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Section 1. History

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ANALYSIS OF "THE LEGEND OF ZHEN HUAN"

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Abstract

"The Legend of Zhen Huan," also known as "Empresses in the Palace" is a Chinese historical drama TV show that aired in 2011. Set during the Qing Dynasty in the Forbidden City, the series immerses viewers in the complex world of the imperial harem, where power struggles, politics, and gender dynamics shape the lives of its inhabitants. This essay will conduct a thorough ideological analysis of "The Legend of Zhen Huan" to unravel the societal and social life narratives depicted, the definition of appropriate roles for various groups, the portrayal of normative and deviant behaviors, the implicit values underlying the content, and the ways in which the show both promotes and challenges dominant ideologies.

Keywords: *The imperial harem, Power, hierarchical, patriarchal, imperial, women, gender roles, power dynamics, morality, ideology*

Social Context

To understand the social context in which "The Legend of Zhen Huan" is embedded, it is crucial to examine the Qing Dynasty (1644–1912). This era was characterized by Confucian values and strict hierarchical structures, with the imperial harem serving as a microcosm of the broader society. The emperor held ultimate authority, and the imperial harem consisted of the emperor's consorts and concubines who vied for his favor and competed for power and influence within the Forbidden City.

Storytelling about Society and Social Life

The Story's Reflection of Society and Social Life:

"The Legend of Zhen Huan" provides insights into the hierarchical and patriarchal nature of Qing Dynasty society. It depicts a complex web of power dynamics within the imperial palace, reflecting the intense competition and manipulation among concubines and the struggles they face to gain favor and secure their positions. The show portrays the lavish lifestyles of the royal family and the stark contrast between the opulence inside the palace and the poverty outside its walls. It highlights the rigid social structure and the limited opportunities for upward mobility for most individuals.

Through Zhen Huan's journey, the story sheds light on the challenges faced by women in a male-dominated society. It explores

themes of femininity, sacrifice, and the constraints imposed on women's agency, emphasizing their roles as objects of desire and tools for political maneuvering. The portrayal of Zhen Huan's experiences exposes the vulnerability and fragility of women's positions, as they constantly navigate the delicate balance between power and survival.

For example, Zhen Huan's journey from a naive young concubine to a calculated strategist reflects the harsh realities and power struggles present in the imperial harem. Her experiences mirror the broader society's expectations, where individuals must navigate a complex web of relationships and protocols to secure their positions and influence.

Appropriate role for various groups

The Imperial Family: The Epitome of Power and Authority

In "The Legend of Zhen Huan", the imperial family holds the highest position in the social hierarchy. The emperor, occupying the pinnacle of power, is portrayed as the ultimate authority figure. He is responsible for making crucial decisions, shaping policies, and maintaining the stability of the empire. The media object portrays the emperor as the symbolic representation of the nation's well-being and the embodiment of the ruling class. The appropriate role assigned to the emperor is one of sovereignty, leadership, and the preservation of the dynasty's legacy. He is expected to govern wisely, maintain harmony within the imperial family, and ensure the continuation of the lineage.

Concubines: Competing for Favor and Securing Status

In Qing Dynasty society, concubines played a significant role in the imperial palace. "The Legend of Zhen Huan" depicts the concubines' lives as they navigate a complex web of power struggles and rivalries to gain favor and secure their positions. The appropriate role assigned to concubines is primarily that of companionship and bearing children. The media object defines the appropriate roles for concubines based on their relationship with the emperor and their ability to provide heirs. They are expected to compete for his attention, cultivate alliances, and maintain harmony within the palace. Their

primary purpose is to fulfill the emperor's desires and ensure the continuation of the dynasty through the birth of legitimate heirs.

Eunuchs: Intermediaries and Holders of Influence

Eunuchs occupy a distinctive role in "The Legend of Zhen Huan" as intermediaries between the emperor and the concubines. They are portrayed as wielding significant influence within the palace, serving as a bridge between the inner workings of the imperial family and the external world. Their primary responsibility is to assist the emperor in managing the affairs of the palace and maintaining order. The appropriate role assigned to eunuchs is that of loyalty, obedience, and discretion. They are expected to serve the emperor faithfully and safeguard the interests of the imperial family. Eunuchs in the show are depicted as key players in the power dynamics, exerting influence and shaping the fate of the concubines.

Maids and Officials: Supporting the Palace Machinery

In "The Legend of Zhen Huan", maids and officials represent two important groups that support the functioning of the imperial palace. Maids play roles such as attendants, serving the needs of the concubines, and ensuring the smooth running of daily affairs. They are assigned the appropriate role of providing assistance and surveillance. Officials, on the other hand, represent the bureaucratic system of the Qing Dynasty. They are responsible for advising the emperor, implementing policies, and serving the empire's interests. The appropriate roles assigned to officials include loyalty to the emperor, competence in governance, and upholding the values of the ruling class.

Conclusion

"The Legend of Zhen Huan" provides a captivating portrayal of the appropriate roles assigned to various groups in Qing Dynasty society. The media object reflects the power dynamics and hierarchical structure that defined the era. From the imperial family to the concubines, eunuchs, maids, and officials, each group played a distinct role in maintaining social order and serving the interests of the ruling class. By examining these defined roles, we gain valuable insights into the social

dynamics and ideological framework of Qing Dynasty society as depicted in the TV show.

Different normative or deviant behavior and lifestyle

Normative Behaviors:

“The Legend of Zhen Huan” presents certain behaviors as normative within the context of Qing Dynasty society. These behaviors align with societal expectations, established customs, and traditional values. Examples include:

a) Filial Piety: Filial piety, a fundamental Confucian value, is prominently depicted as a normative behavior in the show. Characters who display deep respect, obedience, and care towards their parents are celebrated. Zhen Huan’s unwavering loyalty to her family and her willingness to sacrifice her own happiness for their sake exemplify this normative behavior.

b) Obedience and Compliance: Characters who exhibit unquestioning obedience and compliance with authority, particularly the emperor, are portrayed as virtuous and commendable. This behavior is exemplified through Zhen Huan’s submissiveness to the emperor’s wishes and her acceptance of the rules and regulations within the harem.

c) Modesty and Virtue: The show reinforces normative values of modesty and virtue, particularly in relation to women. Female characters who demonstrate modesty, chastity, and adherence to societal expectations of femininity are portrayed positively. Zhen Huan’s initial innocence and adherence to these values contribute to her initial rise within the harem.

Deviant Behaviors

“The Legend of Zhen Huan” also portrays certain behaviors and lifestyles as deviant, deviating from the accepted norms of Qing Dynasty society. These behaviors often carry negative consequences and are met with societal disapproval. Examples include:

a) Ambition and Manipulation: Characters who display ambition and engage in manipulative tactics are depicted as deviant and morally flawed. Zhen Huan’s strategic maneuvers to gain favor and power within the harem, as well as her willingness to scheme against others, exemplify this deviant behavior.

b) Nonconformity and Individualism: The show portrays characters who defy societal expectations and prioritize their own desires as deviant. Those who refuse to conform to traditional gender roles or challenge established power structures face social ostracism and punishment.

c) Romantic Relationships Outside of Marriage: “The Legend of Zhen Huan” portrays romantic relationships outside of traditional marriage as deviant. Characters engaging in extramarital affairs, such as Zhen Huan’s relationship with the prince, are depicted as engaging in morally questionable behavior.

Consequences of Deviance

The show emphasizes the negative consequences of deviant behaviors and lifestyles. Characters who deviate from societal norms often face punishment, isolation, or even death. These consequences serve as a deterrent, reinforcing the idea that conforming to normative behaviors is essential for social stability and individual well-being.

Conclusion

“The Legend of Zhen Huan” presents a nuanced portrayal of normative and deviant behaviors and lifestyles within the context of Qing Dynasty society. The show reinforces the importance of filial piety, obedience, modesty, and adherence to traditional gender roles as normative behaviors. Deviant behaviors such as ambition, manipulation, nonconformity, and engaging in extramarital relationships are depicted as challenging the social order and facing dire consequences. This portrayal reflects the influence of societal norms and values in shaping the characters’ choices and experiences within the show.

Implicit values & served interest

Portrayal of Gender Roles:

“The Legend of Zhen Huan” presents a vivid portrayal of gender roles within its historical setting. The show predominantly showcases women’s struggles and challenges in a patriarchal society. Zhen Huan, the main character, navigates a complex web of court politics and power dynamics. Implicitly, the show emphasizes the resilience and strength of women,

challenging societal norms that relegate them to passive roles. By doing so, the TV show aligns with the interests of female audiences seeking empowerment and recognition.

Examination of Power Dynamics

The series delves deeply into the intricate power dynamics within the imperial palace. It highlights the manipulation, intrigue, and ruthlessness that characters employ to gain and maintain power. These implicit values serve the interests of viewers who are intrigued by the machinations of authority and the exploration of political strategies. Moreover, by shedding light on power imbalances, the show offers viewers a critical lens to evaluate similar dynamics in the real world, appealing to those with an interest in social and political analysis.

Critique of the Social Hierarchy

“The Legend of Zhen Huan” provides a subtle critique of the rigid social hierarchy prevalent during the Qing Dynasty. It exposes the unfairness and corruption that often accompany a hierarchical society, where individuals are judged solely based on their birthright. Through Zhen Huan’s journey, viewers witness the unfair treatment of concubines and the challenges faced by those who do not conform to societal expectations. By highlighting these issues, the show subtly promotes a sense of social justice and equality, catering to the interests of audiences who advocate for progressive values.

Exploration of Morality and Ethics

The TV show prompts viewers to contemplate complex moral dilemmas and ethical choices. Characters are frequently confronted with decisions that test their integrity, loyalty, and compassion. These nuanced portrayals of ethical dilemmas provide audiences with an opportunity to reflect on their own values and principles. By encouraging viewers to grapple with moral ambiguity, the show serves the interests of those who enjoy thought-provoking narratives and philosophical introspection.

Reflection of Cultural Heritage

“The Legend of Zhen Huan” is deeply rooted in Chinese history and culture, cap-

turing the essence of the imperial court and its traditions. The show presents cultural values such as filial piety, loyalty, and respect for elders. By showcasing these values, the series reinforces a sense of national identity and fosters pride in Chinese heritage. Consequently, it serves the interests of viewers who value cultural preservation and appreciation.

Conclusion

“The Legend of Zhen Huan” contains a multitude of implicit values that shape its content and serve the interests of various audiences. By exploring gender roles, power dynamics, social hierarchies, morality, and cultural heritage, the show provides a rich tapestry of themes and ideas. Whether it is empowering women, critiquing social injustices, or evoking introspection, the underlying messages of the TV show reflect the interests and aspirations of its viewers. As media objects continue to shape our collective consciousness, understanding the implicit values they embody is crucial for a comprehensive analysis of their impact on society.

Dominant Ideologies

Promotion of Dominant Ideologies:

a) Reinforcement of Traditional Gender Roles:

“The Legend of Zhen Huan” largely operates within the framework of traditional gender roles prevalent in historical contexts. The show frequently portrays women as navigating a world of power dynamics and court politics while adhering to societal expectations of femininity and subservience. This depiction reinforces the dominant ideology that women should conform to prescribed roles and behave with grace and obedience. For example, Zhen Huan is initially depicted as innocent and naïve, fitting the traditional image of a virtuous woman. This portrayal aligns with societal expectations of female behavior, catering to the prevailing ideology surrounding gender roles.

b) Legitimization of Hierarchical Systems:

The TV show presents an elaborate portrayal of the imperial court, emphasizing the hierarchical structure and the power of the emperor. It depicts the court as a complex web of authority, with characters vying for

favor and engaging in political maneuvering to secure their positions. By showcasing this system, "The Legend of Zhen Huan" inadvertently promotes the dominant ideology that hierarchical structures are both legitimate and necessary for societal order. The portrayal of the emperor as the ultimate authority figure and the characters' constant pursuit of his favor reinforces this ideology.

Challenging Dominant Ideologies

a) Subversion of Gender Expectations:

While "The Legend of Zhen Huan" initially adheres to traditional gender roles, it also presents instances that challenge these expectations. The character of Zhen Huan herself undergoes significant character development, evolving from a passive and obedient concubine to a resilient and strategic individual. Her ability to navigate the complex power dynamics and outmaneuver her adversaries challenges the dominant ideology that women are inherently submissive and lacking agency. Additionally, the show portrays other female characters who defy societal norms, such as the cunning Empress Dowager. These instances of subversion disrupt the traditional gender roles and contribute to a more nuanced understanding of female empowerment.

b) Critique of Patriarchal Systems:

While "The Legend of Zhen Huan" operates within a patriarchal society, it also offers a critique of the oppressive nature of such systems. The show highlights the hardships and struggles faced by women in the imperial court, often subjected to mistreatment and manipulation. Through the experiences

of Zhen Huan and other characters, the TV show reveals the flaws and injustices inherent in patriarchal systems. This critique challenges the dominant ideology that upholds male dominance and superiority, providing a platform for viewers to question and reconsider existing power structures.

c) Exploration of Morality and Ethics:

"The Legend of Zhen Huan" delves into complex moral dilemmas, challenging viewers' understanding of right and wrong. Characters are frequently confronted with choices that test their integrity and loyalty, blurring the lines between good and evil. By presenting these moral quandaries, the show prompts viewers to question dominant ideologies that dictate rigid moral absolutes. It encourages critical thinking and a deeper examination of personal values, challenging the notion that morality is fixed and universal.

Conclusion

"The Legend of Zhen Huan" presents a nuanced exploration of dominant ideologies within society, both promoting and challenging established norms. While it initially reinforces traditional gender roles and hierarchical systems, the TV show also subverts expectations and critiques patriarchal structures. Furthermore, its exploration of morality and ethics encourages viewers to question prevailing ideologies and develop a more nuanced understanding of these concepts. By navigating the complexities of ideologies, "The Legend of Zhen Huan" serves as a catalyst for introspection and contributes to ongoing societal discourse surrounding power, gender, and morality.

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Section 2. Legal studies

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LOCAL FINANCES IN THE REPUBLIC OF ALBANIA, LOCAL TAXES AS PART OF THEM

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Abstract

This article talks about local finances in the Republic of Albania. Fiscal decentralization is one of the main aspects of showing the independence of the local government from the central government. The focus of the work has been the analysis of the three main laws that include local finances, such as Law no. 139/2015 “On Local Self-Government”, Law no. 68/2017 “On Local Finances” and Law no. 9632/2006 “On Local Taxes”, amended. In the rest of the paper, are discussed the principles on the basis of which operate local finances and the relationship between the central and local governments regarding local finances. The main part of the work is focused on the analysis of local taxes as one of the sources of income of local finances and the categories of these taxes. Based on the reports provided by the website financatvendore.al have been drawn the relevant conclusions regarding each of the local taxes and the impact they have on the local budget.

Keywords: *local government, central government, local finance, decentralization, local taxes.*

In the Constitution of the Republic of Albania in its article 13 it is provided that: “Local government is established based on the principle of decentralization of power and is exercised according to the principle of local autonomy”.

Decentralization is a process where authority and responsibility for certain functions is transferred from the central government to local government units. At the foundation of decentralization is the principle of subsidiar-

ity, according to which “the exercise of public responsibilities should, in general, belong more to the authorities closest to the citizens.” Decentralization has its own dimensions, political, administrative and financial, which interact with each other and essentially represent the three components of power. Financial decentralization refers to the transfer of financial power to the local level, in order to equip it with greater authority in the administration of revenues and expenditures.

Legal Basis

Law no. 68/2017 on Local Finances approved in 2017 was one of the greatest achievements of the Albanian government in relation to fiscal decentralization. The above-mentioned law defines the principles, rules and procedures of financing local government units, including own revenues from local taxes and fees, shared taxes, transfers from the state budget, and other revenues provided for by law. The purpose of this law was to guarantee the transparency and predictability of transfers from the central government to the local self-government units, to ensure the sufficiency of the financial resources available to the local self-government units, as well as to guarantee the fiscal autonomy of the local self-government units, through the right to collect taxes and local fees. In accordance with fiscal decentralization and fiscal autonomy, local self-government units are guaranteed the right to generate their own income independently, in accordance with the laws and legal acts in force. Also, each unit has the right to receive unconditional transfers from the State Budget, which is allocated according to the criteria defined in the law. The dominant principle of the reform of decentralization and fiscal autonomy is the right of units to benefit from the distribution of income from national taxes, which are divided according to the criteria defined in the law and have full autonomy in their use. The central bodies, in delegating the functions or powers of the local government unit, should always make available to the local units the necessary tools and financial resources for their exercise. In this way, the right to delegate the function will be considered complete and in accordance with the law and by-laws.

