DSCI 1412 - Project Report: Relationships Between Blood Pressure, BMI, & Life Expectancy

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Introduction:

This report serves the purpose of analyzing a dataset to come to conclusions regarding world healthcare problems. Healthcare is one of human life's most important, if not the most important, aspects. This report works to analyze and visualize data to be able to draw conclusions regarding existing relationships between variables that affect healthcare problems and also signs of healthcare systems globally improving.

Description of the dataset:

The dataset includes several files with data over the decades about male and female blood pressure, body mass index (BMI), and life expectancy all around the world. Each of these healthcare variables has its own file where, for example, there is a file for male blood pressure from the year, 1980 to 2008 for every country, and then there is a separate file for female blood pressure from the year, 1980 to 2008 for every country as well, and the same goes for the variables, BMI and life expectancy. Therefore, this dataset provokes seeking to analyze and visualize the relationships between the essential variables that play a role in trying to achieve a life that is as healthy and long-lasting as possible.

Description of the problem:

Life expectancy, BMI, and blood pressure are measures of a human's health. Struggling to achieve a healthy life is a problem a lot of people face. We can analyze this dataset to find if people have become healthier over the years. By looking at life expectancy over the years, we can measure if people's health has improved, increasing life expectancy. We can also do the same for BMI and blood pressure to see what is a healthy BMI and blood pressure. We need to see if there is a relationship between life expectancy and blood pressure and life expectancy and BMI to see if there is a blood pressure or BMI we seek to achieve to improve our health. We will also look for a relationship between BMI and blood pressure to see if there is a way to achieve optimal blood pressure that maximizes life expectancy if it exists. In conclusion, the problem is finding the optimum parameters of health, and we can use the dataset to answer that question by getting a summary of the data over the years and finding if there is a relationship between the variables.

Data Summary:

Average Life Expectancy for Males Over the Years:

1980	1990	2000	2008
60.235	63.136	65.577	68.095

Average Life Expectancy for Females Over the Years:

1980	1990	2000	2008
65.658	68.67	70.764	73.264

As you can see, male and female life expectancy is growing with time. Many factors can contribute to increased life expectancy such as:
1 - The government increased funding for health care.
2 - More hospitals are being constructed.
3 - New medicines are being discovered.
Female life expectancy rises faster than male life expectancy due to a variety of factors, including:
1 - Men are deployed to war.
2 - Men commit crimes and are sentenced to death.
3 - More males are being murdered.

Average Blood Pressure for Males Over the Years:

1980	1990	2000	2008
132.617	130.780	130.086	131.181

Average Blood Pressure for Females Over the Years:

1980	1990	2000	2008
128.510	127.710	126.769	126.485

As it can be seen, men's and women's blood pressure is lowering over time. Many variables can help lower blood pressure, including:
1 - **Medication**: Some medications, such as antihypertensive pharmaceuticals, are intended to reduce blood pressure. These drugs function by dilating blood arteries, decreasing blood volume, or interfering with the hormonal systems that regulate blood pressure.
2 - **Lifestyle Modifications**: Making positive lifestyle adjustments can have a major impact on blood pressure such as regular physical activity, a nutritious diet (low in salt and high in fruits, vegetables, and whole grains), keeping a healthy weight, lowering alcohol intake, and quitting smoking.
3 - **Stress Reduction**: Excessive stress might temporarily raise blood pressure. Stress-relieving activities such as meditation, deep breathing techniques, yoga, or hobbies can all help lower blood pressure.

Women's blood pressure drops faster than men's due to a range of variables, including:
1 - **Hormonal fluctuations:** Hormonal variations can affect blood pressure throughout a woman's life. Blood pressure levels might fluctuate during the menstrual cycle due to changes in estrogen and progesterone levels. Furthermore, blood pressure may rise during pregnancy and then return to normal

after delivery. Menopause is another time when hormonal changes might have an effect on blood pressure readings.
2 - **Gender differences:** Blood pressure rises with age in both men and women. Women, on the other hand, typically experience a greater increase in blood pressure after menopause than men of the same age. This could be due to a decrease in estrogen levels, which can alter blood vessel function.
3 - **Risk factors:** The prevalence of various high blood pressure risk factors varies between men and women. Women with polycystic ovarian syndrome (PCOS), for example, may be predisposed to high blood pressure. Furthermore, some birth control methods, such as hormonal contraceptives, can modestly raise blood pressure in some women.

Average BMI Values for Males Over the Years:

1980	1990	2000	2008
23.155	23.706	24.369	25.098

Average BMI Values for Males Over the Years:

1980	1990	2000	2008
23.554	24.332	25.141	25.922

As you can see, the body mass index (BMI) of men and women is rising over time. Many causes can contribute to an increase in BMI, including:
1 - The increased popularity of having a healthy lifestyle
2 - Doing sports

Men's BMI rises faster than women's BMI for a variety of reasons, including:
1 - Men participate in more sports than women
2 - Men go to the gym more often than women

Variance Life Expectancy for Males Over the Years:

1980	1990	2000	2008
91.759	89.017	85.380	72.963

Variance Life Expectancy for Females Over the Years:

1980	1990	2000	2008
107.243	104.080	103.636	88.188

As you can see, the variance in life expectancy for men and women is decreasing. Within a given population or group, there is less variation or dispersion in the ages at which people are predicted to

survive. In other words, individuals within that demographic have more equal life expectancies, and the difference between the shortest and longest life spans is lower.
A decrease in the variance of life expectancy can point to one of several scenarios:
1 - **Improved healthcare and living conditions:** If a population's overall health and living conditions improve, the variation in life expectancy may decrease. Better access to healthcare, advances in medical treatments, disease prevention, greater sanitation, and healthier lifestyles can all help to reduce variation.
2 - **Lower mortality rates:** When mortality rates across different age groups within a population become more similar or fall overall, the variation of life expectancy decreases. This could be due to improved healthcare interventions, public health measures, disease control, and better chronic condition management.
3 - **Aging population:** A decrease in the variance of life expectancy can occur in some circumstances as a result of a population aging and reaching a stage where the majority of individuals are in a similar age range, resulting in reduced variety in life expectancy.

