



MSU SciReview

MICHIGAN STATE UNIVERSITY

FEATURED ARTICLES

“Rapid Consumerism, the Environment,
and the Influence of Corporate
Responsibility”

-Gia Galati

“Socioeconomic Status leads to Decreased Access to
Patient Care among Patient Populations”

-Vincetti Carandino

Table of Contents

INTRODUCTION

Letter from the Editor	Leah Meppelink	<i>page 2</i>
Note from Executive Board	Vincetti Carandino	<i>page 3</i>

REVIEW ARTICLES

Capsaicin: The potential cure for obesity	Elena Lecter 4-7	<i>pages</i>
Rapid Consumerism, the Environment, and the Influence of Corporate Responsibility	Gia Galati	<i>pages 8-18</i>
Socioeconomic Status leads to Decreased Access to Patient Care among Patient Populations	Vincetti Carandino	<i>pages 19-23</i>
The Importance of Architecture in Human Psychology	Genevieve Orlewicz	<i>pages 24-33</i>
The Mental Health effects of Living with food allergies	Gabriella Kam	<i>pages 34-38</i>

<i>CONTRIBUTORS PAGE</i>	<i>page 39</i>
--------------------------	----------------

Letter from the Editor

To our readers,

Welcome to the 5th edition of MSU SciReview's journal! This year, I feel our journal has become more diverse. We have expanded beyond the realm of STEM-related topics and reached all majors, from biochemistry to digital storytelling. As I reflect on my membership the past four years, many things stand out.

This journal and club hold a very special place in my heart. In August of 2021, I stepped on campus for the first time as a freshman. I felt a whirl of excitement, apprehension, and curiosity about what the next four years had in store. When I discovered MSU SciReview, I was immediately intrigued and eager to join. As time went on, I met so many other individuals, each with their own unique interests. There was one commonality among us though, and that was both passion and curiosity. MSU SciReview alumni are all over the country, all working in their respective fields and changing the world. MSU SciReview has undoubtedly shaped both the professional and individual I have become from my time at Michigan State.

Goodbyes aren't easy, but I am truly grateful and humbled by my experience. I can't wait to watch this club continue to grow in the very capable hands of Noelle Whorf, who will serve as our next president. I would like to thank my executive board members who have worked tirelessly by my side, and all of the members who make this club so special.

All my best,

Leah Meppelink - 2024-2025 President and Editor in Chief

Note from Executive Board

Dear Reader,

This was my third and final year as a member of MSU SciReview. I was fortunate enough to be a member of the Executive Board for the last two years of my membership. This entire experience has truly been rewarding and I have learned so much from being a part of this club. The individuals that join this club want to be here, they are highly driven students with strong passions and an itch to make the world a little bit better of a place to live. Given that we write literature reviews, we may not be the most fun club to join while you are in college. However, the people that do join this club are extremely fun and will be lifelong friends and connections. Everyone is supportive and willing to help with anything you may need, even if it is not club related.

I would like to extend a thank you to the rest of the Executive Board for allowing me to work beside you for these years. Our publication may be small, but it does make a difference, and we do write about real world issues or topics that interest us. I would also like to extend a thank you to the students that have joined the club and I have interacted with over the years. Continue to ask questions, research what interests you, and keep writing. Finally, I would like to thank our Review Board of Professors, without you, we would not be able to publish our journal. You truly make a difference in supporting the members of this club by assisting them with the writing process involving topics they are passionate about, even if it is not your direct field of study. MSU SciReview will continue to grow and do great things. Go Green!

Keep asking questions!

Vincetti Carandino - Outreach Chair

Capsaicin: The Potential Cure for Obesity

Elena Lecter

Abstract

Capsaicin is the chemical found in chili peppers that gives them their spiciness. The compound has shown potential as an agent for weight management. Capsaicin may increase resting energy expenditure (REE), rather than solely suppressing appetite like other weight-loss agents in the present-day market. However, further research is necessary to fully understand its efficacy and safety.

Introduction

Dietary capsaicin (DC) not only has appetite-suppressing properties, but assists in boosting resting energy expenditure (REE). It does so by activating brown adipose tissue (BAT), also known as brown fat, thermogenesis, TRPV1 receptors, and uncoupled proteins-1 (UCP-1), which regulate temperature and detect temperature changes within the body. This topic has been the subject of extensive research and is expected to remain a focus in the future.

Biochemical Mechanisms

DC aids in weight loss in a similar way to the popular drugs known as Ozempic and Wegovy. The active drug in Ozempic and Wegovy is known as glucagon-like-peptide-1 (GLP-1), which is a naturally occurring compound that is released from the gastrointestinal tract after food consumption, resulting in insulin secretion and appetite suppression (Alzberg-Touchstone, 2024). DC acts in a similar way. In a cross-over study with 15 young, non-obese individuals, DC proved to suppress appetite and decrease caloric intake by 25%. The increase in satiety was attributed to gastrointestinal activity (Szallasi, 2022).

Another way DC is able contribute to weight loss is by triggering BAT activity. DC triggers BAT activity by mimicking the effects of weight loss techniques that utilize frequent exposure to cold temperatures (i.e., cold plunges, ice baths). Transient receptor potential (TRP) channels are membrane proteins that detect environmental change. When humans are exposed to cold for extended periods of time, the TRP channels detect the lack of heat and alert the brain. Uncoupled protein-1 (UCP-1) is activated alongside TRP channels, resulting in fatty acid and glucose

The activation of these two systems innervate BAT with sympathetic nerve endings. BAT's temperature sharply increases, which is followed by an increase in REE, thus resulting in fat loss throughout the body (Saito, et al, 2020).

DC operates through a similar biochemical mechanism, as it interacts with the transient receptor potential vanilloid receptor 1 (TRPV1). TRPV1 is Ca^{2+} ion channel receptor that is found throughout the body and is activated by vanilloids, such as capsaicin, and transmits sensory information. When ingested, DC binds to the TRPV1 receptors (Elmas, 2021). The TRPV1 receptors activate in the gastrointestinal tract, which innervates BAT. BAT temperature rapidly rises, which in turn, increases REE throughout the body. Catecholamines activate shortly after TRPV1, causing UCP-1 secretion. UCP-1, as previously stated, converts energy into heat via fatty acid and glucose oxidation. This then results in a decrease in fat throughout the body (See Figure 1). TRPV1 receptors and UCP-1 are the only systems in the body that are able to interact with capsaicin in such a way, so it is crucial that they are functional for the individual to yield results.

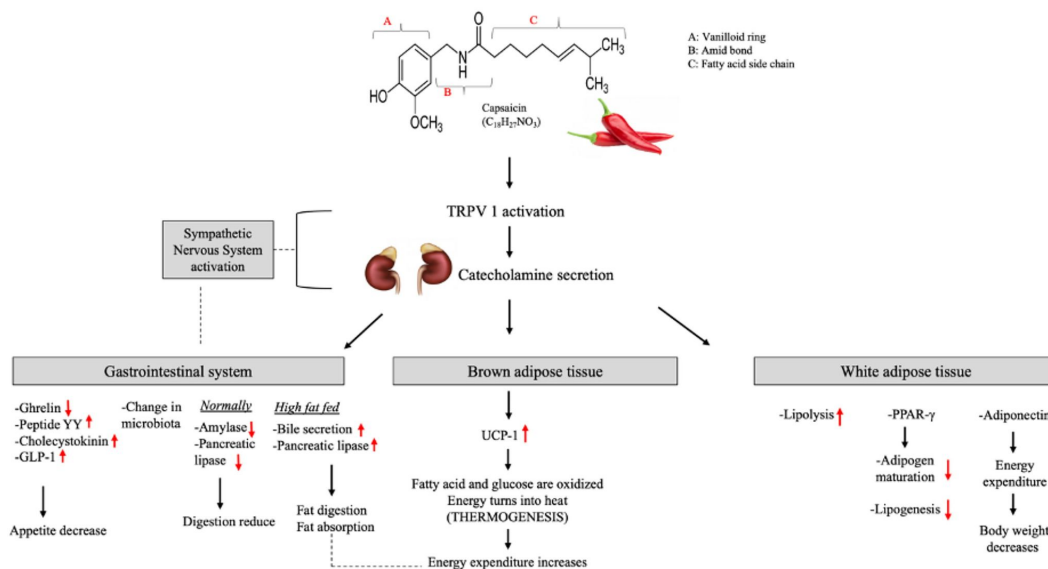


Figure 1 (Elmas, 2021)

History of Diet-Intake Thermogenesis

While DC is a proponent for weight loss, research on it is, while abundant, relatively new. A supplement capable of significantly boosting REE may seem improbable, as diet-induced thermogenesis (DIT) at this level has not been effectively utilized in previous clinical practice. In the early 1930s, an organic compound called 2,4 dinitrophenol

(DNP) was sold as an anti-obesity drug that could be bought over-the-counter without a prescription, although its initial purpose was to act as a fungicide. Unlike DC, DNP assists in weight loss by increasing REE via preventing the mitochondria from synthesizing adenosine triphosphate (ATP). This allows for heat to be produced, rather than ATP (Germain et al., 2021). However, DNP has since been banned from human consumption. Consumption of DNP may have resulted in rapid weight loss, but came at a cost. Said costs include, but are not limited to liver failure, DNP toxicity, uncontrolled hyperthermia, and in most cases, death (Freeman, 2021).

