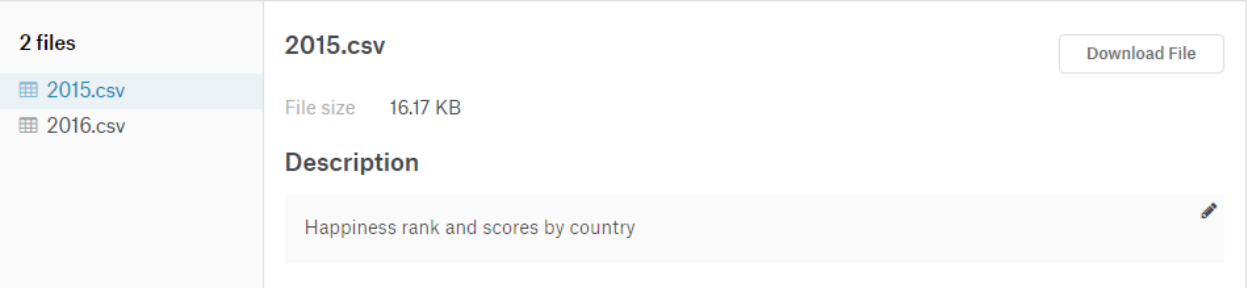
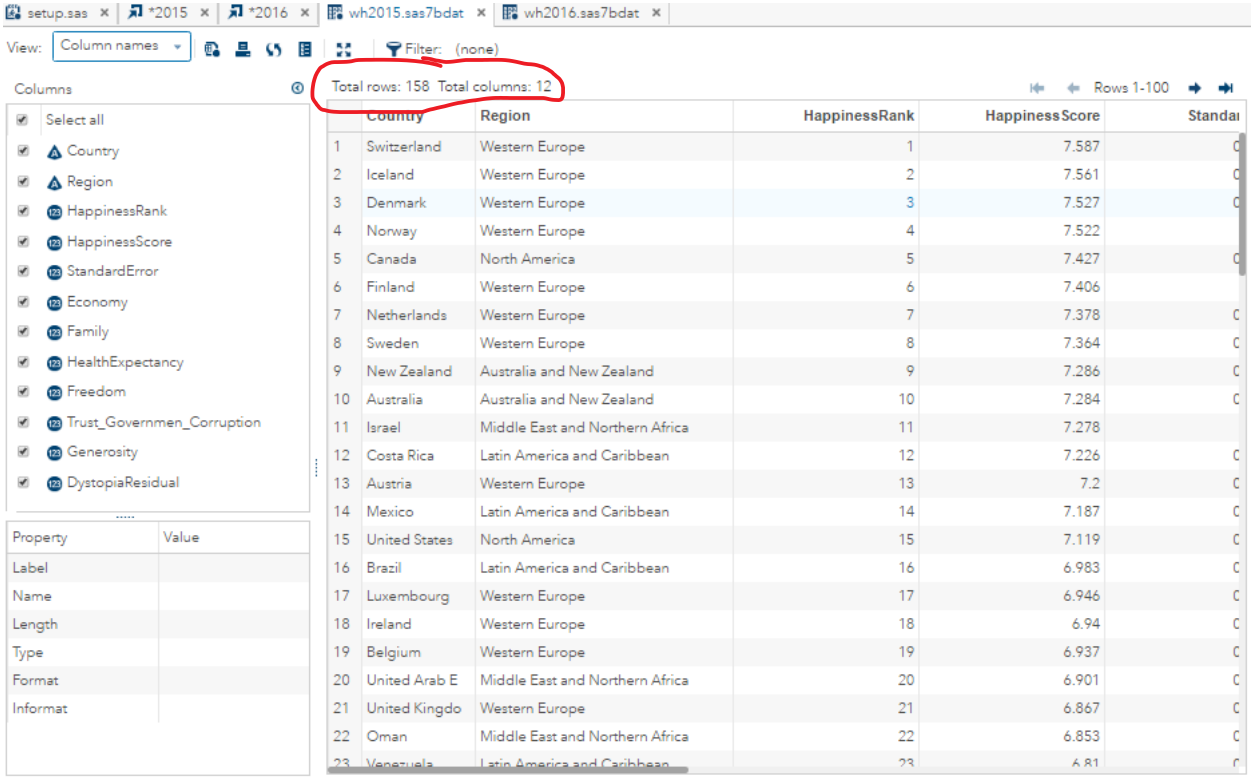
Introduction: The happiness scores and rankings use data from the Gallup World Poll. The columns following the happiness score estimate the extent to which each of six factors – economic production, social support, life expectancy, freedom, absence of corruption, and generosity – contribute to making life evaluations in each country. The project mainly focuses on estimating happiness score with 0 being the worst and 10 being the best possible life based on the 6 factors mentioned above.

