessation programs should become commonplace in schools, where

support is given to students that are trying to quit e-cigarettes. Support programs should be established by each school to give aid to those that need it the most. I believe the most effective way to decrease youth e-cigarette usage is to raise awareness about the harms to prevent usage in the first place. Schools should hold workshops and classes similar to drug education curriculums that teach students the risks of e-cigarettes. On an individual level, students who are aware of the potential risks of e-cigarettes should educate their classmates about it. This is crucially important, as it is much more likely for teenagers to listen to their peers rather than their parents or teachers. Most of the time, students try new things with their peers, so it would be beneficial to stop the trend from within the student groups. The path to youth life uninfluenced by smoking devices is still long, but we should give our all to lay a foundation for a smoke-less, healthy future.

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How Does Gender Construction Impacting Society By Yunji E. Li

After God created the world, he put Adam in the garden. Adam felt lonely, so God created Eve, a woman, to be his companion, constructing gender and setting the tone for gender roles for centuries.²⁰ Throughout history,²¹ such a construct of gender²² once was helpful to humanity²³ before the emergence of civilization because that was how our forefathers in the prehistoric period were able to labor, live, multiply, and continue. However, after civilizations emerged, expanded, and developed, the construct of gender gradually became a barrier that harms humanity by hindering societal progress,²⁴ love, relationships, equality or, better self-identity.

During the Paleolithic Age,²⁵ people mainly were nomads who moved from place to place following the herds and fruits; they lived in small hunting and food-gathering bands, numbering about 20 or 30 people. At that time, humans were already differentiated by their gender and assigned different tasks accordingly; men were responsible for hunting while women were responsible for gathering plants, fruits, and wood.

Science research from the University of Utah states that “males' upper bodies, on average, have 75% more muscle mass and 90% more strength than females’,”²⁶ showing that men are usually stronger than women as a matter of fact. Compared to gathering food, hunting wild animals required more physical energy and stronger physical fitness²⁷; women may have felt indisposed during pregnancy,²⁸ which meant that it was a better choice to let the men hunt instead of women. In such small size pre-civilization bands, the construct of gender helped people to ensure their mutual survival,²⁹ to collaborate more effectively, and to contribute to their individual community by giving them the tasks or jobs that best fit themselves merely based on their biological differences. In short, the construct of gender at this time only divided mankind

²⁰ [10 things singles can learn from Adam and Eve - The ...https://www.washingtonpost.com/soloish/2017/03/21/](https://www.washingtonpost.com/soloish/2017/03/21/10-things-singles-can-learn-from-Adam-and-Eve-The-...)

²¹ When they adopted the word “history” instead of “herstory,” it already was a symbol of inequality between genders.

²² Refers to the characteristics of women, men, girls and boys that are socially constructed

²³ Refers to human race, or mankind

²⁴ [\(PDF\) Societal Progress - ResearchGatehttps://www.researchgate.net/.../Societies](https://www.researchgate.net/.../Societies)

²⁵ 2.5 million years ago to 10,000 BC

²⁶ University of Utah. "Why males pack a powerful punch: Upper arm strength, different from females', may have specialized for forceful blows." ScienceDaily. ScienceDaily, 5 February 2020. <www.sciencedaily.com/releases/2020/02/20200205132404.htm>.

²⁷ Physical fitness is a state of health and well-being and, more specifically, the ability to perform aspects of sports, occupations and daily activities. (Wikipedia, s.v. “Physical fitness”)

²⁸ <https://scroll.in/article/989275/ancient-men-were-hunters-and-women-were-gatherers-right-wrong>

²⁹ [5.2 The Development of Modern Society – Sociologyhttps://open.lib.umn.edu/sociology/chapter/5-2-the-...](https://open.lib.umn.edu/sociology/chapter/5-2-the-...)

into two categories--male and female; such division did not assign people with different statuses or cause negative impacts at all.

During the Neolithic Age,³⁰ the nomadic bands began to settle down, built permanent villages, and learned to farm, shifting their lifestyle from food-gathering to food production. Later, around 4000--3000 BCE,³¹ as agriculture developed, cities expanded, writing systems grew, jobs specialized, trades rose, private ownership began, and social class struggles started, the earliest civilization³² emerged. Since the emergence of civilization, society became increasingly more complex and complete; as soon as civilization brought the concepts of monarchy, property, and status to mankind, the construct of gender gradually became a harmful “wall” that divided people into different statuses unequally, which harmfully impacted humanity hereafter.

Ancient Mesopotamia, Egypt, the Indus Valley, and China are commonly known as the four earliest civilizations. Dating back to around 3300 BCE,³³ Mesopotamia, the earliest known civilization, emerged, as the Sargon of Akkad conquered Sumerian city-states, established the Akkadian Empire, and kept written records of history.³⁴ Sooner, around 3100 BCE,³⁵ Ancient Egypt emerged; in approximately 3000 BCE, the ancient Indus civilization of the Bronze Age developed along the Indus River Valley; in 1600 BCE, ancient Chinese civilization, another river valley civilization, emerged along the Huang He Valley during the Shang Dynasty. Among all four civilizations, Egyptian society might have been more lenient toward women,³⁶ but all of these civilizations were clearly patriarchal: men had primary power³⁷ and predominated the society.

The Indus Valley civilization, in particular, was heavily harmed by the construct of gender as the extreme patriarchy tore down women’s rights and liberties. According to Indus’ official law book that dealt with moral behavior and social relationships, only men could accept education, worship ancestors, and women were supposed to live under the authority of men. “In childhood, a female must be subject to her father, in youth to her husband, and when her lord is

³⁰ 10,000 -- 4,500 BC

³¹ [Key Components of Civilization | National Geographic Society](https://www.nationalgeographic.org/article/key-components-of-civilization/)<https://www.nationalgeographic.org/article/key-components-of-civilization/>

³² The Characteristic of Civilization: cities, well-organized central governments, complex religions, job specialization, social classes, arts and architecture, public works, writing

³³ [Ancient Civilizations - ArcGIS StoryMaps](https://storymaps.arcgis.com/stories/ancient-civilizations)<https://storymaps.arcgis.com/stories/ancient-civilizations>

³⁴ [King Sargon of Akkad—facts and information](https://www.nationalgeographic.com/culture/article/king-sargon-of-akkad-facts-and-information/)<https://www.nationalgeographic.com/culture/article/king-sargon-of-akkad-facts-and-information/>

³⁵ [Ancient Egypt: Civilization, Empire & Culture - HISTORY](https://www.history.com/topics/ancient-egypt/ancient-egypt-civilization-empire-culture)<https://www.history.com/topics/ancient-egypt/ancient-egypt-civilization-empire-culture>

³⁶ Ibid

³⁷ [Patriarchy - Wikipedia](https://en.wikipedia.org/wiki/Patriarchy)<https://en.wikipedia.org/wiki/Patriarchy>

dead, to her sons; a woman must never be independent.”³⁸ “A husband should be worshiped as a God.”³⁹ (The Laws of Manu). During the rule of the Gupta Empire⁴⁰, there was even a practice “whereby a widow threw herself on the funeral pyre”⁴¹ of the deceased husband to join him in death, in order to show her devotion to her husband, known as *Sati*. All these examples show the extreme inequality among genders. Some argued that the ancient Indus Valley civilization used to be matriarchal in lieu of patriarchal because they all worshipped the mother goddess. However, either matriarchy or patriarchy is one-gender dominated, are indirect results of the gender construction, impugned on equality and social developments as they “rived” mankind into two divisions -- dominant and subordinate.