While the semantics of DNP and DC's mechanisms differ, both allow for an increase in REE via thermogenesis, so it is crucial to examine if DC poses the same threat. Currently, there has been no detrimental effects of DC for weight loss found outside of a feeling of slight warmth in the chest area (Zhang, 2023). Research on the specific negative effects of DC for weight loss is limited, but the general consensus is that DC will not pose anywhere near the same threat as its morbid counterpart DNP.

Current Limitations

While the effects of DC appear to be promising, there are limitations. Some individuals are not able to tolerate high amounts of capsaicin due to sensitivity or health conditions. With that in mind, the use of capsinoids has been looked into. Capsinoids are capsaicin-like compounds found in non-pungent peppers that bind to TRPV1 receptors in very similar ways to capsaicin itself. However, capsinoids have been proven to be ineffective for boosting REE, as they are too quickly hydrolyzed within the small intestine (Saito et al, 2020). DC may not be efficient for weight loss if an individual has ineffective TRPV1 or UCP1 receptors, as those are the only receptors that capsaicin interacts with to increase REE.

Another limitation is that while research on DC for REE boosting is abundant, it may be limited due to expenses. In order to yield the most in-depth results, a process called Fluorodeoxyglucose Positron Emission Tomography (FDG-PET) is used to examine changes in body composition. Individual FDG-PET scans often cost over \$1000 (Perrets, 2024). Because FDG-PET uses radioactive tracers, it may raise safety concerns among participants.

Conclusion

The potential DC has for an anti-obesity drug is immense. While current findings are promising, further research is needed to fully understand its long-term efficacy, optimal dosage, and possible side effects. A compound that increases REE could represent a new direction for weight-loss treatment, and possibly contribute to improved health outcomes.

References

- Ahlberg Touchstone, L. (2024, July 9). *School of Molecular & Cellular Biology*. Illinois.
<https://mcb.illinois.edu/news/2024-07-09/how-do-drugs-ozempic-work-weight-loss>
- Elmas, C., & Gezer, C. (2021). Capsaicin and its effects on body weight. *Journal of the American Nutrition Association*, 41(8), 831–839. <https://doi.org/10.1080/07315724.2021.1962771>
- Freeman, N. et al. (2021). 2,4-dinitrophenol: ‘diet’ drug death following major trauma. *Anaesthesia Reports*, 9(1), 106–109. <https://doi.org/10.1002/anr3.12121>
- Germain, J. et al. (2021). 2,4 dinitrophenol: It’s not just for men. *International Journal of Drug Policy*, 95, 102987. <https://doi.org/10.1016/j.drugpo.2020.102987>
- Liz Ahlberg Touchstone, U. of I. N. B. J. 9. (2024, July 9). *How do drugs like ozempic work for weight loss?*. Illinois.
<https://mcb.illinois.edu/news/2024-07-09/how-do-drugs-ozempic-work-weight-loss>
- Perrets, S. (2024, July 8). *How much does a PET scan cost?*. CareCredit.
<https://www.carecredit.com/well-u/health-wellness/pet-scan-cost/>
- Saito, M., Matsushita, M., Yoneshiro, T., & Okamatsu-Ogura, Y. (2020). Brown adipose tissue, diet-induced thermogenesis, and thermogenic food ingredients: From mice to men. *Frontiers in Endocrinology*, 11. <https://doi.org/10.3389/fendo.2020.00222>
- Szallasi, A. (2022). Capsaicin for weight control: “exercise in a pill” (or just another fad)? *Pharmaceuticals*, 15(7), 851. <https://doi.org/10.3390/ph15070851>
- Zhang, W., Zhang, Q., Wang, L., Zhou, Q., Wang, P., Qing, Y., & Sun, C. (2023). The effects of capsaicin intake on weight loss among overweight and obese subjects: A systematic review and meta-analysis of Randomised Controlled Trials. *British Journal of Nutrition*, 130(9), 1645–1656. <https://doi.org/10.1017/s0007114523000697>

Rapid Consumerism, the Environment, and the Influence of Corporate Responsibility
Gia Galati

Abstract

Greenwashing is the act of under-representing a corporation's negative practice during the garment making process while highlighting its seemingly good parts in order to gain a consumer's trust and purchase. This falsehood can lead consumers astray and misrepresent sustainable thinking in consumption behaviors. This review aims to examine how the economic and environmental influences of fast fashion impact developing countries, using Ghana as a key example, and how corporate responsibility may subject consumers to incentivise a green mindset.

Introduction

The Global North, nations that have high socioeconomic levels and standards of living located mostly in the top half of the globe or in the north, is strongly influenced by the next latest craze and influence. Fashion is just one of the many ways that consumers show off their individuality on a daily basis. As social media ramps up and access to the internet increases, more and more trends and styles come and go. Around the world there are 62 million tons of clothing annually being consumed with the number expected to rise to 102 million tons by 2030 (Mensah, 2023). With the consumption of clothing comes excessive environmental usage. For a ton of textile produced the fashion industry in 2015 utilized 200 tons of water along with ~15,500,000,000 tons of water for irrigation- ultimately representing about 3% of irrigation water use worldwide (Mensah, 2023). In a rapidly growing consumer driven economy, the market continues to push forward. This excess of goods once done with its life cycle in second-hand stores is attempting another life in the Global South or in developing countries. Developing countries, such as Ghana, take the massive shipments and resell them in markets in hopes to make an economic profit despite the detriment of waste that is received daily. Of the destinations in the Global South, Ghana is widely popular for imports, yet 90% of the population rely on second-hand clothing as a means of economic profit, a situation coined as waste colonialism (Mensah, 2023).

Fashion corporations continue to push greenwashing and promote sustainability in campaigns as trends constantly change. Theoretical arguments, via attribution theory, claim a consumer attitude or behavior may be influenced by ethical contributions of a corporation- for example, detailed environmental claims from organizations will lead to more informed customers and help associate customers with motives concerning the environment (Szabo et al., 2021). With this working theory in mind, it is easy to see how greenwashing can become easily bought into as a consumer wanting to do their part. The profitability of this false eco-labeling means that many brands and companies are able to easily surmount the profits of other companies without the greenwashed labeling. This creates a paradox as brands with high corporate social responsibility (CSR) standards are often the ones with an extensive greenwashing history (Adamkiewicz et al., 2022).

For these corporations greenwashing is another means of profits. In developing countries, greenwashing is a devastation. Countries such as Africa, specifically Sub-Saharan regions that are urbanizing, depend on developed countries for GDP and economic growth; the rapidness of these cities' urbanisation in comparison to the simultaneous degradation of their natural capital means development is costly and inefficient and reduces the overall welfare of citizens (Amankwah et al., 2023). The fast fashion industry is a stable environment in the constant burgeoning of the Global South. The industrialization of these developing countries accompany a large footprint that must be curbed in order to keep costs down (Amankwah et al., 2023). For the sake of sustainable development, corporations' social responsibility must look at fast fashion through a new lens in order to fix the corruption of the industry.

Global Perspective

A consumer feels a sense of identity and ownership when purchasing clothing. Around the globe, self-expression differs from person-to-person but a constant variable is the \$2.4 trillion-dollar fashion industry that is driven by 300 million people globally (Adamkiewicz et al., 2022). Globalization is defined as an organization's international influence or ability to create relationships across borders via goods and services. One out of six individuals work for the fashion industry and create 100 billion garments yearly, yet 98% of these individuals do not earn enough to support their day-to-day lifestyle (Gupta et al., 2022). These struggles for garment workers creates a strain on the industry

as more and more individuals fight for garment workers rights. Without equality and fair treatment in the fashion industry this disrupts production. This ongoing dysfunction means inhibited globalization; the fashion industry pushes boundaries with continuous turns of fashion trends that lead to an influx of consumer demand. As a result, the treatment and care of workers decreases.