Variance Blood Pressure for Males Over the Years:

1980	1990	2000	2008
23.998	17.552	11.769	12.797

Variance Blood Pressure for Females Over the Years:

1980	1990	2000	2008
30.090	17.578	13.128	18.946

As you can see, the variance in blood pressure for men and women is decreasing. Blood pressure measurements have reduced variability or dispersion within a specific population or group. In other words, individuals in that community have more similar blood pressure levels, and the range between the lowest and highest blood pressure measurements is narrower.
A decrease in blood pressure variance can suggest one of several scenarios:
1 - **Improved blood pressure control:** A decrease in blood pressure variation indicates that blood pressure management within the population or group is becoming more consistent. This could be due to improved healthcare interventions, medication adherence, and lifestyle changes targeted at maintaining appropriate blood pressure levels.
2 - **Effective hypertension treatment and management:** Hypertension, often known as high blood pressure, is a common condition that can lead to greater variability in blood pressure measures. If blood pressure variation diminishes, it may indicate that efforts to diagnose, treat, and manage hypertension have been successful, resulting in persons having more stable and regulated blood pressure.
3 - **Lifestyle changes:** Adopting a healthy lifestyle that includes regular physical activity, a balanced diet, stress management, and limiting alcohol and sodium intake will all help to lower blood pressure and variance. When these lifestyle changes are followed regularly, they can lead to better blood pressure control and less variability in blood pressure measurements.

Variance BMI Values for Males Over the Years:

1980	1990	2000	2008
3.810	4.546	5.653	6.58

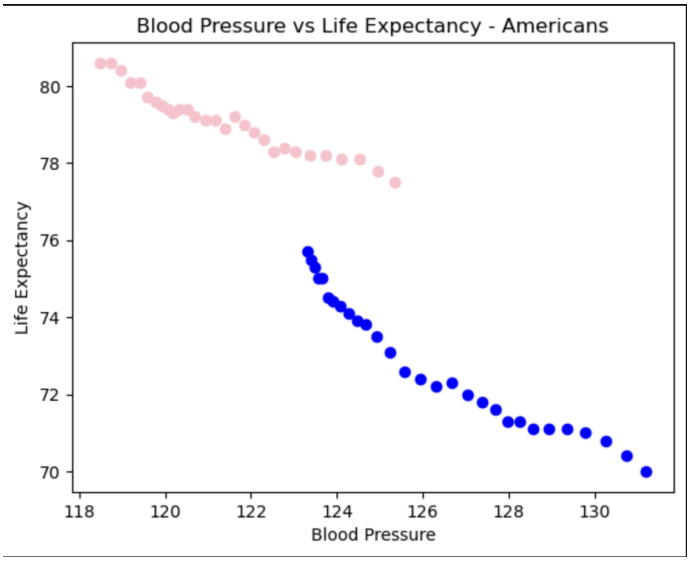
Variance BMI Values for Males Over the Years:

1980	1990	2000	2008
5.636	5.957	6.849	7.867

As you can see, the variance in bmi for men and women is increasing. Within a given demographic or group, there is greater variability or dispersion in BMI values. Individuals in that group, in other words, have a wider range of BMI readings, indicating a greater variability in body weight and composition.
An increase in BMI variance can suggest one of several scenarios:
1 - **Diverse body weight distribution:** As BMI variance grows, it indicates that there is more variation in body weight and composition within the population. This could be due to genetic variances, lifestyle choices, food habits, activity levels, or other variables that contribute to weight fluctuation.
2 - **Changing demographic or lifestyle patterns:** Changes in BMI might occur as a result of demographic or lifestyle changes within a population. Changes in eating habits, decreased physical activity levels, or an increase in sedentary behaviors can all contribute to an increase in BMI variance.
3 - **Health disparities:** An increase in the variance in BMI may be suggestive of population health disparities. Certain subgroups or people within the population may have higher BMIs in some situations, resulting in more variability in BMI results.

Relationships:

USA:

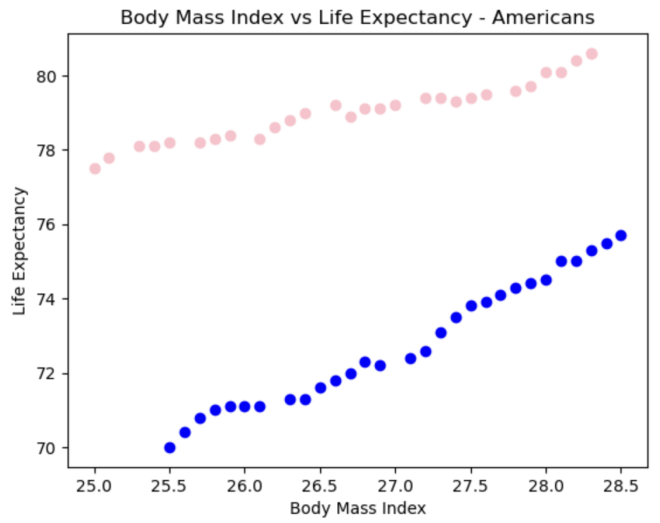


Description & Analysis:

This graph visually represents a linear relationship between life expectancy and blood pressure. From the graph, we can see that there is a negative linear relationship between blood pressure and life expectancy for both men and women in the USA, where life expectancy decreases as blood pressure increases. The covariance and R and R^2 values were calculated to prove this relationship further numerically. The covariance for men was -4.11 and for women -1.57. This shows a negative linear relationship between the two variables.

```
Male R=-0.9662750392176057
Male R^2=0.9336874514149854
Female R=-0.9709842148824448
Female R^2=0.9428103455508777
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.



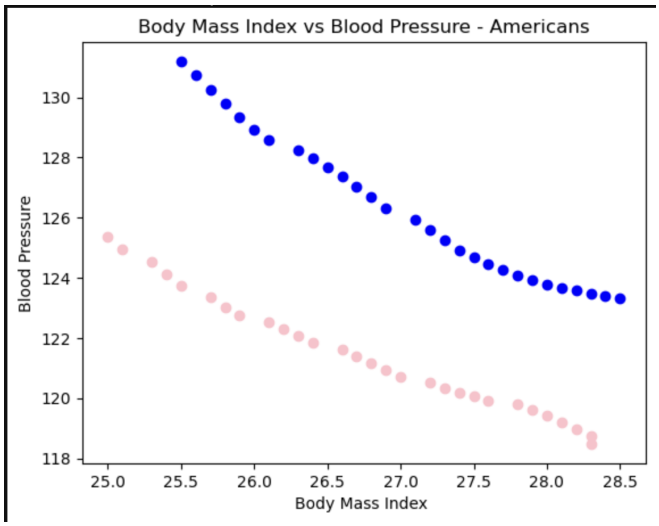
Description & Analysis:

This graph visually represents a linear relationship between the variables BMI and life expectancy. From the graph, we can see that there is a positive linear relationship between BMI and life

expectancy for both men and women in the USA, where life expectancy increases as BMI increases. The covariance and R and R^2 values were calculated to prove this relationship further numerically. The covariance for men was 1.57 and for women 0.84. This shows a positive linear relationship between the two variables.

```
Male R=0.9887898748936947
Male R^2=0.9777054166922885
Female R=0.9764470967158517
Female R^2=0.9534489326848159
```

These values further prove a strong positive linear relationship between blood pressure and life expectancy, as the R values are between 0.7 and 1. The R^2 value shows that the variance in life expectancy is highly correlated with BMI.



Description & Analysis:

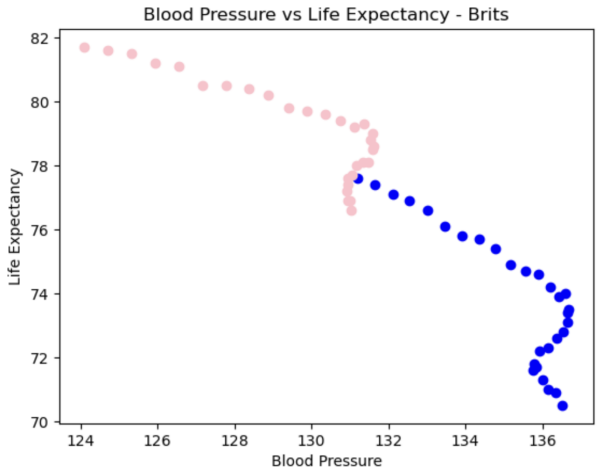
This graph visually represents a linear relationship between BMI and blood pressure. From the graph, we can see that there is also a negative linear relationship between BMI and blood pressure in the USA, where the more the BMI increases, the more the blood pressure decreases. The covariance and R and R^2 values were calculated to prove this relationship further numerically. The covariance for men is -2.28 and for women it is -2.00. This shows a negative linear relationship between BMI and blood pressure.

```
Male R=-0.9881213250266611
Male R^2=0.9763837529724444
Female R=-0.9920820781484969
Female R^2=0.9842268497834403
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in blood pressure is highly correlated with BMI.

Now that we have identified three relationships with the data from the United States, the same process will be repeated for one country from each of the remaining continents to confirm the previously determined relationships.

United Kingdom:

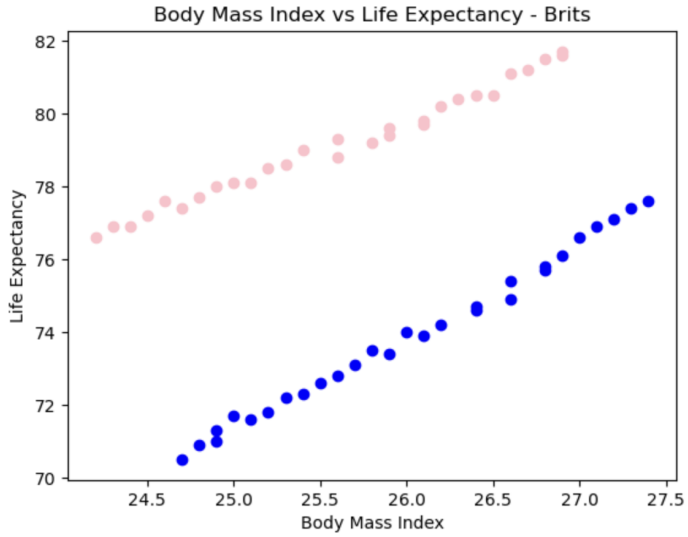


Description & Analysis:

This graph visually represents a linear relationship between life expectancy and blood pressure. From the graph, we can see that there is a negative linear relationship between blood pressure and life expectancy for both men and women in the UK, where life expectancy decreases as blood pressure increases. While this graph does include some clear outliers, it does not take away from the interpreted trend that as the higher the blood pressure is, the lower the life expectancy is. To support that, the variables have a covariance of -2.97 for males which shows there is a negative linear relationship between the variables.

```
Male R=-0.8346548387249185
Male R^2=0.6966486998069198
Female R=-0.8450346172266914
Female R^2=0.7140835043114608
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.



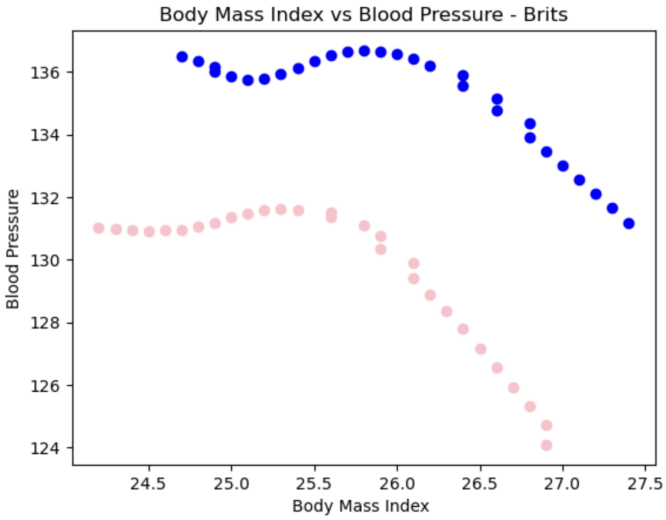
Description & Analysis:

This graph visually represents a linear relationship between BMI and life expectancy. From the graph, we can see that there is a positive linear relationship between BMI and life expectancy for both

men and women in the UK, where the higher the BMI value is, the higher the life expectancy is. The covariance for males is 1.80 and for females 1.29, this reaffirms the positive linear relationship.