Also in Law 139/2015 on Local Self-Government are defined the principles of the operation of local finances, the types of sources of income that local units have, expenses, the local budget and its characteristics, as well as internal and external audit as control mechanisms on local self-government units. Other laws that reflect the principle of financial decentralization are: Laws on the "State Budget", which are approved every year and part of which is the local budget for each year, Law no. 9632/2006 on "Local Taxes",

amended, Law no. 9896/2008 on "Domestic Borrowing".

Basic principles of local government finance

Local self-government in the Republic of Albania ensures effective, efficient governance at a level as close as possible to citizens through legal financial resources. The legal framework, starting with the Law on Local Self-Government, sanctions the main principles regarding the financing of local government. The main focus is on the relationship between central and local government. In this relationship, is provided for the obligation of the former to guarantee the financial sufficiency of the local units. In the creation of national policies, this power must guarantee that the revenues that will be transferred to the local government are in accordance with the fulfillment of their interests. The criterion of sufficiency or necessity is also defined in the case of delegation of functions or powers to local units. According to this principle, every delegation of functions must be accompanied by the necessary financial means for their realization.

Furthermore, the other principles reflect the separation of powers, between central and local, where is provided for the right of local units to generate income independently, the right to secure income from taxes, fees, and other local income and the right to draft, approve, implement and administer its own budget every year in accordance with the legislation in force. Another principle that is mentioned in the law is the obligation of the central government to take measures if the changes it implements in the fiscal policy bring negative consequences for local finances. According to this principle, it is provided that: *"In the event that the changes in the fiscal policy are accompanied by a decrease in the levels, rates and base of local taxes or the share of the income of the local government units from the allocated taxes, the Ministry of Finance is obliged to take measures to compensate for the decrease local units, through increased financial transfers and opportunities for local borrowing and/or other forms"*. According to this principle, not only the obligation to take measures is provided for, but also are specifically defined

the types of measures to compensate the reduction, such as the increase in financial transfers, the possibility of local borrowing or other forms. The goal of the legislator was the real guarantee, predicting that in order to compensate the loss, are necessary only those measures that are really effective and that fully compensate the negative consequences created.

Almost the same principles are provided for in the special law on Local Finances, with the only change being the addition of some additional guarantees for local finances. According to article 4, point 5, the obligation for consultation with local units is foreseen in the case of proposals of the central government for changes in the legislation, which may lead to the reduction of local income or the transfer of powers or functions to the local level.

Also, point 6 of this law, which is similar to point 5 of the law on local self-government, provides for the measures that must be taken in case local taxes are reduced by the actions of the central government. At this point, the measures that are determined are: the increase of the unconditional transfer, separate taxes, the transfer to the local level of another tax or their combination.

Sources of local government's own income

In the law on local self-government as well as the specific law on local finances, are provided for sources of income of local units. According to these laws, local units have their own sources of income, as well as other income derived from national sources. By own sources of income we will understand the income derived from local taxes and local fees, separate taxes and income from other activities of the municipalities. The focus of this work will be on local taxes and their types.

“Tax” is a mandatory and non-refundable payment to the State Budget or in the budget of local government bodies, established by law and paid from any person who benefits from a public service in the territory of the Republic of Albania (Law no. 68/2017 on Local Finances) while “Fee” is the payment made for receiving a specific service such as fees for obtaining a driver's license, for obtaining a passport, etc. As we noticed from

the definition, the “fee” differs from the tax because it is made for receiving a certain service, not a service anyway, that is, a service that the individual requires.

The revenues derived from local taxes are:

- a) tax on real estate, which includes taxes on buildings, taxes on agricultural land and taxes on land, as well as on transactions carried out with them;
- b) infrastructure impact tax from new constructions;
- c) local tax on hotel service activity;
- d) table tax;
- e) temporary local taxes, which are imposed in accordance with the law;
- f) local tax on the economic activity of small business;
- g) local tax on personal income, tax on income generated by gifts, inheritances, wills or local lotteries;
- h) other taxes, defined by law (Law 139/2015).

When the municipal council deems it necessary, it imposes taxes of a temporary nature, in the general interest of the community, in the territory within its jurisdiction. The basis for calculating the provisional tax for each taxpayer is the tax value of the taxpayer's real estate in the territory of the local self-government unit. The level of the provisional tax cannot be higher than 35 percent of the taxpayer's real estate tax base. The temporary tax cannot be applied for more than three years from the entry into force. Municipalities can collect fees for public services. Local fee is a payment that an individual, natural or legal person makes in exchange for a specific service received, specific public good used or right granted by the local self-government unit. Fees should be oriented towards covering the cost of services provided, the consumption of which is measurable. The main fees are related to the occupation of public space, garbage collection and disposal, water supply and sewerage, irrigation and drainage, licenses and permits and authorizations.

Other sources of income in the municipality are:

- income from leasing assets owned by the municipality;
- income from capital investments;
- income from titles and other rights purchased by the municipality;

- income from the profit of publicly owned enterprises;
- revenues from private-public partnerships (Law 139/2015).

In the law on local self-government, article 35, points 2, 3 and 4 give us a clear overview of the autonomy of local bodies regarding local taxes. However, we cannot talk about a full autonomy according to this law, because this space of autonomy is limited by the specific law for local finances. More specifically, point two of Article 35 states: “Municipalities exercise the right to set the tax level, the method of its calculation, as well as their collection and administration **within the limits and according to the criteria defined in the relevant law**”. The same restriction is provided in point three where it is defined: “Municipalities have the right to exclude certain categories or groups in need from paying the tax, **in accordance with the relevant law**”. Point 4 of Article 35 contains the same provision as the above points. It defines a harmonization of the law on local self-government with the specific law on local taxes. At this point it is defined:

*“4. The basis of local taxes, as well as their maximum and/or minimum limits are established by a separate law. Local self-government units have the right to apply or not a local tax. When these units apply the local tax, they exercise the right to set their level, the manner of their collection and administration, **according to the criteria and limits defined in the relevant legislation**”.*

From the second sentence of the point 4, the legislator using the phrase “they have the right”, let us understand that even though there is a legal provision for local taxes, local units do not have the obligation to implement it. At this moment, their autonomy to decide is complete, since their choice is not conditioned by any other factor except the evaluation they make of the local tax. Then, if the local units decide to implement the local tax, at this moment we cannot talk about full autonomy since the third sentence of point 4 expressly determines that the municipalities can set a level of taxes according to their assessment, but the latter must be in accordance with the criteria and limits defined in the relevant legislation.

The Law on Local Self-Government, as well as the Law on Local Finances regarding local taxes, refer to the specific law, which is Law No. 9632 dated 30.10.2006 “On the Local Tax System” as amended. This law defines the rules for the exercise of rights and duties by local government bodies, for the establishment of local taxes, their collection and administration. Regarding the types of local taxes, the categories are the same as those provided for in the law on local finances. The first tax that is foreseen is the simplified tax on small business. The applicable tax rate on taxable profit for taxpayers subject to simplified tax on small business profit, with annual turnover from 0 (zero) to 8 (eight) million ALL, is 0 (zero). Regarding the administration of this tax, the law on local taxes provides that the Central Tax Administration transfers the income from the simplified tax on small business to the accounts of the municipalities, where the taxable business is located, within the 10th of the following month, when they are collected. The Central Tax Administration receives a commission for the service it performs. This commission is calculated as a percentage of the amount of tax collected and transferred to the budget of the local government units, which is 1 percent and is paid to the account of the Central Tax Administration. The commission goes to the account of the State Budget, based on the legislation in force on the use of secondary income, created in budgetary institutions and for covering the costs of “Tax Stamps”.

Among the most important taxes is the real estate tax and the infrastructure impact tax. All natural or legal persons, local or foreign, owners or users of the above assets, in the territory of the Republic of Albania, regardless of the level of use of these assets, are subject to the real estate tax. Exceptions are made in cases where the law provides otherwise. The liability for the real estate tax is, as the case may be, the owner or co-owner, according to the part he owns, or the user of the real estate, for assets that are not equipped with ownership documents.

Real estate taxes include:

- a) taxes on buildings;
- b) tax on agricultural land;
- c) land tax.

The basis of the tax on the building is the value of the building, which is calculated in accordance with the methodology and procedures determined by the decision of the Council of Ministers. According to the law on local taxes, the tax rate, which is applied as a percentage of the tax base, is 0.05% for a building that is used for residential purposes, 0.2% for a building that is used for economic activity, 30% of the corresponding tax rate for the entire construction area, for which the developer has been provided with a construction permit and has not managed to complete it according to the deadline defined in the act of approving the request for a construction permit. In contrast to the simplified income tax administered by the central tax administration, the real estate tax is administered by the local self-government unit for buildings under its jurisdiction. Also regarding the income obtained from this tax, we emphasize that all income is paid to the account of the relevant budget of the local self-government unit, in whose territory the property is located, and is used in accordance with the law "On the finances of local self-government in Republic of Albania".

Even in relation to the agricultural tax, the earned income is paid to the budget of the municipality where the real estate is located. The tax base is the area of agricultural land, in hectares, owned and used by the taxpayer. The surface of the owned land is determined according to the documents certifying it. Regarding the relationship between the central and local governments regarding this tax, the law determines that the minimum categories of agricultural land are given in Annex 1 that is connected to this law. The space allowed to the municipal council is the possibility to approve sub-categorizations for each minimum category of agricultural land. The same provisions as the agricultural tax are also determined for the tax on the land, where the basis of this tax is the area of the land in square meters owned or used by the taxpayer.

Regarding the infrastructure impact tax, the law defines different tax levels depending on the investment that will be made and the purpose for which this investment will be used. In the case of constructions intended for residential purposes or for trading and service units, which are carried out by a con-

struction company, the rate of the infrastructure impact tax is in the amount of 4 (four) percent to 8 (eight) percent of the sales price per square meter. This category of investments also includes replacement constructions for residential purposes, conditioned to be built as a result of the implementation of a concessionary contract, which affects existing buildings. Also, this category also includes constructions intended for commercial or business centers. The tax base is the value in Lek (Albanian Currency) per square meter of the sale price of buildings for residential purposes or of trading and service units. Regarding the sale prices, the law determines that it is based on the reference value of the market value, according to the definitions issued by the act of the council of ministers.

Paying attention to the new construction and the fact that it can be used in the public sector, such as tourism, industry or agriculture or for public purposes, the law has defined a lower rate of this tax, at the rate of one to three percent of the investment value.

For larger projects in the public sphere, with a much greater impact than the above projects, the law has provided for an even lower value of the infrastructure impact tax. Normally, this is an incentive to encourage such projects which will serve public purposes, facilitating them on the other hand with tax relief. Specifically, this tax is determined at the rate of 0.1 percent of the investment value, but not less than the cost of rehabilitation of the damaged infrastructure, when this cost is not included in the investment estimate. The most important projects will be those for the construction of national roads, ports, airports, tunnels, dams, energy infrastructure construction, including machinery and equipment for these projects. The other two categories defined by the law are not only related to the purpose for which the investment will be used, but also related to other criteria. In point c of article 27 of the law on local taxes, the law has determined that for buildings that are in the legalization process, the tax rate will be 0.5 percent of the investment value. So the current status of the building on which it will be invested is used as a criterion. Meanwhile, point d of the law determines as a criterion the location of the building and the purpose for which it

is being built. This point determines that for buildings intended for residential purposes in mountainous areas, the infrastructure impact tax is 0 to 3 percent of the investment value. The Municipal Council determines by decision the mountainous areas for the effect of the implementation of this paragraph.

Regardless of the different levels of the tax, the law has also provided for exemptions from the payment of this tax. The following which benefit from these exceptions are:

- investments made for the construction of accommodation structures “Hotel/Resort with five stars, special status”, according to the definition in the legislation in the field of tourism and which are holders of a registered and internationally recognized trademark “brand name”;
- investments of subjects, which develop hosting activities certified as “agritourism”, according to the legislation in force in the field of tourism;
- investments for the reconstruction, repair or restoration of buildings-damaged as a result of natural disasters, according to the definition given in the legislation in force for civil protection;
- investments within the reconstruction programs, according to the provisions of the law, for coping with the consequences of the natural disaster.

According to the report carried out in 2023, published by the website financatvendore.al, it results that the income from local sources (about 7.2 billion ALL) decreased during 2023T1 by about 16% compared to the same period a year ago. The negative performance in revenues from local sources was largely determined by the decrease of local tax revenues. Revenues from local taxes reached a level of about 3 billion ALL, decreasing by about 49% in annual terms. If we exclude from the total income from local taxes those collected by the municipality of Tirana, the income from this category (for the other 60 municipalities) turns out to have decreased by about 22% in annual terms. The negative performance in local tax revenue is led by the decline in infrastructure impact tax revenue from new construction, followed by real estate tax. Together, these two tax-

es represent about 88% of the total revenue from local taxes in the period under analysis. Revenues from the infrastructure impact tax from new constructions (TNI) reached a level of about 1.6 billion ALL, decreasing by about 63% in annual terms. Income from taxes on real estate recorded a value of about 996 million ALL, decreasing by about 4% in annual terms. The main weight and contribution to the income from the tax on real estate is given by the income from the tax on the building (72%), which recorded a slight annual increase in the period under analysis.

Based on this website, was made the study of the income generated according to the funding sources for 2023. If we take as a source of funding the municipalities' own local resources, we will notice that most of the income is obtained from unconditional transfers of which are sent by the central government with 54.15%. Next comes the income from local taxes with 17.26% and the income from local fees with 16.33%, passing after other local incomes which are divided between them, occupying a small percentage. If we take the income from taxes and local fees as a source of financing, we will notice that the largest part of the income from taxes consists of the infrastructure impact tax with 28.10% and the building tax with 12.43%. Other taxes, such as the hotel tax, property transfer tax on real estate, land tax, agricultural land tax, signboard and advertising tax, occupy a very small percentage compared to the above two taxes. What is worth emphasizing is the large space occupied by local fees as a very important source for generating income. Specifically, fees for administrative services make up 23.26% of local revenues, fees for local public services (waste, greening, etc.) make up 17.87% of revenues.

Guarantees given to the local government regarding local finances

In terms of decentralization, the relationship between central and local government is also reflected in other articles of the law, especially with regard to local finances, where in article 34 point 5 is provided for: *“In case changes in the fiscal policy are accompanied by a decrease in the levels, rates and base of local taxes or the share of the income of local government units from separate tax-*

es, the Ministry of Finance is obliged to take measures to compensate for the decrease, through increased financial transfers and the possibility of local borrowing and/or other forms". In addition, in the Law "On the Finances of Local Self-Government", is made a detailed prediction by providing in Article 4/6: *"In case local taxes or fees are reduced or removed from the central government, self-government units local are fully compensated, through the increase of the unconditional transfer, separate taxes, the transfer to the local level of another national tax or their combination".* This article clearly reflects the line of decentralization in its two forms, jurisdictional and financial. What this means is, first, a guarantee for the local government that interventions by the central government in fiscal and budget policies must be accompanied, in advance, by a consultation and compensatory measures for the local government, in case they have a negative impact on local finances and the legal guarantee that the establishment and change of local taxes and fees belongs to local decision-making, i.e. the Municipal Council. The Law "On Local Self-Government" also gives a preliminary guarantee to the local government, obliging the central government to consult with the local self-government units during the drafting of the state budget, through the defined consultation instruments, analyzing the sufficiency and stability of the financial resources of the local self-government unit to achieve the goals defined in this law. But this consultation, in the case of changes in the building tax, turns out to be not real and not in accordance with the spirit of the law and its purpose. The consultation of the central government with the local government is an expression of local autonomy and if we see this article also related to other provisions, we conclude that the law in this aspect is not being applied.