Moreover, each of the above-mentioned four early civilizations were dominated by one main ruler: Egypt had a pharaoh; Indu had a priest; Mesopotamia had a king; China had an emperor. In spite of several exceptions,⁴² all of those rulers were supposed to be male. In other words, the construct of gender gradually divided mankind into “the gender that could rule” and “the gender that had to be submissive.” By only allowing men to be in charge of the country, women rarely had the opportunity to play a role in politics, let alone holding power, while in fact, women are able to make an extraordinary “King” just as men could. For example, in Tang China, there was a female “Emperor”⁴³ called Wu Zetian. Wu Zetian was one of the greatest “Emperors” in Chinese history; she expanded the empire to its furthest extent in Central Asia, reopened the Silk Road, eliminated all bureaucracy, and established a line for people to directly communicate with her, widening governmental recruitment to commoners,⁴⁴ and consequently bringing the Tang Dynasty to its peak of glory. Although Wu demonstrated and proved the capacity of a woman to be a good Emperor, no other woman ever became an “Emperor” after her.⁴⁵ Imagine if there were never constructs of gender throughout history, there would have been so many preeminent female “Kings” like Wu that significantly contributed to humanity throughout history.

³⁸ <http://www.womeninworldhistory.com/TWR-05.html>

³⁹ Ibid

⁴⁰ about 320 BCE

⁴¹ [Sati \(practice\) - Wikipedia](https://en.wikipedia.org/wiki/Sati_(practice))[https://en.wikipedia.org/wiki/Sati_\(practice\)](https://en.wikipedia.org/wiki/Sati_(practice))

⁴² There were a few Female pharaohs (e.g., Hatshepsut) in Egypt and one Female “Emperor” in China (Wu Zetian)

⁴³ Yes, back then, she’s known as a female Emperor, not Empress, because “Empress” was not a word or notion yet.

⁴⁴ <https://www.historyhit.com/facts-about-wu-zetian-the-only-empress-of-china/>

⁴⁵ Cixi from the Qing Dynasty did have a huge amount of power but was not called an “Emperor”.

Not only did China not let females come into power, but so did plenty of countries around the world. In England, women could not inherit the throne until Mary Tudor;⁴⁶ women could not equally inherit property from their father or husband until the Parliament abolished primogeniture in 1925.⁴⁷ Throughout Georgian Era England, the law of primogeniture inheritance tremendously harmed the rights and lives of women. In Jane Austen's novel *Pride and Prejudice*, the Bennet girls have to find someone rich to marry at young ages because they cannot inherit their fathers' estate property after he dies and they do not have a brother who can take the estate and share with them. According to the England Common Law, "Entailment or fee tail allowed the patriarch of the family to pass property to one line of the family. If that line failed to produce descendants or descendants were not of the right sex (generally male), the land would pass to another more distant line of the family."⁴⁸ Thus, Mr. Bennet's estate ends up being taken by his cousin William Collins because gender identity matters more than blood relation for inheriting property in their patriarchal society. Gender remained as a barrier to women from gaining property that they deserved, even in the Victorian Era. Although single women and widows were allowed to have property, once they married, their money and any property would belong to their husbands, including their children.⁴⁹ At the same time,⁵⁰ Mary Ann Evans, a brilliant female writer adopted a male pen name -- George Eliot, hoping her readers would take "him" seriously and "fallen woman" would not be attached to her status.⁵¹ Additionally, Victorians practiced a sexual double standard: "men wanted and needed sex; women were free of sexual desire and submitted to sex only to please their husbands,"⁵² which intensely belittled the social status of women and exacerbated inequality issues among male and female.

Gender inequality is still an issue in the contemporary world. Many women still do not have equal access to education as men, face job discrimination, employment inequality, lack political representation, etc.⁵³ Most noticeably, many stereotypes throughout history have been made based on the construct of gender. As a girl who grew up in China, I have heard too many unfriendly judgments about females simply based on the traditional stereotypes of our gender:

⁴⁶ "Although Queen Matilda briefly ruled during the Middle Ages, she was never crowned. Lady Jane Grey was also proclaimed Queen in 1553, but never crowned." *History of British female monarchs - ITV News* <https://www.itv.com/news/update/history-of-britis...>

⁴⁷ *Why it's time to stamp out Britain's sexist inheritance rules* <https://www.stylist.co.uk/people/feminism/duke-of...>

⁴⁸ <http://jasna.org/publications-2/persuasions-online/vol38no1/collins/> Appel, Peter A. "A Funhouse Mirror of Law: The Entailment in Jane Austen's *Pride and Prejudice*." *Georgia Journal of International and Comparative Law* 41.3 (2013): 609–36.

⁴⁹ *Women's Rights in the Victorian Era - The Ambition & Destiny ...* <https://valmcbeath.com/victorian-era-womens-rights> (Victorian Era)

⁵¹ *Why do women write under men's names? - BBC Culture* <https://www.bbc.com/culture/article/20200911-why-...>

⁵² <https://www.britannica.com/event/Victorian-era>

⁵³ *10 Causes of Gender Inequality | Human Rights Careers* <https://www.humanrightscarers.com/issues/causes-g...>

“girls are not as good as boys at math or science”; “girls are not as smart as boys”; “girls should be quiet, humble, courteous, frugal, and demure if they want a good marriage”; “it’s unnecessary for girls to study for academic knowledge; marrying a good husband is more important”; “girls who wear too much makeup are ignoble”, etc. Such stereotypes not only undermine girls’ confidence by giving them psychological suggestions but also deepen some parents’ strong will to have a boy. After the Chinese State Council enacted and carried out the One Child Policy⁵⁴ to control populations in 1979, many parents chose to abort, abandon, or even murder their daughters because they eagerly wanted a boy, and if they chose to give birth to or keep the daughter, they would never have a chance to have a son. This cruel practice was shaped by the construct of gender and reflected the traditional values of patriarchy, deeply harming humanity.

Women are not the only victims of the construct of gender, so are men and LGBTQ+ groups who may have different gender identities. Men were also usually taught to fit in a certain “template.” They were supposed to be responsible for their family with huge pressure and burden, to follow the chivalric code during Medieval times, to act like gentlemen today by holding the doors for ladies, always paying for the dinner and bills, and being manly, etc. However, are these really their duties? Should the man still always pay when a woman makes the same or more income than the man? What if the man prefers to be queer instead of manly?

To a certain extent, the construct of gender limits the equality between males, females, and the people who recognize themselves differently. Too many lesbians, gays, bisexuals, and transgender people are too afraid to show or share their real gender identity with other people or to be in a relationship with the people they love because they know that their community or society may not accept them. In *Anne With An E*,⁵⁵ Miss Josephine Barry is set as a lesbian living in a Prince Edward Island during the early 20th century; her female life partner is only known as a friend to the Barrys. Diana Barry is shocked when she first understands Josephine’s different sexual orientation because she is raised in a traditional and conservative family that never teaches her the fact that love has no gender, and it takes Dianna a lot of time to accept and truly understand this. Cole, another special character in this TV show, is isolated, mocked, bullied at school due to his queer gender identity---it is hard for those people who lived in an undeveloped town during the early 20th-century to embrace a different and effeminate boy. Not hard to imagine if one day Cole wants to be transgender, his family and neighbors will not support him.

