Review

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Abstract: This article aims to provide a comprehensive understanding of vaping from various perspectives that contributes to the origin, development, achievement, and consequences of the greed of e-cigarette manufacturers. In our analysis, multiple elements of the social landscape, including economic, cultural, moral, psychological, and philosophical dimensions, contributed to the origin and development of the vaping greed and shaped people's behaviors. Further discussion was made on how the specific characteristics of e-cigarette products and the marketing strategies of the companies, especially social media marketing, fostered the growth of such greed. Through interviews, we have also discussed the unfolding of this greed within the community of teenage vapers. The growth of the vaping greed was manifested in the large market share taken by the companies, but these all significantly harm people's health and the communities. Nicotine and other chemicals in e-liquids promote each other's negative effects in the mechanism leading to pulmonary symptoms and addiction, which are not limited to the physical level. We described that addiction could be transgenerational and can induce trauma both at an individual level and a community level. Overall, the greed of the vaping industry is a very complex system. The treatment of the greed shall be complicated as well: Besides the public health measures taken to treat the symptoms of the greed, we should educate individuals to be aware of their unfulfilled needs to regain authenticity and establish an infallible authority to enforce universal morality, which eradicates the complications of addiction and the root of the capitalists' greed, respectively.

Keywords: vaping; e-cigarettes; addiction; social; flavors; nicotine; toxicity

Introduction

Recently, e-cigarette use among the adolescent population has become a concerning public health challenge in the United States that has reversed the nation's effort to reduce youth tobacco use in the past 30 years.[1] According to data collected in 2021 in the US, 24% of 12th-grade students reported having engaged in vaping activities in the past 30 days.[1] This public health issue is not limited to the US, however, as the prevalence of past-30-day vaping among adolescents aged 12-16 years in 68 different countries worldwide was 9.2% (2021).[2] Besides the prevalence, adolescents who vape can develop severe respiratory symptoms that may even require ventilation, and other symptoms can also arise throughout the body.[3] All of the serious consequences above can be attributed to the greed of the entrepreneurs, who turned a product that could benefit society, e-cigarettes, into a drug that poisoned adolescents all over the world. This article is inspired by CNBC documentaries aired consisting of several episodes.

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Origin of E-cigarettes

Surprisingly, the prototype of e-cigarettes was not even designed for smoking: In 1927, Joseph Robinson created an application for a patent for his "electric vaporizer", which was designed for vaporizing medicinal compounds.[4] In the description of his design, the goal of the invention was to create a device that can be handled without the possibility of being burned and is easy to use.[4]

The vaporizers were never intended to be used on cigarettes until 1963 when Herbert A. Gilbert had his patent for the first e-cigarette in the world approved.[5] In his description, Herbert A. Gilbert claimed that the product could provide a harmless way of smoking and can allow smokers to also take medication under the instruction of physicians.[5] An important aspect of his design was that it included a cartridge to moisturize the vapor and provide flavors, one of the most influential factors of e-cigarettes' attraction to adolescents.[5] Therefore, although with good intentions, this design from Herbert A. Gilbert paved a way for the vaping greed that was about to come.

The Development of E-cigarettes and The Emergence of Greed

The event that marked the e-cigarettes' entry into the market was the invention of the first e-cigarette to be commercially successful, "Ruyan", by Hon Lik.[6] The product, "Ruyan", was designed to be a smoke cessation product to replace nicotine patches, its name meaning "like cigarettes".[6] As described by its name, "Ruyan" mimics the appearance of a traditional cigarette, which is a signature of the first generation of e-cigarettes, namely cig-a-likes.[7] A "Ruyan" e-cigarette is assembled with 3 pieces: a battery, an atomizer, and a cartridge.[7] There is no switch to turn the device on or off as vapor is produced automatically when the device is being sucked on.[7] Later, in other first-generation e-cigarettes, the setup of the devices was simplified as the atomizer and the cartridge was combined to form a "cartomizer".[7,8] There are also products that combined all three components into a single unit, making the device a disposable product.[8]

Unlike the cigarette shape of first-generation e-cigarettes, second-generation e-cigarettes often look like pens, leading to their name "vape pens".[7] The most manifested renovation in e-cigarettes' transition into the second generation is the "clearomizer".[7,8] The clearomizer consists of a clear tube, a liquid tank, a connector, a wick and coil (the wick delivers the e-liquid to the heating coil), and a drip tip.[7] The clear tube allows the user to see the level of e-liquid left in the tank, and the tank is larger than the cartridge in the first-generation e-cigarettes.[7,8] Other new aspects of the second-generation e-cigarettes include a button that allows users to manually turn on/off the device and a chip to prevent overheating of the device.[7] Also, clearomizers in second-generation e-cigarettes are often refillable by customers.[8]

Just like the transition from the first generation to the second generation, third-generation e-cigarettes also adopt a different shape than before: Third-generation e-cigarettes are also called "mods", which implies that third-generation e-cigarettes are "modified" from flashlights.[7] Third-generation e-cigarettes are highly customizable, so one device can be largely different from another, but there are still features common in most third-generation e-cigarettes: They often contain sub-ohm heating coils (resistance lower than 1 ohm, allow for the production of more vapor), and they often allow users to regulate the wattage of the device, which in turn changes the amount of vapor produced.[7,8]

Some people may categorize the sub-ohm devices into the fourth generation, but according to the CDC, fourth-generation e-cigarettes are called "Pod Mods", meaning modifiable devices with a "pod" cartridge.[8,9] These devices look very different from each other, their shapes even include USB shapes.[9,10] An important and dangerous characteristic of fourth-generation e-cigarettes is that nicotine salts, instead of freebase nicotine that are used in previous generations, are used so that higher concentrations of nicotine could be inhaled.[9] Some of the pods can even contain CBD or THC, which introduced a new risk to the population which will be discussed later in this article.[9] Figure 1 describes an overview of the development of e-cigarette products.