Another financial guarantee for municipalities consists in the fact that unconditional transfer cannot be smaller than that of the previous year. But the fact that the budget of the local units in total does not show a significant increase, it is a clear indicator that the autonomy is not complete and that the new legislation has not brought an increase in the budget of the municipalities, i.e. the

essence of decentralization. The level is more or less the same, i.e. no less than 1% of GDP is allocated from the central budget, which is the lowest regional level, thus preventing municipalities from increasing the quality of services and exercising new powers in full discretion, as provided for in the European Charter of Local Autonomy. Apparently, there is an inconsistency between objectives of the territorial reform and fiscal and budgetary policies of the government, thus undermining the strengthening of decentralization and fiscal autonomy of municipalities.

Conclusions

Local taxes are a very important source of income for local units. In order for the revenues to be realized completely and realistically in the local budget, a great effort on the part of the local actors is needed to make this possible. First, efforts should be made to inform citizens about local taxes, their types and their obligation to pay local taxes. Citizens should be informed and be aware that this payment is translated into better service for them in the future. On the other hand, the employees of the respective municipalities must correctly fulfill their duties for the collection of local taxes as are defined in relevant laws. Thirdly, we must have a real contribution from both central and local actors to respect the constitutional principle of decentralization and local autonomy. The Law "On Local Self-Government" and the Law "On Finances of Local Self-Government" do not reflect one of the important principles of the European Charter of Local Autonomy that the central government should support local decision-making and not simply finance through a specific fund a task, for which the local government does not exercise decision-making. If the transfer of a social function or another to the local level means more income, but reduces the decision-making of the local government on expenses, then the local government will become an subordinate of central government so we will have a centralization of local income in function of central decision-making.

In this perspective, with a correct treatment of local government bodies as independent bodies and governing partners, funding from the state budget would not

only be an attribute of the executive at the central level, but a fundamental right of local government bodies, as constitutional bodies which, with the necessary financial resources, can exercise the functions defined by law.

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Section 3. Pedagogy

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PROJECT – BASED LEARNING THE MOST EFFECTIVE WAY OF DEVELOPING STUDENTS’ CRITICAL THINKING

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Abstract

This article provides general information about modern pedagogical technology – Project – based learning, its advantages and challenges aimed at developing students’ critical thinking. The relevance of the article is on the formation and development of critical thinking skills among students in the context of modern needs – improving the quality and effectiveness of education. Also implementing this pedagogy in the form of “4– C”, i.e. cooperation, communication, critical thinking, creativity, which is taken from the basis of “K-12” setting. Moreover, this article talks about the origin and historical development of project – based education and the ideas of great educator – scientists along with their huge contribution in prosperity of it. This article reviews a range of literature and research findings, and draws on teachers’ real – life experiences.

Keywords: *critical thinking, 4 – C, collaboration, communication, criticism, creativity, modern pedagogical technologies, PBL – Project Based Learning, professional skills*

Introduction

The 21st century is an era marked by rapid adoption of new technologies, a time when a new stage of scientific development is being created, a new science, scientific research, an effective mechanism for stimulating innovative achievements and implementing them in practice.

The fundamentalization of education clearly shows that in order to form a morally responsible personality, students must be

taught not only to know, but also to think. For the comprehensive development of the younger generation, the development of innovative technologies, the formation of new laws that meet the spirit of the times, and their implementation, specific measures are being strengthened to achieve improved quality at all stages of the education system.

The modern world demands a multidimensional approach to the educational process. The 21st century skills-based curriculum

moves away from learning content and memorization to focus on the skills and abilities that will best serve our young generation. Student engagement and hands-on interdisciplinary learning take precedence over information transfer and the classroom of this era emphasizes a creative and collaborative approach to learning.

To find a solution to the problems and to eliminate the shortcomings in the field of education, huge reforms are being carried out in our country. As a clear proof of this, the principle of “4 C” education of the 21st century skills can be given as an example. The 4 C model is:

- Communication;
- Collaboration;
- Critical thinking;
- Creativity.

Communication – the ability to communicate is a skill that is necessary throughout life. Without communication, it is impossible to establish interpersonally relationships in everyday life, at school, at university, or at work.

Collaboration – cooperation is the skill of working in a team. Accepting help while completing a task, taking into account the point of view of others, defending one’s own opinion, in brief, forming the ability to work cooperatively.

Critical thinking – a critical thinker is an independent thinker. Such people do not adopt the opinions of other people, they always have their own opinions and can prove them with evidence.

Creativity – creative thinking is a way of thinking that distinguishes a person from a machine and artificial intelligence.

Based on this, this article sheds light on the modern pedagogical technology project-based education, which covers the 4C educational model, its advantages and unique aspects.

Theoretical basis and methodology

Project-based learning (PBL) is designed to give students the opportunity to develop knowledge and skills by organizing and actively participating in projects around real-life challenges and problems.

The historical development of project-based education goes back to the ancient

times. While Confucius, the famous Chinese sage, made a fame by participating in debates and discussions with his students, a Greek philosopher Socrates used the method of questioning and rejection, and Aristotle promoted the idea of learning through action, that is, on the basis of practice. As Aristotle wrote in *Nicomachean Ethics*, “What we have to learn to do, we learn by doing”. This is directly related to the authenticity component of the PBL gold standard.

Another promoter of project-based education is the Czech philosopher and pedagogue Jan Amos Comenius, who is the founder of the modern teaching process. As a supporter of universal education, he led schools and advised governments on education. Moreover, he believed that education should be student-centered, not teacher-centered, and connected to everyday experience, focusing on thinking rather than memorizing, and emphasizing learning through multiple tools. He created the first multimedia textbook with wooden pictures. His ideas are closely aligned with key components of PBL, such as reflection and authenticity.

Twentieth-century educational theorist and philosopher John Dewey argued that active experiences better prepare children for life in the real world and challenged the view that students are passive recipients of knowledge.

In Dewey’s idea that learning is more interesting for students who actively participate in the learning process, we can see the roots of the project-based learning components of student choice, voice, and authenticity.

Talian physician and child development expert Maria Montessori founded an international movement based on the idea that young children learn best through experience.

Swiss psychologist Jean Piaget’s “situated learning” approach advocated engaging students in the learning process rather than forcing them to learn by memorization. He is considered the founder of constructivist theory, which shows that people actively construct their knowledge of the world based on the interrelationship between their thoughts and experiences.

In the 1960s, McMaster University in Canada implemented a project-based learning approach that became standard practice in medical schools. Other disciplines such as

engineering, economics, and law soon began using these strategies to teach their students how to solve real-life situations and problems. Some K-12 schools began adopting project-based learning practices in the 1980s.

In the 21st century, project-based learning has been further developed as an instructional method for K-12 education. A project-based learning environment engages students in hands-on learning, gives students more choice about what they learn, and puts students in charge of their own learning.

Studies conducted at Stanford and Vanderbilt universities have shown that students in schools that use project-based learning outperform traditional school students in math, problem solving, and planning.

Based on years of literature review and educational research, the Buck Institute for Education (BIE) has identified seven key elements of PBL-Project-Based Education. Together, these elements are called the “Gold Standard” of Project-Based Learning. According to these standards, the main elements of project design are:

- A complex problem or question;
- Continuous research;
- Authenticity;
- Student voice (point of view) and choice;
- Reflection;
- Criticism and revision;
- Public product.

All of these elements, when used as a whole, allow learners to understand and learn the essential knowledge and skills necessary for success, rather than simply through rote memorization. Another benefit of project-based learning is its peculiarity is that this type of education teaches the student to take responsibility for the task he has to perform for a certain period of time.

“Solving real-world issues that matter is important to us as adults – and it’s important to our students,” explain Lathram, Lenz, and Vander Ark in their e-book, *Preparing Students for a Project-Based World*.

Discussion and results

Project-based learning creates an environment that fosters collaboration and effective communication skills. Students work in teams, learn to express their opinions, listen

actively, and share different points of view. Collaborative project-based discussions foster a sense of shared communication and encourage students to value teamwork. These experiences equip them with important interpersonal skills that are important in the professional world, where collaboration and effective communication are highly sought after qualities. Project-based learning has a number of advantages, including:

Relevance to real life. Project-based learning directly answers the question most students have during their learning process: “How will this be useful in life?” Instead of abstract knowledge, students will have the experience of solving specific problems.

Comprehensive approach. In the process of working on a project, students conduct researches, collect information from various sources, and rely on the knowledge and skills they already have.

Develop thinking. By developing a project plan, students develop logic, critical thinking, and the ability to defend their point of view.

Student-oriented. The goal of project-based education is not to teach the students to solve problems that are convenient for teachers to investigate, but to make the students interested in the studied topic, to encourage them to think critically, so that they could search solution themselves.

Motivation. Project-based learning awakens the student’s natural desire for self-expression. When students have the opportunity to “realize” something, they are more interested in doing it better than anyone else.

Self-expression. Project work does not limit the student from choosing a solution, there are no right answers, the main thing is that the result corresponds to the goal. Thus, the project leaves a lot of room for creativity. This is certainly not only good, but unique, elegant and efficient work that deserves special attention. It encourages children to use their imagination and find innovative solutions.

Multi-subjectivity. Work on the project involves the integration of various scientific disciplines.

Efficiency. Project-based learning gives students the opportunity not only to acquire valuable skills, but also to create something

useful. For example, children can design a brochure for a school, create a design for a HEI website or make chairs, the main thing is that the result will be clear and productive.

Communication. Working together on a project helps bring the team together, teaches young people to work in a team, share responsibilities, play the role of leaders and executors, and listen to each other.

Interest. Project-based learning should be useful and interesting, which is one of the secrets of its effectiveness.

Examples of project-based learning include:

- *Community Service:* Students identify a community problem, such as flooding or environmental pollution, and develop a service project to solve it. They plan and implement activities such as organizing food deliveries, cleaning up a local park, or creating awareness campaigns. This project develops empathy, civic responsibility and problem-solving skills;
- *Literary Adaptation:* Students choose their favorite book or play and create a screen adaptation such as a short film or graphic novel. They analyze themes, develop characters, and bring the story to life. This project will enhance storytelling, artistic expression, and literary analysis skills;
- *Scientific research:* students conduct experiments to collect data and study the results. Then they carefully analyze the collected data. Finally, they draw conclusions and share their findings in a report or presentation;

- *Cultural Exchange Project:* Students explore different cultures and create a project that promotes understanding and appreciation. They can create multimedia presentations, organize cultural festivals or have virtual exchanges with students from other countries. This project promotes global awareness, cooperation and intercultural communication.

While doing project at each stage, students would face problems, search for information, use logical, critical and design thinking, imagination, draw, calculate, work with hands, show patience and perseverance, and finally they also use public speaking skills. They also realize their strengths and weaknesses and gradually develop unique problem-solving skills that they can later use in other areas.

In preparing students, teachers, and leaders for the project-based world, PBL is recognized as the most appropriate approach to inspire, activate, and support socially isolated, human learners. Admittedly, PBL serves to create a generation of students (teachers and leaders) who are passionate about meaningful, authentic, and often real-world learning, engaged in and promoting deeper learning that leads to academic and professional success.

Conclusion

In conclusion, it should be noted that PBL – Project-based learning helps prepare students for “real life”, since they naturally learn to apply theoretical knowledge in practice.

Project-based education is one of the most effective ways to acquire knowledge through practical assignments.

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Section 4. Political science

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VACCINE APARTHEID AS A STRUCTURAL INJUSTICE: THE SOCIAL CONNECTION MODEL OF RESPONSIBILITY PERSPECTIVE

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Abstract

Within the branches of global justice theory, there are two dominant perspectives: nationalism, which limits the scope of justice principles within constitutional communities, and cosmopolitanism, which extends justice to encompass the universal human rights of people worldwide. However, the COVID-19 vaccine apartheid, caused by the refusal of major multinational corporations like Moderna to grant patent exemption to underdeveloped regions, cannot be adequately addressed within the frameworks of either nationalism or cosmopolitanism. Nevertheless, Iris Young's theory of structural injustice offers a more nuanced understanding of this issue. Specifically, utilizing the Social Connection Model of Responsibility can provide a more comprehensive solution to structural injustice problems like vaccine apartheid. In practice, the resolution path for vaccine apartheid validates the effectiveness of the Social Connection Model as a series of actions taken by civil society organizations, which ultimately led to the approval of the COVID-19 vaccine patent waiver proposal. By examining the effectiveness of the Social Connection Model in addressing patent apartheid issues, this paper highlights the trend of modern societal subsystem differentiation, and the potential for employing the social connection model to address global structural injustices.

Keywords: *Structural Injustice; Vaccine Apartheid; Social Connection Model; Global Justice; Societal Subsystem*

The article analyzes the global vaccine apartheid, which exhibits characteristics of "structural injustice", triggered by multinational pharmaceutical companies like Moderna refusing to share vaccine patents with developing countries. Due to the diverse agents involved and the blurred lines

of responsibility, a conventional moral-legal responsibility model is inadequate in addressing structural injustice issues, necessitating a new model for responsibility allocation. To elaborate, it should employ a social connection model of responsibility to analyze the social relationships and po-

sitions of the actors, leading to a more reasonable attribution of responsibility and solutions for vaccine apartheid. The article unfolds as follows: The first section introduces the incident of vaccine patent apartheid and explains why it constitutes a form of structural injustice. The second section discusses the shortcomings of nationalist and cosmopolitan perspectives on global justice in addressing the vaccine apartheid and introduces the social connection model of responsibility to analyze the issue. The third section demonstrates how the vaccine apartheid has been resolved in practice and how this resolution aligns with the solution path of the social connection model of responsibility. The final section explores the potential of the social connection model as an approach to addressing various forms of structural injustice.

Vaccine Apartheid caused by Multinational Pharmaceutical Corporation

Emergence of the Problem

On March 30, 2023, the President of Kenya announced at a regional trade summit organized by the US Chamber of Commerce that the American biopharmaceutical company Moderna is set to invest \$500 million in Kenya to establish an mRNA vaccine factory. This factory will address the vaccine demands for acute respiratory infections, HIV/AIDS, Ebola, and other diseases across the African continent (Agence Ecofin, 2023). The President mentioned that once the project is completed, it will be the only one of its kind on the African continent. However, the reason behind Moderna's sudden decision is not solely due to what they claim as "trust in the investment environment in Africa". Why didn't they first establish production facilities in Canada, Australia, and the UK as part of their "Improving Global Health Initiative?" Why did they not have the willingness and funding to set up vaccine factories in the past, only to suddenly have ample funds this year? The true reason lies in the international criticism faced by multinational pharmaceutical companies like Moderna for refusing to grant vaccine patent waivers to underdeveloped countries, which resulted in significant public pressure.

The source of funding for the new vaccine factory can be easily inferred, primarily stemming from the lucrative profits of the vaccine patents that are being steadfastly adhered to. Having gained a near-monopoly market advantage by being among the first to produce COVID-19 vaccines and with massive demand from governments and private entities worldwide, Moderna's total revenue in 2021 (\$18 billion) was 23 times that of 2020 (\$803 million) (Moderna, 2021). Furthermore, their profit margin reached a staggering 70%, surpassing the profit margin of basic pharmaceuticals and rivalling that of luxury goods, and this trend continued in 2022, with revenue consistently exceeding \$18 billion annually (Nick Dearden, 2011).

However, in 2020, Moderna rejected a vaccine patent exemption proposal jointly submitted to the WTO, led by countries like South Africa and India (Canadian Centre for Policy Alternatives (2022; WTO (2020.10.02). While Moderna issued a statement in 2020 expressing their willingness not to enforce COVID-19 vaccine-related patents on any company attempting to develop COVID-19 vaccines during the pandemic (Moderna (2020.10.16), they, in practice, not only joined forces with governments of developed countries and other pharmaceutical companies to resist the approval of the aforementioned patent-sharing proposal but also extensively applied for mRNA patents in South Africa to ensure that their patents could be enforced abroad (Nick Dearden (2011). The debates and delays among governments and companies within the WTO regarding the patent waiver proposal indirectly resulted in a large number of people in underdeveloped regions being unable to access vaccines or even causing fatalities. Amidst the criticism of multinational pharmaceutical companies, lobbying organizations representing vaccine development corporations and some developed countries have also raised their advocacy for the patent system. They argue that the patent system plays a crucial role in combating the COVID-19 pandemic (encouraging rapid vaccine production, incentivizing private organizations to address global public health crises, promoting collaboration between global private organizations and government agencies), ensuring future medical innovation, and prompting econom-

ic recovery. They argue that allowing vaccine waivers would violate patent law, and once this exception is made, future incentives for medical research would be significantly reduced. Both positions have received substantial support, resulting in the patent waiver proposal remaining unimplemented.

