Analyzing Influences and Barriers to Nutritional Health

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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STS Research Paper

An Evaluation of Nutritional Health

While the circumstances in the documentary film, *Super Size Me* seem jarring, fast food dependency is a reality many Americans face in areas of food scarcity. Even worse, those forced to live in such conditions are not aware of the detrimental effects a diet primarily composed of fast food has on the human body. One's well-being is dependent on a variety of risk factors such as the environment, genetic predispositions, food allergies, accessibility of dietary needs, and federal policy which affect the availability of nutritional resources. "Changes in food availability are a key element in the changing social conditions of the urban poor and, as good nutrition is critical for good health, a contributing factor in the decline of urban health," (Eisenhauer, 2001). There are drastically different standards of living between areas of differing socioeconomic status regarding access to proper healthcare, poor dietary choices, and clean air and water, which affect chronic conditions and the risk factors that impact one's life expectancy. Food deserts and the increased availability of processed food has created a divide between socioeconomic classes regarding nutritional health from a greater reliance on fast food (Caporuscio, 2020). The impact nutrition has on health is unavoidable. Preexisting health conditions such as allergies, obesity, and various chronic diseases necessitate nutritional education in order to combat these predispositions that rob people from a carefree lifestyle (Mayo Foundation, 2019). More effective nutritional research will identify social and political nutritional barriers that currently prevent individuals from living a healthier lifestyle. Discerning factors that significantly affect one's health will help the public care for themselves while combatting detrimental influences. The examination of nutrition and health will increase access to knowledge about preventative healthcare and the systemic barriers associated with the lack of proper nutrition. The influences

and nutritional barriers to dietary choices are analyzed within the Social Construction of Technology (SCOT) framework to educate the public about nutrition and its influence on health. The SCOT framework focuses on the influence of social groups and community interactions and highlights their impact on nutrition and the health of American populations. The evaluation of nutritional health for more accessible education must answer the following question: what about current nutritional education needs to change and how do nutritional barriers to dietary choices affect the subsequent health of individuals and populations?

Research Question

What are the nutritional barriers to dietary choices and how do these choices affect the overall health and well-being of individuals and populations in the United States? This research is intended to spotlight the underlying causes of food deserts and the drastic differences in standards of living between inner cities and suburban populations, and steps that can be taken to solve the issue of food insecurity.

Origins of Food Insecurity: Case Study and Discourse Analysis

Historical case studies and discourse analysis are being utilized in order to analyze social influences and barriers to dietary choices. A specific focus is on individual nutrition and subsequent health concerns for various racial, ethnic, and age demographics. This research is intended to identify the causes of food insecurity which have created drastic differences in standards of living between inner cities and suburban populations. For example, Census Bureau data helps discern overall health and the intersection between race, regions, and socioeconomic status (U.S. Department of Commerce, n.d.). Online databases and keywords such as, “nutrition,” “dietary health,” “systemic barriers,” “policy,” “government regulations,” “food

insecurity," and "food deserts," further develop this research. This cumulation of this quantitative and qualitative data, organized thematically, identifies various influences on nutrition and the specific groups that are affected by barriers to health.

History of Food Insecurity in America

Nutritional health is heavily influenced by the area in which one lives. Food insecurity is characterized by poor access to food stores, making it difficult for individuals to feed themselves and their families. Areas of food insecurity are also known as food deserts, and they afflict a majority of Native American Reservations and many inner city districts. Native American Reservations are a prime example of food deserts, "With the onslaught of settlements and later reservation and federal policies, Tribal Nations were forced into other areas of unfamiliarity through the reservation system," (Move For Hunger, n.d.). Previously Native American Communities had well established relationships with their environment, but now have restricted access to grocery stores making it difficult to make nutritional food choices. Native Americans have a long history of prejudicial federal policy interfering with their ability to coexist with United States populations starting from the Indian Removal Act of 1830, which forced the removal of these communities, and the Dawes Act of 1887 which reallocated tribal land to U.S. citizens (Sandefur, n.d.). These targeted policies against Native Americans have created a greater correlation of food insecurity with Tribal communities, while also providing evidence of a bias against Native Americans and other people of color. Even as the United States has been officially desegregated, "...there are still racially identifiable neighborhoods in cities across the country. And it causes a lot of inequality," (Natividad, 2021). Inequality is signaled by drastically different levels of infrastructure, a lack of community outreach programs, and greater policing in segregated residential areas. There is inequality especially seen in the limited levels of access to

nutritious food for populations living in food deserts, who often have greater rates of chronic illness as a result. While people of color are not the only ones affected by food insecurity, decades of federal policy have enforced biases against people of color have forced them to live in areas afflicted with less resources, greater poverty rates, and limited opportunities for success.