Globally, there are 60 million garment workers with 80% being women who are subjected to gender-based violence, verbal abuse, and prolonged work hours making a low hourly wage between \$0.11-0.35/hour (Khurana et al., 2022). In order to see successful globalization and connections between the Global North and South, ethical treatment of workers needs to increase tenfold while supply decreases. From a global standpoint, there are benefits and drawbacks from fast fashion. Specifically, we can compare developing countries to developed countries. In developing countries, benefits include a boost in the economy, however there are social drawbacks. Labor is intensive for women and children who do not make enough to provide adequate living. Developed countries gain benefits such as endless options for expression and affordability while dealing with carbon footprint, waste generation, and economic injustice. These indicate the importance of transparency in globalization as it is the key to improvement and reinforcing international relationships.

Outcomes of Consumption

Consumption

At the bulk of these mass produced commodities are economic considerations- direct and indirect. The economy is a large driving force behind the fast fashion industry and how trends are produced. There are many environmental components that indirectly tie into the economics of the fashion industry. In fact, there is a lot to be said about the relationship between environmental degradation and its negative contribution to economic practices. When looking closely at the unsustainable practices of the fashion industry, it is easy to observe the misuse of resources. Underutilized resources and lack of recycling results in 100 billion dollars lost to the fashion industry (Adamkiewicz et al., 2022). This misuse of resources can be traced back to land usage. Harvesting cotton accounts for 3% of land use, 3% of agricultural water, and 5.2% pesticide sales globally (Chen et al., 2021). Material, such

as cotton, sustains a strong relationship with water as well. When looking at the average person's closet there will be a pair of jeans and a t-shirt. A pair of jeans will have at least 2.2 lbs of cotton, which is equivalent to 1,981-2,642 US gallons of water (Gupta et al., 2022). This can be compared to the 713 gallons of water required to produce one t-shirt (Gupta et al., 2022). Amongst this production of a single t-shirt and jeans is more than 8000 chemicals that are meant for coloring, flame retardancy, and more that may lead to health issues (Adamkiewicz et al., 2022).

Circular Economy

Considering these consumption patterns amongst an environmental frame, the supply and demand of materials and goods can be alarming as rapid market consumerism picks up. Circular economy is a perspective brought as a solution to the rapid demand for materials. Circular economy is an economic system made for sustainable regeneration and reuse- a cradle-to-cradle concept. This economic system has the potential to add to global economic growth by \$6 trillion by 2030 (Amankwah et al., 2023). Despite the potential economic boost, a circular economy may result in an increased affluent population due to linear consumption patterns, thus increasing demand in goods and putting increased pressure on resources (Amankwah et al., 2023). The shift in thinking may also burden the Global South more heavily as circulation and reuse is not as attainable as it is in the Global North or for supply chains (Mensah, 2023). The addition of a circular economy is to be taken with careful consideration as the Global South is put in a vulnerable and fragile position. When considering how one might go about making change for a more sustainable atmosphere, both the Global North and the Global South need to be addressed in order to have efficiency and maximize impartiality.

Life-Cycle Assessment (LCA)



Figure 1. Cotton textile life cycle documenting cradle-to-grave and cradle-to-cradle methods. Note harms of disposal and harms of cultivation (Chen et al., 2021)

To make the cycle of apparel more comprehensible for consumers from a sustainable perspective, life-cycle assessments (LCA) were published to demonstrate the environmental impacts cotton has from a singular article of clothing. As of 2022, 20% of textiles were being reprocessed for less than 1% of garments to be renewed (Gupta et al., 2022). Figure one, refers to the cotton textile life cycle. In this life cycle you can see there are outputs and inputs that negatively impact the cycle. The output factors, if controlled, could have more significant positive environmental impacts if limited. When observing a pair of Levi's 501 denim jeans, a singular pair was discovered to inhibit 129ft₂/year of land while having emitted 0.0334 mt CO₂, consuming about 1,000 gallons of water (68% from fiber production and 23% consumer care), and 48.9 g PO₃₄ (Chen et al., 2021). Consumer care and handling is a large contributor to life cycle analysis, specifically, washing and drying. These processes decide the lifespan of a clothing item and it is important to be methodical of the amount of heat and water being used to maintain clothing. Global warming potential (GWP) is at its height when a shirt is being used which includes 72% of total water use and 64% total energy use which can be attributed to water heating, washing, drying, and transportation (Chen et al., 2021). The care of clothing can lengthen the lifespan of its wear and keep clothing from landfills and second-hand stores for longer

periods of time. The quality of clothing is also important to the life cycle assessment. When comparing fast fashion to luxury or handmade clothing the wear is much shorter for fast fashion due to production quality. Social awareness of how consumption of clothing contributes to the environment negatively can not only lengthen the lifespan of clothing but avoid contributing to the fast fashion mindset and industry.

Ghana

The fashion industry is expansive throughout the Global South. Ghana stands out as an example of how the fashion industry sets standards within developing countries to manipulate infrastructure and economy. Looking closely at Ghana's government infrastructure and policies, one can see that there is a power imbalance amongst Ghana and fashion industries as well as developed countries. For example, in Ghana there is no regulation or control of the trade of second-hand goods leading to substantial amounts being imported but South African importers are lawfully bound to gather a permit to import second-hand garments (Mensah, 2023). Not only is the policy infrastructure weak but as Ghana pushes development and industrialization carbon footprint will increase which may lead to exorbitant outcomes (Amankwah et al., 2023) ultimately decreasing welfare. These second-hand exports are a significant resource of economic value. Fragile countries, such as Ghana, depend on the trading system of second-hand clothing. Katamanto market, in the capital of Ghana, is the country's largest second-hand clothing market that receives about 15 million clothing items weekly; however about four to six million items are dumped in overflowing landfills weekly (Mensah, 2023). Ghana's dependence on this market demonstrates the desperation for economic prosperity while also highlighting corporate irresponsibility and power. The relationship between these two factors, economy and corporate power, are strongly intertwined. Fashion corporations utilize developing countries such as Ghana in order to continue the cycle of fast fashion at alarming rates for the price of economic growth. Second-hand consumption is being turned into a foreign aid in order for large companies to reap greater profits. From a circular economy lens, second-hand clothing has positive environmental and social impacts yet there is no real profitability to be made off of these clothing as new items would have a greater profit (Mensah, 2023) For developing countries, such as Ghana, Global Domestic Product

(GDP) is essential to the betterment of the country and a step towards higher quality living for citizens. While GDP does not equal improvement, it can have an indirect relationship to expansion. Considering these qualities, developing countries rely on trade from developed countries in hopes of increasing productivity yet, this is an unequal tradeoff as developed countries seem to profit more from this trade. This, in turn, tightens the cycle of fast fashion allowing for it to continue at an unsustainable rate. The gap between developed and developing countries furthers as countries such as the US profit from the continued cycle of fashion brands and trends. Addressing this gap in GDP between the Global North and the Global South can lend itself to decreasing the rate at which fashion is consumed.