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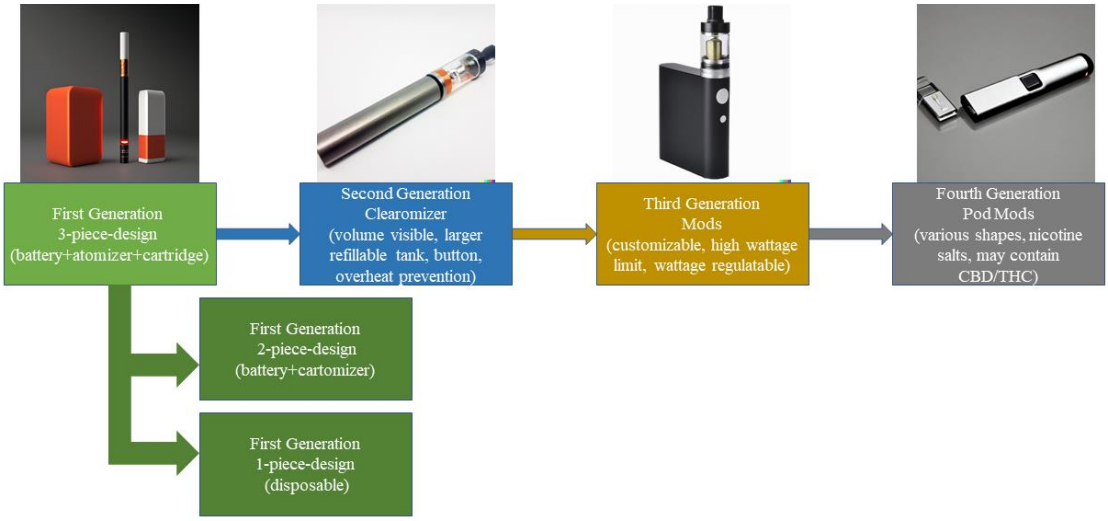

Figure 1. An overview of the development of e-cigarette products. We used AI picture generators. Fotor (https://www.fotor.com/features/ai-image-generator/) generated the 1st and fourth generation e-cigarettes. DALL-E (https://labs.openai.com) generated the 2nd and 3rd generation e-cigarettes.

E-liquids Composition and Toxicology

The liquid that all these devices use to generate vapor is called e-liquid. E-liquids typically consist of a mixture of propylene glycol (PG, humectant), vegetable glycerin (VG, humectant), nicotine, and flavorants.[9,11] There are more than 200 types of flavorants (flavoring chemicals), and each e-liquid product contains an average of 10 different flavorants.[12] Among all the flavorants identified, the most commonly used flavorants are vanillin, ethyl maltol, and ethyl butyrate, each found in 35%, 32%, and 28% of the e-liquids with varying concentrations of nicotine.[12] More details of chemistry are described previously[17].

There are various toxic effects of almost all the components in the e-liquids.[11,13-15] The most abundant chemicals, PG/VG, can negatively affect cell viability by themselves as they can cause decreases in cell growth to a similar degree to dimethyl sulfoxide.[11] On the other hand, the chemical that vapers are addicted to, nicotine, can induce health issues by increasing reactive oxygen species, causing lipid peroxidation, and damaging human DNA.[13]

The most used flavorants in e-liquids mentioned above also have pronounced toxicities.[11,14,15] Vanillin, the flavorant used in 35% of e-liquids, has been shown to positively correlate with the toxicity of the e-liquids ($R^2 = 0.62$).[11] Meanwhile, ethyl maltol leads to incidences of kidney lesions in rats and mild hemolytic anemia in dogs.[14] Ethyl butyrate, a type of ethyl ester flavor additive, can be broken down under high temperatures (may be achieved by atomizers) into carboxylic acids.[15] These carboxylic acids can then decompose into ketene, a chemical known to be a strong respiratory poison that can cause severe lung damage even at lower concentrations.[15] Generally, it is shown that the more chemicals there are in an e-liquid and vaporized (aerosols), the higher toxicity that e-liquid is likely to have.[11]

Besides the chemicals in the e-liquids themselves, other toxic chemicals including heavy metals may be inhaled while vaping and pose health risks.[16] It is observed that later puffs contain higher concentrations of toxic metals, and these higher concentrations can lead to a 30% increase in DNA damage after a 7-day exposure.[16]

Biological Mechanism of Toxicity and Addiction

Overall, the inhalation of e-liquids can lead to lung injuries, and Kaur et al. proposed cellular mechanisms for this process.[17] In their mechanism, the chemicals in the aerosol produce reactive oxygen species in the lungs and induce oxidative stress, DNA damage, and epithelial barrier dysfunction.[17] These cellular toxicities then trigger the TRP/TLR receptors, activate the NF-κB

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complex, and stimulate the release of inflammatory cytokines including IL-1β, IL-6, and TNF-α, which are all parts of inflammatory responses.[17] These inflammatory responses then manifest as symptoms by inducing ER stress, mitochondrial dysfunction, airway hyperactivity, epigenetic modifications, and other pathogenesis mechanisms.[17]

Another worth noting point in their mechanism is the activation of the NF-κB complex.[17] The NF-κB complex is known to facilitate the positive reinforcing effect of drugs via reward sensitization in the nucleus accumbens, thus exacerbating the development and maintenance of nicotine addiction in vapers.[18] The major addiction development pathway, on the other hand, originates from the binding of nicotinic acetylcholine receptors by nicotine.[19] Signals are then sent to the reward system in the central nervous system including the nucleus accumbens to reinforce the behavior and eventually lead to addiction.[19] Figure 2 describes the known biological pathways to the toxicity of and addiction to e-cigarettes.