Existing programs addressing known nutritional barriers levied by the federal government are temporary fixes and often create more issues. Populations in food deserts do not have access to transportation to food stores, or do not live in an area with nutritious food options, both of which affect the proper access to nutritious food. A 2013 research paper studying the intersection of race, poverty, and the availability of food stores found that, "As neighborhood poverty increased, supermarket availability decreased and grocery and convenience stores increased, regardless of race/ethnicity," (Bower, et. al., 2013). The ongoing problem relating poverty and areas of food insecurity is aided by economic security programs such as Social Security and food assistance while full benefits are limited by racial and ethnic discrimination which prevent access to healthcare and other opportunities. The most well-known food assistance program is the Food Stamp Program which was later replaced by the Supplemental Nutrition Assistance Program (SNAP). SNAP is funded entirely through the federal government and is therefore subject to federal budget restrictions. One of these recent changes occurred in December of 2016 in which the government, "...tightened retailer eligibility criteria [which] could decrease the number of SNAP-authorized stores and alter the distribution of store types," (Oliveira, et. al., 2018). Despite the help of all this programming, the issue of food insecurity is prevalent in current society, meaning efforts are still needed to resolve the issue.

Small scale efforts can be seen at the University of Virginia (UVA) where the importance of nutrition is seen by administrative efforts to ensure all students have access to proper nutrition.

All first year students are required to have a meal plan, eliminating the stress of meal planning while acclimating to the University lifestyle. Additional efforts can be seen by the UVA Community Food Pantry whose webpage has links to more information about Food Insecurity and other available resources to aid students (UVA Community Food Pantry, n.d.). University administration's steps toward eliminating food insecurity at UVA have included the creation of the Food Insecurity and Resources Group (FRIG), establishment of the UVA Sustainable Food Collaborative, and the listing of available information for "Nutrition Resources" on the UVA Student Health and Wellness website as well as information for "Food Insecurity" on the UVA Office of the Dean of Students website. The University of Virginia identifies the risks of food insecurity and how it affects students' ability to perform academically stating that, "Hunger impacts our ability to study, be social, exercise, and much more. No student should have to pick between making ends meet and having access to nutritionally adequate and safe food while in college," (UVA DSHW, n.d.). While it may be argued whether these efforts are made to boost UVA's performance in competition with other universities or university administration truly cares about their students, the message is clear that malnutrition severely inhibits one's capabilities. UVA's efforts are a start, but widespread education and better federal regulations are essential to fixing the root cause of food insecurity and malnutrition.

Social Construction of Technology Framework

It is important to analyze the topic of nutritional health and all its complexities, from individual health factors to the effects of government policy, through the Social Construction of Technology (SCOT) Framework. The SCOT framework is defined by social scientists Trevor Pinch and Wiebe Bijker and further analyzed by Hans K. Klein and Daniel Lee Kleinman in "The Social Construction of Technology: Structural Considerations." The direction of this theory

is such that all forms of technology are shaped by the interactive sociotechnical process and that human interactions shape technology. Regarding nutrition and food as a technology, social interactions and personal desires are drivers of nutrition, however, there are many subconscious and systemic barriers preventing groups of people from making certain nutritional choices. There are four main components to SCOT: interpretive flexibility, relevant social groups, closure and stabilization, and wider context. The component of interpretive flexibility is based on the idea that technology design is not a concrete process, it is dependent on social circumstances and may have various results. Relevant social groups are the idea that social groups have the same concerns regarding specific technologies, and closure and stabilization is the next step in the framework's analysis where any conflicting views are attempted to be resolved so the social groups can agree on the issue and work to solve it most efficiently. The last component of this framework is the wider context which is when the technology is considered with respect to broader environments and its impact socially and politically. An example of the wider context is 20th century federal housing policy working with the United States private industry. Suburban and urban populations were split through policies, stealing opportunities from segregated communities and introducing food scarcity in these urban areas, creating lasting effects in inner city areas today. "Changes in food availability are a key element in the changing social conditions of the urban poor and, as good nutrition is critical for good health, a contributing factor in the decline of urban health," (Eisenhauer, 2001). The social construction of technology framework is a useful tool to analyze how technology is impacted by social groups, but also makes assumptions creating room for error in its discussion.