Corporate Responsibility

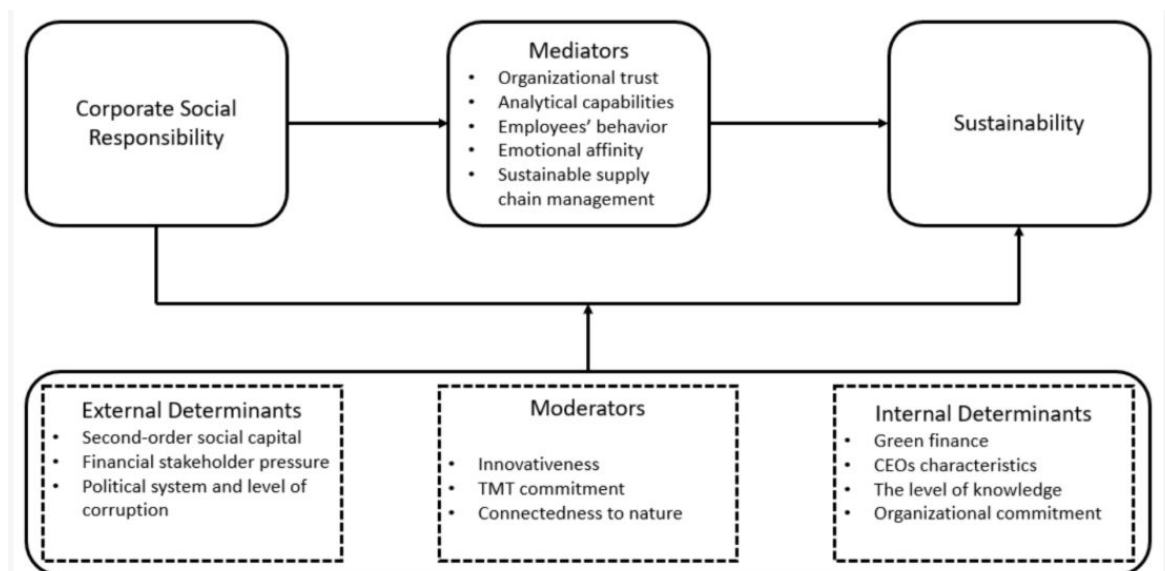


Figure 2. Relationship between Corporate Social Responsibility (CSR) and sustainability. Includes external and internal determinants as well as moderators and mediators in order to depict specific relationships and goals in a corporate environment (Monstepaniuk et al., 2022)

Corporate Social Responsibility

From a fashion perspective, corporations have to manage goals and achievements alongside rules and regulations that reflect social standards within the company. What is good for a corporation may not be good for the public. The rate of consumption, social standards, and external factors means that a corporate setting will

fluctuate with its social responsibility. Corporate Social Responsibility (CSR) branches into four different categories: economic, legal, ethical, and philanthropic and whether it is external or internal aids in promoting sustainable organizational performance (Monstepaniuk et al., 2022). CSR is a concept that is relatively new and pushes for a more positive social and sustainable future. As seen in figure two, there are internal and external determinants such as second-order social capital. It is noted that there is a significant association with second-order capital and sustainable innovations with continued inclusion of sustainability efforts, creating positive impacts in the surrounding community as well as corporate performance (Monstepaniuk et al., 2022). CSR can help to push sustainability into the public eye and promote ethical consumption. Issues with CSR include switching management instruments to help mold a sustainable mindset within employees and the weak ability to measure and compare organization sustainability through the process of sustainability reporting due to non-uniformity (Monstepaniuk et al., 2022). Social responsibility from an organizational perspective is not well defined. Corporations have the ability to redefine social standards as they deem best fit their outlook. While corporate social responsibility is a step towards reporting and comparing sustainability practices and processes, it still needs to be thoroughly defined in order for corporations to stop profiting off of the public and developing countries. One of the most prevalent issues for this moving forward is fashion production happening across many countries, thus making it harder for national governments to mediate and intercept (Fraser et al., 2022). With the fashion industry being so vast, the government will become a part of the challenge in attempting to break down the barriers of responsibility and greed in corporations. The sooner responsibility is accounted for, the easier it will be to make sustainability more transparent and open.

Transparency

Transparency is key in the development of CSR and sustainable initiatives. Firms who had a higher profit margin were also found to be more transparent due to access to reporting and monitoring funds and increased acceptance socially by consumers (Fraser et al., 2022). For corporate sustainability, transparency can mean

improved efficiency in global supply chains or market expansion (Fraser et al., 2022). The more transparent and open corporations become the easier it will be for trust to be built between the consumer and the corporation.

The Consumer and The Worker

Consumers drive the fashion industry. Corporations model their behaviors based on what they expect consumers to appeal to. A large issue at hand is customer awareness. Corporations utilize concepts such as greenwashing in order to misguide consumers. Corporations can make claims of being environmentally friendly or active but do not issue information to back up this statement, they also may utilize words that can be misleading or vague, or draw attention away from the harm being done by introducing a solution or alternative that isn't as productive as believed (Adamkiewicz et al., 2022). Corporations have a responsibility on their end to educate and inform consumers of their product. The misrepresentation or neglect of true environmental practices may lead to more environmental and social damage that is unnecessary given our deteriorating climate. Corporations must choose whether they value economic growth and profits or social justice. Both of these factors are attainable for corporations if pursued correctly. Not only do consumers face the effects of corporate responsibility, but the employees working in the sweatshops and factories do as well. When comparing the amount of garments cycled in each country, China processes and produces more than the United States; a United States worker earns a wage seven times larger than a worker in China (Turnberg, 2021). This is a direct fault of a corporation's neglected social responsibility. These corporations make millions, if not more, and cannot contribute to the well being of their employees who keep the operation running. Corporate social responsibility must be implemented in order to seek change in the fashion industry and for the betterment of the people.

Conclusion

With one fourth of the earth's carbon budget predicted to be spent by the fashion industry by 2050 (Mishra et al., 2024) change is a non-negotiable. There are many solutions being attempted in order to curb the environmental damage of the fashion industry. A major solution is the concept of reuse and reduction. In the cotton life cycle and garment process, it is estimated 15% of fabric is disposed of (Gutpa et al., 2022). Seeking a second life from

the production of items may allow a cut back on waste. Not only is there the opportunity to reduce waste, but from an outside perspective there is an opportunity to educate consumers. By changing the consumer mindset and shifting it towards a greener attitude, consumption will follow suit and decrease. The goal of a consumer is to prolong the lifespan of their closet and, with increased knowledge of corporate background as well as sustainable initiatives such as mending and repairing clothes, it can shift consumers to a quality over quantity mindset (Nkrumah et al., 2025).

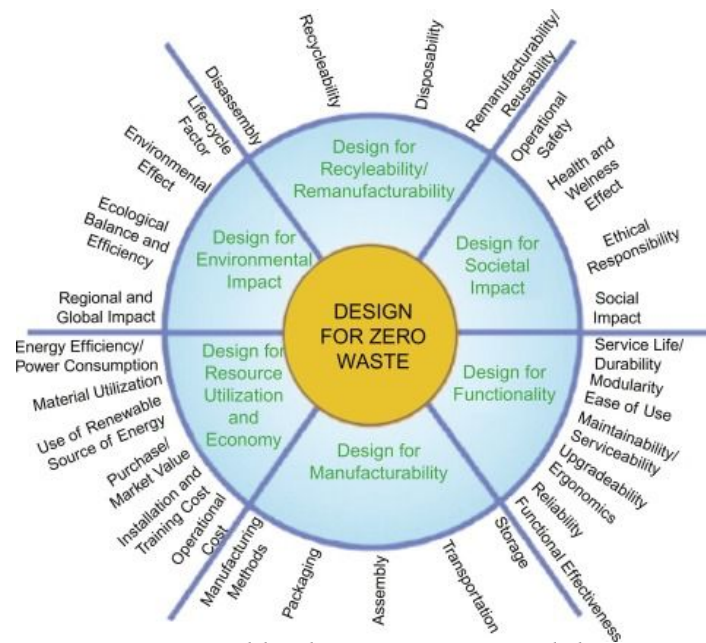


Figure 3. Concept design for Zero Waste. Sectioned by design concepts and their impacts (Gupta et al., 2022)

Shifting the public towards slow fashion will have the ability to reap many benefits. Despite slow fashion's idealism, consumers have a strong influence in the industry and the industry will not be able to keep pace when there is a high consumer demand and low clothing production (Mensah, 2023). Slow fashion, while it may seem like the perfect route to sustainability, has its flaws. Starting with a zero waste design within the fashion industry may be the solution towards the road to sustainability and transparency. Considerations for zero waste, as seen in figure three, are vast. The ability to change habits within production can lead to increased consumer education, social awareness, and environmental benefits. With zero waste being an obtainable objective it becomes a question of how does this initiative root itself into corporations and effectively. Moving forward, corporations must initiate and work towards plans that begin to add zero waste practices in order to create positive future progress without being too reliant on this plan to solve the environmental and social issues seen today. The more informed consumers are and the more transparent the

the corporation is, the more sustainable our future will be.