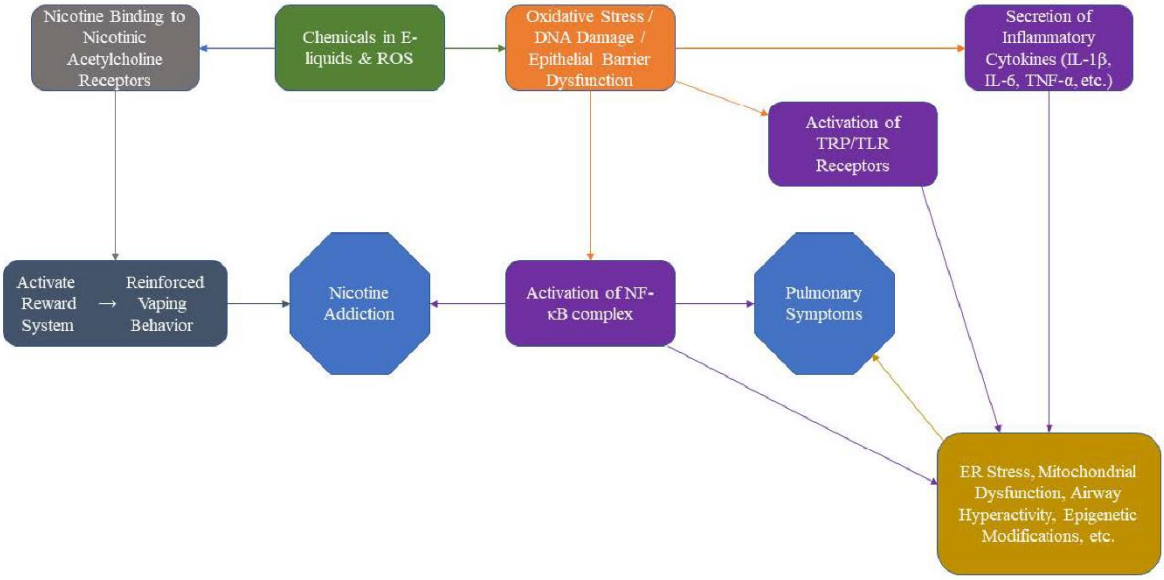

Figure 2. Biological pathways to pulmonary symptoms and nicotine addiction.

Capitalists' Incentivization of the Tobacco Market

Western culture thrives on its capitalistic influence over the individual mind. This aspect of the culture represents a significant factor in assessing the causes of the continued and growing use of vaping, nicotine, and tobacco consumption. To examine and derive conclusions from the economic, social, political, and philosophical dimensions of the vaping phenomenon, this section involved Von Bertalanffy's (1968) systems theory and Senge's (2006) systems perspective.[20,21] Von Bertalanffy (1968) described systems theory as a science of whole perspectives that considered human systems as complex, interdependent elements that interacted with each other in order to create a sense of equilibrium and homeostasis.[20] Senge's (2006) concept of a learning organization represents a metaphor that describes human systems groups of members with interdependent webs of values, beliefs, worldviews, philosophies, and multiple norms striving for validation and acceptance in a competitive landscape.[21] Senge's (2006) model provided the visual perspective for understanding how systems theory can help others comprehend the complex relationships between cognitive or psychological constructs and the tobacco or vaping organizations whose members seek influence over those constructs.[21] The pursuit of influence over market populations for segment ownership and profitability holds significant value to these types of organizations. The incentivization for such companies to continue their pursuits of market ownership can be described through three concepts: (a) an inconsistent set of perspectives that circulate regarding what capitalism means. (b) an individualistic society in which entrepreneurship receives emphasis, and (c) moral relativism as a socially espoused philosophy among cultural members.

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One of the accepted assumptions about capitalism in the western world is the idea that its philosophy began with the entrepreneurial spirit associated with the freedom to start one's own business as a source of labor and income. Most people define capitalism as an economic and social system in which entrepreneurs use freedom to create new products or services that generate enough capital to provide jobs and stability. Due to this philosophy about entrepreneurism-based capitalism, business owners developed a degree of social skills and emotional intelligence to effectively interact with others and stimulate demand for their goods. The assumption remained that capitalism grew from the individual desire to innovate and grow a business. However, the history of capitalism does not validate this ideology. According to Belloc (1912), capitalism developed during the eruption of the "Servile State": a society in which only a few members owned the means of capital production thereby causing many members to seek wages for their labor.[22] In other words, capitalism emerged from a preexistent group that already owned the capital and production power when Europeans traveled to the New World during its beginning.

Many westerners bought into the concept of the freedom to develop products and services to generate profit for the pursuit of individual wealth and prosperity. The idea of financial wealth became a primary focus for entrepreneurial endeavors in capitalistic enterprises. As a result of this buy-in of a flawed ideology, individualism became a cornerstone of Western societies. Fatehi et al. (2020) defined individualism as the cultural orientation that emphasized the "autonomous self" for one's identity in relation to other societal members.[23] The shared emphasis on individual importance increased the determination to produce new things and gain profit. The glorification of individualism created a blurring effect on the collectivistic perceptions of mutual accountability and ethical responsibility. Furthermore, greed manifested itself through the stagnation of wages while the few owners of production means continued to reap the most financial benefits from profits. Furthermore, the continuation of unchecked greed led to an abstractification of common laborers which involved a mental reduction of human beings into mere objects or parts of an organizational system (Fromm, 1955).[24] To overcome the ongoing exploitation of the working classes, Marxism developed in reaction to this phenomenon in Europe and traveled into North America. The constant battle between capitalism and socialism became a recurrent social stressor that tobacco companies, and the vaping industry, took advantage of for market growth and profit maximization. The sociopolitical and economic messages sent through media and community groups *triggered* the human desire to indulge in escapism: the learned habit of seeking distraction or relief from unpleasant surroundings, influences, realities, or other forms of negative stimuli through a *diverted focus* on an object or activity that caused temporary pleasure. That same type of triggering effect due to political bipolarity still occurs today.

In order to combat the reduction of value once placed on traditional morality, the philosophy of moral relativism emerged and shaped Western societies in the late period of 20th century. Rachels (1986) stated that this moral philosophy indicated that "no universal truths" about morality existed "for all peoples at all times".[25] Therefore, the individualistic mind with capitalistic, entrepreneurial thought conducted business processes with the view that moral beliefs could be reduced to mere personal values that do not affect his or her *entitlement to organizational profits*. The tendency toward greed manifested itself again through the Industrial Age, the Information Age of knowledge transfer, and the Precariat Age which includes both the education and gig economies (Drucker, 2008).[26] Today, the founders of Juul and other entrepreneurs of vaping products express their justification based on the concepts of this study. Overall, the multiple dimensions that lead to the accepted practice of vaping are visualized in Figure 3.