⁵⁴ The One Child Policy was abolished in 2015; the newest Three-Child Policy was enacted last month.

⁵⁵ the Netflix TV show based on the novel *Anne of Green Gables*

Unfair treatments brought Cole many mental injuries and terrible memories. In addition to Cole, many LGBTQ+ people are still suffering from discrimination and most of them are not as lucky as Cole to have friends like Anne, Dianna, and Josephine to understand him. The construct of gender could be a division of gender but should never be a barrier to love, relationships, equality, or better self-identity.

In conclusion, the construct of gender used to be helpful to humanity before the emergence of civilization because prehistoric nomadic bands were able to develop by the collaboration between people based on their biological differences -- male and female. After the emergence of civilization, however, the construct of gender has been more harmful to humanity as it “rived” mankind into two divisions -- dominant and subordinate, and thus brought inequality to women, LGBTQ+ people, and all genders.

How The Edtech is Shaping Education In India: A Complete SWOC Analysis of the Sector

By Ronit Kumar Singh

Abstract

The explosion of Internet in the last few years had paved the way for multiple sectors to make their product or service in demand over the Indian market. One of the sectors is 'EDUCATION'. The massive growth of Internet and Technology has completely transformed the conventional method of teaching. The COVID-19 pandemic gave a major boost to this field which has also lead to the growth of major EDTECHS in India. This study Amis at the strengths, opportunities ,weaknesses and challenges (SWOC) analysis related to EDTECH companies.

Introduction

From a series of past years, EDTECHS did not attracted the mass. They were on the track working on their product and grabbing the investors for funding. But the COVID 19 had its own pros and cons and one of the pros was it forced the people to shift the way of education to online learning. Even the critics had to accept this platform for at least 2 years. This gave the EDTECH word a golden opportunity to prove themselves and their did it.

During the pandemic years student enrolments and investments into the sector have both surged rapidly. EDTECH has garnered investments worth 1.1 billion dollars in 2020 it's highest ever tally and four times over the last year. The Bangalore based firm i.e. BYJU'S leads the table which nearly raised 1.12 billion dollars in 4 series from January 2020 to September 2020. Unacademy also a renowned player of its game has raised 150 million dollars from multiple sources such as Soft bank , Nexus venture , General Atlantic etc.

According to a report of the Indian Express currently there are 7 unicorns in the EDTECH industry :- Physics Wallah , Byju's , Vedantu Unacademy , Lead , Upgrad and Erudritus . There are several other platforms which are on the way of bringing a revolution in the industry.

Methods

This research is completely based on secondary sources. On this particular subject , over 30 web articles and video contents has been reviewed. This study is completely of descriptive type.

Analysis

We have prepared a detailed study on this industry and includes almost every perspective to get a overview about this upcoming sector.

The Strength Of This Industry

- One of the significant strength of this industry is the technology it offers. A number of tech giants use AI , animations for the better understanding of topics and concepts. Animation leads to visualization in the minds of the students .
- One of the major benefits provided by the industry to students is accessibility and flexibility. It makes easy for the students to access the learning whatever time they want.
- Platforms such as Upgrad in India has offered learning for working professionals. It is particularly helpful to people with a full time job who find it extremely difficult to attend regular courses at a university.
- An evident and notable benefit for the massive growth of EDTECH in India is the least cost. For example an offline institute would cost around 1.5 lacs to 5 lacs for 1 year coaching where as the online platforms offers a top notch quality education from 1.5k to 40k.

Weakness

- Many experts and psychologists have an opinion that there is no interaction between the teacher and a student. Without the interaction of these two the education is incomplete.
- Education is not only about rushing to complete the concepts. Understanding of concepts is a part of education. It also teaches the way to survive in the real world. The student should be aware how to cooperate and interact with people around them.
- Students must have an eagerness and determination to learn for something new otherwise they would only join the class for attendance and hence it's of no use. Thus the teacher must know how to connect with the students and keep them attracted to the class.

Opportunities

- The online learning should be personalised from student to student. Like some students are attracted more from visuals while some are more sensitive by the listening to absorb information.

Machine learning can help in achieving this limit. It helps to identify the field of interest, find your growth area and much more.

- Most of the EDTECHS in India are just limited within the country. There is a vast amount of opportunity for the startups to flourish around the globe. They should build a business model where they can approach to international students.
- India is a multilingual country. So the platforms must approach to the students who are not that well converse with Hindi or even English. The educators must launch there content in other regional languages such as Bengali, Tamil, Marathi and much more.

Challenges

- In India , even after the internet boom there is lack of this service. As per the stats provided by the World Economic Forum only 15 out of 100 household have access to internet and broadband. This issue should be fixed to allow complete digital learning in India.
- The National Education Policy (NEP) 2020 lays emphasis on maximizing online education opportunities through virtual labs. Meeting teaching standards will be a long and arduous task that will take years to accomplish.
- The offline learning is deeply rooted into the minds of guardians and students. It seems extremely hard for the EDTECHS to transform this type of thinking as it would need a long term of hard work and dedication.

Conclusion

1. According to a report of startuplab.in the EDTECH industry in India is expected to reach 30 billion dollars in size over the next 10 years. Although there is a long way to go over the journey. Government of India should look after this sector and should bring multiple reforms for the welfare of the people of India. It is completely crystal clear that EDTECHS have played a major role in education of students during the pandemic. This sector has a lot of potential and hence India is becoming ' THE EDTECH CAPITAL OF WORLD '.

The Impact of Family Dynamics on Eating Disorders By Ummehani Pithewan

Abstract

Eating disorders are a significant public health concern. Galmiche and colleagues conducted a systematic review with 94 studies from the years 2000 to 2018 on the global prevalence of eating disorders (page number). Based on their systematic review, the weighted mean of lifetime prevalence of eating disorders was 8.4% (range 3.3-18.6%) for women and 2.2% (range 0.8-6.5%) for men. Further, 75% of first-onset cases emerge during adolescence. An empirically supported risk factor for eating disorders is parent-child interactions and family environment (Jacobi, Hütter, Fittig). This is a narrative review on how parental behaviors impact the development of adolescent or young adult eating disorders. A literature search was conducted using the Google Scholar and Research Rabbit databases. Eating disorders are impacted by family dynamics such as attachment and parenting styles, and modeling of food and weight-related behaviors.

The Impact of Family Dynamics on Eating Disorders

Family dynamics during adolescence play a significant role in the development of eating disorders. Eating Disorders are psychological disorders characterized by abnormal eating habits. Annual U.S. prevalence rates for eating disorders, including anorexia nervosa, bulimia nervosa, and binge eating disorder, range from 0.04% to 3.5% with BED being the most common (i.e. 3.5% for women and 2.0% for men; Agras Robinson 34-41). Some risk factors for eating disorders develop during childhood and adolescence (Agras Robinson 106-122). For example, maternal health issues, parental criticism, and neglect can contribute to an adolescent's risk of developing an eating disorder. This narrative review will focus on the impact of family dynamics on eating disorders across three domains: attachment styles, parenting styles, and modeling of food and weight-related behaviors.