References

- Julia Adamkiewicz, Ewa Kochańska, Iwona Adamkiewicz, Rafał M. Łukasik, Greenwashing and sustainable fashion industry, *Current Opinion in Green and Sustainable Chemistry*, Volume 38, 2022, 100710, ISSN 2452-2236, <https://doi.org/10.1016/j.cogsc.2022.100710>.
- Amankwah, A. M., Appiah, E., & Okai-Mensah, C. K. (2023b, November 29). *Circular approach to environmental impact of apparel production in Ghana: A narrative review*. *Journal of Science and Technology (Ghana)*. <https://doi.org/10.4314/just.v41i3.9>
- Chen, F., Ji, X., & Chu, J. (2021). A review: Life Cycle Assessment of Cotton textiles. 10.35530/IT.072.01.1797
- Richa Gupta, Anamika Kushwaha, Dushyant Dave, Niva Rana Mahanta, Chapter 10 - Waste management in fashion and textile industry: Recent advances and trends, life-cycle assessment, and circular economy, Editor(s): Chaudhery Mustansar Hussain, Sunpreet Singh, Lalit Goswami, *Emerging Trends to Approaching Zero Waste*, Elsevier, 2022, Pages 215-242, ISBN 9780323854030, <https://doi.org/10.1016/B978-0-323-85403-0.00004-9>.
- James Mensah. (2023). The Global South as a Wasteland for Global North's Fast Fashion: Ghana in Focus. *American Journal of Biological and Environmental Statistics*, 9(3), 33-40. <https://doi.org/10.11648/j.ajbes.20230903.12>
- Mishra, S., Malhotra, G., Chatterjee, R., & Sanatkumar Shukla, Y. (2024). Impact of self-expressiveness and environmental commitment on sustainable consumption behavior: the moderating role of fashion consciousness. *Journal of Strategic Marketing*, 32(8), 1048–1070. <https://doi.org/10.1080/0965254X.2021.1892162>
- Mostepaniuk, A., Nasr, E., Awwad, R. I., Hamdan, S., & Aljuhmani, H. Y. (2022). Managing a Relationship between Corporate Social Responsibility and Sustainability: A Systematic Review. *Sustainability*, 14(18), 11203. <https://doi.org/10.3390/su141811203>
- Nkrumah, E., Appiah, N.A., Howard, E.K., Acquaye, R. (2024). Sustainable Fashion Promotion: Assessment of Waste Generation and Management in Ghana's Garment Industry. In: Aigbavboa, C., *et al.* Sustainable Education and Development—Clean Energy. ARCA 2023. Springer, Cham. https://doi.org/10.1007/978-3-031-65357-5_53
- Szabo, S., Webster, J. Perceived Greenwashing: The Effects of Green Marketing on Environmental and Product Perceptions. *J Bus Ethics* 171, 719–739 (2021). <https://doi.org/10.1007/s10551-020-04461-0>
- Turnberg, Summer Roslyn, "The Dangers of Fast Fashion: A Health and Environmental Analysis" (2021). *Global Honors Theses*. 79. https://digitalcommons.tacoma.uw.edu/gh_theses/79

Socioeconomic Status Leads to Decreased Access to Care Among Patient Populations

Vincetti Carandino

Abstract

The cost of healthcare has been uncontrollably rising for years, often surpassing the inflation rate seen in the economy. Access to patient care among all sectors of healthcare has been an ongoing issue, specifically in general primary care and mental health care. Socioeconomic status and social determinants of health are directly related to an individual's ability to obtain access to high-quality care of all types, specifically primary care and mental health services. The ability to bridge the gap in access to high-quality care is there; however, social programs must be implemented in order to allow for all individuals to access the care they need and deserve.

Introduction

The cost of healthcare continues to rise from year to year. In 2022 healthcare costs rose 4.6% from the previous year and in 2023 they rose 7.5% from the previous year totaling 4.9 million dollars or \$14,570 per capita (Trends in health care spending, 2025). In 2023 the economic inflation rate was 4.12% (U.S. inflation rate 1960-2025, 2025). Cost is expected to rise each year in accordance with the inflation rate the economy is experiencing. In 2023 the cost of healthcare increased by almost double when compared to the inflation rate. Costs continue to rise at an uncontrolled rate which negatively impacts the patient care experience. The healthcare system includes the patients, employers, physicians, pharmaceutical companies, insurance companies, the government, medical device suppliers, and research institutions (Health Care Reform: Duties & responsibilities of stakeholders, n.d.). As more organizations contribute to healthcare, the cost will continue to rise resulting in care that patients cannot afford.

Patient Populations Experiencing Difficulty with Access to Mental Health Care

Mental health is closely related to physical health and is the component of behavioral health that includes social, psychological, and emotional well-being; mental health care is the treatment for conditions that negatively

impact the components of behavioral health that lead to an individual's mental health status (Centers for Disease Control and Prevention, 2024). Patients across all populations can experience difficulty accessing care due to location, socioeconomic status, or other outside factors. Socioeconomic status is reflective of the quality of life a person has and is composed of income, educational attainment, occupational prestige, perceptions of social status and social class, and income (American Psychological Association, n.d.). A person's socioeconomic status has a direct impact on their health and overall quality of life, this occurs directly and indirectly due to the inability or ability to form connections and networks and psychosocial factors relating to their own personal advantage (Nutakor, et al., 2023). When seeking psychological care and treatment, individuals with a low socioeconomic status were 4.1% less likely to be offered treatment when compared to those of a high socioeconomic status (Niemeyer & Knaevelsrud, 2022). Roughly 1 in every 25 individuals that seek psychological treatment are denied care because of their socioeconomic status. Unconscious bias towards those with a lower socioeconomic status is resulting in unequal access to treatment and aggravates mental health care disparities (Niemeyer & Knaevelsrud, 2022).

Patient Populations Experiencing Difficulty with Access to Primary Health Care

Primary care is considered to be the health services that cover a wide range of prevention, wellness, and treatment options for common illnesses; primary care providers include physicians, physician assistants, nurses, and nurse practitioners that often maintain long-term relationships with their patients to treat a range of health issues and often coordinate a patient's care with specialists (Primary care, 2023). Those with a high socioeconomic status were 50% more likely to be offered an appointment with a primary care physicians office than those with a low socioeconomic status; due to the operation of health insurance institutions it is often found that physicians offices are biased towards those with a higher socioeconomic status with high quality health insurance over those that have a lower socioeconomic status and no or low quality health insurance (Olah, et al., 2013). There is a positive socioeconomic gradient that highlights a strong correlation between wealth and health; socioeconomic status is tied to healthy aging in which those who have a higher socioeconomic status are likely to live longer and receive better care, they are also less likely to be exposed to stress and trauma. In contrast, those with a low socioeconomic status are more

likely to be exposed to a heavier disease burden and not be given the same level of access to care (McMaughan, et al., 2020). Access to care is not equal among populations and those who struggle to obtain care will likely continue to struggle to access care for the remainder of their lives.

Recommendations to Bridge the Gap for Access to Care Based on Socioeconomic Status

While improving access to care is necessary for healthy aging, a complementary focus on the social determinants of health must be addressed (McMaughan, et al., 2020). The social determinants of health can be defined as the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality of life outcomes and risks (Social Determinants of Health, n.d.).



Figure 1: Social Determinants of Health chart (Social Determinants of Health, n.d.)

Socioeconomic status is a component of a person's social determinants of health. The volume of older patients seen in the hospital is rising; even with programs such as medicare and medicaid, the healthcare system is not equipped to handle the pending influx of an older patient population; the healthcare system must improve infrastructure and secure financial support for the future challenges ahead (McMaughan, et al., 2020). Improving access to care starts with improving socioeconomic status; overall patient health goes beyond healthcare and must address housing, food quality, neighborhood conditions, environment, education, and minority stressors; addressing health inequalities that are specifically found in low socioeconomic areas such as providing education about healthy habits can improve health

behaviors, and social outcomes into adulthood (Shah, 2017). Investing in healthcare systems, programs such as medicare and medicaid, and developing new community programs to support social determinants of health will provide better access to care among all patient populations and increase awareness about health disparities (The impact of socioeconomic factors on healthcare access, 2025).

Conclusion

Socioeconomic status directly impacts the overall health and healthcare access of an individual; those with a low socioeconomic status are burdened with poor health outcomes, reduced access to care, and often have chronic health conditions (The impact of socioeconomic factors on healthcare access, 2025). Individuals with a low socioeconomic status and poor determinants of health have an increased risk for psychological disorders and few are able to obtain quality care for high-quality mental health services (Hodgkinson, et al., 2017). Strategic investments and improving access to care through community programs, education, and allocation of resources can improve access to high-quality care for patients that belong to a low socioeconomic status with poor social determinants of health (Jindal, et al., 2023). The ability to bridge the gap in access to care is there, action must be taken to provide high-quality care to all patients, not just those with the biggest wallet.

References

American Psychological Association. (n.d.). *Socioeconomic status*. American Psychological Association.