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Figure 3. Multiple Dimensions Lead to Accepted Practice of Smoking and Vaping. This diagram represents a holistic visualization of the multiple dimensions, their interconnected relationships, and how the core behavior (accepted practice of smoking and vaping) develops and maintains itself within society. The outer ring of economic, cultural, moral, psychological, and philosophical dimensions represents the various elements of the societal landscape that support or validate the illusion of harmless vaping.

In order to combat the social, political, economic, philosophical, and cultural elements that fuel the greed of the founders of vaping, the following question should be contemplated and continuously argued: *How much profit is enough to bring about both personal and shared harmony from a long-term perspective?* This question conveys both the notion of a relationship between virtue and vice implicit within cultural frameworks; and the conflict between one's self-concept rooted in prosperity and the moralistic expectations of business conduct imposed by a surrounding society that condones a philosophy that rejects worldviews rooted in an implied *universal* morality. The future of the tobacco and vaping industries depends on the Western world's willingness to examine its assumptions about capitalistic endeavors and the possibility of universal morality which requires a formal authority to enforce it. The same question that this section posed also has applicability to other medical industries related to consumerism, profit-driven goals, and social responsibility on a macroeconomic basis: the effects of the profit vs greater welfare battle on pharmaceutical and durable medical equipment (DME) markets. How much profit is reasonable, and by whose standards? Who possesses the infallible authority to enforce such a morality through corporate power, political influence, shared agreement, or governance if all groups who use these tactics share responsibility for creating and recreating the problem? The answer exists in the redevelopment of the concept of an infallible authority whose decisions determine the final outcome for all groups affected by strategic choices. The reconsideration of a universal morality must be reconsidered moving forward if all affected communities failed to create successful outcomes for everyone while practicing moral relativism in a capitalistic vs socialistic system.

Social Media and Vaping

In 2022, the number of social media users in the US has reached over 302 million. Around 90% of the US population uses social media as of 2023. Social media platforms such as Twitter, Reddit, Instagram, TikTok, YouTube, and Facebook have become increasingly popular, especially among

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youth and young adults.[27] Instagram and YouTube are the most broadly used social media platforms among youth in the US, with 80% of youth using YouTube and 72% of youth using Instagram.[28,29]

With the increasing popularity of social media platforms in the US, such as Twitter, Reddit, Instagram, TikTok, YouTube, and Facebook, electronic cigarette companies and vape shops have aggressively marketed vaping products on social media.[30-34] Vaping marketing and promotion posts dominate vaping-related social media posts with more user engagement [29,31,34]. They usually post well-designed pictures with vaping products, images linking vaping with luxury lifestyles, price promotions, discounts, product giveaways, etc.[35-37] They also sponsor influencers with many followers to help them market vaping products.[38] Around $125 million per year were spent on marketing vaping products by the vaping industry as of 2014, including the marketing and promotion on various social media platforms that reach most of the US population, including youth under 18.[38,39] The massive marketing and promotions of vaping products on social media resulted in the misperception of vaping to be a harmless activity. They also increased the risk of vaping initiation, especially among youth and young adults.[40-42] Research also found initiation of vaping is associated with subsequent cigarette smoking.[43,44]

Besides the massive marketing and promotion activities by vaping industries, the public also uses social media platforms to share their opinions and user experience on vaping products.[30,32,45] Our longitudinal examination of the vaping flavors mentioned in 2.8 million Reddit posts from January 2013 to April 2019 showed that the top two flavors were fruit and sweet, consistent with previous survey results during a similar period.[32] A further examination of the association of vaping with health symptoms mentioned in the same Reddit posts showed a significant co-mentioning of fruit-flavored vaping products with cardiovascular symptoms.[30] A sentiment analysis of over 2.7 million vaping-related Twitter posts (tweets) from May 31 to August 22, 2019, found the fruit, mint, and sweet flavor were more positively perceived, and the beverage and tobacco flavors were more negatively perceived by the public.[32] A systematic review of the vaping-related social media studies from 2007 to 2017 found the major topics related to vaping on social media included the health effects of vaping, vaper testimony, benefits and risks associated with vaping, regulations of vaping products, and vaping as smoking cessation aids.[45] Being exposed to anti-vaping content on social media was associated with reduced vaping activities among young people.[46]

Vaping-related social media posts could also be used to examine the impact of vaping product regulation policies on public attitudes toward vaping.[47-49] With the high prevalence of vaping in youth and young adults and the e-cigarette or vaping use-associated lung injury (EVALI) outbreak in 2019, many state governments and US Food and Drug Administration (FDA) started to ban flavored vaping products. Our examination of the public perceptions of vaping products before and after the New York State flavor ban policies and the FDA flavor ban policy showed a more negative attitude towards vaping products after the flavor ban policies compared to the public attitude towards vaping products prior to the flavor ban policies.[47-49] After the New York state and the FDA flavor ban policies, the public discussions on vaping focused on teenage vaping and potential health problems associated with vaping.[47-49] While alternative ways for obtaining vaping products were also vigorously discussed on social media.[48]

Overall, social media plays an essential role in vaping product marketing, promotion, and communication with the public about the potential harms of vaping. Regulations on social media marketing of vaping products can help reduce vaping initiation in youth and young adults. Meanwhile, social media platforms could also be utilized to provide education to the public about the potential harms of vaping and deliver vaping cessation interventions to reduce the uptake of vaping in youth and young adults.

Teenagers' Perception and Addiction with Interviews

First exposed to vaping in school years, adolescents believed in a sense of safety regarding vape products. Considering popular myths that vaping aids in decreasing anxiety, increases lung capacity, and that nicotine liquid used in vape products is less addictive than cigarettes, adolescents began vaping under false pretenses. Vape products adopted a modern and trendy appeal with the creation

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of fruit-flavored nicotine liquids and flashy-colored devices that easily fit in a pocket (or other space in which to hide the device). This marketing strategy of vape products, paired with the popular myths, introduced a new perception to adolescents: vaping is fun and exciting, vaping will not hinder your health, and you can hide it from your parents in your sleeve.