This is a typical example of global healthcare resource allocation inequality. According to Gunther Teubner's perspective, the root of this unequal allocation of global healthcare resources lies in the incompatible action logics of both sides, one being the standard for upholding universal right to life in the field of public health, and the other being the standard for upholding patent law in the economic sphere, among which, the action logic in the economic sphere encroaches upon individuals' basic rights (Gunther Teubner (2006). To be more specific, multinational corporations, as vital subsystems in the economic sphere, take actions based on their self-interest, eroding individuals' capacity to ensure their physical and mental health. However, when viewed from the perspective of general moral responsibility, one side demands responsibilities that go beyond general moral requirements and even violate existing laws in the name of universal human rights, while the other side is the normal commercial activities that align with both societal moral requirements and legal requirements. Therefore, the logic of the economic sphere, relative to the criticism it receives, is more in line with current legal and moral requirements. Consequently, although we may intuitively view multinational pharmaceutical companies not sharing vaccine patents while making substantial profits as unjust, it is challenging to articulate this phenomenon within the framework of existing responsibility discourse. Iris Young aptly categorizes this form of injustice as structural injustice.

Essence of the Problem: Structural Injustice

Young introduced the concept of structural injustice in "Responsibility for Justice". The core meaning of structural injustice can be traced back to Karl Marx's discourse on "a societal material power stemming from the division of labor that is beyond individuals' control", (Marx/Engels (1845) but Marx did not refine or elaborate on this con-

cept, meanwhile, Young's elaboration on this concept does not rely on Marx's theoretical framework. Her main aim is to respond to the surge of justice theory construction triggered by John Rawls' discussions on the "basic structure of society". However, unlike Rawls' idea of constructing a comprehensive and normative theory of justice, Young's approach focuses more on interpreting her theory of justice through the lens of injustice, like domination and oppression.

Young argues that there is a form of injustice distinct from the moral wrongdoing of individual actors or the coercion caused by state's policy. In this form of injustice, it is difficult to identify clear individual or collective agents of responsibility due to the lack of cognitive knowledge and conscious autonomy as circumstances for determining responsible subjects. The consequences of structural injustice stem from a social process formed by the legitimate and self-interested actions of numerous actors. She concludes that structural injustice exists when "social processes put large groups of persons under systematic threat of domination or deprivation of the means to develop and exercise their capacities, at the same time that these processes enable others to dominate or to have a wide range of opportunities for developing and exercising capacities available to them" (Young I. M., 2010).

According to the elaboration in "Responsibility for Justice", we can outline several constitutive conditions of structural injustice" (Young I. M., 2010).

1) The actions of the actors comply with legal, customary norms, and daily habits.

2) Multiple actors are involved, and the process of actions accumulates over time.

3) The outcome of the actions results in one group of people having power over another, granting the former group greater opportunities for self-development or self-determination while suppressing the latter group's capacity for self-development or self-determination.

4) The actors do not have a subjective intention to bring about unjust outcomes, and the results cannot be causality traced back to specific actors.

One of the typical cases mentioned by Young is the sweatshops established by Western multinational corporations in un-

derdeveloped regions during the 1960s and 1970s. Nowadays, the vaccine apartheid caused by multinational pharmaceutical companies also satisfied her definition of structural injustice, as outlined in the above four conditions. Whether in the development of COVID-19 vaccines or other cutting-edge medical products, large pharmaceutical companies are willing to invest substantial amounts of capital, resources, and time in the early stages because they know that the final products will be protected by patent laws. During the period of patent protection, they can sell their research achievements at high prices to recoup their initial investments and accumulate funds for further research. Due to the legitimate status of patent laws and the pivotal role that patent laws have played in drug development, large pharmaceutical companies refusing to share the patent technology of COVID-19 vaccines aligns with established customs and norms (Condition 1).

At the same time, the actions to uphold the patent system are not solely driven by the will of Moderna, but also involve other major pharmaceutical companies engaged in developing COVID-19 vaccines, including Pfizer. These large pharmaceutical companies are unwilling to share their patents to assist underdeveloped regions, which prevents Moderna from independently implementing its pledge to share patents made at the end of 2020 (Moderna, 2020.10.16). Following the submission of a patent waiver proposal to the WTO by countries in Africa and South Asia, certain developed countries led by the European Union adopted a stance of neither opposing nor supporting the proposal, causing delays in its approval. This hesitation is driven by concerns that the patent waiver might result in losses to their interests and disrupt the existing legal order. Additionally, lobbying organizations such as the Biotechnology Innovation Organization (BIO) representing large U.S. pharmaceutical companies have openly opposed patent waiver proposals and petitioned the Biden administration to criticize and sanction countries and organizations that violate drug patents. Therefore, it can be observed that from the initial proposal for patent waivers in 2020 to the prolonged resistance leading to the approval of the proposal in 2022, the actions of diverse agents

have exacerbated the unjust consequences of pharmaceutical companies delaying patent waivers (Condition 2).

In the context of scarce vaccine resources, multinational pharmaceutical companies prioritize selling vaccines to buyers who can pay higher prices. Due to the weak purchasing power of less-developed countries and regions, they fail to secure an adequate supply of vaccines. In this seemingly normal market behavior, people in underdeveloped regions are deprived of their ability to access the limited global vaccine resources. Vaccines and medical resources disproportionately flow to a small portion of the world's population and countries, resulting in smaller losses for wealthy nations and individuals during the pandemic, while the life security and future economic prospects of poorer countries and individuals suffer irreversible damage. This enhances the power and prospects of multinational corporations while suppressing the ability of poorer individuals to develop themselves (Condition 3).

Yet, the actions of multinational pharmaceutical companies are driven by the objective of maximizing profits within the usual drug development and sales process to sustain their ongoing operations. They do not possess a subjective intent to cause suffering to people in underdeveloped regions, nor do they consider their legitimate market activities as the primary cause of severe hardships in these regions (Condition 4). Based on the above arguments, we can conclude that the refusal of multinational pharmaceutical companies to grant patent waivers constitutes a phenomenon of structural injustice.

Further Elaboration: Structural Transaction Model

To further explain why the market transactions of multinational pharmaceutical companies constitute a form of structural injustice, we will analyze their market behavior by comparing a simplified transaction model with a structural transaction model. The subjective actions of multinational pharmaceutical companies involve selling their products based on patent laws and market prices. In conditions of high demand and limited supply, they tend to prioritize transactions with countries or individuals who have greater purchasing power. In the sim-

plified market model, buyers and sellers are independent agents who engage in transactions based on supply and demand dynamics. In contrast, in the structural market model, buyers and sellers do not exist in isolation but are interdependent. Therefore, in the structural transaction model, assessing transactions solely based on supply and demand dynamics is inadequate.

To elaborate, consider a simplified free-market model with only one seller: A, facing two potential buyers: B-rich and B-poor, who are interested in purchasing vaccines. According to market principles, the seller can choose to sell the product only to B-rich, who offers a higher price, while refusing to sell to B-poor, who offers a lower price. Such market transaction behavior aligns with the laws of supply and demand and does not violate any legal or ethical regulations; hence, it can be considered reasonable. Nevertheless, the real market model is not as straightforward as described above; it is a complex, structured process shaped by numerous actors. In this context, Moderna's vaccine production process is not solely an investment and research endeavor undertaken by the seller alone.

Firstly, in the early stages of vaccine development in 2020, Moderna obtained a research and development contract from the U.S. government that included compulsory licensing provisions. This means that through the invocation of the Section 1498, the government allowed Moderna to use certain patented technologies from other pharmaceutical companies during the vaccine development process under patent exemptions. In essence, Moderna used this regulation, enacted under emergency circumstances, to utilize some patents without paying fees to other companies during the vaccine's development. In May 2022, two American pharmaceutical companies filed a lawsuit against Moderna for using their patented technologies without compensation during the development of the COVID-19 vaccine. Moderna argued that the COVID-19 pandemic was a suitable situation as described in Section 1498, which allows businesses, in emergency situations, to be compelled by the government to share patented inventions, and that the two plaintiffs could only seek compensation from taxpayers

(Moderna, 2022.05.06). This lawsuit has not yet reached a clear resolution. However, as reported, even if the court agrees to compensate the two companies for their patent losses, it would ultimately be taxpayers' money used to protect the interests of these companies that do not accept patent exemptions.

Furthermore, the funding and research resources for Moderna's development of the COVID-19 vaccine involve government funds, including taxpayer support, and government research institutions. In the early stages of production, federal funding injected \$2.48 billion into the company, and the government had long signed substantial pre-orders with the company. Additionally, the company continued to receive support from various government agencies and official agencies. Moreover, its research process was not self-contained but involved collaboration with multiple official research institutions. Moderna's Phase III clinical trial was also funded by the government and conducted at government-designated facilities. Since its market activities are significantly influenced by government actions, its actions should inevitably be considered as a form of production that involves public opinion and public interest, and its vaccine product should even be treated as a public good.

Moreover, while the vaccines developed by Moderna may be classified as a public good for national use due to the reasons mentioned earlier, can they also be categorized as a global public good within the realm of global health? Based on perspectives ranging from Rosa Luxemburg's theory of global capital accumulation to Wallerstein and David Harvey's world-system theory, it becomes evident that market actions following global capitalization are not isolated but form a differentiated system created by economically central countries depriving economically peripheral countries. In the production of COVID-19 vaccines, we can observe phenomena in line with the world-system theory. Research on global migration issues has found that many highly skilled doctors trained either domestically or through international collaboration in African countries (including Ethiopia, Kenya, Malawi, Nigeria, South Africa, Uganda, Tanzania, Zambia, and Zimbabwe) face the issue of

High-Skill Labor Migration (HSLM) (David Owen, 2021). This results in African nations investing resources in training highly skilled medical professionals but still experiencing a severe shortage of healthcare talents. David Owen points out that refugee protection is a non-exclusive and non-competitive global public good, whereas the migrated labor that constitutes it has competitive or exclusive characteristics. Low-skilled labor is an exclusive and non-competitive club good, while high-skilled labor is an exclusive and competitive private good. In other words, high-skilled labor possessing medical expertise becomes a global private good, leading to competition and appropriation among various countries. Whether the solution to this issue should follow Mills' principle of prohibiting the recruitment of labor that harms the basic rights of the home country (Mills, E., et al., 2011) or adopt David's proposal of forming alliances between underdeveloped countries and finding neutral mediation organizations to safeguard collective interests (David Owen, 2021), we can see that developed countries are, in fact, benefiting from medical talents and resources from peripheral nations and regions. Although this appropriation is non-coercive and compliant with legal and moral standards, from the perspective of structural power disparities, it constitutes a constitutive factor in structural injustice.

Finally, due to multinational pharmaceutical companies selling vaccines at prices thirteen times higher than the cost, this process of creating an imbalance in the power dynamics between buyers and sellers remains a part of the formation process of structural injustice. The emergence of disparities in social power dynamics is often overlooked in the assessment of isolated events. Nozick's thought experiment about basketball star Wilt Chamberlain becoming a millionaire by each voluntarily paying him 25 cents from millions of spectators was countered by Cohen. Nozick argued that each payment had the nature of a just transfer, and thus, the resulting wealth distribution was just (Nozick, R., 1974). However, Cohen pointed out that Nozick overlooked a fact: this cumulative wealth would transform into significant power, placing Chamberlain in a unique position of power in a society that was originally more equal,

and this power would limit the ability of others and their descendants to access resources (Cohen, G.A., 1995). Similarly, in the case of multinational pharmaceutical companies selectively selling vaccines to more powerful buyers, the massive profit income has granted these companies thousands of times more resources and power than before. In this process, the powerful gain access to medical aid and acquire more resources for their own development, while the weak face death and form a greater disadvantage in future development. Thus, the actions of seller A suppress the development of B-poor, leading to a social hierarchy where A and B-rich are positioned above B-poor. Although this process is not driven by individual intent but by societal roles, the cumulative power relations within it are unjust.

Resolution Pathways: Nationalism, Cosmopolitanism, and the Social Connection Model

Mainstream Perspectives: Nationalism and Cosmopolitanism

How should the issue of vaccine apartheid, an injustice that transcends borders, be addressed? To whom does the responsibility for resolving this issue belong? There are two mainstream analytical approaches to global justice issues: one is the nationalist perspective of global justice, which defines justice within the boundaries of a common community, and the other is the cosmopolitan perspective of global justice, which aims to achieve equal justice claims among individuals worldwide.

On the one side, representatives of nationalist justice perspectives include John Rawls, David Miller etc. Rawls' theory implies a form of thin moral cosmopolitanism, according to "The Law of Peoples", he acknowledges the necessity to aid other nations burdened by severe problems, to help them restore their institutional capacity to maintain the basic human rights order. However, Rawls opposes extending the standards of justice from one nation to other societies with reasonable plural identities. David Miller, Thomas Nagel, Andrew Mason, and others argue from different angles the uniqueness of specific communities and why they are the only units capable of generating binding principles of justice.

On the other side, cosmopolitan justice perspectives can be further divided into various approaches. Ethical cosmopolitanism, represented by Peter Singer, attempts to argue for a utilitarian view of happiness that everyone deserves. Contractarian cosmopolitanism, represented by Charles Beitz, Thomas Pogge, and Henry Shue, seeks to construct normative arguments for global equality of opportunity within the context of global inequality. Representative figures of human rights-oriented cosmopolitanism include those like Shue, who emphasizes the rights to survival and security; Nussbaum, who emphasizes human capabilities and development rights; and Thomas Pogge, who advocates for the construction of a global framework for distributive justice.

While Rawls and Pogge belong to different camps of global justice theory, they both advocate for a distinction between individual interactions and institutional structures. Rawls, as the first scholar to explicitly make “the basic structure of society” the primary focus of the theory of justice, profoundly influenced the direction of contemporary political philosophy discussions. However, his understanding of the basic structure of society is relatively narrow, containing merely the basic social institution and excluding individual daily habits and choices from the scope of societal structures. This is because he intentionally differentiates between the moral analysis of individual interactions and the analysis at the institutional level (Rawls, 1993). Rawls believes that the theory of justice should not interfere with the processes in which individuals and groups act purely in their self-interest. Instead, it should design and implement a set of just basic rules and institutions for individual actions. Principles of justice, especially the difference principle, apply only to major public principles and policies that regulate social and economic inequalities because they initially place people in unequal social positions, leading to different expected ranges of life prospects. However, once the institutions have been adjusted to comply with the principles of justice, individual choices made within them are not subject to the intervention of justice principles. For example, how parents demand from their children within families, regulations

related to different genders in religions, and how individual employers establish salary rules do not need to adhere to the “difference principle”, which prioritizes the interests of the least advantaged.

Young, deeply influenced by Rawls and Pogge’s distinction between interactional and institutional aspects, believes that maintaining this distinction is necessary (Young I. M., 2006). However, she opposes the exclusion of individuals or diverse actors from the institutional process. She believes that while institutional processes create forces beyond individual control, the resolution of their problem can only be achieved through collective action involving diverse actors. Therefore, she opposes Pogge’s reliance solely on large institutional reforms by entities like national governments, the United Nations, and the WTO to address global justice issues. She believes that multiple agents play important roles in collective action, particularly the power of civil society organizations.

The Limitations of Mainstream Perspectives: Inadequate Responses to the Vaccine Apartheid

In Young’s view, neither nationalism nor cosmopolitanism, the two opposing stances on global justice, can adequately address the issue of attributing responsibility for structural injustice (Young I. M., 2006). This point can be illustrated by analyzing the issue of patent apartheid concerning COVID-19 vaccines. Firstly, within the framework of nationalist justice, which constrains justice within the scope of a nation’s constitution, the transnational corporation Moderna is not under a perfect duty for international assistance; instead, it falls under an imperfect duty of benevolence when it comes to international aid. Regarding patent law, the act of vaccine patent exemption is in violation of existing laws. Even lobbyist for transnational pharmaceutical companies had no need to invoke the role of the patent system in fighting the pandemic, promoting medical innovation, or aiding economic recovery, but can simply assert that their actions are legal and compliant with the constitutional order, at least in legal terms should not face any punishment.