Bulimia Nervosa (BN) is, according to the DSM-5, recurrent episodes of binge eating (American Psychiatric Association 345-350). An episode of binge eating is characterized by both of the following: (1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is larger than what most individuals would eat in a similar period of time under similar circumstances; (2) sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating). According to

Agras and Robinson (34-41), the prevalence of BN is 1% to 1.5% in adolescents and women in 1 year (1.5% - in American women, 2.9% - in Australian women, 4.6% in Italian women). Lifetime prevalence is 1.5% for women (1.3% in girls) and 0.5% for men (0.5% for boys). The standard mortality ratio (SMR) for BN is 1.93 for all causes and 7.9 for suicide. The prevalence of suicide attempts in BN patients is 12%. Risk factors for BN include early childhood health problems, physical neglect in childhood, sexual abuse, negative perception of parental attitudes, perceived low social support from family, adverse family experiences, and parental problems. People living with BN will eat a large amount of food over a short period of time and will then compensate by using unhealthy methods to avoid weight gain (Agras Robinson 106).

Binge Eating Disorder (BED) is according to the DSM-5 (American Psychiatric Association 350-353), associated with three (or more) of the following: (1) Eating much more rapidly than normal; (2) eating until feeling uncomfortably full; (3) eating large amounts of food when not feeling physically hungry; (4) eating alone because of feeling embarrassed by how much one is eating; (5) feeling disgusted with oneself, depressed, or very guilty after eating. According to Agras and Robinson (34-41), the prevalence of BED in women is 3.5% and 2.0% in men in the United States. Lifetime prevalence for adolescent girls is 2.3% and 0.8% in adolescent boys. Binge Eating Disorder has a crude mortality ratio of 3% and SMR of 2.29 with no recorded suicide attempts for BED. Risk factors for BED include low perceived social support, childhood experiences of sexual abuse and physical neglect, greater exposure to parental criticism, minimal affection, high expectations, low maternal care, high overprotection, parental neglect, and rejection (106). People living with BED will eat large amounts of food in a short period of time, and experience difficulty controlling the amount that they eat (106).

Parenting Styles. Parenting styles are patterns to upbringing children which are formed from normal interaction of parents and their response to children's behaviors. There are four well-known styles: authoritarian, authoritative, permissive, and uninvolved.

Sanvictores and Mendez explain in their review of parenting styles that an authoritarian parent or guardian is not nurturing, very strict, unyielding, and has many rules that are not explained to their child, though the child is expected to follow those rules with absolute precision, out of fear of punishment. Parents or guardians with this parenting style demand obedience and conformity and do not allow much independence or autonomy in their children. Authoritarian parents are low in responsiveness and support, and they prefer more punishing

and forceful measures rather than explaining their reasoning. The authoritarian parent is strict, uncompromising, and prefers punishment as a favored way of disciplining their child.

In contrast, the authoritative parent is nurturing, has clear guidelines for behavior that are explained, and disciplinary actions are intended to teach rather than punish (Sanvictores, Mendez). Parents are open to change and willing to work with their children, rather than use force to make the child do what the parent wants. Authoritative parents are affectionate and attentive to the child's needs while keeping firm and clear expectations for socially acceptable behavior. Authoritative parents are neutral, reasonable, and consistent. They include their child in their decision-making process.

Permissive parents are nurturing, but no rules are enforced and their parenting style is very lax (Sanvictores Mendez). The permissive parent lets their child figure things out on their own, and they are more like friends than authority figures. While permissive parents are very responsive and willing to support their children, they give their children a high level of freedom and do not punish their children or enforce many, if any rules at all (Sanvictores, Mendez). While permissive parents do not punish their children, they are inconsistent and unpredictable.

Uninvolved parents are not nurturing and are very detached from their child's life (Sanvictores, Mendez). Uninvolved parents meet the most basic expectations, like food, shelter, and schooling, but otherwise, remain distant from their child. There are no disciplinary actions ever enacted and there is little to zero communication with their child. Parents are low in responsiveness and spend little to no time interacting with or talking to their children. Uninvolved parents do not have many demands and most often tend to fail in providing behavioral standards for their children.

Parent-Child Attachment Styles. There are four types of parent-child attachment styles, secure, anxious, avoidant, and disorganized.

In adulthood, individuals who have secure attachment styles are able to form healthy relationships that allow them to connect with others while remaining independent (Urban 4). Children with secure attachment have greater perceived acceptance from parents. There is greater maternal acceptance and positive affect. In a secure attachment, there is low psychological control. Mothers are more available and responsive to their children's needs, and they express less negative emotion when discussing their children. In a secure attachment, mothers are more sensitive and supportive of their children's needs.

As children with anxious attachment grow up, they are often afraid to get to know people and cling to parents or romantic partners (Urban 5). Parents in this attachment style behave inconsistently toward children sometimes because of poor or lacking parenting skills. Children with anxious attachment are more likely to be victims of neglect from parents. Children will be more likely to have depressive symptoms, anxiety, and substance use problems (Cassidy, Shaver 182). Anxious attachment style parents are unable to invest in their children, which is shown by inconsistent or unpredictable parenting (Cassidy, Shaver 104).

In an avoidant attachment style, these individuals are more likely to avoid loving relationships with others and withdraw from close connections with others. They also tend to dislike groups that are high in warmth. Children with avoidant attachment to their mothers perceived their parents to exhibit lower levels of involvement, support, and interest in their activities (Urban 4). Parents are not a secure base for their children, and the parents will be cold and rejecting. Parents with an avoidant attachment style are unwilling to invest in their children, as shown by inconsistent or unpredictable parenting (Cassidy, Shaver 104). In the strange situation experiment, Ainsworth and colleagues (1978) found that infants with an avoidant attachment style resisted their mothers by distancing themselves or ignoring them when they returned to the room. Mothers with this parenting style show the most problematic parenting and this attachment style is mostly seen in children who are maltreated or otherwise scared of parental behavior, like parents dealing with unresolved trauma. Behaviors for children in a disorganized attachment style include scared facial expressions, freezing or stilling of behavior, or avoidance in distress (Cassidy, Shaver 156).

Parental Modeling of Food and Appearance-Related Behaviors. Parent role-modeling is often conceptualized as a parent's purposeful or intentional effort to demonstrate healthy food choices and eating behaviors to encourage similar behaviors in the child (Vaughan et al). Parental modeling of food behaviors could be defined as restricting what a child eats, or demonstrating positive or negative food behaviors. An example of parental modeling of appearance-related behaviors would be remarks made by a parent in front of a child about the parent's or child's appearance.

Literature Review

There is a large body of literature on the impact of family dynamics on eating disorders in adolescence. In general, literature supports that family dynamics are key risk factors for adolescent eating disorders. Three important areas of the research literature are parenting styles, attachment, and parental modeling of food and weight-related behaviors.