To further analyze the teenagers' perception and addiction, personal interviews were conducted, and the information was recorded in third-person language:

Interview one: One college student (21 years old, white female) recalls her experience with vaping. While in high school, her close friend purchased a vape from an older student. The college student tried her friend's vape and enjoyed the "buzz", a light-headed feeling that the nicotine gave her. When the friend came over, the two shared taking "hits", inhaling the heated liquid from the mouthpiece, while spending time together. Eventually, the college student gave her friend money to buy one of her own. The college student, as a high schooler, remembers that the "nicotine is a highly addictive substance" warning on the nicotine liquid bottles did not scare her. She did not worry about the problems addiction could cause while also believing the popular myths that vaping did not cause the health problems that cigarettes did.

Interview two: Another individual (22 years old, white female, no college) shared that he first tried a vape product at age thirteen while spending time with a group of friends. At age sixteen, the individual purchased his own from an older friend in the group. His perception of vaping consisted of such popular myths as the safety of vaping, believing that water vapor created the smoke sensation of the product. The individual also became enticed by the smells and flavors of the nicotine liquid, leading to his belief that vaping is fun and exciting. The student recalls that most of his peers either owned a vape product or had direct access to one, while in high school.

Interview three: A high school student (17 years old, white female) explained their first experience with vaping, beginning at eleven years old. The student shared that a childcare provider allowed them to take a "hit" (inhaling the heated liquid from the mouthpiece) of the vape device. Eventually, at age sixteen, the student purchased a vape device from an older peer that attended the same high school as the student. The student understood vaping as a fun experience because of the "buzz", a light-headed feeling that the nicotine gave her, and remained under the impression that vaping provided a safe and effective way to relieve anxiety. The student owned a small vape device that they felt could easily be hidden from their parents in a bra, pocket, or bag.

From the interviews above, it is confirmed that the group experience of vaping, the misconception that vaping poses fewer risks than traditional cigarettes, and the ease of hiding the product from parents and teachers all play a role in teenagers' usage of and addiction to vaping products.

Profit and market share of e-cigarette manufacturers – statistics on the capitalists' "achievements"

Since 2011, the e-cigarette market has been growing rapidly based on the successes of various corporations over the last decade.[50] The major players in the US e-cigarette market include Imperial Tobacco (Blu), British American Tobacco (Vuse), NJOY, Japan Tobacco Inc. (Logic), Altria (Markten, Green Smoke), and JUUL Labs. As seen, most e-cigarette brands have been acquired by large tobacco corporations that already have a large stake in the traditional cigarette market. Additionally, it is worth noting that Markten and Green Smoke e-cigarettes have recently been discontinued and that Altria has acquired a 35% stake in JUUL Labs in 2018. The introduction of JUUL in 2015 drove unprecedented growth in the e-cigarette industry, with JUUL unit sales increasing exponentially from 2015-2018. By 2018, JUUL held the highest market share (29%) of all e-cigarette manufacturers.[51]

JUUL's sudden popularity is largely attributed to its extensive marketing strategies. JUUL's advertising expenditures in 2018 totaled $73 million, rivaling Imperial Tobacco's 2014-2018 spending ($85 million).[52] In quarter 4 of 2018, JUUL Labs accounted for 85.8% of all e-cigarette marketing expenditures.[52] In short, JUUL Labs spent on advertising in 2018 nearly as much as the top e-cigarette

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manufacturers spent in five years, largely on newspaper advertisements. It is important to think about these statistics and business decisions in the context of today's vaping epidemic - as described earlier, JUUL's advertising content appealed heavily to the younger population, leading to its popularity amongst school-aged children. E-cigarette corporations', particularly JUUL Labs, intense focus on profit has led to enormous public health complications; this is most visibly in the form of nicotine addiction but can lead to other diseases that devastate the health of the population.

Prevalence of Physical Illness Related to Vaping

Due to recent e-cigarette popularization, there is limited scientific evidence regarding its exact long-term effects. However, e-cigarette use has caused the onset of respiratory symptoms amongst consumers, labeled as vaping-associated pulmonary illness (VAPI) or e-cigarette or vaping-associated lung injury (EVALI).[53] As of 2020, almost 3,000 cases of lung injury hospitalizations related to vaping have been reported in the United States.[54] Lung biopsies taken of eight VAPI patients in various centers revealed acute lung injuries including organizing pneumonia, diffuse alveolar damage, and/or interstitial inflammation.[55] In addition to respiratory damage, e-cigarette use can have effects elsewhere. In a recent study, researchers noticed an association between e-cigarette use and seizures in youth, perhaps due to the high levels of nicotine or flavoring chemicals inhaled when vaping – this finding also raises concerns about the impacts of e-cigarette use on brain development and other neurological complications in the youth population.[56] E-cigarettes have been shown to produce an increase in blood pressure and aortic stiffness, lending itself to further cardiovascular stress[57], and can also be potentially carcinogenic due to formaldehyde-releasing agent formation during the vaporization process[58] and high levels of nitrosamines present in e-cigarette flavorings.[59]

If used as a cessation method for traditional smoking, e-cigarettes had the potential to limit the progression of health problems caused by traditional smoking. However, e-cigarette corporations' decision to expand their consumer base past quitting smokers ushered in a new generation plagued by nicotine addiction. Since 1999, combustible nicotine intake had been steadily decreasing among high schoolers, down from an average of 5 days per month to only 1 - however, after the popularization of e-cigarettes amongst school-aged children in 2015-2017 (coinciding with the release and rapid growth of the JUUL corporation), these numbers have begun to rise, once again approaching 5 days.[60] While nicotine addiction in youth may be lucrative for e-cigarette corporations, it perpetuates a cycle of toxicant inhalation, leading to the dangerous symptoms described above.