Nonetheless, this does not imply that transnational pharmaceutical companies

do not bear structural responsibility for the healthcare situation in less developed regions. According to Young's criticism of nationalism, she maintains that social connections between individuals precede any contingent institutions and systems, such as national governments. Hence, placing the constitutional standards of a single community above social connections to assess the legitimacy of social issues is a misplacement of priorities. Young also acknowledges that people within the same community have stronger claims to justice, but this arises from deeper social connections rather than national identity or shared constitutions. "The reason to presume stronger claims of justice among those in the same region or country, however, is neither national identification, common constitution, nor geography per se, but rather the scope and density of social and economic ties" (Young I.M., 2000). The legitimacy of transnational principles of justice should be affirmed, and according to the definition of structural injustice, transnational pharmaceutical companies are substantively involved in processes that lead to unjust outcomes, benefiting from harm to others; thus, they should be significant actors in bearing structural responsibility.

Next, the perspective of cosmopolitan utilitarianism claiming global human rights, argues from the standpoint of basic necessity that every individual in the world should have equal access to the right to health. It condemns the unequal global distribution of vaccines and the profit-driven behavior of multinational pharmaceutical companies, concluding that these companies should be morally or ethically obligated to relinquish some of their interests. A more constructive cosmopolitan view is found in Thomas Pogge's institutionalism. He believes that the massive profits of multinational pharmaceutical companies and the issue of unequal global medicine distribution stem from the inefficiencies of the global trade system (Thomas Pogge, & Krishen Mehta, 2022). Pogge suggests a thorough transformation of the existing, highly unethical, and wasteful patent system and global trade framework. This reform aims at significantly improve the situation for the impoverished while also benefiting the wealthy to some extent. Con-

sequently, this proposal for institutional reform could secure support from both the impoverished and the affluent.

In response to the general utilitarian cosmopolitan position, Young argues that it has a position of individualism in principle. She criticizes the moral individualism inherent in condemning multinational pharmaceutical companies for upholding patent rights and advocating the right of every individual to equal access to vaccine resources. Her criticism does not mean that Young lacks a belief in universal equality; rather, she relies more on a cosmopolitanism to critique or advance theories (Young, I.M., 2000). However, this merely reflects Young using cosmopolitanism as her theoretical tool, rather than indicating that she adopts it as her theoretical stance. Young believes that criticizing global justice issues based on universal human rights leads to an individualistic perspective that overlooks social relationships. For example, the core issue with the vaccine apartheid caused by multinational pharmaceutical companies does not lie in whether they violate laws, ethics, or market norms, but rather in the structural processes of society and the societal roles that require them to make such choices. Perhaps deep down, Young also holds a belief in universal human rights, but making it her theoretical stance would lead to the contradiction between general moral responsibility and structural injustice, neglecting the social system structures that truly need reform. Furthermore, even cosmopolitan positions aimed at institutional reform are questioned by Young. This raises the second issue with cosmopolitan positions, namely that cosmopolitan universal principles overlook power relations between the strong and the weak in the real world, potentially leading to arbitrary interference in the interests of the unprivileged by external powers, such as strong nations interfering in weak nation's policies. Young acknowledges a non-dominating intervention right based on social connection responsibility but opposes arbitrary interference that may result from cosmopolitan institutionalism (Young, I.M., 2000). For example, the global modifications proposed by Pogge regarding patent protection, international trade, and incentives for researchers would inevitably require weak

countries to participate in global patent exemption matters concerning global public affairs. However, the reality is that many developing countries' innovative industries are in a fragile developmental stage, struggling to develop due to the inadequacy of the patent law system and the dominance of developed countries' innovative industries. If they are also required to join the system reform, they may lose the conditions for the rise of indigenous technological industries altogether. Young believes that it is impossible to achieve permanent structural change through institutional change like Pogge is doing because the rules and practices of institutions often align with power rather than unprivileged. Moreover, it is impossible to let states or international organizations act as arbitrators of both sides' interests because their policies and projects often reflect the outcomes of these struggles rather than balancing or arbitrating these differences (Young I. M., 2010).

Surely, a more reasonable or differentiated plan for global institutional reform is still open for discussion and should be promoted. However, one missing link in cosmopolitan institutionalism is how to initiate such a process. Pogge believes this is a question of institutional reforms that the UN, WTO, or governments should carry out, but where should the driving force for reforming these international organizations and national governments come from?

Alternative: The Social Connection Model of Responsibility

The reason why the nationalist and cosmopolitan approaches fail to effectively identify the responsible parties for structural injustices is that they still adhere to general legal or moral responsibilities, which is called "liability model" by Young. However, for structural consequences that arise through collective human actions without clearly defined responsible agents, a different approach is needed. Young argues that it is necessary to introduce a "social connection model" to dissect the mechanisms behind the formation of structural processes and, in turn, address the challenge of identifying responsible agents in cases of structural injustice.

Before analyzing the social connection model, let's begin by contrasting it with the liability model. Questioning and punishing

individual wrongdoings represent the direction of attribution of general legal-moral responsibility to date. The application of the liability model typically requires meeting four conditions:

- 1) Clear identification of the actor(s).
- 2) A valid causal connection between the actor(s) and unjust outcomes.
- 3) The actor(s) possess subjective intentions for the outcomes.
- 4) The actor(s) have sufficient knowledge of the context of their actions and consequences.

However, the liability model is not applicable when it comes to determining structural responsibility. The liability model continues to be relevant in many cases where institutions blatantly violate human rights. For example, if a sweatshop company prioritizes profits over the health of its employees or if its leaders engage in harassment and intimidation of workers, local or international laws are used to impose penalties. But when we attempt to use the "liability model" to identify the responsible parties in cases of structural injustice, problems arise. This was the case when Young assessed the issue of sweatshops, and it is also the case in the context of vaccine patent apartheid. As outlined before, the actors contributing to the issue of vaccine patent apartheid include various agents such as multinational pharmaceutical companies and their executives, pharmaceutical patent lobby agencies, and relevant national governments, among others (Condition 1). However, there is no direct causal link between the actions of these agents and the infections and deaths in underdeveloped regions (Condition 2). The actions of these corporations and institutions comply with existing laws and market norms, and the actors involved do not have a subjective intention to harm the health and economic development capacity of people in underdeveloped regions (Condition 3). Furthermore, they do not have a comprehensive understanding of the specific circumstances causing harm (Condition 4). Therefore, major pharmaceutical companies have not committed any legal or moral wrongdoing. It becomes evident that the liability model is inadequate for effectively addressing cases of transnational structural injustice.

How should we understand the structural responsibility of multinational pharmaceutical companies' action that comply with legal regulations, do not have a subjective intention to harm people in underdeveloped regions, and do not directly cause a health crisis in these regions? Since structural injustice arises from a structural process rather than a identifiable agent, its unjust consequences seem to possess an uncontrollable force beyond human activities, and people are left powerless in the face of the collective actions' harmful outcomes. Young argues that this represents a form of Reification logic that blinds human thinking, and a novel analytical approach should be adopted to determine responsibility in cases of structural injustice. According to Young, the liability model, due to its backward and blaming nature, cannot address many issues related to structural responsibility. Therefore, she introduces a forward-looking and non-blaming social connection model to complement the shortcomings of the liability model. The social connection model possesses five characteristics that can compensate for the deficiencies of the liability model (Young, I. M., 2010):

- 1) Not isolating;
- 2) Judging background conditions;
- 3) More forward looking than backward looking;
- 4) Shared responsibility;
- 5) Discharged only through collective action.

Firstly, the social connection model does not isolate the blame to specific individuals or a few responsible parties. Liability models aim to pinpoint individuals who are responsible among a multitude of actors and differentiate them from those who are not responsible. However, what truly drives the formation of structural events is the participation of many individuals within dispersed groups. If harm results from the involvement of thousands of people, finding a few guilty parties cannot serve as a reason to absolve others who have contributed to the outcome. Therefore, the social connection model no longer attempts to identify responsible parties with clear agent, subjective intent, and causality. Young claims that in cases of structural injustice, we may identify some explicit legal and moral responsibility events that fall within the scope of the

liability model. Beyond these culpable individuals, others involved in the process that leads to unjust consequences, even if their actions align with institutional rules and social norms, should also be held accountable under the social connection model.

Secondly, the social connection model emphasizes an examination of background conditions. In the liability model, we typically treat the social background structure as a standard that, while not perfect, is fundamentally normative. Any act of wrongdoing represents a deviation from this normative baseline. When we accuse a wrongdoer of wrongdoing and demand correction or compensation, it's because we believe they have deviated from the right path and need to be restored to the normal societal track. When describing a process that leads to unjust outcomes, it is seen as something that has deviated from the normal social process, a split or separate event. Through punishment, compensation, and remediation, our social structure appears to regain integrity relative to the normative baseline.

The focus within the social connection model shifts to questioning the rationality of background structures and understanding the connection between actors and the structural background. Unlike the liability model that treats background conditions as normal and standard, structural injustice indicates that there are problems to varying degrees within the background conditions. We must identify what morally unacceptable structures have formed within these background conditions. Moreover, the role played by individuals should also be considered in examining background conditions. Most of the time, individuals contribute to the maintenance of established background structures by adhering to the community's institutions, rules, customs, or their own behavioral habits. Individuals rarely consciously reflect on their actions and background circumstances; instead, they focus on specific goals in front of them and their interpersonal relationships.

Thirdly, the social connection model places stronger emphasis on addressing structural issues with potential future impacts. The temporal focus differs between the liability model and the social connection model. The liability model primarily looks backward,

while the social connection model predominantly looks forward. This is because they are designed to address different kinds of responsibilities. The liability model deals with injustices that have reached their conclusion, such as completed robberies or pollutant that have already leaked. In contrast, the social connection model addresses injustices that are ongoing and have not yet reached their conclusion, like ongoing global sweatshops or environmental pollution affecting future generations. However, both the liability model and the social connection model encompass both forward and backward dimensions, as they involve reflections on the past and prevention for the future. To some extent, both the liability model and the social connection model have a temporal continuity. The liability model's punishment or compensation for past wrongdoings also serves a forward purpose. On the one hand, it can act as a deterrent for future similar actions by the perpetrators. On the other hand, it highlights weaknesses in the existing institutional systems that either allow or encourage such misconduct, providing leverage for further institutional reforms. Young argues that once we move to the latter stage, we might shift away from the liability model and enter the domain of the social connection model. In this sense, the initial step of the social connection model involves examining the historical and systemic formation of past injustices. The social connection model is concerned with an ongoing process that extends from the past into the future. If this process isn't halted, harm will continue to occur. This form of responsibility is forward-looking rather than backward. Because when investigating a continuous process, it becomes challenging to establish causal relationships between specific actors' actions and the structural consequences. It's also difficult to determine the proportion of involvement of these actors in the result. Placing too much emphasis on identifying and deflecting action responsibility can reduce the time available for collaborative efforts to change the structural impact on the future.

Fourthly, the responsibility within the social connection model is fundamentally shared by all involved individuals. Young distinguishes between collective responsi-

bility and shared responsibility. Collective responsibility involves taking responsibility in a group format, even though individual members may not have decisively participated in any action process. For example, a corporation might assume collective responsibility as an independent entity. Shared responsibility, on the other hand, is individual responsibility, but the consequences are generated by a group of people. Each individual in the group has made some contribution to the consequences or potential consequences. However, no single person can independently cause these consequences, and it's impossible to identify the individual contributions within the overall process. Stopping the actions of certain individuals within the group does not halt the entire process. Therefore, the solution to such a problem inherently requires sharing and cooperation. The nature of shared responsibility clearly reveals that what Young seeks to create is essentially a theory of individual responsibility. It's about how individuals influence collective actions and how they can remedy injustice by joining new collective actions. Directly blame, punishment, or compensation requirements can trigger negative emotions of evasion or shifting responsibility on the part of the actors, thus reducing their enthusiasm for participating in addressing structural issues. Convincing them to take their political responsibility in a non-blaming environment is a more favorable way to promote cooperation. The accusatory action in public discourse often leads to defensive and unproductive responsibility-shifting behavior. Our legal and moral accusations require the defendant to provide a "burden of proof" to prove their innocence after being accused. However, in cases of structural injustice, the consequences of defense and argumentation are often negative. This is because, firstly, defense and argumentation focus too much on the past rather than what we can change now. Secondly, they divert attention and create mistrust, hindering the sense of trust necessary for cooperation. Finally, they lead individuals to shift blame onto others because structural responsibility is so easy to shift. In a form of injustice that involves everyone, this responsibility cannot be pinned on one individual. This leads us to become passive in our proac-

tive efforts to address the problem, but wait for someone to be singled out for punishment or correction. However, even if someone admit guilt and haven't shifted it to others, their focus will be on their past actions, state of mind, and character rather than the structures that need reform. Excessive self-reflection and introspection divert energy from the objective discussion of structural operations and change. Since the structural process is continuing, it is more important to call on the individuals who constitute this process to cooperate in changing the existing structures to prevent actors from leaving after being condemned or fleeing after punishment.

Fifthly, the social connection model emphasizes that structural injustice can only be discharged through collective action. Due to the shared nature of responsibility, forward-looking responsibility can only be fulfilled through collective actions undertaken with others. Thousands of individuals contribute to the process that produces unjust outcomes through their actions within specific institutional backgrounds; thus our forward responsibility primarily involves changing institutions and processes. Yet, no one can change structures solely by reflecting on their own behavior. For instance, it is unrealistic for some consumers in developed countries to protest against large pharmaceutical companies' refutation of patent sharing by refusing to take their COVID-19 vaccines. This would only increase the health risks for the protesters and would not influence the companies' decisions, as they still have legal grounds and a steady consumer base. The transformation of structural processes can only be accomplished through collective interventions by people in different social positions. Protests by the oppressed or third parties should be directed at specific powerful agents, with the ultimate goal of compelling them to take action, thereby creating an integral collective action process.

In this context, the social connection model of responsibility responds to the positions of both sides in the debate over vaccine patent waivers. It differs from nationalist or cosmopolitan approaches and asserts that the responsibility of actors lies in participating in the collective action process that leads to unjust consequences. Therefore, all indi-

viduals involved in the action process should join collective efforts to address the issue.

The Social Connection Model of Responsibility Addressing the Vaccine Apartheid

The Task Allocation and Action Plans of the Social Connection Model of Responsibility

Young argues that structural injustice can only be resolved through collective action involving numerous responsible agents. This collective action is not the action of a unified group but rather a process composed of individuals with varying degrees of involvement and different action tasks. Young believes that the magnitude of responsibility for addressing structural injustice should be determined based on the influence individuals possess due to their social status. The parameters determining the weight of responsibility should directly reflect the social roles of actors in their interpersonal relationships with others. When facing issues of structural injustice, those who have more power, resources, and capabilities should bear greater responsibility because their contributions to changing the structure will be more substantial. The weighting of participatory responsibility is determined by five parameters:

- 1) Connection (Young, I.M., 2004);
- 2) Power;
- 3) Privilege;
- 4) Interest;
- 5) Collective Ability (Young, I.M., 2010).

Firstly, social connection can help actors determine the priority of fulfilling their responsibilities and make some of the identifiable long-distance responsibilities more concrete. Actors can first examine the institutions they are directly involved in or track their everyday locations, such as workplaces, cities of residence, or affiliations with churches or organizations. By examining the individuals who might be affected by these institutions and locations, even if they are distant strangers or unfamiliar groups, this process of analyzing one's actions from local to global helps remove the anonymity or mystery in the connection between actors and the structural consequences. Upon discovering that the institutions they are involved in or the services they use have caused harm to other distant

groups, structural injustices that they should be involved in remedying are identified.

Secondly, shared responsibility and collective action do not imply that everyone has an equal level of responsibility. “The power to influence the processes that produce unjust outcomes is an important factor distinguishing degrees of responsibility” (Young, I. M., 2006). In general, the more power one has, the greater their responsibility. This is because resolving structural issues involves changing institutional backgrounds, cultural norms, and even making some integral revolutions, which require certain resources and capabilities that ordinary individuals do not possess. Individuals or institutions with higher social power in the structural process, such as governments, corporations, managers, etc., have greater power to allocate resources, adjust institutions, or influence outcomes. The actions of these powerful agents often play a decisive role in determining whether structural changes can be successful. For example, in the vaccine apartheid issue, key decision-makers in multinational pharmaceutical companies, political lobbying groups of big pharmaceutical companies, government decision-makers in the companies’ home countries, the World Trade Organization, the World Health Organization, and others are all actors with more resources and capabilities to change the status quo.

