Evaluating Factors Influencing Filipinos' Perceived Behavior to Boost Healthy Lifestyle through Multiple Regression Analysis

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Abstract

Physical inactivity and unhealthy lifestyle among individuals are persistent societal problems that have negative implications on one's health. With the COVID-19 pandemic breakout, there has been an alarming rise in sedentary behaviors, a decrease in fitness activities engagement, and apparent physical inactivity among people across different countries. By integrating the Theory of Effort Minimization (TEMPA) and Protection Motivation Theory (PMT) with socio-ecological factors into a single framework, this study aims to identify factors influencing the perceived behavior of Filipinos toward facilitating physical fitness and lifestyle wellness. Through the convenience sampling method, a self-administered questionnaire was disseminated using online platforms, with a total of 565 Filipinos being considered for this study. Results from multiple linear regression analysis showed that Age (p-value = 0.005), Media (p-value = 0.023), Self-efficacy (p-value = 0.000), Intent to Adapt (p-value = 0.002), Income (p-value = 0.034), and Diet (p-value = 0.000) were the key variables that affects the perceived behavior of Filipinos in boosting physical fitness and lifestyle wellness. This study has structured a model that could be utilized by the fitness industry, different government and educational institutions, Health Maintenance Organizations (HMOs), and other private and public institutions to establish effective strategies and interventions through fitness programs that will promote fitness and lifestyle wellness among different stakeholders.

Keywords
Physical Activity, Lifestyle Wellness, Multiple Linear Regression, Protection Motivation Theory, Theory of Effort Minimization in Physical Activity.

1. Introduction
Physical fitness is the ability of the body to function efficiently to perform daily activities, maintain good health, and prevent diseases (Kent 2006). Comparatively, lifestyle wellness pertains to every individual's action that contributes to physical, mental, and social well-being. Fitness and lifestyle wellness are linked to physical activity such as walking, gardening, and doing house chores, and exercises such as jogging, cycling, strength and muscle training, including a healthy diet. These two components have been considered essential to human health and, unfortunately, have not received significant attention.

Over the past decades, physical inactivity and unhealthy lifestyle have been alarming issues among many individuals. In relation, The WHO recommended physical activity levels per week are not being met globally by 81% of adolescents and 23% of adults (World Health Organization [WHO], 2010). Additionally, the COVID-19 pandemic has amplified people's deteriorating lifestyles, such as sedentary behaviors, poor eating and sleeping habits, and alcohol consumption worsening their overall lifestyle (Chew & Lopez 2021). These unhealthy behaviors increase the risk of mortality due to non-communicable diseases (NCDs) such as diabetes, heart and chronic respiratory disease, and cancer (WHO 2013). In the Philippines, it is revealed that approximately 27 million Filipinos are overweight and

obese due to unhealthy lifestyles brought about by the pandemic (Department of Science and Technology – Food and Nutrition Research Institute [DOST-FNRI], 2022). A study from The Lancet Child & Adolescent Health journal revealed that Filipino adolescents ranked almost last out of the 146 countries in terms of physical activity level. It also noted that the Philippines is one of the countries that had the highest prevalence of insufficient activity among adolescents, with a reported rate of 94.2%. In response to these, the government initiated different healthy lifestyle and sports programs such as "Galaw Pilipinas" by the Department of Education and Sports Development Plan developed by the Philippine Sports Commission, but these proved inadequate.

These issues can be attributed to several factors hindering an individual's physical activity. These include personal factors such as experiences and feelings towards repetitive physical strain (Brand & Ekkekakis 2017), resources such as capabilities and availability (Hanson et al. 2021), social norms and support (Sicilia 2020; Andriyani et al. 2021), and other socio-ecological factors. Numerous studies revealed these socio-ecological factors to be a significant contributor of healthy lifestyle intentions. Thus, in a more sensible approach, this study considered comprehensive factors that can influence the perceived behavior of Filipinos in implementing health-promoting actions.

1.1 Objectives
This study aims to determine the factors influencing the perceived behavior of Filipinos to boost physical fitness and lifestyle wellness utilizing multiple linear regression analysis using the Minitab-19 Statistical software. Factors from the Protection Motivation Theory (PMT) and Theory of Effort Minimization in Physical Activity (TEMPA) as well as socio-ecological and individual factors were considered in the analysis.