Addiction: Transgenerational and Multigenerational Aspects

Besides the symptoms associated with the addiction to e-cigarettes, the addiction itself is also complicated, as it is a combination of biological, psychological, and spiritual aspects.[61]

The definition of epigenetic transgenerational inheritance is "germline-mediated inheritance of epigenetic information between generations in the absence of direct environmental influences that lead to phenotypic variation."[62] That is, when there is direct exposure to a specific chemical and that information is transmitted to a subsequent generation without direct contact with the chemical or environmental influences, it is considered a multigenerational transfer of genetic information.

For instance, in a family, when the first generation of males or females are exposed to chemicals prior to pregnancy that imbalance the brain, the information passed through their genetic information to the next generation is considered multigenerational, as the next generation is indirectly exposed to the chemical. If the child refrains from exposing his or herself to the chemical unbalancing factors, the grandchild or 3rd generation is not considered to be exposed. (Figure 4)

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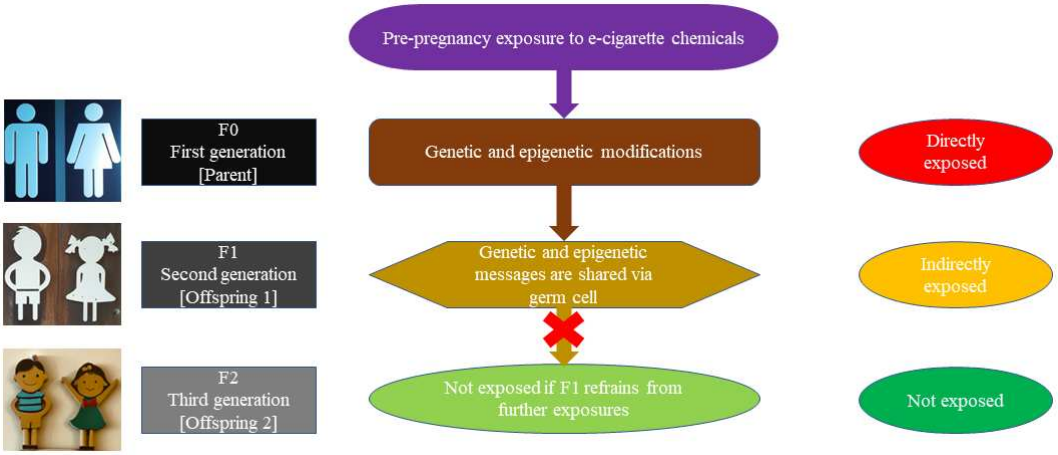

Figure 4. Multigenerational transfer prior to pregnancy. In this model, the parent is exposed to the chemicals derived from e-cigarettes. When this happens, regardless of gender the progeny is considered exposed. If the progeny refrains from exposing to the chemicals, the offspring i.e., grandchild or 2nd generation is not considered to be exposed. Simplified (https://app.simplified.com/tools/text-to-image) generated images of parents and offspring.

In another scenario when the mother is exposed to the chemical during pregnancy, her offspring would be considered directly exposed. This way, the multigenerational effect extends even further, and the effect would only start to diminish in the 4th generation. (Figure 5).

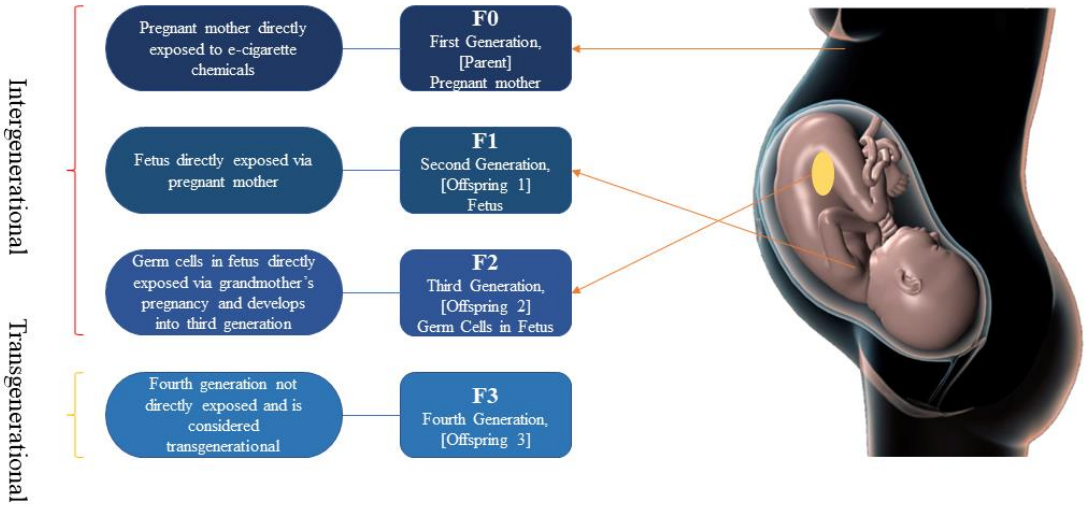

Figure 5. Multigenerational transfer during pregnancy. In this model, only the mother is exposed to chemicals derived from e-cigarettes. When this occurs, the somatic and the germ cells of the offspring receive direct exposure to this event. Stock pictures (https://bria.ai) is responsible for the image of the pregnant woman and the fetus.

Addiction: Transgenerational Effects on Society

In certain communities, there is a belief that non-adherence to the human laws of governance will result in a perpetuation of a multigenerational transgression that is passed down from the parent to the offspring and the third and fourth generations. Any behavior that would alter the success of future generations is considered a deliberate injury to them, and the introduction of addictive chemicals including nicotine in the body has a direct effect on future generations. Specifically, nicotine exposure is associated with methylation changes in the gene coding in a key enzyme in the metabolism of dopamine and other Monoamines.[61]

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Prior to 2011, some cultures opposed using nicotine products because of the impact that it would have on future generations. It was also believed that if the moral laws of conduct are broken, society will suffer the consequences of breaking these laws up to the third and fourth generations. Therefore, broad nicotine product use in society introduces social circumstances that create traumatic situations, which, combined with the mental health impact of nicotine,[63] leads to chemical imbalances in the brain. Also, these social messages embedded in community groups trigger the human desire to indulge in escapism. These social effects also undergo epigenetic transgenerational inheritance and are carried on to the next generation. Then, if repeated trauma continues to be present in a particular group of people, the cycle of trauma would not break, and the ailment would reset every generation.