Klein and Kleinman criticize Pinch's and Bijker's initial take on the SCOT framework by identifying assumptions that risk inaccurate analysis through the SCOT framework. In the

recognition of relevant social groups, the framework's view on society assumes that all these groups are equal and present during discussion of technology. Not only does it not recognize power asymmetry both between and within social groups, but it also ignores any dynamics and varying relationships between collective group thinking (Klein & Kleinman, 2002). There is inaccurate comprehension of group identification missing a risk of technological influences. Additionally, there is missing discussion of group capacity relative to resources, consumers, and developers. The availability of economic, political, and cultural resources all affects technological design. Looking at the social aspect of SCOT, advertising and social norms are not given enough influence in the analysis of technology using the SCOT methodology. The SCOT framework focuses on the influence of various social groups, interactions, and their complexities to analyze barriers to nutritional health.

Other scholars analyzed the social construction of food access in a food desert, shifting focus to the racial bias that indirectly affects food access through social exclusion. "Food access in cities is an increasingly intractable problem, with policy makers advocating for simplistic color-blind solutions that do not address existing inequalities [in] the complexity of unevenly developed urban spaces," (Howerton & Trauger, 2017). This analysis compared two grocery stores: one that focused on ethnic foods and one that focused on organic foods. The result of the analysis found that the grocery store closer to African American communities, which focused on ethnic foods, experienced greater financial instability due to negative racial perceptions from customers of the competing grocery store. Ultimately these perceptions led to the ethnic grocery store's closure. The grocery store comparison is a further look into the social influences of food using the SCOT framework. There are also scholarly analyses on the social construction of illness, describing medical conditions as more than just the medical definition but the societal

effects due to said illness (P., C., & KK, B., 2019). Illness and nutrition are linked through preventative healthcare. While food itself was not discussed by the Journal of Health and Social Behavior, the implications of preventative healthcare discuss malnutrition as a cause of conditions that would previously be a non-issue. “Children growing up in families with incomes below the poverty line typically fare worse — in physical and mental health, educational attainment and labor market success, and engagement in risky behaviors and delinquency — than children from wealthier families,” (Carlson, et. al., 2021). Previous writings describing food and illness as social constructs suggest the agreeance of the social effects that shape how various American populations interact with food regarding nutritional health. Documentation, such as the previously mentioned studies, provide the backbone of this research.

How Nutritional Health is Controlled by Community Resources

Food insecurity is heavily influenced by one’s socioeconomic status: where one lives and the transportation services available largely dictate access to nutrient options. Millions of people lack access to proper nutrition, negatively affecting their health and well-being. This lack of accessibility stems from residential segregation, inadequate federal policy, and limited education about the effects of malnutrition. Federal assistance programs, if eligible, provide some relief, but do not solve the root cause of food insecurity. Discussing nutritional barriers in terms of the Social Construction of Technology (SCOT) framework, the nature of society in the United States has established social circumstances, shaping nutrition and the health of the American population. The main social groups relevant to the issue of food insecurity are the families living in food deserts, policymakers in charge of providing benefits to their constituents, and supermarket chains who control a majority of food distribution.

Nutrition has been recognized as an important factor in the development of society and well-being of the human population, leading to the numerous studies in nutrition research by NASA. The National Aeronautics and Space Administration (NASA, 2014) has conducted multiple studies on Earth and in the International Space Station (ISS) regarding nutrition, the results of which were published in *Human Adaptation to Spaceflight: The Role of Nutrition* in 2014. Space exploration has been a major development in the scientific community since the 1960s. NASA's missions are considered a form of human interaction in terms of the SCOT Framework, and it has influenced what is known about nutrition, how the human body interacts with its environment, and the effects of malnutrition. At the beginning of space travel astronauts were forced to eat from a limited supply of pre-packaged, processed food with few options, leading to astronauts to have menu-fatigue and become malnourished from a lack of wanting to eat the same pre-packaged meal. Scientists anticipated many problems with space travel, but the human experience created a new need for nutrition research in space to see the effects of malnutrition on human performance, specifically critical for space missions. While space travel affects the human body differently than ground Earth conditions, the ISS provides an isolated experimental basis for nutritional research with consideration given to additional factors (radiation exposure, microgravity, cabin environment conditions, and more). The results of these studies "suggest that many systems are affected by inadequate nutrient intake, including the muscle, bone, cardiovascular, and immune systems," in addition to body mass loss and dehydration (NASA, 2014). An important effect to note is the dysregulation of the immune system in response to poor nutrition which triggers a stress response, comparable to stresses experienced on Earth. "Even a marginal nutrient deficiency over a long enough period could be devastating," (NASA, 2014) which is why society and policy is greatly affected by the