The results of this study would provide a ground for policymakers from government institutions, fitness and healthcare sectors, and other private and public organizations to develop effective health-promoting programs that will enhance the well-being of many individuals. Maintaining a healthy lifestyle would gradually decrease the prevalence of non-communicable diseases, entailing different health, social, and economic benefits in the long-term perspective (WHO, 2018). Moreover, this study could be applied globally and be explored further with comprehensive analysis.

2. Literature Review
Physical activity is always associated with wellness as it affects an individual's quality of life. It is also beneficial for maintaining an individual's health, including positive health behaviors, self-care, blood pressure, muscle tone, eating habits, and physical activity levels (Olivers 2019). Being physically active entails improving brain health, strengthening bones and muscles, and reducing the risk of chronic diseases (Centers for Disease Control and Prevention 2022). However, during the pandemic, physical activity and lifestyle wellness were compromised as several unhealthy behaviors began to arise (Chew & Lopez 2021). The pandemic has led to fewer opportunities for people to exercise and practice proper nutrition. Thus, the problem with physical inactivity was even more magnified.

To effectively address such issues, it is essential first to understand the different factors affecting an individual's participation in physical activity and lifestyle wellness. Theories such as the Protection Motivation Theory (PMT) help understand behavioral intentions. PMT is a value-based theory wherein behavioral intentions are influenced by beliefs and attitudes (Hanson 2021). It also considers the intrinsic and extrinsic motivation of individuals, therefore having a better understanding of how individuals perform adaptive responses (Lahiri 2021). For this reason, PMT is used to explain general health behaviors, such as an individual's intention to adapt healthy behaviors, since it can be deemed as an approach to remove and prevent health concerns (e.g., COVID-19). Moreover, the Theory of Effort Minimization (TEMPA) is also a helpful framework for understanding the behaviors of individuals concerning their intent to boost physical activity and a healthy lifestyle. TEMPA considers why individuals who intend to be physically active fail to translate it into action (Cheval & Boisgointier 2021). Cheval & Boisgointier (2021) have stated that positive (perceived pleasure) or negative (perceived displeasure) evaluations of physical activity cues influence automatic precursors (e.g., past affective experiences and approach-avoidance tendencies) and controlled precursors (e.g., reasoned attitudes, outcome expectancy, and perceived benefits). For individuals to successfully engage in physical activity, their automatic and controlled processes should exhibit a more potent driving force to outweigh the negative processes. Integrating both theories and considering the different factors under them may produce an enhanced understanding of individuals' reasoning and their intention to adapt physical activity and lifestyle wellness.

Demographic factors may also influence human reasoning. Studies have shown that age and socioeconomic status significantly affect an individual's intention to engage in healthy behaviors. Research proves that there is an almost

universal decline in physical activity throughout the lifespan (Wolff-Hughes et al. 2015). Physical activity levels tend to stabilize during midlife and eventually decline in older ages (Varma et al. 2017). Other than age-related influences, socioeconomic factors also play an essential role in the intention to adapt healthy behaviors. Studies have shown that individuals in low-income brackets pose lower self-efficacy compared to those in the high-income brackets (Talaei 2013). Therefore, they may find it difficult to adapt healthy lifestyles as they have less access to resources needed to maintain such lifestyle.

Almost a quarter of the Philippine population is overweight and obese due to unhealthy lifestyles ((Department of Science and Technology – Food and Nutrition Research Institute [DOST-FNRI] 2022). Consequently, the country ranks last out of 146 countries in terms of physical activity level. An effective approach to solving this problem entails considering different factors affecting Filipinos' intent to participate in healthy behaviors. The evaluation of intrinsic and extrinsic motivations and automatic and controlled precursors must be carried out. Lastly, demographic factors such as age and socioeconomic status should be considered in devising health programs.