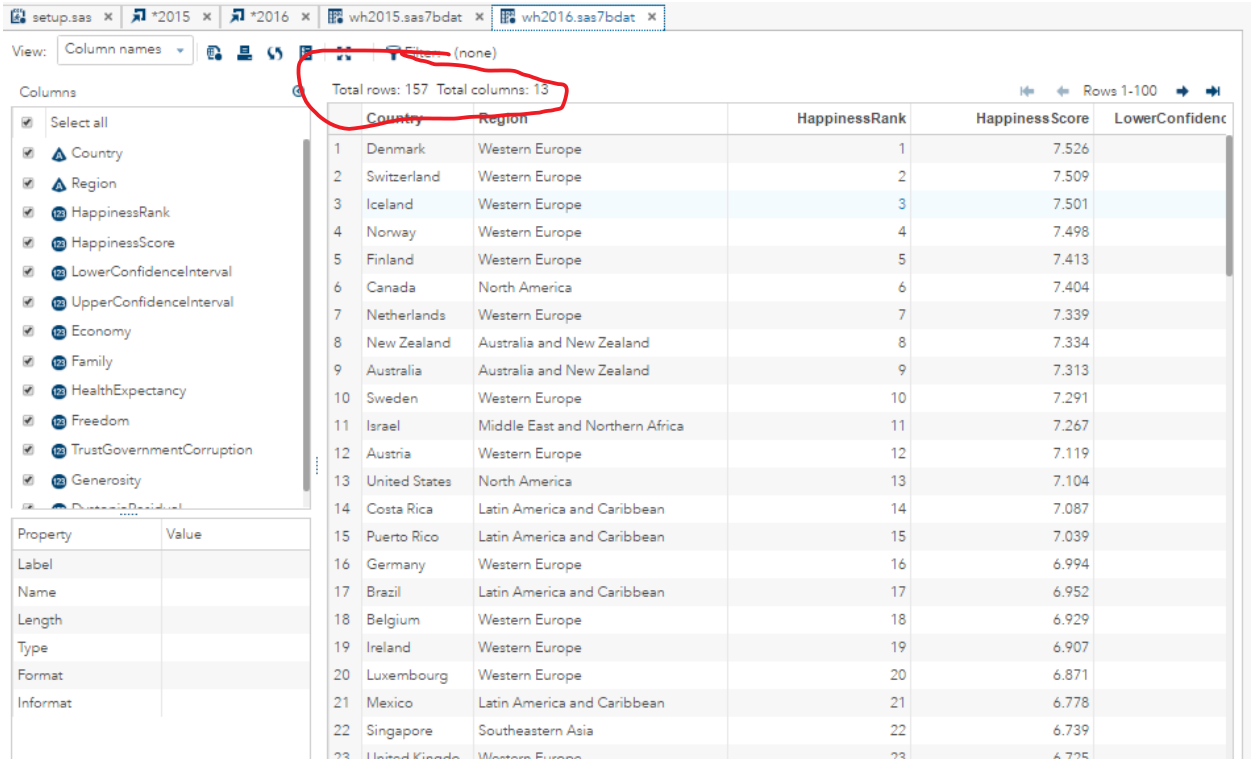
Data Source - https://www.kaggle.com/unsdsn/world-happiness

I have chosen data for the year 2015 and 2016



As you can see below the 2015 dataset contains 158 rows and 12 columns
And the data for 2016 contains 157 rows and 13 columns.