```
Male R=0.9960713347835787
Male R^2=0.9921581039775401
Female R=0.9932894426220183
Female R^2=0.9866239168243599
```

These values further prove a strong positive linear relationship between blood pressure and life expectancy, as the R values are between 0.7 and 1. The R^2 value shows that the variance in life expectancy is highly correlated with BMI.



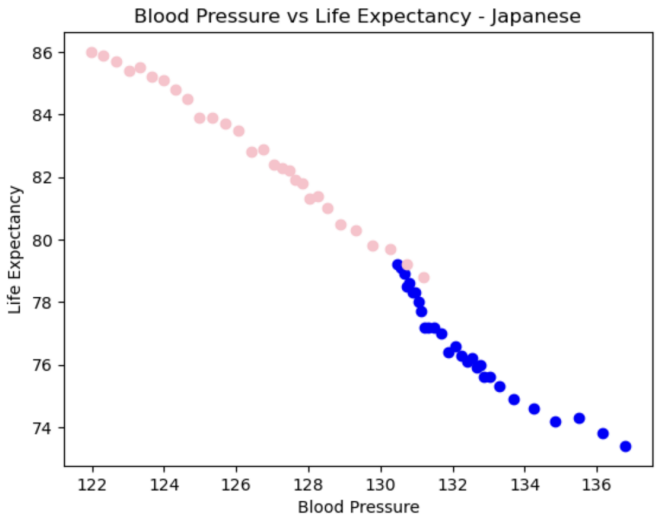
Description & Analysis:

This graph visually represents a linear relationship between BMI and blood pressure. From the graph, we can see that the linear relationship is specifically a negative linear relationship between BMI and blood pressure in the UK, where the more the BMI increases, the more the blood pressure decreases. While this graph does feature some outliers, it does not rule out that the vast majority of the data supports and represents the negative linear relationship between BMI and blood pressure. The covariance supports this claim as it is -1.13 for males and -1.62 for females meaning a negative linear relationship.

```
Male R=-0.804239802748864
Male R^2=0.6468016603255317
Female R=-0.8164593316229029
Female R^2=0.6666058401941173
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.

Japan:

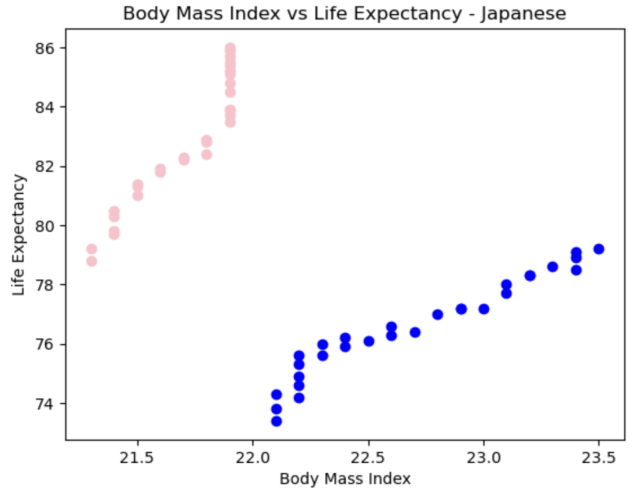


Description & Analysis:

This graph once again visually represents a linear relationship between life expectancy and blood pressure. From the graph, we can see that there is a negative linear relationship between blood pressure and life expectancy for both men and women in Japan, where life expectancy decreases as blood pressure increases. The covariance for males is -2.74 and for females it is -5.72, these values verify the claim about the relationship.

```
Male R=-0.9546999783521611
Male R^2=0.9114520486656169
Female R=-0.9948110779132446
Female R^2=0.9896490807389117
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.



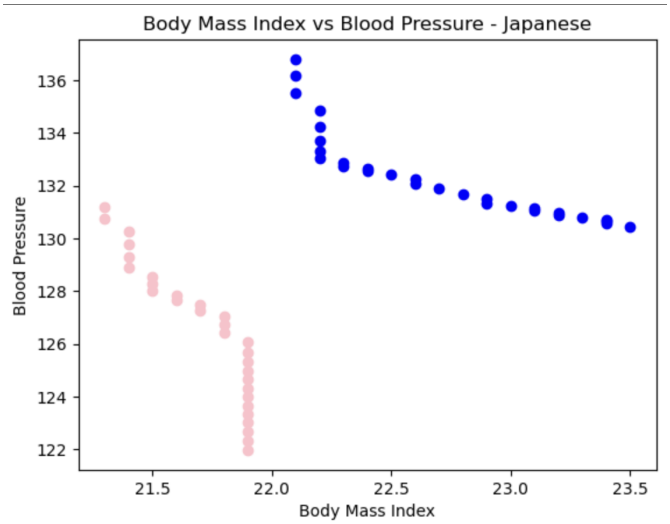
Description & Analysis:

This graph visually represents a linear relationship between the variables BMI and life expectancy. From the graph, we can see that there is a positive linear relationship between BMI and life expectancy for both men and women in Japan, where life expectancy increases as BMI increases. The

covariance for men is 0.76 while for women it is 0.46. This confirms the positive linear relationship shown in the graph.