3. Methods

From the PMT, response efficacy (RE) and self-efficacy (SE) factors were extracted. From TEMPA, automatic precursors (AP) and controlled precursors (CP) were considered. Additionally, socio-ecological factors such as media (ME), motivation (M), and COVID-19 understanding (CU) were evaluated. Lastly, individual factors such as gender, generational age group, occupation, geographical residence, exercise frequency, and diet were included in the analysis. These factors were evaluated constituting the overall framework of this study which is shown in Figure 1.
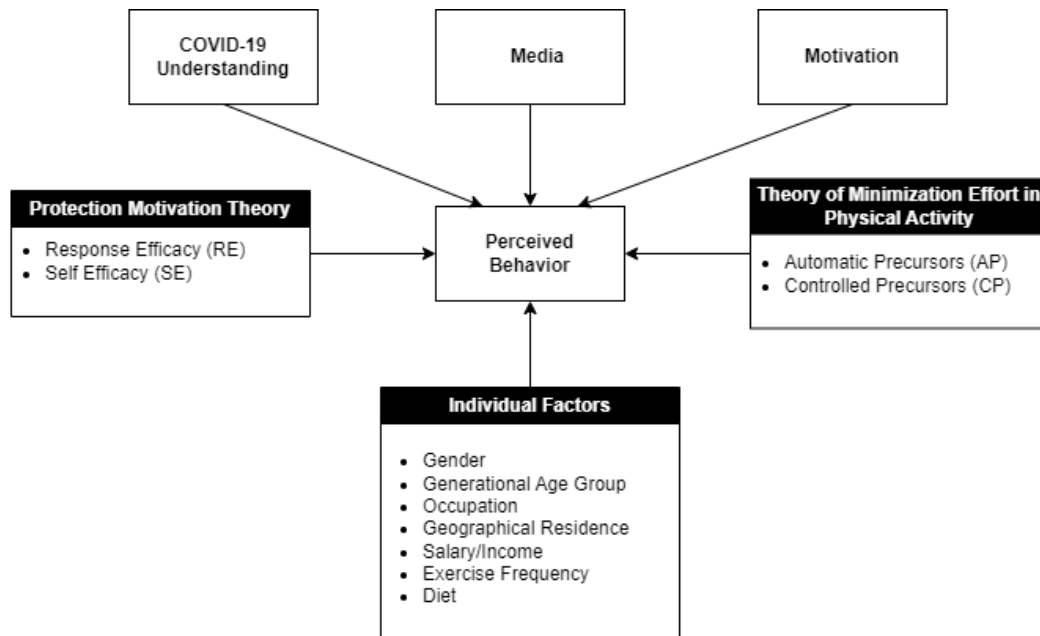

Figure 1. Conceptual Framework

4. Data Collection

In this section, the researchers utilized stepwise multiple linear regression (MLR) from the 565 data collected from the respondents. The data gathering procedure was conducted online using survey questionnaires, specifically Google forms which were distributed through different online media platforms. Respondents are mostly from Generation Z, ages between 18 to 25. Male respondents are 45.8% while 54.2% are female; the majority are students who exercise weekly and follow a specific diet.

Table 1. Respondent's Descriptives

Characteristics	Category	N	%
Gender	Male	259	45.8
	Female	306	54.2
Generational Age Group	Gen Z (18-25)	542	95.9
	Millennials (26-41)	14	2.5
	Gen X (42-57)	8	1.4
	Boomers II (58-67)	1	.2
Occupation	Student	517	91.5
	Part-time	8	1.4
	Full time	29	5.1
	Self-employed	6	1.1
	Unemployed	4	0.7
	Retired	1	0.2
Geographical Residence	Region I – Ilocos Region	11	1.9
	Region II – Cagayan Valley	3	0.5
	Region III – Central Luzon	93	16.5
	Region IV-A – CALABARZON	154	27.3
	Region IV-B – MIMAROPA	1	0.2
	Region V – Bicol Region	6	1.1
	Region VI – Western Visayas	4	0.7
	Region VII – Central Visayas Region (CAR)	5	0.9
	Region VIII – Eastern Visayas	1	0.2
	Region IX – Zamboanga Peninsula	2	0.4
	Region X – Northern Mindanao	5	0.9
	Region XI – Davao Region	1	0.2
	Region XII – SOCCSKSARGEN	1	0.2

	Region XIII – Caraga	1	0.2
	National Capital Region (NCR)	276	48.8
	Cordillera Administrative Region (CAR)	1	0.2
Exercise Often?	Daily	92	16.3
	Weekly	221	39.1
	Monthly	100	17.7
	N/A	152	26.9
Have a specific diet?	Yes	69	12.2
	No	496	87.8

5. Results and Discussion

5.1 Correlation Analysis

To determine the extent at which the independent variables influence the dependent variable, correlation analysis was performed. Shown in Table 2 are the correlation coefficient and the corresponding relationship on the response variable.