	Country	Region	HappinessRank	HappinessScore	LowerConfidenc
1	Denmark	Western Europe	1	7.526	
2	Switzerland	Western Europe	2	7.509	
3	Iceland	Western Europe	3	7.501	
4	Norway	Western Europe	4	7.498	
5	Finland	Western Europe	5	7.413	
6	Canada	North America	6	7.404	
7	Netherlands	Western Europe	7	7.339	
8	New Zealand	Australia and New Zealand	8	7.334	
9	Australia	Australia and New Zealand	9	7.313	
10	Sweden	Western Europe	10	7.291	
11	Israel	Middle East and Northern Africa	11	7.267	
12	Austria	Western Europe	12	7.119	
13	United States	North America	13	7.104	
14	Costa Rica	Latin America and Caribbean	14	7.087	
15	Puerto Rico	Latin America and Caribbean	15	7.039	
16	Germany	Western Europe	16	6.994	
17	Brazil	Latin America and Caribbean	17	6.952	
18	Belgium	Western Europe	18	6.929	
19	Ireland	Western Europe	19	6.907	
20	Luxembourg	Western Europe	20	6.871	
21	Mexico	Latin America and Caribbean	21	6.778	
22	Singapore	Southeastern Asia	22	6.739	

Variables chosen are:

Axis	Variable	Type
X	**HappinessScore**	**Numerical**
Y	**Economy**	**Numerical**
X	**HealthLifeExpectancy**	**Numerical**
Y	**Economy**	**Numerical**

SAS Procedures to be used

- PROC SGSCATTER
- PROC CORR
- PROC UNIVARIATE

SAS Code:

```
proc sgscatter data=world.wh2015;
plot Happinessscore*economy / reg;
```

```
title "Impact of Economy on Happiness Score";
title2 "World Happiness Data - 2015";
title3 "Submitted by Jena Mehta";
run;

proc sgscatter data=world.wh2016;
plot Happinessscore*economy / reg;
title "Impact of Economy on Happiness Score";
title2 "World Happiness Data - 2016";
title3 "Submitted by Jena Mehta";
run;


proc sgscatter data=world.wh2015;
plot HealthExpectancy*economy / reg;
title "Impact of Economy on Person's Health/Life Expectancy";
title2 "World Happiness Data - 2015";
title3 "Submitted by Jena Mehta";
run;

proc sgscatter data=world.wh2016;
plot HealthExpectancy*economy / reg;
title "Impact of Economy on Person's Health/Life Expectancy";
title2 "World Happiness Data - 2016";
title3 "Submitted by Jena Mehta";
run;


proc corr data=world.wh2015;
var Economy Healthexpectancy Happinessscore Family Freedom;
run;
```

The CONTENTS Procedure

Data Set Name	WORLD.WH2015	**Observations**	158
Member Type	DATA	**Variables**	12
Engine	V9	**Indexes**	0
Created	04/19/2017 00:12:21	**Observation Length**	128
Last Modified	04/19/2017 00:12:21	**Deleted Observations**	0
Protection		**Compressed**	NO
Data Set Type		**Sorted**	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Engine/Host Dependent Information	
Data Set Page Size	65536
Number of Data Set Pages	1
First Data Page	1
Max Obs per Page	511
Obs in First Data Page	158
Number of Data Set Repairs	0
Filename	/folders/myfolders/world/wh2015.sas7bdat
Release Created	9.0401M4
Host Created	Linux
Inode Number	5335
Access Permission	rwxrwxrwx
Owner Name	root
File Size	128KB
File Size (bytes)	131072

Alphabetic List of Variables and Attributes					
#	**Variable**	**Type**	**Len**	**Format**	**Informat**
1	Country	Char	13	$13.	$13.
12	DystopiaResidual	Num	8	BEST12.	BEST32.
6	Economy	Num	8	BEST12.	BEST32.
7	Family	Num	8	BEST12.	BEST32.
9	Freedom	Num	8	BEST12.	BEST32.
11	Generosity	Num	8	BEST12.	BEST32.
3	HappinessRank	Num	8	BEST12.	BEST32.
4	HappinessScore	Num	8	BEST12.	BEST32.
8	HealthExpectancy	Num	8	BEST12.	BEST32.

The CONTENTS Procedure

Alphabetic List of Variables and Attributes					
#	**Variable**	**Type**	**Len**	**Format**	**Informat**
2	Region	Char	31	$31.	$31.
5	StandardError	Num	8	BEST12.	BEST32.
10	Trust_Governmen_Corruption	Num	8	BEST12.	BEST32.