understanding of nutrition and genetics. Nutrition being the food consumed to allow bodily function, digestion, metabolism, hormone production, and nutrient expenditure. Space travel presents the opportunity to understand nutritional deficiency on an individual level, which may allow us to combat chronic health issues to benefit the entire American populace.

Residential Segregation: A Case Study

Specific areas with greater rates of food insecurity are also called food deserts, with at least 20% of the population living below the poverty line, and more often than not, correlate with inner city districts (Caporuscio, 2020). One example of the impact food deserts have on one's quality life is a 2013 study by the Robert Wood Johnson Foundation (Robert Wood Johnson Foundation, 2017). The study focuses on residents of New Orleans, Louisiana and found that the life expectancy of inner city neighborhood residents was 25 years less than that of suburban neighborhood residents in New Orleans (American Academy of Family Physicians, 2019). At the time of the study, the population in New Orleans consisted of 34% White residents and 60% Black residents according to the Census Bureau (U.S. Department of Commerce, n.d.). Comparing the life expectancies between these two areas, the effect of proper nutrition and other risk factors such as clean air and water is evidenced. Poor nutrition compounded with underlying health conditions such as obesity, diabetes, high blood pressure, and cardiovascular disease which lower life expectancy. The New Orleans inner city population was averaged to have a life expectancy of 55 years (Robert Wood Johnson Foundation, 2017); comparatively the national life expectancy for the White population was 79 years and 75 years for the Black population in the United States (Xu, Bastian, Kochanek, & Murphy, 2016). The chronic conditions caused by one's environment compounded by genetic risk factors further impact individual health, limiting their quality of life. It is clear there is a nutritional health concern creating this disparity.

Figure 1

Average Life Expectancy of Urban and Suburban New Orleans Regions

(Robert Wood Johnson Foundation, 2017)

The reason these areas are more poorly resourced stems from the historic shift in racial segregation, "While 20th century segregation was also residential — Black urban areas versus white suburban areas — in the 21st century we're seeing segregation as more regional today," (Natividad, 2021). Inner city districts are characterized by lower socioeconomic status which has previously been correlated with people of color, "... since racially segregated minority neighborhoods are more likely to be economically disadvantaged, it is difficult to disentangle the impact of segregation versus poverty," (Bower, et. al., 2013). American society has created social circumstances in inner cities which has led to food insecurity. In the context of the Social Construction of Technology, societal prejudices against people of color have limited nutritional access. Considering how deeply entrenched poverty and food insecurity is in American society, the solution is easier said than done. Simple solutions such as, "Incentivizing grocery stores and

supermarkets in underserved areas," disregard the underlying issues of these poorly resourced neighborhoods (The Annie E. Casey Foundation, 2021). Supermarkets are not existing structures in these areas because of economic factors and biases which consider inner cities to be high risk, and chains are less willing to risk a return on their investment. Indirectly, decades of social prejudices propagated through racial interactions have food deserts. Nationwide education efforts about the importance of nutrition are needed, on par with "The Real Cost" advertisement campaign encouraging the American population to quit using nicotine products (U.S. Department of Health and Human Services, n.d.). Efforts such as former First Lady Michelle Obama's "Let's Move" campaign must be continued, educating children about nutrition, holding school lunch providers to better nutritional standards, and enforcing proper food access for school children to combat food insecurity.