Thirdly, there are groups in society who, despite having relatively less power, possess certain privileges compared to the victims. Like nations and populations that have easy access to COVID-19 medical resources. “Persons who benefit relatively from structural inequalities have special moral responsibilities to contribute to organized efforts to correct them, not because they are to blame for them, but because they have more resources and are able to adapt to changed circumstances without suffering serious deprivation” (Young, I. M., (2004). For instance, the citizens of developed countries who protest and boycott pharmaceutical companies that refuse to exempt patents can do so without suffering significant health or economic consequences. In contrast, impoverished individuals or people in less developed countries, struggling to secure their basic needs, bear a lesser burden of protest due to their limited capability.

Fourthly, individuals with an interest in rectifying structural injustices should bear responsibility. Due to the inherently public nature of structural responsibility, even victims should take on responsibilities. Often, victims have also contributed to unjust structural processes. For instance, people in underdeveloped regions may silently endure the unjust distribution of vaccines, even tolerating domestic monopolistic powers acquiring vaccine resources at higher prices without considering the well-being of the underprivileged. This submission serves as the foundation for the perpetuation of unjust structures. Moreover, a more pragmatic reason lies in the fact that victims often suffer the most severe consequences in structural processes, making it essential to safeguard their interests during the correction of structural injustices. Generally victims possess the deepest understanding of their own interests and demands. The absence of victims in collective actions can significantly diminish the effectiveness of such efforts. Well-intentioned outsiders may inadvertently harm them, or the direction of change may prove incorrect due to the absence of opinion from the victims. For instance, in efforts to eliminate barriers to vaccine access, actions that exclude communication with victims can lead to negative outcomes akin to a paternalistic aid approach. This might result in obtaining permission for vaccine patent technology without establishing corresponding production plans in underdeveloped countries or lacking a sufficient number of healthcare professionals to implement vaccine production; or just get the exemption permission instead of the concrete know-how. It is therefore necessary for victims to join in the public expression of their demands in collective action to ameliorate structural injustice.

Fifthly, agents with greater collective capacity should bear the responsibility for rectifying structural injustices. As previously mentioned, structural injustices can only be resolved through collective action. However, existing organizations have predefined roles and modes of operation. Initiating new collective actions requires the recoordination of individuals and groups to enter into a new organizational relationship, which can be a challenging task. In such cases, collec-

tive actions can benefit from the inclusion of existing organizations and their leaders, i.e., entities with stronger collective capabilities. They can leverage their existing resources to advance structural reform. For instance, labor unions, religious organizations, shareholder groups—all of which occupy positions in society that enable them to mobilize other members of their organizations effectively. For example, in the case of dismantling vaccine segregation, the World Trade Organization, the World Health Organization, and regional health organizations are all entities with greater mobilization capabilities.

Notably, Young emphasizes the need for the oppressed to bear responsibility in addressing structural issues. She believes that those in positions of power often require pressure from the powerless to instigate change. “The former must usually be pressured to take steps aimed at changing the effects of their actions, and the political responsibility of the latter often can mount to little else than organizing to criticize and pressure more powerful actors” (Young, I. M., 2010). In fact, the oppressed “perhaps should take the lead in organizing and proposing remedies for injustice because their interests, it might be argued, are most acutely at stake” (Young, I. M., 2010). What is even more crucial is that “political actors should not assume that powerful agents will promote justice of their own accord” (Young, I. M., 2010) because the actions of those in power primarily serve to maintain their own privilege.

Young even suggests borrowing the power of third parties and guiding them into becoming allies of the disadvantaged to change public opinion (Young, I. M., 2010). She claims that the positioning of third parties is crucial in this political contest. While there may be opposing interest groups within structural processes, it is rare for every participant in these structures to belong exclusively to the powerful or the disadvantaged. Third parties, having fewer vested interests in maintaining or changing the structure, are potential allies important to both sides. Silent third parties align with the powerful, whereas openly judgmental third parties align with the powerless. On one hand, when third parties are distant from the centers of power process, they may not be aware of injustice and may comply

with rules and practices that help perpetuate injustice or maintain the status quo. On the other hand, when third parties are interested in the impact of daily processes on the lives of marginalized groups, especially when the powerless communicate with them, they sometimes initiate public discussions about what is right, rather than simply engaging in power and interest combat.

In summary, Young’s proposed path to addressing structural injustice primarily involves the following process: starting from the expression of powerless at the grassroots level, leveraging the influence of third parties to generate public pressure, and stimulating powerful actors to take actions with significant impacts on the social structure.

Realistic Pathways to Addressing Vaccine Apartheid

The resolution of the vaccine apartheid is a prime example of structural connection model of responsibility, which is a systemic and bottom-up collective action. This action process has notably supplemented the driving forces lacking in the institutionalist cosmopolitanism’s call for institutional reform. In the resolution of the vaccine patent exemption event, the People’s Vaccine organization played a pivotal role. The People’s Vaccine organization originated from an open letter signed by over 140 individuals and organizations, including economists, health scholars, current and former world leaders, international organizations, and more, in response to the news that the French pharmaceutical company Sanofi would prioritize the United States for any new COVID-19 vaccine. They deemed it unjust for pharmaceutical companies to decide who lives and who dies in such a crisis by charging exorbitant prices. They called for governments worldwide to work together to prevent corporations from profiting from the pandemic and urged the sharing of COVID-19 vaccine technology to address global public health and humanitarian crises. Subsequently, over 100 official and private organizations, including the International AIDS Society, African Alliance, Amnesty International, Global Justice Now, and others, formed The People’s Vaccine alliance. With the support of numerous experts and political figures beyond the original open letter, they called for global participation in actions

against the vaccine patent monopoly by major pharmaceutical companies.

They established organizations and websites, through which they called on the public to participate using the following methods: Firstly, by providing academic research, news reports, and promotional videos, the organizations openly exposed the injustice of large multinational corporations refusing patent waivers and revealing the asymmetry between the public funding they received and the massive private profits they occupied. Secondly, the organizations declared their demands for addressing this issue. In one respect, they demanded pharmaceutical companies to share vaccine production technology and to contribute their technology to the World Health Organization's COVID-19 Technology Access Pool (C-TAP). In another respect, they require governments worldwide to temporarily suspend patent laws related to COVID-19 vaccines, treatments, and testing technologies at the World Trade Organization during the pandemic. This would help break the monopoly of large pharmaceutical companies and ensure vaccine supplies worldwide. Finally, the website provided five ways for the public to participate in protests and advocacy activities, making it easier for participants to voice their support for this movement on social media. According to official website statistics, nearly 1.4 billion internet users engaged in the aforementioned protest methods they offered. Supporters from developed countries also held rallies in front of EU offices during EU meetings, demanding vaccine patent waivers. Some protesters even carried mock coffin with the words "Pharma Greed Kills" on it to commemorate the deceased and protest vaccine patent apartheid on the streets of London.

After more than a year of organization and activities, influenced by public pressure, in May 2022, the Biden administration shared eleven new COVID technology research findings from the National Institutes of Health. They placed certain COVID vaccine technologies (the stable spike protein technology) held by the U.S. government into the World Health Organization's technology access pool. In the same month, Pfizer signed an agreement, stating that, through joint efforts with governments, businesses, and civil

society, Pfizer would provide all COVID drugs used in the U.S. and EU to 1.2 billion people in low-income countries at non-profit prices. In the following month, the World Trade Organization also approved the proposal to waive COVID vaccine patents globally. However, the sharing of COVID medical technology still faces some challenges. The head of Knowledge Ecology International, an advocacy group campaigning for access to medicine, points out that merely opening vaccine patents is not enough because replicating vaccines is difficult, requiring further sharing of detailed technical methods and even close collaboration with original company technicians. Currently, there are many more vaccines available on the market than when the vaccine waiver proposal was first made. The current focus of low-income countries is mainly on the lack of diagnostic equipment and therapeutic drugs, such as Pfizer's Paxlovid. Moreover, generic drugs are easier and faster to produce compared to generic vaccines, but their patents have not yet been waived. The People's Vaccine organization continues to publish research reports and public appeals to further demand the sharing of therapeutics and diagnostic systems to address the risks of Long COVID.

Based on the experience of joint action organizations like The People's Vaccine, utilizing the internet and new media technologies to create a platform for the powerless to voice their concerns, mobilizing the powerless and numerous third parties to join in the resistance against the consequences of structural injustice, and ultimately urging governments, international institutions, and multinational corporations to take actions to change the status quo, the social connection responsibility model has been greatly validated in addressing global justice issues. As Young says, "Our working through state institutions is often an effective means of such collective action to change structural processes, but states are not the only tools of effective collective action (we also have civil society organizations)" (Young, I.M., 2006). Young's mistrust of national governments and her emphasis on civil society organizations precisely reflect her recognition of the increasing strengthening of social subsystem differentiation in modern

society. Among substantial studies, whether Betts' proposal for a bottom-up global migration governance system (Betts, A. (ed.) 2011), David Vogel's observation of the rise of civil regulation in labor and human rights, animal protection, environmental standards, and the enhancement of corporate social responsibility in transnational trade management (David Vogel, 2009), or Kenneth W. Abbott and Duncan Snidal's suggestion of a new trend in transnational governance that involves collaborative actions among businesses, governments, and non-governmental organizations to promulgate regulatory standard-setting or voluntary norms (Kenneth, W. Abbott & Duncan Snidal, 2009), experiences in global issue governance in various subfields all demonstrate the necessity of social subsystem autonomy. Therefore, the power of civil society organizations and the transparency and standardization of their actions are crucial in addressing structural injustice.

Conclusion

The resolution path of the vaccine apartheid followed a route starting from protests

by the powerless and, with the support of third-party forces, exerting pressure on the powerful to drive comprehensive and transformative actions, which accorded with and thus validated the effectiveness of the social connection model of responsibility in addressing global structural injustice. Notably, the social subsystems' collective action proposed by the social connection model played a crucial role in resolving vaccine apartheid as it broke participants' ignorance, prompted the protest process, and triggered the reform action of larger subsystems like multinational corporations. Thereby, the subsystems' effect was throughout the whole process of collective action and determined the resolution degree of structural injustice. Since the social connection model claims multi-agent collective action on a systemic process, it can be applied to address all forms of structural injustice that can merely be tackled systematically. From this perspective, further resolution of structural injustices depends on creating an environment conducive to the formation and regulation of civil society organizations, which requires further exploration.

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Section 5. Psychology

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RISK FACTORS FOR MENTAL HEALTH AMONG ADOLESCENTS DURING THE COVID-19 PANDEMIC

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Abstract

The COVID-19 pandemic has greatly disrupted the daily life of adolescents nationwide. According to the Centers of Disease Control and Prevention (CDC), more than half of students experienced emotional abuse in the home, more than 1 in 3 high school students experienced poor mental health during the pandemic and nearly half of students felt persistently sad or hopeless.

In this research, we investigated possible risk factors for mental health during the COVID-19 pandemic among adolescents and identified the most significant positive and negative factors through logistic regression. We used the 2021 Adolescent Behaviors and Experiences Survey data with features ranging from demographic information to the adolescents' family condition. The response variable is whether an adolescent has good or bad mental health during the COVID-19 pandemic.

After processing the dataset, we built a logistic regression model to predict whether an adolescent is likely to develop mental health problems. By investigating the logistic regression coefficients, we found that parents' attitude toward the adolescent, the gender of the adolescent, and the family's financial ability to cover food are all risk factors. The logistic regression model has achieved an AUROC score of 0.78, with 68.2% true positive rate (TPR) and 28.0% false positive rate (FPR). This predictive model is helpful for healthcare professionals to identify and reduce the risk for the adolescents that are prone to the mental problems during the pandemic.

Keywords: *mental health, COVID-19 pandemic, logistic regression model*

Introduction

The COVID-19 pandemic has had a seismic effect on communities across the country, and young people have been especially

impacted by the ways in which their everyday lives have been altered. The disruptions were widespread – school buildings closed, opportunities for connecting with peers were

limited, communities were dealing with loss and upheaval.

While the pandemic has affected all students, the experiences of disruption and adversity have not affected all students equally. According to CDC, more than 1 in 3 high school students experienced poor mental health during the pandemic and nearly half of students felt persistently sad or hopeless (Centers for Disease Control and Prevention (2022, March 31). In addition, the daily life of many adolescents has also been disrupted due to the pandemic, as more than half of students experienced emotional abuse in the home and more than 10% reported physical abuse in the home (Centers for Disease Control and Prevention (2022, March 31). Therefore, it is of great importance for healthcare professional to identify children that are at high risk for developing mental problems and help address problems at an early stage. To fulfill this task, this report discussed the machine learning techniques that can be applied to build predictive models on whether a child will have mental health issues.

Specifically, we pre-processed the dataset, built a logistic regression model, and in-

vestigated factors most related to the goodness of mental health during the COVID-19 pandemic. We also measured the model performance using various validation techniques and analyzed the model coefficients to find the variables that contribute most to our predicted results.

Method

Data

We used 2021 Adolescent Behaviors and Experiences Survey (ABES) data for this study. The ABES is a 110-question online survey completed by US high school students in early-mid 2021. It is a national survey conducted by Centers for Disease Control and Prevention (CDC) that provides rich data on health-related experiences and behaviors among high school students and was designed to assess the impacts of the COVID-19 pandemic on adolescents. In addition, ABES is also the first nationally representative survey looking at the effects of the COVID-19 pandemic on the health of adolescents. The 2021 ABES data contains 7,705 complete data samples. We used the following variables as independent variables.

Table 1. Features used for analysis

Variable	Description	Comments
Q1	How old are you?	Range: 12–18
Q2	What is your sex?	0: Female, 1: Male
Q4	Are you Hispanic or Latino?	0: Yes, 1: No
Q101	During the COVID-19 pandemic, did any adult in your home lose their job?	0: Yes, 1: No
Q102	During the COVID-19 pandemic, did you lose your paying job?	0: Yes, 1: No
Q103	During the COVID-19 pandemic, how often did you go hungry because there was not enough food in your home?	Higher value indicates higher frequency
Q104	Do you agree that doing your schoolwork was more difficult during the COVID-19 pandemic than before?	Higher value indicates stronger agree
Q105	During the COVID-19 pandemic, how often did any adult in your home swear at you, insult you, or put you down?	Higher value indicates higher frequency
Q106	During the COVID-19 pandemic, how often did any adult in your home hit, beat, kick, or physically hurt you in any way?	Higher value indicates higher frequency

Q107	Do you agree that you drank more alcohol during the COVID-19 pandemic than before?	Higher value indicates stronger agree
Q108	Do you agree that you used drugs more during the COVID-19 pandemic than before?	Higher value indicates stronger agree
Q109	During the COVID-19 pandemic, did you get medical care from a doctor or nurse using a computer, phone, or other device (also called telemedicine)?	0: Yes, 1: No
Q110	During the COVID-19 pandemic, did you get mental health care using a computer, phone, or other device (also called telemedicine)?	0: Yes, 1: No
Q111	During the COVID-19 pandemic, how often were you able to spend time with family, friends by using a computer, phone, or other device?	Higher value indicates higher frequency
Q100	During the COVID-19 pandemic, how often was your mental health not good?	Higher value indicates higher frequency and worse mental health

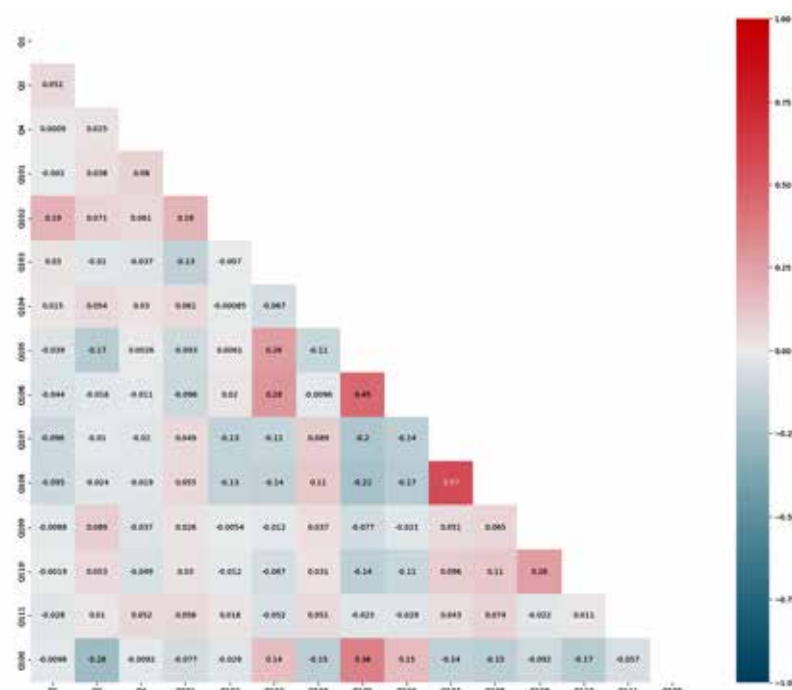
The dependent variable is a binary feature coded as “Q100,” which indicates the respondent’s mental health. Responses of “most of the time” and “always” were recoded as having poor mental health and were used as positive samples in this study.