Parenting Styles. Parenting styles are known to impact children's eating and weight-related behaviors. This can be seen in how much control they have over their child's eating habits and behaviors. Different parenting styles can mean different interactions with children. Whether or not a child develops an eating disorder is something that can be impacted by family influences, especially maternal and paternal influences. According to Scaglioni et al, authoritative parents are associated with healthy eating habits in their offspring and a lower risk of obesity (4). Parents with an authoritative parenting style also lead to high rates of self-discipline, emotional maturity, and overall healthier eating habits (Scaglioni et al 4). Authoritative parenting and feeding styles are best for preventing weight-related problems (Krause and Dailey, 264). On the other hand, restrictive practices around food, usually displayed by authoritarian parents, can increase the overconsumption of unhealthy and restricted foods and the underconsumption of core foods in children (Scaglioni et al 4). Authoritarian parenting can cause a sense of lack of control over their children. Children raised by parents who employ authoritarian parenting styles are likely to do their best to accommodate others, especially their parents, even when it causes harm to them. Since these types of parents are very rigid and controlling, there is an obvious lack of control over their offspring. Because the child will go out of their way to accommodate their parents, especially their mother, they will also wish to fit their parents' ideal of perfection, which can include developing an eating disorder in the effort to earn other people's, more specifically their parents', affection and praise. Authoritarian parenting and feeding can also cause a lower intake of fruit, juices, and vegetables (Krause and Dailey, 248). Permissive parenting styles have been associated with less weight loss and greater food intake (Krause and Dailey, 250). According to *Types of Parenting Styles and Effects on Children*, permissive parenting can lead to unhealthy eating habits and an increased risk of obesity (Sanvictores and Mendez). This, in turn, can lead to the development of one or more eating disorders. Parenting styles that can lead to a lack of a sense of control in children also include uninvolved parenting, which can, in some cases,

influence the development of eating disorders in adolescence and adulthood. However, there is limited research on the impact of uninvolved parenting styles on eating disorders.

Parent-Child Attachment Styles. The type of attachment that a child has to their parents can make a huge impact on parental influences on eating disorders. Secure attachment is seen to have the most positive impact on the chances of a child developing an eating disorder. A secure parent and child attachment means that most often, a child, especially daughters, feels more in control of their lives, therefore losing the incentive to develop an eating disorder as a way to feel in control of their environment. However, the other three attachment styles tend to create a lack of sense of control and are called insecure attachment styles. Children with anxious attachment styles are more likely to show more symptoms of BN and AN than those with secure attachment styles, and there are poorer treatment outcomes (Gander et al). Individuals with an avoidant attachment are more likely to have depressive and anxious symptoms and show signs of a substance abuse problem (Cassidy and Shaver, 182). Depression, anxiety, and substance abuse are all mental health problems that share risk factors with eating disorders. Adolescents with anxious attachment styles feel a desperate need for approval, which leads to an impaired ability to develop healthy coping mechanisms. Though both anxious and avoidant attachments can lead to an increase in depressive and anxiety symptoms over time (Cassidy and Shaver 409). However, adolescents with avoidant attachment styles showed a larger reduction in depressive symptoms than adolescents with anxious attachment styles (Gander et al). Those with avoidant attachments tend to have a negative outlook on others. They are very self-reliant and avoid close relationships since they have found early on that relationships do not meet their emotional needs. They also tend to exercise hyper control over their emotions (Krause and Dailey, 148-149). Avoidant attachment styles can lead to needing control over other aspects of life, such as control over the body, or food consumption, leading to an eating disorder. This means that they would not have a strong support system, so they would be more likely to develop an eating disorder as a coping mechanism.

Parental Modeling of Food and Appearance-Related Behaviors. Parent behaviors can influence whether or not adolescents develop an eating disorder. According to a study by Scaglioni et al., what motivates maternal modeling of food and weight behaviors is not well understood (5). Scaglioni and colleagues claim that mothers have limited awareness of their modeling behaviors. Mothers can unintentionally influence the development of eating disorders in their children.

According to *The Influence of Mothers on the Development of Their Daughter's Eating Disorders: An Integrative Review*, maternal dieting is associated with unhealthy eating behaviors in their children (Ferreria et al). This review shows that a mother's eating habits and the ones she instills in her children could influence the development of eating disorders. While there is information about how mothers model food and appearance-related behaviors, there is limited research on why they do it (Scaglioni et al 5). Children imitate the eating behaviors of their parents, even if the modeling is not intentional. There is evidence, according to Langdon-Dally and Sperell, that by eating regular meals together as a family, parents reduce the risk of their child developing eating disorders (12). There are two ways parents can influence a child's eating habits, by using overt control and covert control. Overt control is obvious, by restricting and controlling what their children eat and do not eat, while covert control is less obvious. Covert control is when parents model food behaviors for their children to follow, rather than simply restrict them. With covert control, parents model their food behaviors and set standards for their kids using their behaviors, doing things such as avoiding foods in grocery stores and restaurants that are unhealthy. Depending on a child's gender, the way a mother models food behaviors for them will be different, even if it is not entirely conscious (Scaglioni et al 5). When a child is younger, more overt control methods are applied, however, as a child reaches adolescence, parents start to trust their children more, so they use more covert tactics. It is shown that the more attention a mother pays to her body, the more the child, specifically daughters, pays attention to theirs (Ferreria et al). A mother's modeling of appearance-related behaviors is shown to have a big influence on the way her children see their bodies. If the behaviors are negative, such as extreme dieting, or complaints about her body, the child will notice the same things in their bodies and will therefore start to exhibit the same behaviors as their mother.

Limitations in Literature. There is a large body of literature on how parent-child interactions influence adolescent eating disorders. However, many first theories were based on clinical observations rather than empirical evidence. Only in the last few decades, researchers have been investigating relationships in families with eating disorders more systematically (Errui et al). Some authors have focused more on family interaction in families that have children with eating disorders.

In contrast, other authors have focused more on trying to identify specific family interactional patterns related to eating disorders. There are also studies examining the difference

between families with eating disorders and families not part of the clinical research. The results of these studies show that by only considering the family functioning, which is defined by *A systematic review of the literature on family functioning across all eating disorder diagnoses in comparison to control families* as “the interactions of family members that involve physical, emotional and psychological activities”(Holtom-Viesel, Allan), in clinical groups was less than the functioning in the control groups (Erriu et al). However, when different variables in family functioning are considered, like emotional involvement, communication, and organization, the results of the trials vary and are sometimes contradictory. As such, dysfunctional family dynamics do not have specific empirical evidence backing them up. There are many different results concerning family functioning in different categories of eating disorders. Some studies showed no significant differences between the different categories of eating disorders. Other studies showed significant differences between categories of eating disorders. Recent studies, partly confirming observations of family therapists, show that in families with anorexic daughters, there is conflicting communication and a lack of reciprocity and emotional harmony. The above patterns are consistent with the empirical evidence of poor child interactions in childhood. Many studies have shown an association between eating disorders and family context, though it is hard to draw concrete conclusions about the role of family dynamics in the pathology of eating disorders. Current scientific literature rejects the idea that family is the only cause, or the main risk factor, of eating disorders. The Academy of Eating Disorders says that any generalized model for eating disorders that has family as the main risk factor must be rejected.

Conclusion

There are a few main points of focus when looking at how family dynamics impact the development of eating disorders. A few of those are parenting styles, attachment styles, and food or weight-related behaviors. Parenting styles have a big impact on the development of eating disorders in childhood and adolescence. Authoritarian parenting styles are most associated with eating disorders and authoritative parenting styles are more protective. Secure attachment styles are more protective, whereas avoidant, anxious, and anxious-avoidant are more predictive of mental health difficulties, such as eating disorders. Parents use overt or covert control to model eating and weight-related behaviors, which can play a role in the development of eating disorders. Modeling of food and weight-related behaviors can be especially influential within the

mother-daughter relationship. While a large body of literature on this topic indicates that family variables play a role, numerous other factors, such as adolescent personality, peer group influence, and culture also play an important role. Family dynamics are one of many factors that are important to target in eating disorder prevention and treatment.