Table 2. Correlation Results

Factors	Correlation Coefficient	Relationship
Media	0.292	Weak correlation
COVID-19 Understanding	0.415	Moderate correlation
Motivation	0.05	Weak correlation
Response-Efficacy	0.311	Weak correlation
Self-Efficacy	0.511	Moderate correlation
Automatic Precursors	0.418	Moderate correlation
Controlled Precursors	0.246	Weak correlation
Intent to Adapt	0.429	Moderate correlation

Presented in table 2 is the correlation results of the model. Utilizing the coefficient interpretation from the study of Akoglu (2018) that is typically used in the field of psychological studies, the following relationships were determined. COVID-19 Understanding, Self-Efficacy, Automatic Precursors, and Intent to Adapt factors showed a moderate correlation with Perceived Behavior. While Media, Motivation, Response-Efficacy, and Controlled Precursors variables have a weak correlation with Perceived Behavior.

5.2 Multiple Regression Analysis
Multiple linear regression was utilized to structure the relationships between the identified predictor variables and the response variable. Through the stepwise method, nonsignificant variables were removed, and the final model was determined.

Table 3. Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	56	265.734	4.745	7.54	0.000
Age	1	4.899	4.900	7.78	0.005
ME	12	15.091	1.258	2.00	0.023
SE	20	48.256	2.413	3.83	0.000
ITA	16	23.795	1.487	2.36	0.002
Salary/Income	5	7.640	1.528	2.43	0.034
Diet	1	13.211	13.211	20.99	0.000
Error	508	319.711	0.629		
Total	564	585.445			

Table 4. Model Fitness Results

S	R-sq	R-sq (adj)
0.793317	45.39%	39.37%

Table 3 shows factors such as Age (p-value = 0.005), Media (p-value = 0.023), Self-efficacy (p-value = 0.000), Intent to Adapt (p-value = 0.002), Salary (p-value = 0.034) were the significant variables that impacts Filipinos' perceived behavior on performing healthy lifestyle behaviors. With an R-square model value of 45.39% which met the minimum threshold of at least 10%, an acceptable range for social science studies, this indicates the validity of the model (Ozili 2022).

From the variance inflation factors (VIF) results shown in Table 5, all values are below the range of 5.00 implying that there is no multicollinearity presented in the model (James et al., 2017). Moreover, it can be concluded that the independent variables have moderate correlation since the VIF values are between 1 and 5 (Necio et al. 2019).

Table 5. Variance Inflation Factors

Term	Beta Coef	SE Coef	T-Value	P-Value	VIF
Constant	3.436	0.839	4.09	0.000	
Age	-0.399	0.143	-2.79	0.005	1.72

ME	-0.458	0.445	-1.03	0.034	3.09
SE	0.276	0.541	0.51	0.009	2.76
ITA	-0.430	1.090	-0.39	0.025	1.87
Salary/Income	0.282	0.115	2.46	0.014	1.12
Diet	-0.514	0.112	-4.58	0.000	1.21

5.2 Discussion

The past decades have shown alarming numbers of physical inactivity and unhealthy lifestyle among several individuals. Approximately 27 million Filipinos were found to be obese and overweight due to unhealthy lifestyles. Such detrimental lifestyles have been amplified more by the COVID-19 pandemic, as increased sedentary behaviors, poor eating and sleeping habits, and alcohol consumption were all observed during this period. To successfully address these issues, understanding the different factors that affect an individual's perceived behavior should be studied.

The results of this study showed that Age has a negative significant effect on an individual's perceived behavior. This indicates that as individuals age, they will less likely participate in physical activity. This may be attributed to the fact that people lose their muscle mass and strength as they age (Suryadinata et al. 2020). In contrast, Salary/Income has a significant positive effect on perceived behavior, indicating that as people earn more, they are more likely to engage in physical activity and healthy habits. Andualem et al. (2020) highlighted that those with low monthly incomes could not afford all recommended lifestyle modifications; therefore, higher income would give individuals fewer restrictions and more equipment for a healthier lifestyle.