```
Male R=0.9664435093062702
Male R^2=0.9340130566802188
Female R=0.9441949372204795
Female R^2=0.8915040794727853
```

These values further prove a strong positive linear relationship between blood pressure and life expectancy, as the R values are between 0.7 and 1. The R^2 value shows that the variance in life expectancy is highly correlated with BMI.



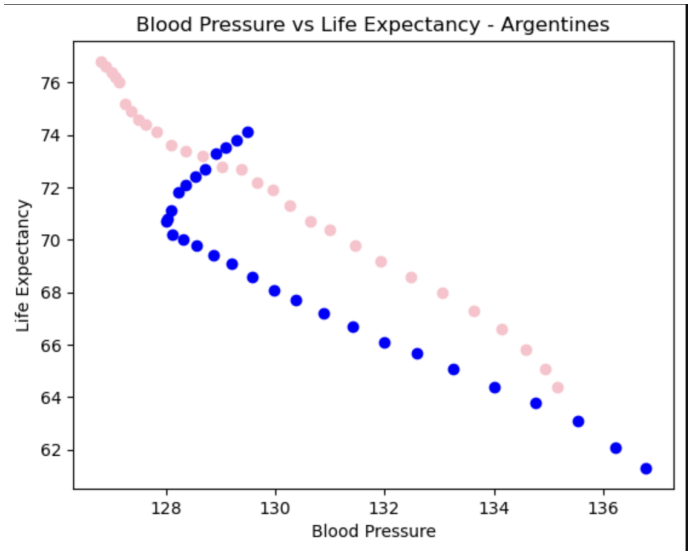
Description & Analysis:

This graph also visually represents a linear relationship between BMI and blood pressure. From the graph, we can see that there is also a negative linear relationship between BMI and blood pressure in Japan, where the more the BMI increases, the more the blood pressure decreases. To further prove this visual relationship, covariance was calculated. The covariance for males is -0.72 and for females it is -0.54. This supports that there is a negative linear relationship.

```
Male R=-0.8799271328770696
Male R^2=0.7742717591732601
Female R=-0.9172805113548372
Female R^2=0.8414035365113917
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.

Argentina:

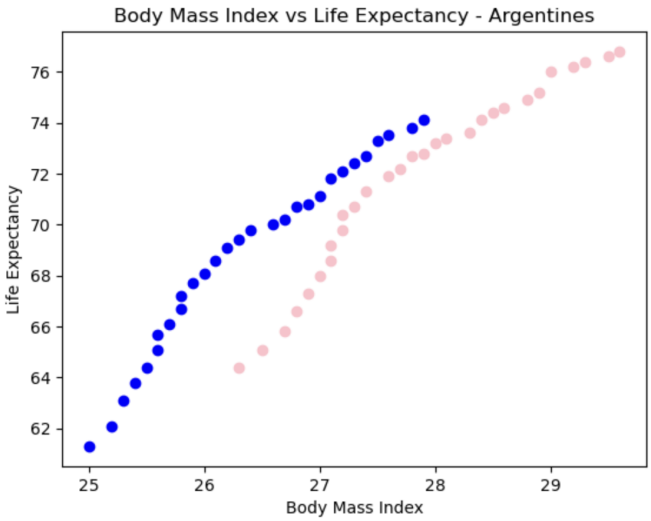


Description & Analysis:

This graph once again visually represents a linear relationship between life expectancy and blood pressure. From the graph, we can see that there is a negative linear relationship between blood pressure and life expectancy for both men and women in Argentina, where life expectancy decreases as blood pressure increases. This is supported by a covariance of -8.96 for males and -10.04 for females which proves a negative linear relationship.

```
Male R=-0.9015130394807447
Male R^2=0.8127257603538107
Female R=-0.9937475738790639
Female R^2=0.9875342405905255
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.

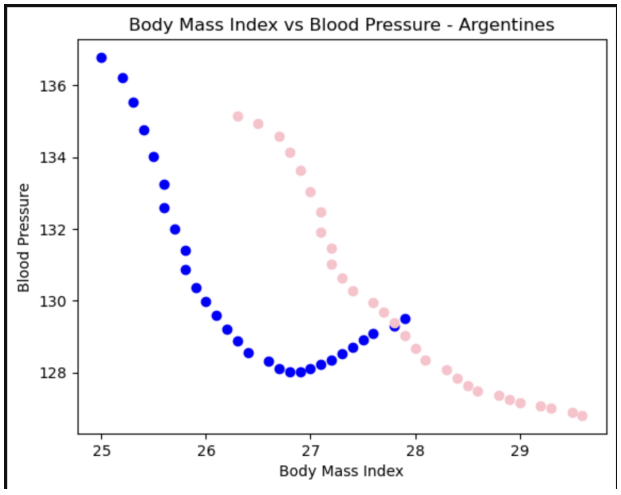


Description & Analysis:

This graph visually represents a linear relationship between the variables BMI and life expectancy. From the graph, we can see that there is a positive linear relationship between BMI and life expectancy for both men and women in Argentina, where the higher the BMI value is, the higher the life expectancy is. This is further supported by the covariance which is 3.05 for males and 3.39 for women. This covariance means a positive linear relationship.

```
Male R=0.9765836995870161
Male R^2=0.9537157222990632
Female R=0.9660884733647507
Female R^2=0.9333269383682345
```

These values further prove a strong positive linear relationship between blood pressure and life expectancy, as the R values are between 0.7 and 1. The R^2 value shows that the variance in life expectancy is highly correlated with BMI.



Description & Analysis:

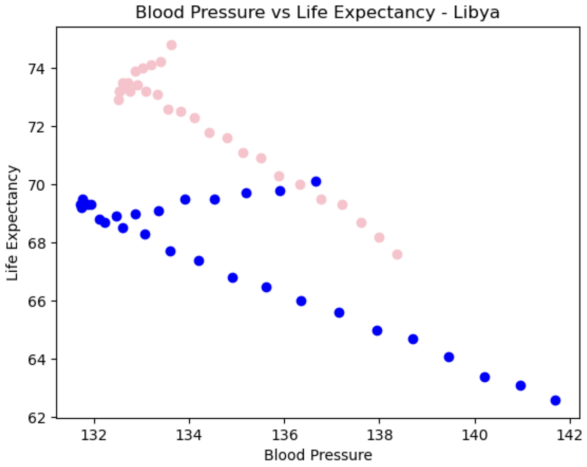
This graph visually represents a negative linear relationship between the variables BMI and blood pressure. From the graph, we can see that there is a negative linear relationship between BMI and blood

pressure for both men and women in Argentina, where blood pressure BMI increases. The covariance proves that there is a negative linear relationship since it is -1.84 for males and -2.48 for females.