Exploratory Analysis

A correlation graph is a primitive yet straightforward representation of the cells of a matrix of correlations. The idea is to display

the pattern of correlations in terms of their signs and magnitudes by using visual thinning and correlation-based variable ordering. Moreover, the matrix cells can be shaded or colored to show the correlation value. The positive correlations are shown in red, while the negative correlations are shown in blue; the darker the hue, the greater the magnitude of the correlation.

Figure 1. Correlation among variables



The graph above shows that the dependent variable (has bad mental health) has the highest positive correlation with Q105, while having the highest negative correlation with Q2 (sex), indicating that family members' attitude toward the adolescent and the gender of the adolescent play a significant role in his or her mental health. In addition, we discovered that the variable Q103 and Q106 also have positive correlation with the dependent variable.

In addition, the correlation graph also provides valuable information regarding the relationship among features. For example, the correlation between Q108 and Q107 is 0.57, indicating that the two variables are significantly positively correlated and adolescents who abuse alcohol are more likely to abuse drugs as well during the COVID-19 pandemic.

Statistical Method

Pre-processing

The data set is pre-processed in this step to improve both the training speed and accuracy. As most machine learning algorithms are not able to deal with missing values, all the data points with missing entries or invalid responses to the dependent variable are excluded from training and testing. In addition, as different features usually have remarkedly different value ranges, we applied the feature standardization technique to transform different features into comparable scales. This measure ensures that different features weigh equally in the training process. For each feature, its mean value and standard deviation are first computed as $avg(x)$ and $std(x)$. Then each data point x with respect to that feature is replaced by y_i calculated as:

$$y_i = \frac{x - avg(x)}{std(x)}.$$

Finally, the dataset is partitioned into two datasets for training and test purposes: the training dataset (70%) for model development and the test dataset (30%) for model test and validation.

Logistic Regression

Logistic regression models were used to calculate the predicted risk. Logistic regression is a part of a category of statistical models called generalized linear models, and it allows one to predict a discrete outcome

from a set of variables that may be continuous, discrete, dichotomous, or a combination of these. Typically, the dependent variable is dichotomous, and the independent variables are either categorical or continuous.

The logistic regression model can be expressed with the formula:

$$\ln\left(\frac{y}{1-y}\right) = w_0 + w_1x_1 + \dots + w_mx_m$$

In the logistic regression, y is the probability of the sample classified as the positive class, and each feature x_i has its specific weight w_i , where w_0 is the intercept while w_1 through w_m are the coefficients of the independent variables.

Our task is to find a set of parameters w_0, \dots, w_m such that the loss function between the output y and the actual values u is minimized.

$$l(y, u) = \|y - u\|_2^2$$

In addition, we applied elastic-net regularization to constrain model complexity and prevent model over-fitting problems with L-1 ratio equaling 0.5.

Model Validation

Consider a two-class prediction problem, where the outcomes are labeled either as positive or negative. There are four possible outcomes from a binary classifier. If the outcome from a prediction is positive and the actual value is also positive, then it is called a true positive (TP); however, if the actual value is negative, then it is said to be a false positive (FP). Conversely, a true negative (TN) has occurred when both the prediction outcome and the actual value are negative, and false negative (FN) is when the prediction outcome is negative while the actual value is positive. In this way, the true positive rate (TPR) can be calculated as follows:

$$TPR = \frac{TP}{TP + FN}$$

And the false positive rate (FPR) can be calculated as:

$$FPR = \frac{FP}{TN + FP}$$

A confusion matrix is a table that allows visualization of the performance of an algorithm. Each row of the matrix represents the

instances in an actual class while each column represents the instances in a predicted class. An example of the confusion matrix and the meaning of each cell within the table

can be found in the graph below. Typically, the confusion matrix of a good predictive model has high true positive and true negative rates

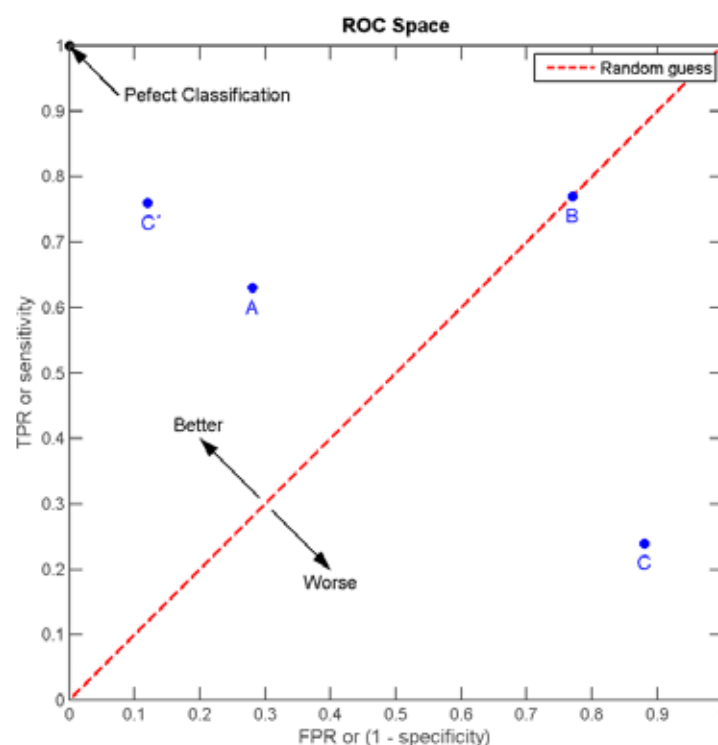
Figure 2. *Confusion matrix example*

		Predicted condition	
		Positive (PP)	Negative (PN)
Actual condition	Positive (P)	True positive (TP)	False negative (FN)
	Negative (N)	False positive (FP)	True negative (TN)

A receiver operating characteristic curve, or ROC curve, is a graphical plot that illustrates the diagnostic ability of a binary classifier system as its discrimination threshold is varied. The ROC curve is created by plotting the true positive rate (TPR) against the false positive rate (FPR) at various threshold settings (Google. Classification: ROCC urve and AUC). The best possible prediction method would yield a point in the upper left corner of the ROC space. A random guess would give a point along a diagonal line from the left bottom to the top right corners. Points above the

diagonal represent better than random classification results, while points below the line represent worse than random results. A sample ROC plot is shown in Figure 2. In general, ROC analysis is one tool to select possibly optimal models and to discard suboptimal ones independently from the class distribution. Sometimes, it might be hard to identify which algorithm performs better by directly looking at ROC curves. Area Under Curve (AUC) overcomes this drawback by finding the area under the ROC curve, making it easier to find the optimal model.

Figure 3. *A sample ROC plot*



Results

Confusion matrix and ROCcurve

Figure 4 shows the confusion matrix of the logistic regression model. The upper left region is true negative, the upper right region is false positive, the lower left region is

false negative, and the lower right region is true positive. As shown in (Figure 4), the logistic regression model has a relatively high (~68.2%) true positive rate and a relatively low (~28.0%) false positive rate.

Figure 4. Confusion matrix of the predicted results

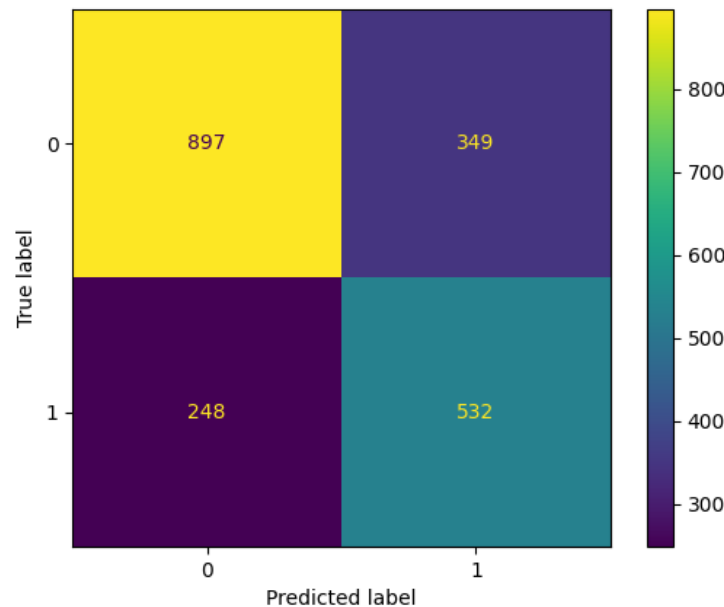
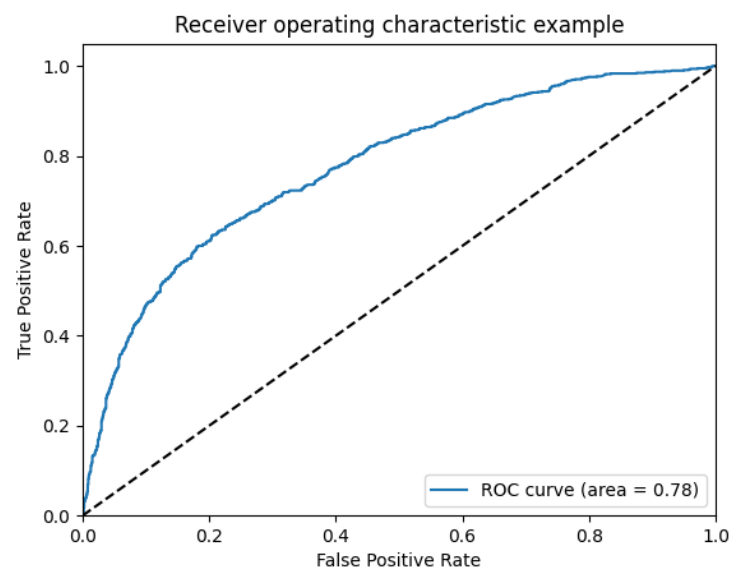


Figure 5 displays the ROC curve for the logistic regression model. It can be concluded

that the model has results much better than random guessing and the AUROC score is 0.78.

Figure 5. The ROC curve for the logistic regression model



Feature Importance

Like in linear regression, the coefficients in the logistic regression model also provide valuable information about the direction and magnitude of the impact of each input variable on the dependent variable. In other

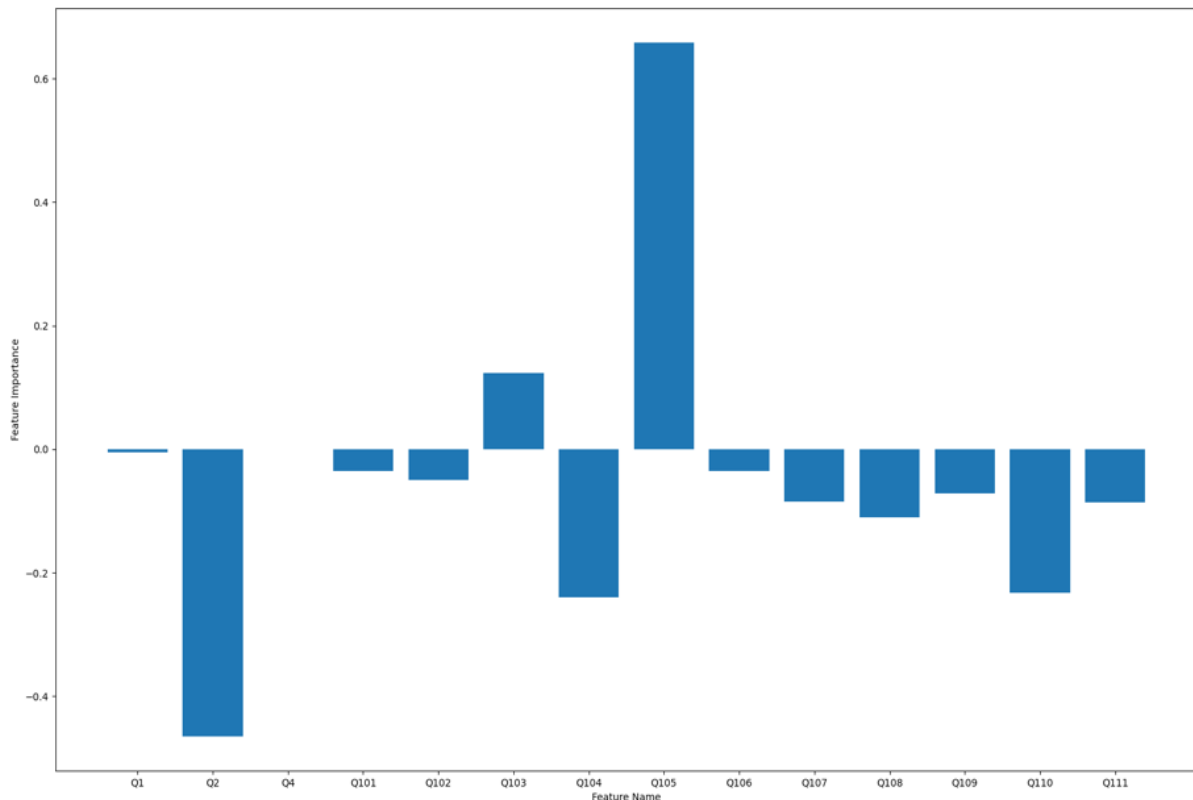
words, these coefficients can provide the basis for a crude feature importance score. The figure below shows the coefficient of each input variable.

The chart below shows that variables Q2, Q103, Q104, Q105 all have relative-

ly large impact on the dependent variable (adolescents' mental health). These results align with our findings from the correlation analysis. By analyzing those relationships in detail, we also found that being female, hav-

ing more difficult schoolwork compared to the pre-pandemic era, having abusing family members, and living in a family with insufficient food are all risk factors for developing mental health problems.

Figure 6. *The importance score for each feature*



Discussion

This study intends to build a predictive model to investigate the factors most related to the development of mental problems during the COVID-19 pandemic among adolescents. Through preliminary analysis, we discovered that family members' attitude and family's financial ability to cover basic living expenses are all risk factors for the adolescents' mental health. A logistic regression model was built, and the AUROC score is 0.78, indicating that the model has achieved relatively good performance in making accurate predictions on whether a child will develop mental issues. The predictive model suggests that Q105 (family member's attitude toward the adolescent) and Q2 (the gender of the adolescent) are top risk factors for mental health. A possible explanation of the results might be that adolescents with parents or family members frequently insulting them may receive much less love and encour-

agement and thus are more likely to develop mental health issues. This predictive model is helpful for healthcare professionals to identify children that are at higher risk for mental diseases and come up with specific plans to reduce their risk for long-term impacts.

One limitation of this study is that data entries with missing values are excluded from the analysis. This is a timesaving but defective approach. Depending on the number of data entries with missing values, we may have removed too many sample points, resulting in losing valuable information for the model to learn the critical relationship between the independent and dependent variables. Therefore, for future studies, we may use more advanced techniques such as mean value imputation or k-nearest neighbors (kNN) to impute a value for the missing entries. The mean value imputation method completes missing values with the mean of the entire feature. This is a simple and effec-

tive way to make those entries usable by the logistic regression model. Other techniques include the k-nearest neighbor approach, which replaces missing values with the mean

of k (a value assigned by users) nearest neighbors of that sample (Kozma, Laszlo 2008). This technique requires more effort but can generally achieve better performance.

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Section 6. Sociology

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UNHEALTHY DIET AMONG HIGH SCHOOL STUDENTS

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Abstract

Objective: This study aims to: 1) examine the predictors of an Unhealthy diet; 2) build a predictive model for an Unhealthy diet using an artificial neural network and compare its performance to logistic regression model.