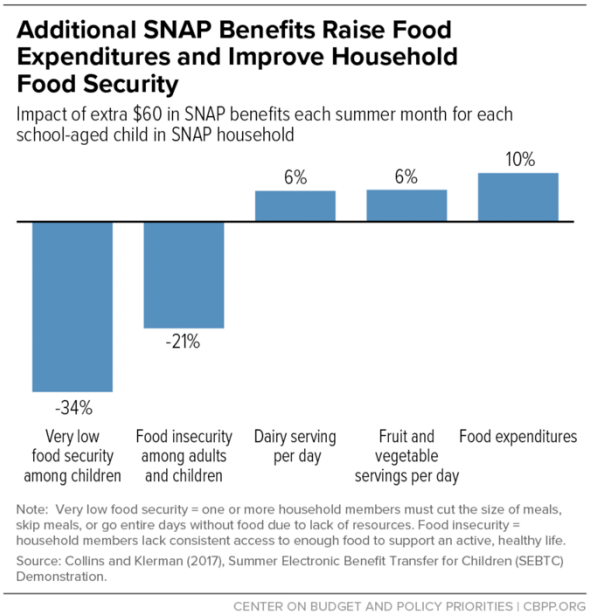
Analyzing Federal Assistance

In 2008, SNAP, the Supplemental Nutrition Assistance Program, replaced the Food Stamp Program. Furthermore, eight years later, more regulations were put in place by the USDA (United States Department of Agriculture) to increase the number of required foods offered by SNAP stores. SNAP stores are subject to federal regulation due to being fully funded by the federal government. SNAP stores have even greater implications to the community than just the people they provide with federal assistance, "Because retailer eligibility standards affect the SNAP retail landscape and business practices, they can indirectly influence the nutrition of SNAP participants by changing participants' access to food stores and the types of food provided in them," (Oliveira, et. al., 2018). While regulations to increase the required number of foods in SNAP stores are well intentioned, stores not able to meet these new requirements would be removed from the program. On the other hand, however, stores that are able to meet the new

requirements provide greater opportunity for the entire neighborhood to have access to nutritional food. The Center on Budget and Policy Priorities analyzed SNAP benefits and found that, "SNAP benefits fall short of what many participants need to purchase and prepare a healthy diet and that higher SNAP benefits would increase food expenditures and improve food security," (Carlson, et. al., 2021). Some concerns include the fact that the basis of benefits is based on an outdated food expenditure model, there is a monthly cycle of food insecurity after the benefits run out, and existing benefits are not enough to help families for a full month, just to name a few. The previous model of federal assistance has provided many families help, but it cannot be expected that old benefits offer the same level of protection against food insecurity. The human interaction involves the way low-income families are using their SNAP benefits which has shed light on the issue with federal aid. Shortcomings of SNAP recognize the changes needed to the technology, the federal benefits for low-income families, to readdress the issue of food insecurity. There are other federal programs offered by the USDA's Food and Nutrition Service that have various qualifications, for example: the Summer Food Service Program (SFSP) provides food for children and teens during the summer; and the Seniors Farmers' Market Nutrition Program (SFMNP) provides low-income seniors with access to local produce (National Center for Mobility Management, 2020). However, SNAP is the most well-known program because it provides year-round benefits to entire households.

"… at the end of the benefit month, children's test scores are lower, children are more likely to misbehave in school, and low-income high school students score lower on the SAT," (Carlson, et. al., 2021).

Figure 2



Impact of Additional SNAP Benefits

(Carlson, et. al., 2021)

The importance of nutrition is further evidenced by the impact of SNAP benefits on children. According to the Center on Budget and Policy Priorities, "… at the end of the benefit month, children's test scores are lower, children are more likely to misbehave in school, and low-income high school students score lower on the SAT," (Carlson, et. al., 2021). Additionally, figure 2 above shows that a minor increase in benefits improve the quality of life of families who require this federal assistance. Just $60 more per family decreases food insecurity and increases dairy, fruit, and vegetable servings per day. Considering the cumulative effect $60 per family has on the federal budget when accounting for the millions of participants in the SNAP program, hesitation is understandable. However, the positive impact on the performance of children in school outweighs any negatives. Especially when considering the long-lasting effects lower test

scores can have on one's future, impacting their ability to handle stress, get into college, get a job, and ultimately succeed in life.

The Luxury of Transportation

Education starts the conversation, but communities need better resources to climb out of the trap that is food insecurity. The addition of community gardens and farmer's markets along with changes to public transportation and surrounding policy are changes needed to ensure resources are available for populations living in food deserts (Eisenhauer, E. 2001). In the day and age in which a majority of households have multiple personal vehicles, this luxury is not afforded to populations in poverty. Many inner city districts rely on public transportation for access to supermarkets, which can be difficult and time-consuming. Transportation time adds up when using bus routes considering they are not direct links from residential areas to grocery stores. Bus route schedules may not line up with personal timelines and frequent stops, changing of lines, detours, and bus maintenance affect its reliability to the public (Safe Routes Partnership, 2017). Additionally, "... many transit agencies limit the number of bags individuals can bring on board to those that will fit at their feet as they sit on the bus," making it difficult to transport groceries for entire families (National Center for Mobility Management, 2020). Transportation stressors can be alleviated by the addition of more direct routes to supermarkets, or a prioritization of bus routes to farmer's markets and grocery stores, along with more understanding bag regulation for the reliance of grocery shopping via these routes. Circumventing transportation issues entirely, local food source options improve nutritional opportunities for inner city communities. Community gardens provide another source of fruits and vegetables not dependent on federal assistance. The locality of other food sources eliminates the need for transportation to supermarkets as well. Bus routes, transit agencies, bag policies, and