To fully comprehend the multigenerational effects of moral disobedience we must also understand the connectedness of the implications of good and evil and our human inability to decipher between the two. Human nature tends to distract itself from adverse experiences and seek pleasure. Examining how people respond to trauma is a way to examine the human fundamental needs, the lack thereof, and how they are fulfilled.

Addiction: Germline Reprogramming

In biology, a germline is a series of germ cells each descended or developed from earlier cells in the series, regarded as continuing through successive generations of an organism.

The effects of trauma and nicotine intake can be intergenerationally passed through epigenetic mechanisms such as methylation.[64] Methylation is a process in which a methyl group is added to specific spots on the DNA to regulate the transcription of the genes.[65] Typically, methylation downregulates gene expression while demethylation (removing a methyl group) upregulates gene expression.[65] Another mechanism of epigenetic modification includes a change in the packing of histone, in which an addition or removal of a chemical group can tighten or loosen histone packing, thereby decreasing or increasing gene expression.[65] Childhood trauma has been associated with alteration in methylation patterns in human sperm which may induce intergenerational effects.[64]

The erasure of epigenetic memory prevents the transmission of epigenetic mutations to the next generation, so it helps lower the impact of transgenerational exposures. The technique itself works for the benefit of the community. However, when used to maintain capitalistic influence the technique of epigenetic erasure could also work for the benefit of the pharmaceutical companies that make a profit off of the repetitious behaviors that contribute to addiction.

Addiction: Psychological Behavior in Humans and Corporations

Addiction is a complex psychological behavior. The popular idea is that addiction is a choice. The legal system shares this idea, which is why the justice system monetized and monopolized the incarceration of people with drug addictions.[66] According to the American Society of Addiction Medicine, addiction involves a set of interactions between brain circuits, genetics, the environment, and a person's experiences.[67]

Addiction is any behavior that an individual finds comfort in and therefore wants instant gratification but suffers detrimental long-term effects and refuses to give up despite the consequences.[68]

It might be interesting to ask questions to understand addiction and behavior. For example, where do addictions begin? Does addiction begin with addiction? If we personified entities, large corporations, and even government-funded systems, could we recognize the same addictive behaviors? If addiction is fulfilling a need, and the need is to a social attachment as opposed to authenticity, do not we see these behaviors displayed in our communities despite the negative consequences? These are some of the interesting questions and responses that can be deciphered on addictions.

On the other hand, when we personify the behaviors or business practices of corporations, we can identify that there is also an addiction in these corporations to a specific lifestyle and life cycle. Large tobacco corporations also display the characteristics of exchanging their authenticity to maintain their intrinsic attachment to a supply of consumers. The socio-economic behaviors of the

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tobacco industry partners serve a self-fulfilling need to maintain status and control. Ultimately, for the tobacco industry to maintain a supply for its addiction, it must camouflage its greed and appeal to the need of its supply - generations of people. Addiction in this case is displayed by both the supplier and consumer as a multigenerational behavioral response to a specific social stressor that is present in relationships between people and corporations.

Addiction: Co-dependent/ Narcissistic Characteristics

A codependent relationship involves one person taking advantage of another person's care as if that person is a caregiver and is considered dysfunctional.[69] It is important to note that codependent relationships are very typical among people with substance use disorders.[69]

The case of personified relationships that greedy corporations have with communities with substance abuse issues correlates to the methods that people with narcissistic personality types foster co-dependent relationships. Due to the increased access to information, the knowledge of the harmful effects of nicotine in traditional cigarettes has caused many people to stop purchasing cigarettes. Then, entrepreneurism-based capitalism takes place as the tobacco industry developed a degree of social skills and emotional intelligence to interact with and stimulate demand from their customers. Corporations adapted to the social change, rebranded nicotine-based products, and marketed electric cigarettes to a new generation in order to maintain their symbiotic connection. The relationship models that of two partners in a co-dependent relationship that the companies and smokers developed complementary roles to fill each other's needs[70]: The codependents fulfill the attachment need by finding a "parasite" that they can supply, while the narcissistic individuals find a "host" who puts their needs first.[70]

What then becomes the need for corporations that display narcissistic business behaviors? Since codependency is usually rooted in childhood,[71] for large corporations to obtain and maintain their "host" it benefits them to advertise or coerce their products to younger and potential working-class generations into a toxic inauthentic relationship. Engaging younger generations means that their supply will last for a longer time with the hope of perpetuation of its propaganda and attachment to the next generation.

Addiction: Human Development, Attachment, and Authenticity

A profound, enduring emotional connection that spans both time and space is referred to as attachment.[72] In early childhood development, this fundamental human need is aligned with both Erikson's Theory of Adult development's early stage of Infancy and resolving the dilemma of trust vs. mistrust.[73] Maslow's hierarchy of needs theory also points to having the basic fundamental needs fulfilled not only physiological needs but those of emotional safety, love, esteem, and self-actualization.[74]

Gabor Maté states that attachment is one of the "life-long needs that must be fulfilled simply because we are human".[66] If we do not connect and attach, we do not survive.

Therefore, everyone is born with potentially addictive behavior because the definition of addiction is not isolated to a substance, it is a human behavior that is prone to fulfill a natural need. When people are helpless, they need to attach, or they will not survive. Therefore "attachment is not a negotiable need".[66]

Authenticity and attachment are two fundamental human needs for survival. However, often in certain social contexts (i.e., family, school, community/ religious fellowships), there is an inability for the social norms to handle the authenticity of the self-actualized individual- as a result, the individual is often forced to choose between his or her authentic self and his or her need for attachment. Both are survival needs- yet seemingly, only one can be fulfilled at a time. Sometimes, the human desire for self-preservation would cause an individual to compromise the need for authenticity in exchange for attachment, and in societies that have endured traumatic episodes within a generation, this attachment is in the form of an extrinsic social attachment where the individual or community engages in a particular behavior as reward seeking, including vaping.