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South Korea's Unique and Troubled Economy: Surveying the Past and Present By Junhyeop Cho

Introduction

Korea has undergone one of the most rapid economic transformations and expansions in the past 70 years. South Korea's post-colonial decades, beginning after liberation from Japanese subjugation, have witnessed dramatic improvements in living conditions. How did South Korea transform into its current status as an economic powerhouse after enduring colonialization, a military coup, and the financial crisis of 1997, among many other challenges? The country's remarkable history of rising living standards is a persuasive argument for suggesting that institutions, particularly the government, are vital for prosperity. While Korea is externally viewed as thriving, serious issues such as the Chaebol system (family-owned businesses) and a high startup failure rate continue to plague the country internally. In light of the country's current stagnant economy, South Korea seems to no longer exhibit financial growth due to a lack of active, novel startups, which is caused by a variety of factors, including the entrenched Chaebol system and a complicated past.

By way of an overview of the history of the nation's economy, the Korean peninsula was divided into two different regimes following the National Liberation of Korea in 1945, as a result of the end of the Second World War in 1945. After liberation and partition of the country by the Soviet Union and the United States (US), two states were eventually created: the Democratic People's Republic of Korea (DPRK) and the Republic of Korea (ROK), in the north and south, respectively. To this point Korea did see some industrialization, mainly in the provinces in present-day North Korea, but industrialization was an exploitative arrangement meant to benefit the Japanese forces occupying the territory since 1910. The bulk of the mining, industrial power, and electric generation initially belonged to the DPRK, whereas the ROK was focused on agriculture.¹

Syngman Rhee, the first president of South Korea, faced a number of issues that set back the fledgling nation's economy. First, the loss of industrial capabilities due to a divided Korea meant having to start anew in commerce. Second, the dissolution of relations with Japan meant a loss of skilled Japanese workers who returned to their native country, as well as losing access to Japan's market, their main purchaser of agricultural exports. Throughout the Rhee administration (1948 to 1961), the economy stagnated due to authoritarian policies, rampant corruption, reliance

on US aid, and the breakout of the Korean War in 1950, which claimed the lives of 1.5 million and destroyed more than a quarter of the country's capital over a three-year period.^{1,2} Following in the footsteps of other budding countries in the post-World War II period, policymakers had concentrated their efforts on fostering local industrial enterprises in order to drive economic development and reduce dependence on imports. Still, the system was not very effective, as noted by the \$364 million trade deficit in 1956, in the face of U.S. assistance, which made up almost 80% of all government revenue.¹ Much of this aid ended up embezzled by the regime, and with import licenses granted only to favored businessmen, rampant corruption further hampered comprehensive management of the state.

Given Rhee's mercilessness toward any political opposition, his administration is regarded by many as a dictatorship, driven by self-enrichment and power. Others conclude that while indeed power-hungry, his drive and uncompromising anti-communism stance successfully thwarted the Soviet and Chinese alliance from gaining control of the peninsula during the Korean War.³ The corrupt officials in government carried out political repression by means of imprisonment and assassination of dissenters, tactics that are indicative of the regime's authoritarianism. Rhee was able to win four elections by forcibly removing the opposition in order to amend the original two-term limit to allow unlimited terms.¹ In the tumultuous period leading up to the Korean War, his government crushed several uprisings through massacres. However, it can be argued that several of the reformation policies during Rhee's presidency aimed at equality and elimination of class divisions did set the stage for South Korea's eventual economic rise, thus contradicting his portrayal as a self-interested autocrat.³

The early writings of Rhee, heavily influenced by extensive periods of residence in Hawaii and Washington, DC, seem to align with his desire for a strong market economy in South Korea that would emulate the U.S. model. In particular, two adjustments took place under Rhee's watch to gradually improve conditions. First, a land reform program was launched in 1950, which made land distribution more egalitarian. Property sizes were limited to 7.5 acres, which aided in transferring capital and power from the beneficiaries of the hierarchical Japanese landlord system' to the lower classes.³ Prior to the program, the top 3 percent of landowners owned 64 percent of all land and by 1956, only 18 percent was held by the top 6 percent.¹ The laboring and peasant class could finally establish and invest in businesses for themselves. The second major change was through Rhee's focus on expanding education. Between 1945 and

1960, enrollment increased in primary, secondary, and higher education by three-, eight-, and ten-fold, respectively. Adult literacy programs were also enacted and, as a result of these measures, South Korea became the best-educated workforce amongst comparable developing countries in 1961.¹ Nonetheless, citizens grew weary of Rhee's grip on political power and the college student population he helped cultivate led a revolution, which ultimately compelled his resignation and exile in 1960.⁴

After the Rhee administration's demise, a short-lived Second Republic was ousted in May 1961 in an armed coup led by General Chung Hee Park. The new military government of Park, though inexperienced in economic matters, prioritized development and ushered in a new age of growth through the promotion of exports in what is now known as South Korea's "economic miracle" or "miracle on the Han," named after the Han River in Seoul. The country's dramatic economic transformation that continued through the mid-1990s is often traced back to Park's 1962 five-year plan, which called for independence from US aid and building infrastructure with considerable government intervention to end the country's impoverishment. Economic growth rate averaged 8.9 percent per year during the plan's implementation. In comparison, the growth rate under President Rhee, who pursued a more laissez-faire policy, only averaged 4 percent annually, peaking at 7.7 percent in 1957, mainly due to reconstruction efforts. Other factors attributed to Park that advanced the economy were US benefits for sending Korean troops into Vietnam, normalization of relations with Japan, and sending mine workers and nurses to Germany to guarantee foreign borrowings.^{1,5}

Leaning on the authoritarian support of the military, Park was able to execute visionary projects by consolidating political power, a key factor missing in Rhee's tenure. Park also coerced compliance among laborers under a credo of nationalism. Nationalist fervor was high in many nations in the post-WWII era, but even more so for the tiny post-colonial country that persevered through the Korean War. Park's campaign to suppress political and civil rights allowed labor-intensive industries like agriculture and textiles to gain a competitive international foothold, capitalizing on the plentiful and cheap, but educated, workforce. Though burdened by their work conditions, Korean laborers saw tangible breakthroughs as they rose out of poverty and were able to support themselves and their families. As exports thrived and the economy began stabilizing, Park's second five-year plan, introduced in 1967, switched the government's priority to investing into heavier industries. Manufacturing grew to account for 35.2 percent of

domestic production at the start of the 1970s, compared to 17.1 percent a decade earlier.⁵ Park's government worked closely with select entrepreneurs throughout both five-year plans to build up large conglomerates capable of competing on a global scale. Many of these family-owned businesses, known as Chaebols, had roots in the Japanese colonial era and into the Rhee administration, but it was under Park that they came to dominate the South Korean economy. Fueled by the government's seizure of the financial sector, these relationships directly developed South Korea's modernized export-oriented industries like petrochemicals, steel, shipbuilding, and machinery during Park's third and fourth five-year plans.⁶