Consequently, based on our results, self-efficacy was also found to have a significant effect on perceived behavior. The belief of an individual regarding their physical capacity may contribute to their decision to execute the physical activity. Moreover, the availability of fitness equipment and time availability may also be a factor in an individual's decision to perform healthy behaviors (Hong & Chung 2020; Rhodes et al. 2017; Hamilton et al. 2016). Physical inactivity can increase the risk of individuals developing metabolic disorders and other chronic diseases such as diabetes and cardiovascular diseases. Therefore, tailored programs that will limit physical exercise barriers can help Filipinos be more confident in exercising.

Regression results also show that Media has a negative significant effect on perceived behavior. This is in line with a study that proved that mass media could influence individuals to change their daily routine, which includes changes in eating habits and physical activity (Vasuja & Balamurugan 2018). According to global reports, the Philippines is one of the leading countries in media consumption, averaging 10 hours and 27 minutes a day (Baclig 2022). It is proven that social media may have negative consequences, such as reduced physical and psychological health due to a sedentary lifestyle, poor diet, and sleeping habits. The more an individual is exposed to media, the more it affects their cognition, such as social isolation and negative self-perception (Jane et al. 2018, Goodyear et al. 2018). Therefore, it is important for the government to address this, given the risks that excessive media usage poses.

ITA was seen to have a significant negative effect on perceived behavior. Similar to the findings from the study of Hassan et al. (2016), intentions in individuals might be high, but there is a lack of follow-through in engaging in the activity. Thus, it is suggested to utilize commitment applications as a self-regulatory strategy to bridge an individual's intention and perceived behavior. Lastly, Diet significantly negatively affects perceived behavior, implying that people following a dietary plan are less likely to also do physical activity. This might be due to the success of results similar

to the study of Edwards et al. (2020) of diet-only interventions without exercise was already associated with a significant reduction in BMI.

5.3 Proposed Improvements
As promising as the results of this study are, the researchers acknowledge the several limitations of this paper. First, due to COVID-19 restrictions, the researchers could only disseminate the survey online, resulting in a majority of Gen Z age bracket respondents who also favored a certain income bracket. Face-to-face data gathering can capture more age and income brackets for more robust results for the study. Second, more geographical representation from other regions could be improved, which could then be used for further studies focusing on the three island groups can also be a good topic due to different environmental and cultural factors. Lastly, considering the integration of action control, planning ability, and attitude as added variables may contribute to a more comprehensive study.

5.4 Validation
From Table 6, the Cronbach's Alpha values of the variables are in the acceptable cutoff range; higher than 0.600 (Ghozali 2016). This indicates that all measurement items are considered consistent and reliable.

Table 6. Cronbach's Alpha Results

Factor	Cronbach's Alpha
Media	0.756
COVID-19 Understanding	0.776
Motivation	0.625
Response Efficacy	0.824
Self-Efficacy	0.858
Automatic Precursors	0.864
Controlled Precursors	0.834
Intent to Adapt	0.732
Perceived Behavior	0.781

6. Conclusion
The high prevalence of physical inactivity and sedentary behaviors of Filipinos, fueled more by the COVID-19 lockdowns, resulted in adverse health effects and a weakened immune system; therefore the necessity for health-promoting behaviors are necessary to reduce the risk of diseases and improve health outcomes. This study identified factors affecting Filipinos' perceived behavioral intention to boost physical fitness and lifestyle, considering individual factors, ME, CU, M, and incorporating both the Protection Motivation Theory (PMT) and the Theory of Effort Minimization in Physical Activity (TEMPA). These factors were assessed using a multiple regression analysis.

Results indicate Salary/Income and SE have a positive direct and high significance to PB. At the same time, Exercise Often, Age, ITA, ME, and Diet were seen to have a significant negative effect on PB. The belief in one's capability and financial capacity contributes to engaging in healthier routines. With that, it would also increase the likelihood of an individual becoming a health-oriented person if they are encouraged at the earliest stage of their life with less media exposure. Though limitations were presented, the study could be utilized by the fitness industry, government, local government units (LGUs), and private and public institutions to create successful fitness and wellness programs.

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