```
Male R=-0.8042783893982536
Male R^2=0.6468637276530488
Female R=-0.9468781165661202
Female R^2=0.8965781676318031
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.

Libya:

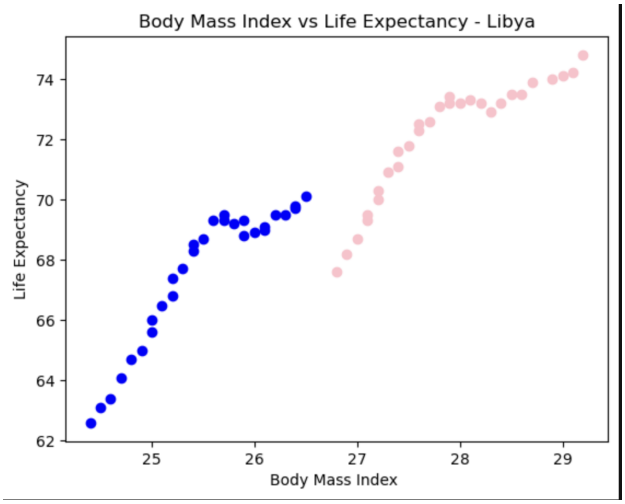


Description & Analysis:

This graph also shows a linear relationship between life expectancy and blood pressure. From the graph, we can see that there is a negative linear relationship between blood pressure and life expectancy for both men and women in Libya, where life expectancy decreases as blood pressure increases. Although may not be clear visually, the covariance reaffirms the relationship as it is -5.93 for males and -3.48 for females. This covariance means that there is a negative linear relationship.

```
Male R=-0.8601671017329569
Male R^2=0.7398874429036749
Female R=-0.9543802579614532
Female R^2=0.9108416767865699
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.

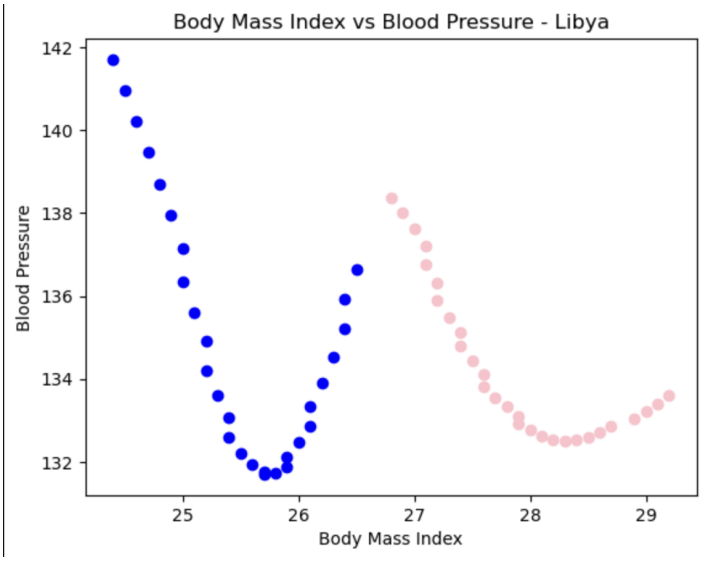


Description & Analysis:

This graph also shows a linear relationship between the variables BMI and life expectancy. From the graph, we can see that there is a positive linear relationship between BMI and life expectancy for both men and women in Libya, where life expectancy increases as the BMI value increases. The covariance confirms that as it is 1.31 and 1.25 for males and females respectively.

```
Male R=0.9304636462126871
Male R^2=0.8657625969234085
Female R=0.9034967001884514
Female R^2=0.8163062872514204
```

These values further prove a strong positive linear relationship between blood pressure and life expectancy, as the R values are between 0.7 and 1. The R^2 value shows that the variance in life expectancy is highly correlated with BMI.



Description & Analysis:

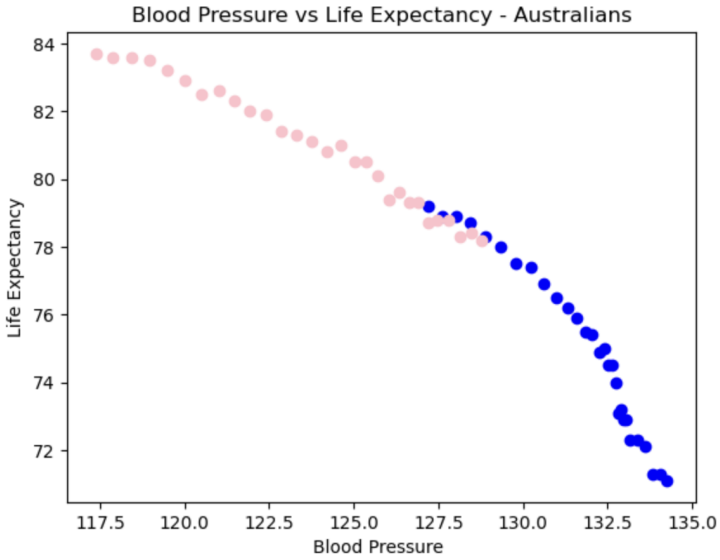
This graph visually represents a linear relationship between BMI and blood pressure. From the graph, we can see that there is also a negative linear relationship between BMI and blood pressure in Libya, where the more the BMI increases, the more the blood pressure decreases. The covariance proves

this claim as it is -1.21 for males and -1.05 for females. These values indicate a negative linear relationship.

```
Male R=-0.6530329624906572
Male R^2=0.42645205009932413
Female R=-0.8021095961918222
Female R^2=0.6433798043030081
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure. Although for males the R value is from -0.4 to -0.7 therefore it is a moderate negative linear relationship.