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Social acceptance is the process of conforming to the opinions of others to fulfill an attachment need. Tobacco industries use marketing strategies to make vaping appealing by providing suggestive behaviors which promote social acceptance. Pressure and ease to fulfill the need causes individuals to attach to a habit of engaging in the temporary pleasure of vaping and distracting themselves from unpleasant surroundings, causing them to focus solely on their attachment needs rather than cultivating authenticity. This stagnation towards self-actualization caused them to be stuck in an uneven balance of "survival mode"- needing attachments to fulfill the need for authenticity (rather than vice-versa).

All mammals are creatures of attachment. Endorphins and the body's natural internal opiates facilitate attachment.[75] When the endorphin receptors are not connected, especially in children, the children would not cry out for help and the caretaker will not respond to the child, leading to a lower likelihood of survival. When there is stress and trauma at the beginning stages of life, the endorphins in the child fail to fully develop. The addiction, in turn, gives a false sense of temporary comfort to compensate for their underdevelopment.[75]

We have established that attachment is a fundamental human need. Another fundamental human need is for authenticity -- or what Maslow's Hierarchy would call the need for self-actualization.[74] Self-actualization is the spiritual connection that we have in ourselves.[74] Either way, it describes a spiritual connection to a deeper self-awareness and is fulfilled when we are connected to ourselves in a true and authentic way.

Addiction: Healing the Internal Trauma

Addiction is not the root problem[66]; traumatic events which trigger addiction behaviors are.[66] Humanity is characterized by its physiological, psychological, and spiritual needs and a desire to fulfill them. The two basic human needs discussed as it pertains to addiction are the need for attachment and the need for authenticity. The psychological and emotional imbalance between self-actualization and a normalized toxic attachment behavior requires genetic reprogramming, emotional rebalancing, and reprioritizing understanding of spiritual and psychological laws of self-preservation to be treated.

Specifically, the cure is 1) awareness of the unfulfilled need and then 2) a desire to prioritize a healthy fulfillment of the need until the individual is physically, psychologically, and wholistically rebalanced. To counter the addictions formed from a false fulfillment of attachment, socially suggestive advertisements & marketing toward youth in their developmental stages must be silenced: Communities of people who suffer from traumatic-related addictions must be allowed time to reconnect and recover a sense of authenticity. Ensuring that consumers are free to make an informed decision as opposed to being coerced into a toxic narcissistic relationship pattern between the corporation and the community is crucial. The etiology of trauma is the loss of authenticity, and restoration of authenticity can serve to heal the trauma.

Public Health Interventions to Treat the Greed

The sole motivation of the tobacco industry is to maximize profit, which is so great from the sales of tobacco products that it is unlikely it will ever be motivated to help address the public health issue of tobacco product use.[76] Historically and to this day, this profit has clearly been at the expense of public health such as through the use of aggressive tactics including lobbying for industry-favorable laws and regulations,[77] marketing directly and indirectly to youth,[78] targeting many channels and sub-populations with evolving marketing strategies,[79] and advanced public relations approaches to undermine and misrepresent evidence-based science by inflating scientific uncertainty to undercut public health initiatives and regulatory actions.[76,80] Many industries have subsequently adopted this game plan of disrupting normative science, which leads to an assertion of personal accountability for what are actually industrially generated health hazards.[77,81]

Despite overall drops in rates of smoking (including mentholated products), menthol product use has increased especially among young adult, female, and Black users. Bans on menthol, a flavoring that has historically been disproportionately marketed to African American Communities,

have been associated with a lower likelihood of cessation among persons from these communities.[82] Governments have taken steps to outlaw the retail sale of flavored tobacco products, inclusive of menthol cigarettes, but the tobacco industry has once again aggressively fueled erroneous information about these policies, disrupting normative science in service of their goals to protect profit. They will exert all their effort and resources to oppose such prohibitions.[83]

Summary and Conclusion

Overall, we have discussed the various aspects of vaping behavior and the greed behind the industry. Through a series of interviews, we analyzed the perception of e-cigarettes from vapers and found that the misconception of the safety of e-cigarettes played a large role in their behaviors. The ease of hiding from supervisors and the group experiences are also important factors. These are all marketing strategies of e-cigarette corporations, as they deliberately spread myths about its safety and target youth and other subpopulations in their approaches.[76,78-80] In the meantime, social media marketing is also an essential part of their strategies due to its high influence among youth. The targeting of youth allows the corporations to coerce the youth into a codependent relationship so that their impact would be long-term and even perpetuate to the next generation. Their strategies are "successful", as they gained exponential growth in their sales, and caused almost 3000 hospitalizations associated with vaping in the US.[54] The mechanism of the toxicity of and addiction to e-liquids was also proposed in this paper (Figure 2). Addiction is also an important issue associated with vaping since it can be both a biological issue and a psychological issue that involves a loss of authenticity. Addiction can also be transgenerational and cause trauma at both an individual level and a community level. The consequences are serious of the greed, and the greed is also complicated as it roots from economic, cultural, moral, psychological, and philosophical dimensions. Considering the complexity of the greed and associated problems, the treatments should also cover all these aspects. From a public health perspective, social media marketing of vaping products should be prohibited, and social media should be utilized to provide education to the public and dispel the myths. Government regulations on flavored tobacco products alone would not help, since corporations can bypass such regulations with their resources.[83] Considering the psychological and transgenerational views of addiction, germline reprogramming can minimize the transgenerational effects of addiction, and we can cure the psychological trauma by encouraging people's awareness of their unfulfilled needs and their desire to rebalance their needs in order for them to regain authenticity. We can only eradicate the greed by combating the sociological foundations of the greed. This can be achieved by establishing an infallible authority to enforce universal morality.

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