<https://www.apa.org/topics/socioeconomic-status>

Centers for Disease Control and Prevention. (2024, August 8). *About mental health*. Centers for Disease Control and Prevention. <https://www.cdc.gov/mental-health/about/index.html#:~:text=Get%20help%20now%E2%80%8E,needs%20can%20improve%20overall%20health>.

Health Care Reform: Duties & responsibilities of stakeholders. Saint Joseph's University. (n.d.).

[https://www.sju.edu/centers/icb/blog/health-care-reform-duties-and-responsibilities-of-the-stakeholders#:~:tex](https://www.sju.edu/centers/icb/blog/health-care-reform-duties-and-responsibilities-of-the-stakeholders#:~:text=The%20major%20stakeholders%20in%20the,through%20employer%20or%20governmental%20intermedia)
t=The%20major%20stakeholders%20in%20the,through%20employer%20or%20governmental%20intermedia
ries.

Hodgkinson, S., Godoy, L., Beers, L. S., & Lewin, A. (2017, January). *Improving mental health access for low-income children and families in the Primary Care Setting*. Pediatrics.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC5192088/#:~:text=Poverty%20has%20been%20consistently%20linked,persist%20across%20the%20life%20span.&text=Despite%20the%20mental%20health%20needs,high%20quality%20mental%20health%20services>.

The impact of socioeconomic factors on healthcare access. Home - Willows Healthcare. (2025, April 21).

<https://www.willowshealthcare.com/blog/the-impact-of-socioeconomic-factors-on-healthcare-access>

Jindal, M., Chaiyachati, K. H., Fung, V., Manson, S. M., & Mortensen, K. (2023, December). *Eliminating health care inequities through strengthening access to care*. Health services research.

<https://pmc.ncbi.nlm.nih.gov/articles/PMC10684044/>

The Importance of Architecture on Human Psychology

Genevieve Orlewicz

Introduction

Architecture is more than a visual; it is a place where forms connect human psychological and emotional responses together. Understanding the evolution of architecture's characteristics is necessary to understand why architects include certain features. By dissecting these characteristics on a psychological level, understanding architects' choices is feasible. Ultimately, this will urge for better societal understanding of the human mind and body in future architectural builds.

Evolution of Architecture

As architectural styles have evolved, the human experience within these spaces has too, laying the foundation for what is now understood as architectural and environmental psychology. For centuries now, architects across the world have experimented with various designs and structures from the early 1200s chapels to modern-day office buildings. Architecture has varied immensely, reaching every end of the visual spectrum. These styles ultimately have shaped human responses both psychologically and emotionally, fostering environments that influence feelings, behaviors, and even cognitive processes. In the Middle Ages, during the Romanesque period, architects prioritized creating spaces that felt enduring and holy. The structure is characterized by round arches and bulky piers, dark interiors, and an elaborate and ornate appearance. The *Basilica of Saint-Sernin* in Toulouse, France, is one example, where bulkiness and barrel vaults were used heavily to emphasize permanence and divine presence. Psychologically, this design evoked feelings of awe and spirituality, to imitate a holy setting as these structures were primarily used for religious purposes (Kleiner 2020, ch. 12).

By the early to mid-1200s, Gothic architecture emerged across Europe, transforming the ornate and thoughtful holiness creations of Romanesque architecture. Architects began prioritizing verticality and light by

incorporating flying buttresses, light inside buildings through stained-glass windows, and pointed arches, seemingly piercing through the sky, ultimately setting Gothic architecture apart from prior builds. Churches like the *Chartres Cathedral* in France featured these immense stained-glass windows, allowing for natural light and color in the sacred space (Kleiner 2020, ch. 13). These new spaces provided a fresh wave of immersive environmental experience, with light, as well as functionality, supporting the need for growing populations in terms of spirituality.

The Renaissance marked a major shift in the revival of classical ideals such as balance, humanism, and harmony, incorporating these attributes externally and internally (Kleiner 2020, chs. 16–17). Architects such as Filippo Brunelleschi returned to Roman design principles while embracing new purposes for their spaces. The *Ospedale degli Innocenti* in Florence, Italy, is a key example of this: the use of a sandstone called gray pietra serena, decorated columns called Corinthian capitals, and loggia, a rational layout with several arches, reflected a new age of visual aesthetics and classical beauty (Kleiner 2020, ch. 16). Brunelleschi's later work on the *Pazzi Chapel* emphasized balance, subtle color, medallion sculptures known as tondi for gentle decoration, and pendentives to support the central dome. Rather than simply being architecturally stunning, his incorporation of thought-out window placement to reflect natural light and functional weight distribution showcases his commitment to creating aesthetically pleasing and functional spaces. His creations often resembled crosses and served as meeting halls; therefore, social unity and spiritual bonding emerged like never before (Kleiner 2020, ch. 17).

As architecture evolved, interior spaces began to incorporate personal and expressive touches, seen in the surge of the Renaissance (Kleiner 2020, ch. 14). Giotto Di Bondone's *Lamentation*, a commission by Enrico Scrovegni, transcended worshippers into immersive environments of connection and reflection, considering the facial expressions of biblical grief and agony. Baroque emerged in the 17th century, where the focus shifted to the sole emotional impact. Italy and Spain were the face of this movement as these countries' architecture emerged a new wave of builds prioritizing drama and movement within builds. The incorporation of details guided feelings and beliefs.

The Neoclassical era responded differently following this surge. Thomas Jefferson's *Monticello* embraced Roman architectural ideals to reflect values such as order, reason, patriotism, morals, and civic virtue. The combination of brick and white columns symbolized a new wave of identity and ideals. Andrea Palladio's *Villa Rotonda*, likewise, showcased symmetry, proportion, and a viewing platform called a belvedere to overlook the countryside, merging beauty and function.

In the 20th century, industrialization and modern life took over architecture, banishing ornateness but increasing functionality. Walter Gropius' *Bauhaus school* represents a form of "total architecture," combining form, function, and industry. The sleek, industrial look, large windows, and absence of direct light aligned with the needs of a fast-paced and machine-run world. The northeast-facing windows, though indirect, were considered ideal work conditions. However, integrating environmental attributes into modern architecture was not far and few. Frank Lloyd Wright's *Robie House* focused on organic architecture, having horizontal and ground-hugging lines, carefully placed windows, asymmetry, and a wandering plan. Instead of immense detail, the focus was on the fireplace, symbolizing simplicity and balance. The *Kaufmann House*, also known as *Fallingwater*, integrates a waterfall with natural stone to blur the boundary between the home and its environment. Wright didn't just design buildings; he shaped experiences grounded in function and a love for nature.

Despite the immense amounts of changes architecture has endured, all appear and function differently, allowing for appreciation and importance per work. Earlier times often prioritized detail, verticality, spirituality, and grandiose appearances, while modern times tend to prioritize functionality, effectiveness, and incorporation of the environment. Regardless, each piece has paved the way for what architecture has become today.

Different Characteristics of Architecture and the Psychological Responses

Considering the evolution of architecture's attributes, as humans spend most of their time and live emerged in structures, understanding how various colors, light, functions, spaces, and details correlate with human psychological responses is imperative (St-Jean, Clark, and Jemtrud 2022). Better psychological

understanding means better human function, health, happiness, and well-being.

Color

Considering humans visualize 2.3 million discernible colors, there is an almost indefinite number of possible combinations that we visualize on a day-to-day basis (Linhares, Pinto, and Nascimento 2008). Color psychology, which is when the brain assigns emotional and psychological connotations to colors and emotions, has proven that colors have an imperative influence on the brain's cognition and behavior, such as decision-making. Due to blue and green stimuli linking the brain to natural realms, such as the sky, bodies of water, and vegetation, the brain deems greens as positive content, increasing calmness, focus, and increased attention to detail (Clarke and Costall 2008; Moller, Elliot, and Maier 2009), while blues tend to be associated with openness and peace (Kaya and Epps 2004; Mehta and Zhu 2009). Meanwhile, yellows, oranges, and reds tend to be associated with creativity and energy. Reds, however, are advised to be used with caution as they can lead to overstimulation and inimical implications for performance outcomes (Stevens and Ruxton 2012). Neutral colors, like whites and beiges, are often deemed as grounding, pure, and holy, providing sense as to why a variety of churches in the Renaissance period gravitated towards the usage of these colors (Lakens, Semin, and Foroni 2012). Pops of colors, like murals or, for example, the *Lamentation*, can serve as personality and excitement. Blacks and whites tend to carry neither negative nor positive connotations, but rather, tend to depend on the human at hand and their individual experiences (Lakens, Semin, and Foroni 2012). Hence, many modern-day works, such as Walter Gropius' *Bauhaus school*, tend to lean towards the sole incorporation of light grays. Because they are predetermined, there is neither a positive nor negative connotation assigned to the colors subconsciously, but rather, are neutral and reliable to the eye. Color and context are integrated early in visual processing, requiring no attention or intention. Psychologists often refer to color as an "implicit affective cue," as it influences psychological functioning gently (Friedman and Förster 2010). By understanding different responses colors elicit in the brain, architects can better tailor their interior and exterior spaces to assist the human mind and behavior.