Australia:

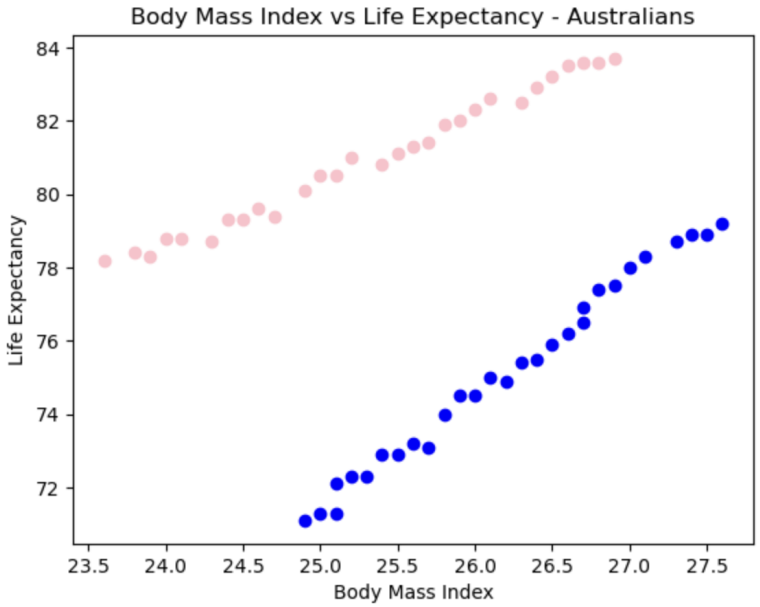


Description & Analysis:

This graph visually represents a linear relationship between life expectancy and blood pressure. From the graph, we can see that there is a negative linear relationship between blood pressure and life expectancy for both men and women in Australia, where life expectancy decreases as blood pressure increases. The covariance of -5.04 and -6.23 for males and females respectively proves the relationship between the variables as the values represent a negative linear relationship.

```
Male R=-0.9632315907422297
Male R^2=0.9278150974038064
Female R=-0.9905026394658877
Female R^2=0.9810954787888903
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.

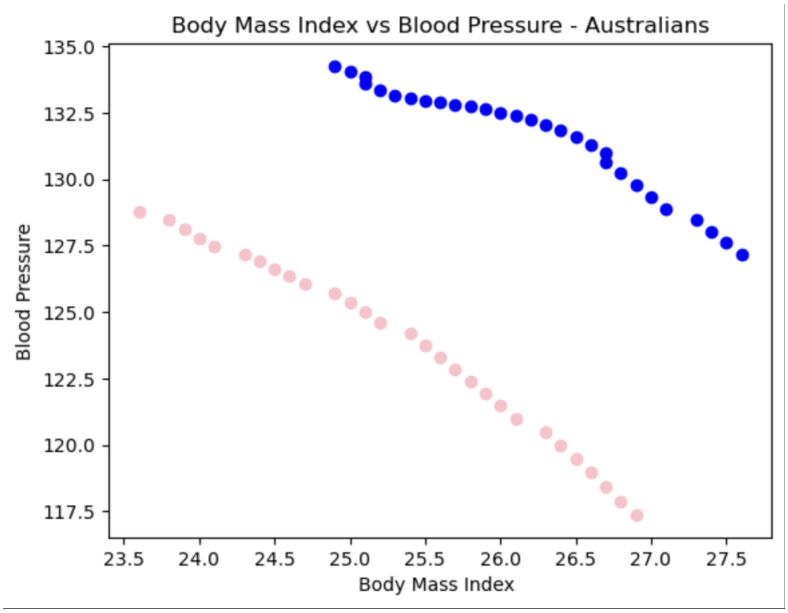


Description & Analysis:

This graph visually represents a linear relationship between the variables BMI and life expectancy. From the graph, we can see that there is a positive linear relationship between BMI and life expectancy for both men and women in Australia, where life expectancy increases as BMI increases. The covariance turned out to be 2.09 for males and 1.81 for females which indicates a positive linear relationship. This confirms what was reported visually.

```
Male R=0.9952377581412756
Male R^2=0.9904981952300721
Female R=0.9938114367461754
Female R^2=0.9876611718074975
```

These values further prove a strong positive linear relationship between blood pressure and life expectancy, as the R values are between 0.7 and 1. The R^2 value shows that the variance in life expectancy is highly correlated with BMI.



Description & Analysis:

This graph also visually displays a linear relationship between BMI and blood pressure. From the graph, we can see that there is also a negative linear relationship between BMI and blood pressure in Australia, where the more the BMI increases, the more the blood pressure decreases.the covariance is -1.61 and -3.43 for males and females respectively proves the relationship between the variables as the values represent a negative linear relationship.