the local government are some barriers to nutritional health for lower income populations. Each of these barriers makes it more difficult for families to get groceries and have nutritious meals. While there is a need for better public transportation to supermarkets, transit agencies design bus routes to maximize efficiency and get the public to various destinations. Many years of human interaction with the technology of public transportation has created the existing barriers in place. However, in order to readdress the issue of food insecurity, these transportation policies must be redesigned to properly address the needs of human interactions, namely low-income populations using bus routes to have access to nutrition.

The Complexity of Food Insecurity

The main limitation of this research is that food insecurity is a complex issue because it affects a large number of people and has various origins and limiting factors. Another major limitation is that this research about food insecurity focuses on American society, utilizing historical federal policies against marginalized populations. Native American reservations were highlighted as examples of food deserts in the background information, yet inner cities were focused during the discussion. Additionally, the scope of food insecurity is very broad, making it difficult to contextualize properly while proposing a solution. And because so many groups are involved in the issue of food insecurity (low-income households, politicians, and supermarket chains), it may be difficult to ensure change occurs. The solution to food insecurity is multi-pronged, requiring a multitude of these groups to follow recommendations. Each actor has different motivations where politicians fight against solutions costing the government money, grocery store chains are focused on profiting from their business, and those in need are trying to feed their families. Therefore, educating communities is especially important and must be emphasized to create social and political pressures advocating for change.

Future Applications of Nutritional Health Research

This research focused on America's food deserts but has potential applications globally. If I had the chance to continue this research, I would focus on low-income countries, not solely on low-income families to analyze nutritional barriers applicable to the entire world. This extends to the effect national policy and regional corporation conglomerates have on population nutritional health. Additionally, the intersection of nutrition and healthcare should be further researched. This research briefly touched on the importance of nutrition in preventive medicine, but a lot is left unsaid about chronic conditions such as allergies, diabetes, and obesity. Greater rates of chronic illness have been directly linked to populations living in poverty, and knowing these people have poorer access to healthcare creates further incentive.

As previously stated, the Supplemental Nutrition Assistance Program (SNAP) is the primary federal relief program currently helping millions of families. Yet this federal aid policy is in need of improvement. While SNAP is beneficial in providing short term relief, every month those benefits run low putting these families at a greater health risk. More research needs to be performed on the improved quality of life from increased SNAP benefits. In order to most effectively perform policy change, evidence must be provided to policymakers about a SNAP proposal consisting of a cost analysis comparing the benefits of increased spending and the risks of leaving constituents malnourished.

Conclusion

The significance of food insecurity is seen in how it affects millions of households across the nation, predominantly minoritized communities. The effects of malnutrition are seen in chronic conditions and have been deemed important enough to be studied in space by NASA,

where it was found that the immune system triggers a stress response when the body is not properly fed. The effects of malnutrition are clearly negative, but food insecurity is prevalent because nutritional access is limited by societal prejudices against people of color, shaping the way humans interact with nutrition. Notable nutritional health barriers include residential segregation, inadequate federal policy, shortcomings of public transportation, and limited education about poor policy and subsequent effects of malnutrition. These barriers may be overcome by an education campaign about limiting policies and the importance of nutritional food in diets, an increase of SNAP benefits to provide better food security for low-income families, adjusted transportation regulations to accommodate grocery needs, and a push for community gardens to provide local access to fresh produce. Properly addressing each of these limitations involves utilizing the Social Construction of Technology (SCOT) Framework to best address how humans have shaped the technology in place. Social prejudices, inadequate federal policy, and lacking transportation is best analyzed with the SCOT framework to see how humans currently interact with these nutritional barriers and what needs to be fixed. Food insecurity has a plethora of unintended consequences limiting the success of the American people. The proposed multi-pronged solution provides a baseline in which change can be evaluated and avenues for the development of a properly nourished society.

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