Light

Light is not just a perception or visual aesthetic, but a catalyst for cognitive, emotional, and behavioral responses by the human in the environment (Tomassoni, Galetta, & Treglia, 2015). It is considered a cognitive map and emotional driver, guiding perception and influencing mood, attention, and emotional well-being. Proper lighting design can create feelings of alertness, calmness, and even creativity, depending on intensity and positioning. Poor or harsh light can lead to stress, overstimulation, and discomfort, emphasizing the need for an ecological and health-conscious approach in architectural lighting (Tomassoni et al., 2015).

Environment

Environmental psychology looks at transactions between individuals and their environment, built and natural. Blues and greens associate the brain subconsciously with nature and calmness; however, having a piece of that nature visible in buildings is equally transformative, if not, more. There is abundant evidence showing how nature is restorative, as it improves productivity, vitality and mood, connectivity with nature, and reduces stress and anger (Kaplan 1995). Even a houseplant in an office can mimic the setting of nature and trick the subconscious mind into thinking it is submerged in nature; however, this typically works more for men than women (Raanaas et al. 2011). Green spaces can also improve functioning for children with disorders such as attention deficit hyperactivity disorder as more social activity tends to occur in green spaces than in spaces that are less green (Hinds and Sparks 2013). Not only can incorporating environmental attributes inside and outside architecture be helpful for the person, but it could further better people's behaviors towards the environment and increase their concern for environmental issues. Studies have found that having an affective connection to nature significantly predicts people's behaviors (Hinds and Sparks 2008). This means more of a chance to change any anti-environmental behaviors, increasing the possibility of eco-friendly actions such as recycling.

Space

Space is another characteristic of architecture that plays a significant role in the human mind and bodies as there is a direct relationship between people's behaviors and preferences. Studies show distinctive and realistic responses in surveys of affective reactions and room appraisal according to variations in ceiling height and type (ScienceDirect 2020). In a study that compared HIVE, immersive virtual environments, and the physical environment, evidence shows that participants drastically preferred the higher feeling to the lower ceilings, as it felt more “attractive” (ScienceDirect 2020). This finding is further supported by fMRI, a brain imaging technique that detects changes in blood flow and measures brain activity. It demonstrated that higher ceilings correlate with increased exploration, attention, and aesthetic satisfaction in the dorsal stream, a visual pathway in the brain that processes visual information.

Detail

Architectural details, like texture, curves, natural materials, or sculptures, play a powerful role in shaping emotional responses, and many architects attempt to align the purpose of the building with the emotional responses they intend to elicit. For example, in Gothic cathedrals, architects strive to create a spiritual feeling; therefore, they prioritize usage of ornamentation and immense amounts of detail. However, more organic architectural forms can be better for workplaces, as they elicit comfort, pleasure, and calmness (Vartanian et al., 2013; Coburn et al., 2020). This connection between visual detail and well-being emphasizes the importance of designing for more than just function or aesthetics; it's about planning and designing for feeling.

Functionality

Creating architecture functionally has long been influenced by historical priorities and is, luckily, a

a common theme. During the Renaissance, Filippo Brunelleschi's *Ospedale degli Innocenti* reflected humanistic ideals not only through symmetry but also in how its structure supported clear movement and purpose for the people in the building. Modern architects, like Walter Gropius, eliminated unnecessary ornateness to emphasize more focus on clarity, usability, and light, ensuring the building is subtle, gentle, and sleek. These choices align with findings that thoughtful layouts and lighting, as such, improve cognition, reduce stress, and support human well-being (Evans & McCoy, 1998; Ulrich et al., 2008).

Conclusion

Ultimately, architecture is not just a visual art but a psychological environment. Across history, from the spiritual gravity of Romanesque cathedrals to the functionality of *Bauhaus*, architectural shifts have reflected evolving ideas about the human mind, emotion, and environment. Today, scientific research continues to show how elements like color, space, light, detail, and environmental incorporation can influence characteristics in humans such as cognitive function, stress, attention, productivity, and emotional well-being (Evans & McCoy, 1998; Tomassoni et al., 2015; Vartanian et al., 2013).

By designing spaces that meet fundamental psychological needs, such as safety, stimulation, aesthetic clarity, connection to nature, and spatial harmony, better lives are built. If simple aspects like lighting or ceiling height can reduce stress or increase creativity, then architectural choices are not small but rather, transformative. With increased awareness of mental health and environmental wellness, architects have the opportunity and responsibility to integrate psychology into every detail of design.

Future architecture must acknowledge that people are diverse. Individuals have different personalities, experiences, and even disorders. Designs that are flexible, inclusive, and emotionally intelligent will foster greater productivity and happiness as well as create healthier communities. A better understanding of how the human mind and body respond to built environments will advance architecture and enhance the way humans

humans live, work, connect, and feel.

References

- Linhares, J. M., P. D. Pinto, and S. M. Nascimento. "The Number of Discernable Colors in Natural Scenes." *Journal of the Optical Society of America A* 25, no. 11 (2008): 2918–24.
- Moller, A. C., A. J. Elliot, and M. A. Maier. "Basic Hue-Meaning Associations." *Emotion* 9, no. 6 (2009): 898–902.
- Mehta, R., and R. J. Zhu. "Blue or Red? Exploring the Effect of Color on Cognitive Task Performance." *Science* 323, no. 5918 (2009): 1226–29.
- Lakens, D., G. R. Semin, and F. Foroni. "But for the Bad, There Would Not Be Good: Grounding Valence in Brightness Through Shared Relational Structures." *Journal of Experimental Psychology: General* 141, no. 4 (2012): 584–94.
- Stevens, M., and G. D. Ruxton. "Linking the Evolution and Form of Warning Coloration in Nature." *Proceedings of the Royal Society B: Biological Sciences* 279, no. 1739 (2012): 417–26.
- Friedman, R. S., and J. Förster. "Implicit Affective Cues and Attentional Tuning: An Integrative Review." *Psychological Bulletin* 136, no. 6 (2010): 875–93.
- Raanaas, R. K., K. H. Evensen, D. Rich, G. Sjøström, and C. Patil. "Benefits of Indoor Plants on Attention Capacity in an Office Setting." *Journal of Environmental Psychology* 31, no. 1 (2011): 99–105.
- Hinds, J., and M. Sparks. "The Psychology of Environmental Concern and Its Role in Predicting Pro-Environmental Behavior." *Annual Review of Psychology* 64 (2013): 5–25.
<https://www.annualreviews.org/content/journals/10.1146/annurev-psych-010213-115035>.
- "Height and Ceiling Variation's Impact on Human Preference and Behavior." *ScienceDirect*, 2020.
<https://www.sciencedirect.com/science/article/pii/S0360132319304950>.
- Kleiner, F. S. *Gardner's Art Through the Ages: A Global History*. 16th ed. New York: Cengage Learning, 2020.
- Tomassoni, R., G. Galetta, and E. Treglia. "Psychology of Light: How Light Influences the Health and Psyche." *Psychology* 6, no. 10 (2015): 1216–22. <https://doi.org/10.4236/psych.2015.610119>.
- Evans, G. W., and J. M. McCoy. "When Buildings Don't Work: The Role of Architecture in Human Health." *Journal of Environmental Psychology* 18, no. 1 (1998): 85–94.
<https://doi.org/10.1006/jevp.1998.0089>.
- Ulrich, R. S., C. Zimring, X. Zhu, J. DuBose, H. B. Seo, Y. S. Choi, et al. "A Review of the Research Literature on Evidence-Based Healthcare Design." *Health Environments Research & Design Journal* 1, no. 3 (2008): 61–125. <https://doi.org/10.1177/193758670800100306>.