President Chung Hee Park never saw the results of his fourth and final plan. He was assassinated in October of 1979 by a friend who was the director of the Korean Central Intelligence Agency. Despite South Korea's economic boom under his leadership, Park's legacy is viewed as divisive given his authoritarian approach to attaining prosperity. Still, the country returned to a military-led government after the turmoil that followed his death. Major General Doo Hwan Chun assumed power in 1980 and, although met with protests calling for a civilian government, he was legitimized by an election in 1981. The authoritarian status quo continued but a seven-year term limit was passed before Chun's election. As Chun took office, cracks were beginning to appear in South Korea's economy, driven by inflation and oil price hikes around the world. These economic shifts led to a global recession, which affected Korean exports as other countries enacted more protective measures.^{1,6}

To address issues of inflation, Chun's government adopted a conservative fiscal policy that including increasing interest rates and limiting credit. He understood the risks in depending on large Chaebols and pushed to restructure the system with a series of policies: marking failing companies for acquisition or merger, increasing resource distribution to smaller firms, and calling for greater oversight and restrictions of Chaebol activities. The collective changes seemed largely effective as the growth rate throughout Chun's term from 1981 to 1987 averaged 8.7 percent despite a 1.5 percent decline in 1980. During this period, South Korean exports gradually shifted from labor-intensive sectors like textiles to the heavier industries that the previous Park administration had envisioned, expanding into electronics, semiconductors, automobiles, steel, and ships. Much like his predecessors, Chun's legacy is marred by corruption and human rights atrocities like the 1980 Gwangju uprising that ended with over 150 dead. When his term neared the seven-year limit, the South Korean people had had enough of military rule and successfully

protested for free elections in the upcoming 1987 vote.^{1,6} Perplexingly, the democratization of the nation would result in severe unforeseen consequences just 10 years later.

The first two freely elected presidents during the democratic transition phase, spanning from 1987 to 1997, both looked to distance themselves from the non-existent social welfare policies and censorship of previous administrations. As South Korea had, by then, risen to the GDP level of developed countries, the new administrations made efforts to quickly match the quality of life enjoyed by those advanced nations. However, compared to similarly thriving countries, South Koreans worked longer hours and for lower wages.¹ The newfound freedoms of the working class led to powerful unions that successfully organized for higher wages, subsequently stalling the growth rate sustained by the previous authoritarian regimes. While the middle class enjoyed a stronger political voice and greater purchasing power, productivity did not keep pace with worker earnings, thereby increasing inflation and affecting export competitiveness.⁶ During this interval of shifting dynamics, president Young Sam Kim, elected in 1992, enacted policies to ease restrictions on the foreign exchange rate and foreign investments, resulting in an explosive build-up of short-term foreign debts.² The combination of a heavily indebted business sector – essentially the large Chaebols – and a banking sector destabilized by financial repression contributed to the spread of Southeast Asia's financial crisis to South Korea in 1997.⁷

South Korea's Response

Facing default from the 1997 financial crisis, the South Korean government requested that the US-based International Monetary Fund (IMF) bail out the economy. The necessary funds were provided with reformation suggestions, a responsibility which fell on the newly elected 1998 administration of President Dae Jung Kim. These recommendations included Chaebol and bank restructuring, increasing interest rates and taxes, and a conservative federal budget. A downside of the changes was a difficulty in obtaining loans by smaller firms, which forced bankruptcies and increased unemployment. Due to this, some South Koreans blame the IMF for the crisis, even labeling it the IMF Crisis. Still, the country was able to recover quickly during the tenures of Kim and his successor, Moo Hyun Roh. However, not all the policies passed in the post-financial crisis years achieved their intentions. Tax increases to fund social welfare and labor-friendly programs led to outsourcing of production to foreign countries.⁶ The implications

of too-big-to-fail corporations with gradually declining South Korean interests are still unfolding to this day.

Despite South Korea climbing out from its economic abyss and demonstrating tremendous economic growth, the country is believed to be in “danger of replicating Japan's economic bubble collapse” and at “the beginning of the end of globalization.”^{8,9} There are numerous historical events and factors that contribute to South Korea arriving at its current state of affairs; however, if one historical cause had to be selected, the deeply-rooted Chaebol system prevents startups from achieving their full potential. The development of the Chaebol system serves as a government-led business model that nurtures and protects a select group of family-oriented businesses. They were able to outperform domestic competitors and devote resources to product innovation and company expansion while remaining hidden from public scrutiny as a result of discriminatory government subsidies and tax loopholes. Without question, the Chaebol system played a crucial role in South Korea’s triumph from relative obscurity to international prominence over the twentieth century. Several Korean corporations, such as Samsung and Hyundai, have risen to the top of the world's largest mega-conglomerates as a result of their association with the government. While the Chaebol system has been highly successful in providing the nation with a success story, it has had a negative impact on the startup ecosystem.

The startup, generally associated with originating in the Silicon Valley in the US, is defined as a blend of modern capitalism and cutting-edge innovations. Since the 1980s, startups are credited with transforming young, ambitious technophiles into upper-class entrepreneurs, and they continue to cultivate firms with the potential to disrupt monopolies in pursuit of becoming the next Apple or Microsoft. However, in South Korea the global startup boom appears to defy the obvious associations that exist in other countries. An important member of the G20 intergovernmental cooperative, South Korea stands out as a strong leader in the exporting sector, with a GDP growth rate of 4.28 percent expected for 2021.¹⁰ The country’s status as an Asian economic superpower should suggest that the country is primed for a healthy startup environment, but this may not be the case.

The results of a thorough investigation into some of South Korea's major firms reveal an alarming pattern that complicates the role of modernization and innovation in the Korean market. Looking at the founding dates of select top companies in South Korea, virtually all were

established before 1970.¹¹ The advanced age of these organizations contrasts with their more recent counterparts located in the US. For example, the largest company in South Korea based on market capitalization, Samsung Electronics, was founded in 1938, whereas the two largest firms in the US, Apple and Microsoft, were founded in 1976 and 1975, respectively.¹² The average year of incorporation for South Korea's ten largest firms is 1957.¹³ In comparison, the top ten most valuable firms in the United States were, on average, founded in 1975, representing almost two decades of discrepancy between startup dates in the two countries. The history of contemporary capitalism and company management in Korea, which is substantially more recent than that of the US, should imply the opposite. The long-term success of these large Korean firms serves as a harsh reminder to entrepreneurs of the difficulty in becoming established in the Korean market.

By 2020, 13 percent of South Korea's total population will have established their own business, making the country the second most active startup environment in Asia.¹⁵ According to Statista, there are presently 1.7 million startup enterprises in the country, with the service industry accounting for 78 percent of all newly established businesses.¹⁴ This enormous share of startups, mostly unrelated to the largest companies, may indicate that new competitors in fields dominated by Chaebol companies cannot survive. The sustainability of the startup market is clearly critical to the economy's long-term health.

In a global economy heavily reliant on the startup boom, the logical assumption is that a stable state of affairs should allow startups to expand and thrive. A less utopian depiction of reality is presented by the current climate in South Korea. Less than 30 percent of all companies survive after five years in operation, whereas US and European Union (EU) startups boast 47 and 44 percent, respectively.¹⁶ Businesses in South Korea must launch without access to meaningful funding while competing against established firms prominent in industries ranging from consumer electronics to food services; this is a difficult proposition. The power of large companies and the lack of local companies' globalized reach have been identified as contributing to the prevention of startup survival.