Methods: Youth Risk Behavior Surveillance System (YRBSS) 2017 data were used for this study. All the participants who were eligible were randomly assigned into 2 groups: training sample and testing sample. A logistic regression model was built using training sample. Receiver operating characteristic (ROC) was calculated.

Results: About 7.17% of 7221 high school students had unhealthy diet, about 5.9% among the female and 8.8% among the male.

According to the logistic regression, Q1 (how old are you?), Q2 (What is your sex?), race, Q6 (How tall are you without your shoes on), Q31 (How old were you when you first tried cigarette smoking, even one or two puffs?), Q60 (How old were you when you had sexual intercourse for the first time?), Q61 (During your life, with how many people have you had sexual intercourse?), Q64 (The last time you had sexual intercourse, did you or your partner use a condom?) were significantly associated with the Unhealthy diet in the high school students.

The area under curve was 0.66. The optional cutoff time is 0.49. The mis-classification error was 0.07. The sensitivity rate is about 0% and the specificity is 99.9%.

Conclusions: In this study, we identified important of predictors of unhealth diet among high school students, for example age, gender and sexual behaviors.

Keywords: *Unhealthy diet, gender, behavior, predictors, high school students, model*

Instruction

Healthy eating in childhood and adolescence is important for proper growth and development and to prevent various health conditions. The 2015–2020 Dietary Guidelines for Americans external icon recommend that peo-

ple aged 2 years or older follow a healthy eating pattern that includes the following (US Department of Health and Human Services and US Department of Agriculture, 2015):

- 1) A variety of fruits and vegetables.
- 2) Whole grains.

- 3) Fat-free and low-fat dairy products.
- 4) A variety of protein foods.
- 5) Oils.

Childhood obesity is a progressive phenomenon and is a known risk factor for the metabolic syndrome and type-II DM (Adair, L. S., Gordon-Larsen, P., Du S. F., Zhang, B., Popkin, B. M. 2013).

In this study, we aim to: 1) examine the predictors of the having unhealthy diet at high school; 2) build a predictive model for having unhealthy diet using logistic regression model.

Data and Methods:

Data:

Youth Risk Behavior Surveillance System (YRBSS) 2017 data were used for this study.

The YRBSS was developed in 1990 to monitor priority health risk behaviors that contribute markedly to the leading causes of death, disability, and social problems among youth and adults in the United States.

Models:

We also used logistic regression models to calculate the predicted risk. Logistic regression is a part of a category of statistical models called generalized linear models, and it allows one to predict a discrete outcome from a set of variables that may be continuous, discrete, dichotomous, or a combination of these. Typically, the dependent variable is dichotomous and the independent variables are either categorical or continuous.

The logistic regression model can be expressed with the formula:

$$\ln(P/1-p) = \beta_0 + \beta_1 \times X_1 + \beta_2 \times X_2 + \dots + \beta_n \times X_n$$

Model evaluation:

The discriminatory ability — the capacity of the model to separate cases from non-cases, with 1.0 and 0.5 meaning perfect and random discrimination, respectively— was determined using receiver operating characteristic (ROC) curve analysis. ROC curves are commonly used to summarize the diagnostic accuracy of risk models and to assess the improvements made to such models that are gained from adding other risk factors. Sensitivity, specificity, and accuracy will be also calculated and compared. For all these measures, there exist statistical tests to determine whether one model exceeds another in discrimination ability.

Optimal Cutoff for Binary Classification maximizes the accuracy.

Mis-Classification Error is the proportion of all events that were incorrectly classified, for a given probability cutoff score.

Sensitivity: probability that a test result will be positive when the disease is present (true positive rate).

Specificity: probability that a test result will be negative when the disease is not present (true negative rate, expressed as a percentage).

Variables:

The outcome variable is percentage of students who had Unhealthy diet (Percentage of students who drank a can, bottle, or glass of soda or pop three or more times per day (such as Coke, Pepsi, or Sprite, not counting diet soda or diet pop, during the 7 days before the survey)) based on QNSODA3.

Table 1. Variables used in this study

- Q1. How old are you?
- A. 12 years old or younger
 - B. 13 years old
 - C. 14 years old
 - D. 15 years old
 - E. 16 years old
 - F. 17 years old
 - G. 18 years old or older
- Q2. What is your sex?
- A. Female
 - B. Male

- Q3. In what grade are you?
- A. 9th grade
 - B. 10th grade
 - C. 11th grade
 - D. 12th grade
 - E. Ungraded or other grade
- Q4. Are you Hispanic or Latino?
- A. Yes
 - B. No
- Q5. What is your race? (Select one or more responses.)
- A. American Indian or Alaska Native
 - B. Asian
 - C. Black or African American
 - D. Native Hawaiian or Other Pacific Islander
 - E. White
- Q6. How tall are you without your shoes on?
- Q7. How much do you weigh without your shoes on?
- Q31. Have you ever tried cigarette smoking, even one or two puffs?
- A. Yes
 - B. No
- Q41. During your life, on how many days have you had at least one drink of alcohol?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 9 days
 - D. 10 to 19 days
 - E. 20 to 39 days
 - F. 40 to 99 days
 - G. 100 or more days
- Q47. During your life, how many times have you used marijuana?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 to 99 times
 - G. 100 or more times
- Q60. Have you ever had sexual intercourse?
- A. Yes
 - B. No
- Q68. Which of the following best describes you?
- A. Heterosexual (straight)
 - B. Gay or lesbian
 - C. Bisexual
 - D. Not sure

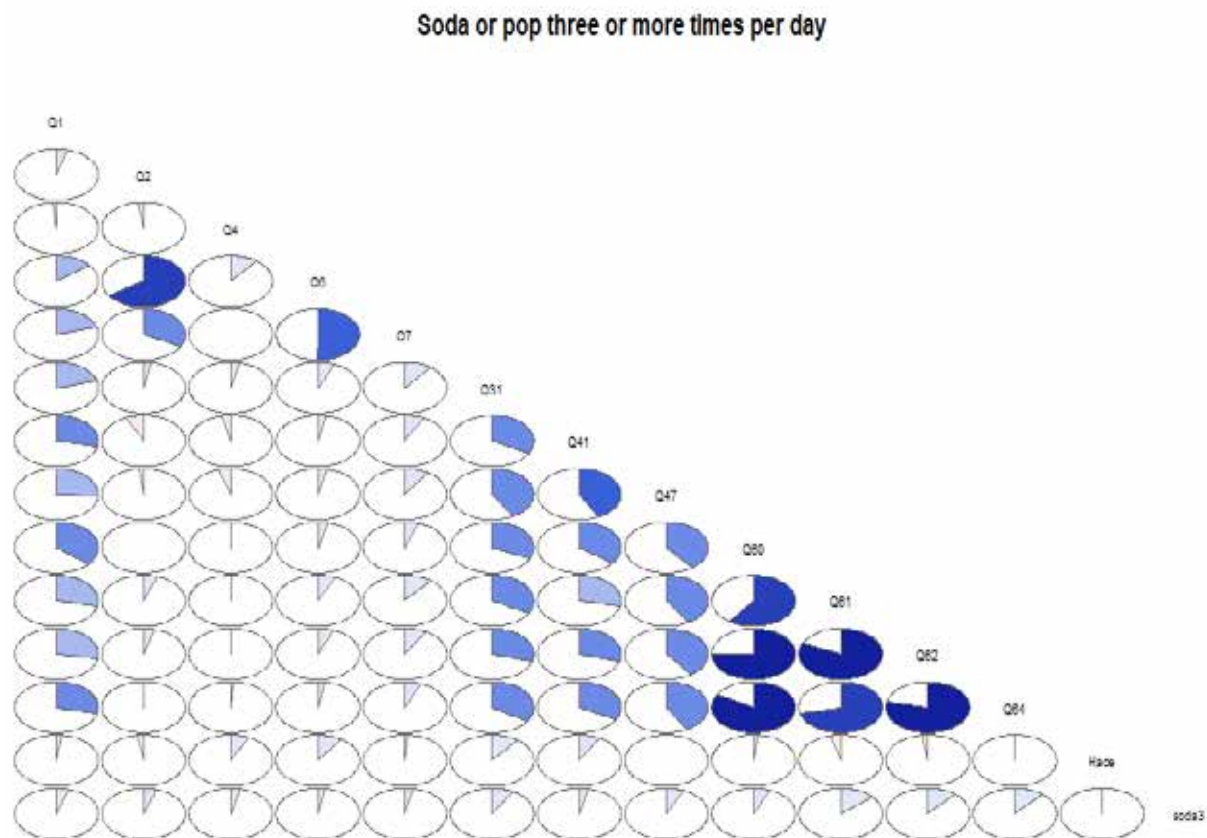
Results

About 7.17% of 7221 high school students had unhealthy diet, about 5.9% among the female and 8.8% among the male.

Basically, a corrgram is a graphical representation of the cells of a matrix of correlations. The idea is to display the pattern of correlations in terms of their signs and

magnitudes using visual thinning and correlation-based variable ordering. Moreover, the cells of the matrix can be shaded or colored to show the correlation value. The positive correlations are shown in blue, while the negative correlations are shown in red; the darker the hue, the greater the magnitude of the correlation.

Figure 1. Matrix of correlations between variables



According to the logistic regression, Q1 (how old are you?), Q2 (What is your sex?), race, Q6 (How tall are you without your shoes on), Q31 (How old were you when you first tried cigarette smoking, even one or two puffs?), Q60 (How old were you when you had sexual inter-

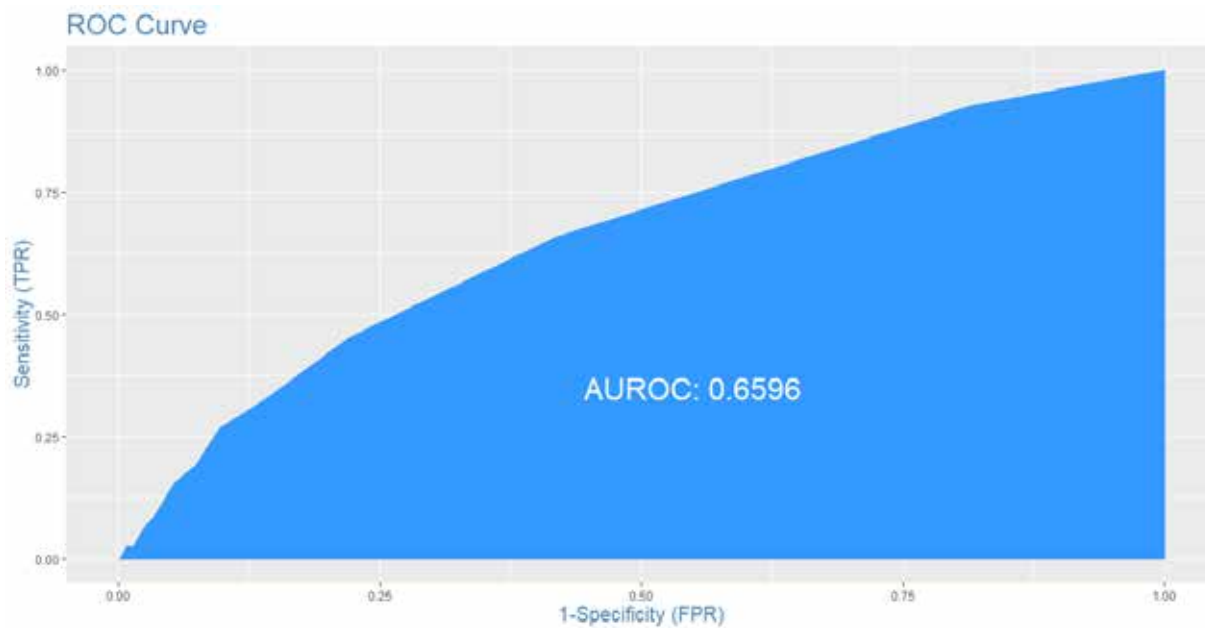
course for the first time?), Q61 (During your life, with how many people have you had sexual intercourse?), Q64 (The last time you had sexual intercourse, did you or your partner use a condom?) were significantly associated with the Unhealthy diet in the high school students.

Table 2. Logistic Regression

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-1.37	1.07	-1.28	0.20	
Q1	0.10	0.05	2.22	0.03	*
factor(Q2)2	0.56	0.13	4.24	0.00	***
factor(Q4)2	0.52	0.15	3.36	0.00	***
factor(Race)2	-1.56	0.46	-3.36	0.00	***
factor(Race)3	0.14	0.28	0.51	0.61	

	Estimate	Std. Error	z value	Pr(> z)	
factor(Race)4	-0.63	0.49	-1.28	0.20	
factor(Race)5	-0.19	0.26	-0.72	0.47	
Q6	-1.65	0.69	-2.38	0.02	*
Q7	0.00	0.00	0.00	1.00	
factor(Q31)2	0.79	0.24	3.25	0.00	**
factor(Q31)3	0.76	0.25	3.01	0.00	**
factor(Q31)4	0.66	0.20	3.25	0.00	**
factor(Q31)5	0.50	0.17	2.98	0.00	**
factor(Q31)6	0.43	0.17	2.57	0.01	*
factor(Q31)7	0.21	0.32	0.66	0.51	
factor(Q41)2	0.36	0.22	1.65	0.10	.
factor(Q41)3	0.24	0.23	1.06	0.29	
factor(Q41)4	0.25	0.19	1.29	0.20	
factor(Q41)5	0.01	0.16	0.07	0.95	
factor(Q41)6	0.17	0.15	1.13	0.26	
factor(Q41)7	-0.14	0.28	-0.52	0.60	
factor(Q47)2	0.52	0.38	1.37	0.17	
factor(Q47)3	0.37	0.33	1.12	0.26	
factor(Q47)4	0.10	0.22	0.43	0.67	
factor(Q47)5	-0.07	0.16	-0.41	0.68	
factor(Q47)6	0.01	0.15	0.04	0.97	
factor(Q47)7	0.16	0.27	0.60	0.55	
factor(Q60)2	1.44	0.45	3.23	0.00	**
factor(Q60)3	1.17	0.50	2.36	0.02	*
factor(Q60)4	1.05	0.47	2.21	0.03	*
factor(Q60)5	0.93	0.46	2.00	0.05	*
factor(Q60)6	0.80	0.46	1.74	0.08	.
factor(Q60)7	0.59	0.48	1.24	0.22	
factor(Q60)8	0.40	0.51	0.78	0.44	
factor(Q61)2	-0.14	0.25	-0.56	0.58	
factor(Q61)3	-0.66	0.27	-2.49	0.01	*
factor(Q61)4	-0.10	0.25	-0.38	0.71	
factor(Q61)5	0.05	0.27	0.17	0.86	
factor(Q61)6	-0.53	0.35	-1.53	0.13	
factor(Q62)2	-0.08	0.48	-0.17	0.86	
factor(Q62)3	-0.04	0.47	-0.08	0.94	
factor(Q62)4	-0.13	0.48	-0.26	0.79	
factor(Q62)5	0.01	0.51	0.01	0.99	
factor(Q62)6	0.06	0.61	0.10	0.92	
factor(Q62)7	-0.31	0.90	-0.34	0.73	
factor(Q64)2	-0.26	0.13	-1.99	0.05	*
Signif. codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'	0.1 ''

Figure. ROC in testing sample for Logistic Regression



The area under curve was 0.66. The optional cutoff time is 0.49. The mis-classification error was 0.07. The sensitivity rate is about 0% and the specificity is 99.9%.

Table

Cut-off	sensitivity	specificity
0.3	2.3%	99.2%
0.5	0%	99.97%
0.7	0%	100%

Discussions

During 2007–2015, daily soda consumption among U.S. high school students decreased significantly from 33.8% to 20.4%. Although the significant downward trends in daily soda consumption suggest that interventions encouraging reduced consumption of soda are working, overall prevalence of daily soda consumption remains high (Trends in Beverage Consumption Among High School Students — United States, 2007–2015).

About 7.17% of 7221 high school students had unhealthy diet, about 5.9% among the female and 8.8% among the male. According to the logistic regression, Q1 (how old are you?), Q2 (What is your sex?), race, Q6 (How tall are you without your shoes on), Q31 (How old were you when you first tried

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In this study, we identified important of predictors of unhealth diet among high school students, for example age, gender and sexual behaviors.

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