-
- Vartanian, O., G. Navarrete, A. Chatterjee, L. B. Fich, H. Leder, C. Modrono, et al. "Impact of Contour on Aesthetic Judgments and Approach-Avoidance Decisions in Architecture." *Proceedings of the National Academy of Sciences* 110, Suppl. 2 (2013): 10446–53.
<https://doi.org/10.1073/pnas.1301227110>.
- Coburn, A., O. Vartanian, and A. Chatterjee. "Buildings, Beauty, and the Brain: A Neuroscience of Architectural Experience." *Journal of Cognitive Neuroscience* 32, no. 12 (2020): 2196–2207.
https://doi.org/10.1162/jocn_a_01569.

The Mental Health Effects of Living with Food Allergies

Gabriella Kam

Abstract

Food allergies are a life threatening immune response that occurs when an individual eats or comes into contact with a certain allergen. With the increase in food allergy prevalence, the burden of food allergies puts a toll on patients' mental health. Analyzing the prevalence of mental health conditions such as anxiety and panic in those with food allergies will allow physicians to better understand how to treat food allergies as a whole.

With more research on why food allergies are becoming a growing epidemic throughout the world, the management of food allergies is vital for patients' everyday lives.

Introduction

Researchers are increasingly discovering a connection between food allergies and declining mental health. The psychosocial significance of food allergies leaves a toll on individuals with food allergies and caregivers emotional, mental, and social health. Food avoidance, for example avoiding foods in a restaurant because of cross contamination, is a weighing factor on why heightened emotions such as stress and anxiety is so prominent in those with food allergies. The severity of food allergies play an important role in this trend and various data among the mental health in individuals. The higher prevalence of food allergies creates a burden for individuals living with the food allergies. Treating the mental health of individuals with food allergies should be considered when navigating food allergies as anxiety and panic grows in patients (Casale, 2024).

Food Allergy Prevalence

The rapid increase in food allergies in adults and adolescents has been skyrocketing. It is estimated that 1 in every 10 adults and 1 in every 12 adolescents or 10% of the United States population has a food allergy (Warren, 2020). Anaphylactic reactions have become more prevalent as well, with 1 in 10 individuals with allergies having an allergic reaction related visit to the emergency department in a twelve month span (Warren, 2020). An anaphylactic reaction is a life threatening reaction that occurs seconds to minutes when an individual

is exposed to an allergen.

Severe symptoms include hives, vomiting, wheezing, while also experiencing symptoms that affect the skin, gastrointestinal tract, respiratory system, and cardiovascular system (Warren, 2020). A study found that between 2007-2016, the percent of claims with diagnoses of anaphylaxis increased by 377% with the most common severe allergy to peanuts and tree nuts (Warren, 2020). The fastest growing food allergy are peanut allergies. In 1997 the prevalence of a peanut allergy was 0.4% for kids while in 2008 the prevalence was 1.4% for kids (Warren, 2020). Looking at the world population, the country with the highest prevalence of food allergies was in Finland with a 9.3% prevalence in kids from ages 1-4 years old (Pyrhonen, 2009). It is still unknown to why this is occurring but research is being done to get more answers on why certain prevalence of food allergies occur.

The Burden of Food Allergies

The most common mental health conditions caused by allergies include anxiety and panic. These emotions stem from the fear of eating foods with an individual's allergen no matter what that allergen is. Two-thirds of individuals with food allergies have reported mental health concerns caused by food allergies such as anxiety and panic. Individuals with multiple food allergies experienced much more significant mental health effects compared to those with only one food allergy. Individuals with food allergies who expressed more concern as adults. This is due to the adults understanding the severity of the allergies and knowing how uncertain food can be, especially from restaurants. About 55% of patients have anxiety about living with food allergies, after an allergic reaction around 46% of patients experience anxiety. Those experiencing more allergic reactions experienced increased mental health concerns surrounding allergies. This data expresses that mental health management should be a treatment along with treating the allergy itself (Casale, 2024).

Treatment of Mental Health

There are gaps in the treatment of mental health conditions that are associated with food allergies; specifically anxiety and panic. The treatment of food allergies puts an emphasis on treating the allergy

condition, though the relationship between the body and mind should also be considered. Treatments directly treating the food allergy are OIT (Oral Immunotherapy) and SLIT (Sublingual Immunotherapy). These treatments are usually most successful for kids. Though there are no current treatments for the mind when dealing with food allergies. Since food allergy related mental health specialists are uncommon there are still tools that could improve the mental health of patients. Epinephrine autoinjectors, commonly called EpiPens, and having a well supportive community have both demonstrated to be beneficial to a patients mental health (Casale, 2024). When giving the food allergy diagnosis information must be provided in an easily understandable format in order for the patient to confidently manage their condition.

Navigating Food Allergies

For adolescents with food allergies, education in schools is vital to mitigate bullying of the patient and to create a safe place for the child to thrive in a place of education. Psychosocial factors such as social and work environment that stem from childhood could increase the likelihood of anxiety and fear of living with food allergies (Huddleston, 2020). There are multiple ways to minimize the risk of an allergic reaction in schools. Yet schools that were labeled “peanut free” had an increased use of epinephrine autoinjectors (Huddleston 2020). It is vital to note that the cleaning of surfaces with soap and water or a cleaner is important to ensure allergens are free from surfaces (Huddleston, 2020). Hand sanitizer does not effectively remove the allergen proteins such as peanut protein (Huddleston 2020). Schools must highlight the importance of washing hands before and after eating to ensure allergens are free from individuals which have eaten a specific allergen. Only 44% of those with allergies in schools had an action plan (Huddleston, 2020). An allergy action plan must be in place for all individuals with allergies in the event of an allergic reaction. Though each individual with allergies will have a different plan depending on the severity of the allergy. Though all staff should know where to easily access an epinephrine auto-injector as every second counts during anaphylactic reactions. Those around individuals with food allergies must be knowledgeable about the allergy to mitigate life-threatening outcomes of an allergic

reaction. Restaurants must also be more knowledgeable about food allergies. Cross contamination is a big issue in restaurants as workers are not taught about the severity of allergies. Restaurants having labels of the top nine allergens on menus will mitigate the anxiety of going to restaurants.

Conclusion

The benefits of mental health awareness and tools for those with food allergies is vital for patients to thrive. Improving the mental health of those with food allergies will significantly decrease the anxiety, fear and panic that can be encountered in everyday life. There is still little research on the distribution of mental health resources and information to those with food allergies, but as the prevalence of food-allergies continues to increase more research will be needed to ensure improved quality of life for those with allergies. Ideally, individuals with food allergies should be treated more holistically with an emphasis on mental health. This would resolve the struggles that many patients experience as a result of their food allergies and create a new sector of allergists and immunologists who include mental health treatment with the treatment of the allergy itself.. Though there is still little research investigating mental health conditions associated with food allergies, recent data supports that this is an area of study that could greatly improve the lives of these individuals. With this data, there will be more advocates and awareness on why patients with food allergies must have access to mental health resources.

References

“Anaphylaxis.” Mayo Clinic, Mayo Foundation for Medical Education and Research,

www.mayoclinic.org/diseases-conditions/anaphylaxis/symptoms-causes/syc-20351468. Accessed 29 Apr. 2025.

Casale, T. B. et al. (2024). The mental health burden of food allergies: Insights from patients and their caregivers from the Food Allergy Research & Education (FARE) Patient Registry. *The World Allergy Organization journal*, 17(4), 100891. <https://doi.org/10.1016/j.waojou.2024.100891>

Huddleston, C. M. et al. (2020). Management of food allergy in the school setting. *Journal of food allergy*, 2(1), 104–107. <https://doi.org/10.2500/jfa.2020.2.200023>

Warren, Christopher M et al. “Epidemiology and Burden of Food Allergy.” *Current allergy and asthma reports* vol. 20,2 6. 14 Feb. 2020, doi:10.1007/s11882-020-0898-7

Contributors Page

This issue of MSU SciReview would not have possible without the support of the following people:

MSU SciReview Executive Board

President: Leah Meppelink

Founder: Lillian Young

Vice President: Shambhvi Ojha

Secretary: Noelle Whorf

Outreach Chair: Vincetti Carandino

Director of Social Media & Marketing: Sai Keertana Gubbala

Faculty Advisory Board

Dr. Geri Alumit Zeldes

Faculty Editorial Board

Dr. Margaret Petroff, Dr. Heather Miller, Dr. Valerie Hedges,

Dr. Peter Gulick Jr., Dr. Amy Peters

Thank you!