The service industry tends to concentrate on an ever-changing Korean market defined by fussy consumer fads, which is a contributor to startup hindrance. Owners must navigate a fragmented market to find their niche. The oversaturation of eateries and cafés throughout the country demonstrates this phenomenon. Seoul, the capital of South Korea, is the fourth most

highly city in the world in terms of restaurants and is considered one of the most vibrant street food cultures on the planet, according to World Restaurant Rankings. Local and international cuisines may be found in abundance in Seoul, and some are unique to the city and not found anywhere else. Still, these options are primarily targeted towards local clients in terms of their menu offerings, services, and location. Subsequently, they are inaccessible to visitors and expatriates from around the world. Though some restaurants in Seoul now cater to the growing expatriate population, the majority are unable to break free from the confines of local wants and sentiments. This trend in the Seoul restaurant scene contradicts the advantageous conditions associated with the survival of startups, such as an orientation toward global opportunities and resistance to traditional attitudes.

Wadiz, a South Korean startup funding platform similar to Kickstarter in the US, demonstrates a pattern of localization that highlights a lack of global reach. The most popular projects funded on Kickstarter range from promising electric vehicles to innovative video games and smart watches, while the most popular campaigns on Wadiz are limited to calendars, bed sets, undergarments, and dubious cosmetic treatments, to name a few examples. While these products are still sought-after, the projects are dwarfed by the size of successful startups formed on Kickstarter, which is certainly more widely used and developed. On the other hand, Wadiz appears inferior when compared to Campfire, another crowdfunding platform based in Japan. Agricultural firms, technology companies, and up-and-coming animation studios are among the most popular campaigns on Campfire, and they possess greater global potential than the projects on Wadiz. Small enterprises in South Korea face a challenging national business climate dominated by large corporations, and a self-inflicted lack of broader ambitions certainly limits revenues.

A handful of remarkable startup success stories from South Korea indicate that adopting globalization initiatives is vital to obtaining success. One such company, Coupang, began with food catering and e-commerce but has since expanded product offerings to include speedy delivery as well as online entertainment distribution. Another startup, Market Kurly, delivers quality ingredients and household products that are difficult to find in local stores due to owners' preference for stocking items according to traditional Korean tastes. Despite a well-timed initiative during the pandemic to simplify the e-commerce and delivery experience for consumers, it is no coincidence that Coupang and Market Kurly reached current market

dominance among countless similar startups. The most significant difference contributing to their unicorn valuations of over \$1 billion was their interest in global resources. Coupang began in the US and immediately thrived due to the international economic ecosystem. Market Kurly offers imported and organic products that are rarely found in South Korea, thus appealing to expatriates and a wider base than its locally focused competitors. These case studies show that perhaps introducing a globalist policy can lead to greater startup prosperity.

Impact of the Chaebol System

The Chaebol system's curbing of competition is one circumstantial factor detrimental to startups. Government assistance, beginning with President Park, allowed Chaebols to disproportionately take advantage of available resources and funds to expand and open hundreds of factories. Their early success in the global marketplace was, and continues, to damage new entrepreneurs. Given startups' inexperience with exporting and the inaccessible government incentives enjoyed by Chaebols, startups were unable to compete with government-sponsored behemoths. The business operations of small and medium-sized firms were further impeded by the country's harsh foreign trade and travel limitations, almost non-existent when Chaebol operations were concerned. The winner-take-all corporate culture and government involvement that characterized the early boom years have since been removed from official policy, especially after the 1997 crisis. Still, the business climate and government partiality persists today. Moreover, initiatives to offset the imbalance have gone mostly unnoticed by foreign markets as a result of the enormous amount of worldwide success and familiarity Chaebols have achieved.

Many of these Chaebol enterprises are ingrained in the daily lives of South Koreans because of their tremendous size and dominance in the country. Profits earned by South Korea's largest firms have a significant impact on GDP, unlike in other countries. The top ten companies account for an astonishing 44.2 percent of the country's total GDP.¹⁷ Samsung's electronic business alone, omitting the parent company's many other divisions, accounts for more than 14 percent of the total GDP. In the US, the top ten corporations contribute only 11.8 percent of GDP, and in Japan, 24.6 percent.² These low proportions occur despite the fact that both countries have globally dominating firms. Chaebol corporations have a significant and widespread influence on South Korean business issues, cultural discourse, and social sentiments. The logos of companies such as Samsung, Hyundai, and LG can be found in virtually every sphere of everyday life, from

electronic devices and home appliances to military vehicles, hospitals, and even sponsorship of baseball teams. Chaebol firms even have a presence in popular media. Television shows feature Chaebol organizations and family members as central characters. Many inheritors to Chaebol fortunes are highly active on social media, but this has backfired when others denounce social media as curated PR attempts to appear relatable and ordinary. While some believe that these corporations are "too big to fail," the reliance on major corporations is becoming a source of concern. Should a Chaebol company fail, the entire country's GDP would suffer a steep and immediate decline.

In addition to destructive fallout effects from potential failure, South Korea's conglomerates actively impact the economy in other ways given their influence. Successful startups today are eager for acquisitions or funding from Chaebol firms, rather than growing to these levels independently. South Korea's few unicorn startups, private companies valued at over \$1 billion, have been backed in large part by one or more of these conglomerates. Only 11 unicorns currently operating across the entire country exist, with that number constantly declining as more enterprises choose to go public through an initial public offering, known as an IPO. This number is miniscule when compared to the 388 unicorns in the US or even the 31 in the UK.¹⁸ The accomplishments of these 11 firms, while undoubtedly the result of considerable effort and ingenuity, can largely be attributed to Chaebol investors. Stipulations for financing sometimes require startups like Musina, Danggeun Market, and Socar to promote Chaebol brand names and carry their products. Another impact of the dominance of Chaebols is that entrepreneurial and creative individuals with business potential find it easier to work for a Chaebol rather than launching their own venture. Further, attracting employees to startups who compete against conglomerates proves difficult, given the latter's pervasiveness and resources to offer greater job stability. Despite South Korea having a highly skilled population, major corporations seemingly monopolize the employment market.

The Chaebol system is a double-edged sword. It can be credited for the economic ascension enjoyed by South Korea over the last several decades, creating employment opportunities for many individuals and promoting Korean culture worldwide. However, in today's fast-paced society, Chaebols are resistant to fresh ideas and companies because they reserve power in a select few companies. As demonstrated by the thriving Silicon Valley scene, startups and small firms are the ones that disrupt the status quo and shape the future of economic

development. They promote innovation and cultural development, as well as substantially impact the economy as a whole. With the South Korean economy controlled by old conglomerates, startups and true advancements are suppressed. A general lack of foresight on the part of startups to appeal to a rapidly globalizing world further deters success. Collaboration between the small business sector and the government is essential in order to revive South Korean ventures and promote long-term strength.

Concluding Thoughts

The troubled history of Korea – its politics, economy, the Chaebol system, and startup culture – are all important aspects of comprehending contemporary South Korea. Despite pessimistic news reports, South Korea is still a major player in the global economic arena. However, economies do not signal noticeable declines until they have reached the point of no return. It is impossible to tell whether the South Korean economy is nearing collapse at the moment, but now is the time for South Koreans to recognize current and potential problems in order to find solutions to secure a better tomorrow. Reforms to the fragile Chaebol system and a gradual cultural shift away from rigid, traditional schools of thought may serve as beneficial starting points.

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