```
Male R=-0.963691890934086
Male R^2=0.9287020606521144
Female R=-0.9906654730972495
Female R^2=0.9814180795869972
```

These values further prove a strong negative linear relationship between blood pressure and life expectancy, as the R values are between -0.7 and -1. The R^2 value shows that the variance in life expectancy is highly correlated with blood pressure.

Relationships

After analyzing the data and how certain variables affect each other with one country from each continent, one correlation that can be confirmed is that having higher blood pressure lowers one's life expectancy. The negative linear relationship between these two variables was the case for all six countries where in the graphs where the x-axis was the blood pressure and the y-axis was the life expectancy, as the blood pressure got higher, the life expectancy got progressively smaller. Blood pressure and life expectancy having an negative linear relationship was further supported with their covariance values being negative rather than positive, indicating that as one increases the other decreases. From the same graphs, it can also be seen that females have much less blood pressure and much higher life expectancy than males which indicates the female body being less susceptible to having high blood pressure.

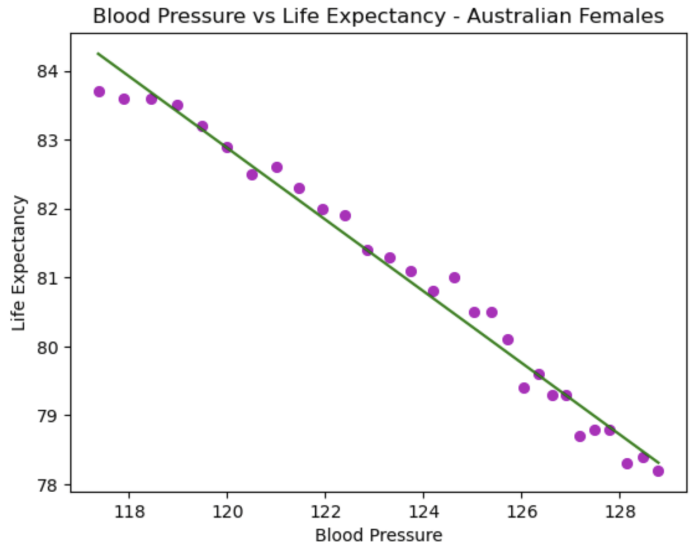
Another relationship that was observed for all of the analyzed countries was having higher BMI values increases one's life expectancy. This direct correlation between BMI and life expectancy was also the case for all six countries that were investigated where the x-axis was the BMI and the y-axis was the life expectancy, as the blood pressure got higher, the life expectancy was also increasing more and more. This particular directly proportional relationship between BMI and life expectancy was not only visually represented with graphs, but it also supported with their covariance values being positive which represents that when one variable increases, the other one increases as well. From these graphs, while men and women having a clear difference in BMI values is not always the case, women having higher life expectancies is consistently the case which connects back the blood pressure vs life expectancy graphs where it was also seen that women have higher life expectancies than men.

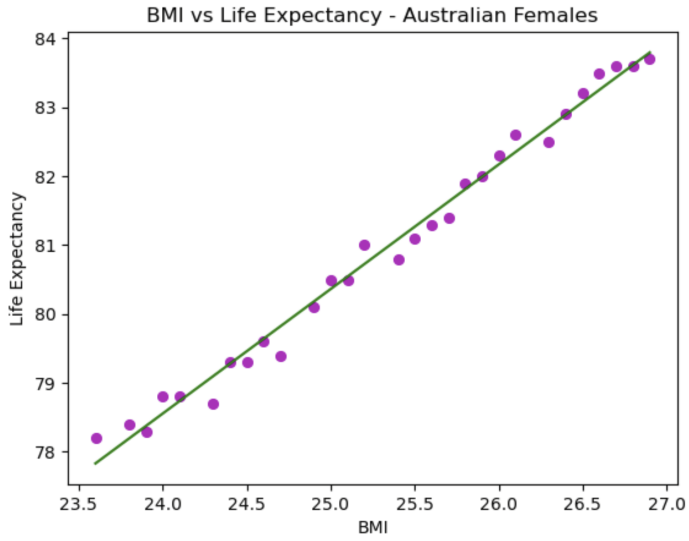
A third relationship that was observed while analyzing the dataset is that having higher BMI values decreases one's blood pressure. This negative linear relationship between BMI and blood pressure was once again the case for all of the analyzed nations which was confirmed with visual representations where the x-axis was the BMI and the y-axis was the corresponding blood pressure. Regarding these particular graphs, while they were not as collectively linear as the previous graphs and relationships due to the inclusion of some outliers, it can still be clearly observed that as the BMI value increases, the blood pressure decreases. To make sure that this was truly the case because of the inclusion of outliers, the covariance values between these two variables were calculated and sure enough their covariance values were negative, further supporting the negative linear relationship between BMI and blood pressure values. Further analyzing these graphs show that women have smaller BMI values than males which therefore means that they also have less blood pressure than males, which also accurately corresponds with the previous graphs and relationships as it was previously observed, in the graphs with blood pressure/BMI as

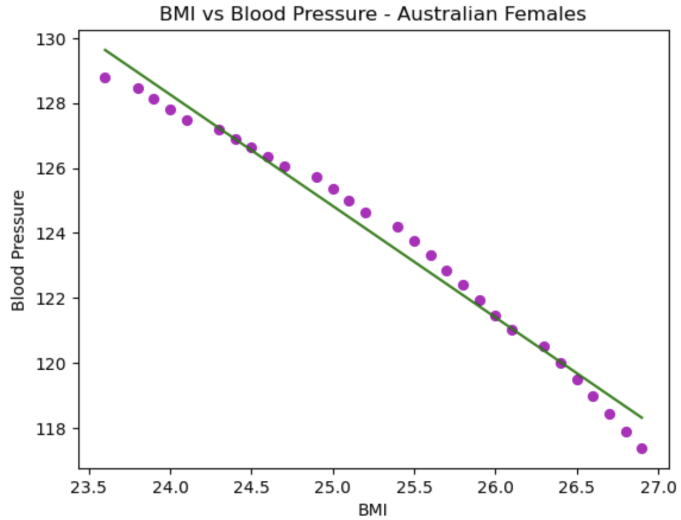
the x-axis and life expectancy as the y-axis, that women do tend to have less blood pressure and BMI values than men, respectively.

Regression Models:

For the regression models, we decided to use Australian females to predict values for as it had the highest R values among the countries and both genders which led us to believe that it would give us the most accurate results when predicting values by linear regression.







These linear regression models help in predicting y values that we don't have for their corresponding x values.

Conclusion:

After thoroughly analyzing the dataset, it can be concluded that there is a correlation between the three variables which are human blood pressure, BMI, and life expectancy. This ties back to the problem that we were trying to solve as we can now look at the relationships to see what are the optimum values for a long and healthy life. Firstly, We spotted a negative linear relationship between blood pressure and life expectancy, where the higher one's blood pressure is, the lower their life expectancy is. It was also observed that there is a directly proportional relationship between BMI and life expectancy where the higher the BMI value is, the longer someone is expected to live. From this, we found out that for someone to live a long and healthy life they should most likely have a low blood pressure and a high BMI value. To see if someone can aim for a longer life expectancy by having a lower blood pressure, we looked for a relationship between BMI and blood pressure. We found that the higher the BMI the lower the blood

pressure results in having a higher life expectancy. Additionally, summarizing the data and looking at the trend over the years we found that the trend agrees with our conclusion on relationships between these variables. One thing to keep in mind is that this dataset was collected by natural observation therefore these relationships are only correlational which does not mean causation therefore we cannot conclude that increasing BMI would lower blood pressure and increase life expectancy but only that it is likely that someone who has a high BMI would have a lower blood pressure and therefore a higher life expectancy, and therefore have a long and healthy life.