The CONTENTS Procedure

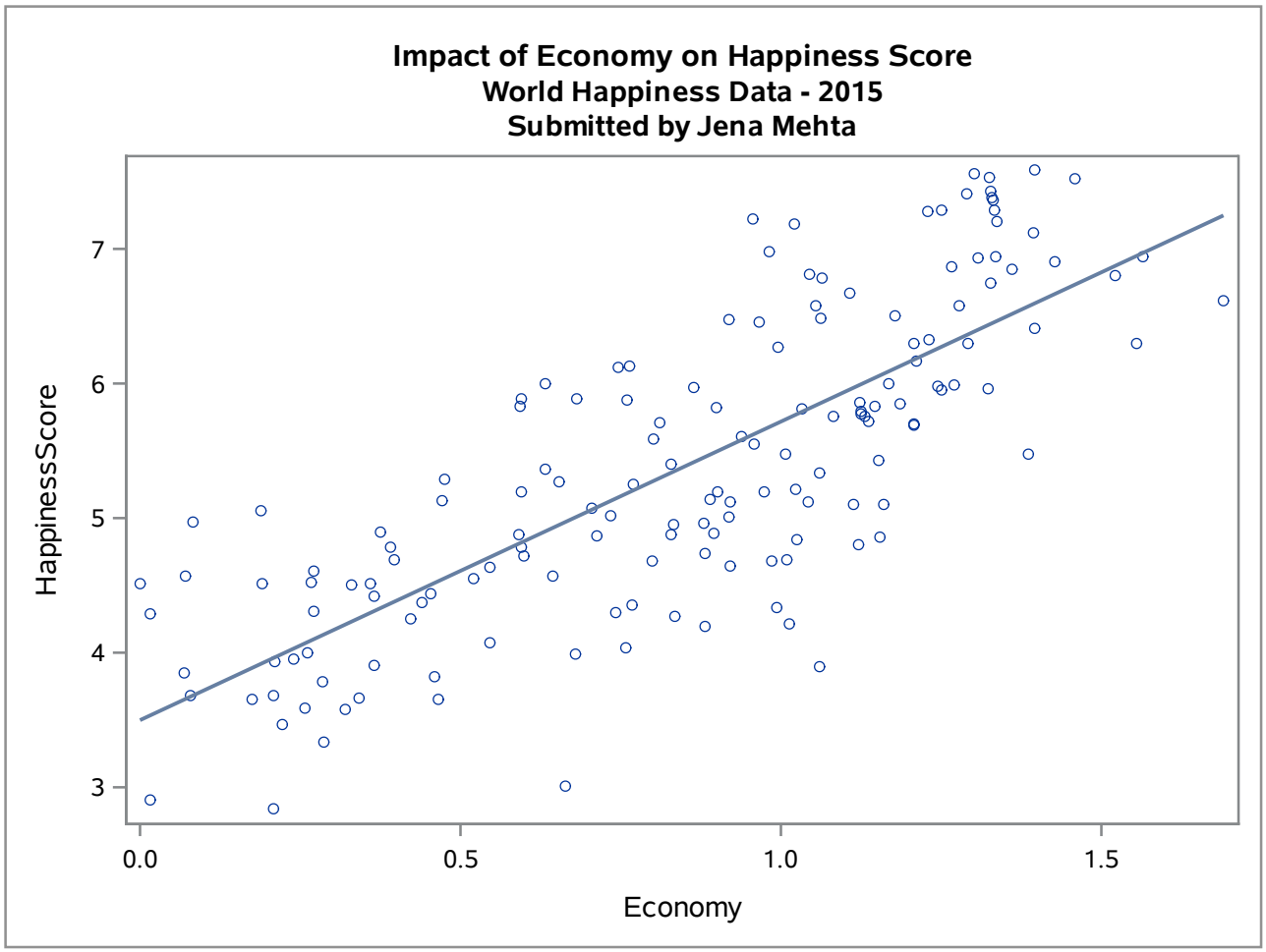
Data Set Name	WORLD.WH2016	**Observations**	157
Member Type	DATA	**Variables**	13
Engine	V9	**Indexes**	0
Created	04/19/2017 00:11:45	**Observation Length**	136
Last Modified	04/19/2017 00:11:45	**Deleted Observations**	0
Protection		**Compressed**	NO
Data Set Type		**Sorted**	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

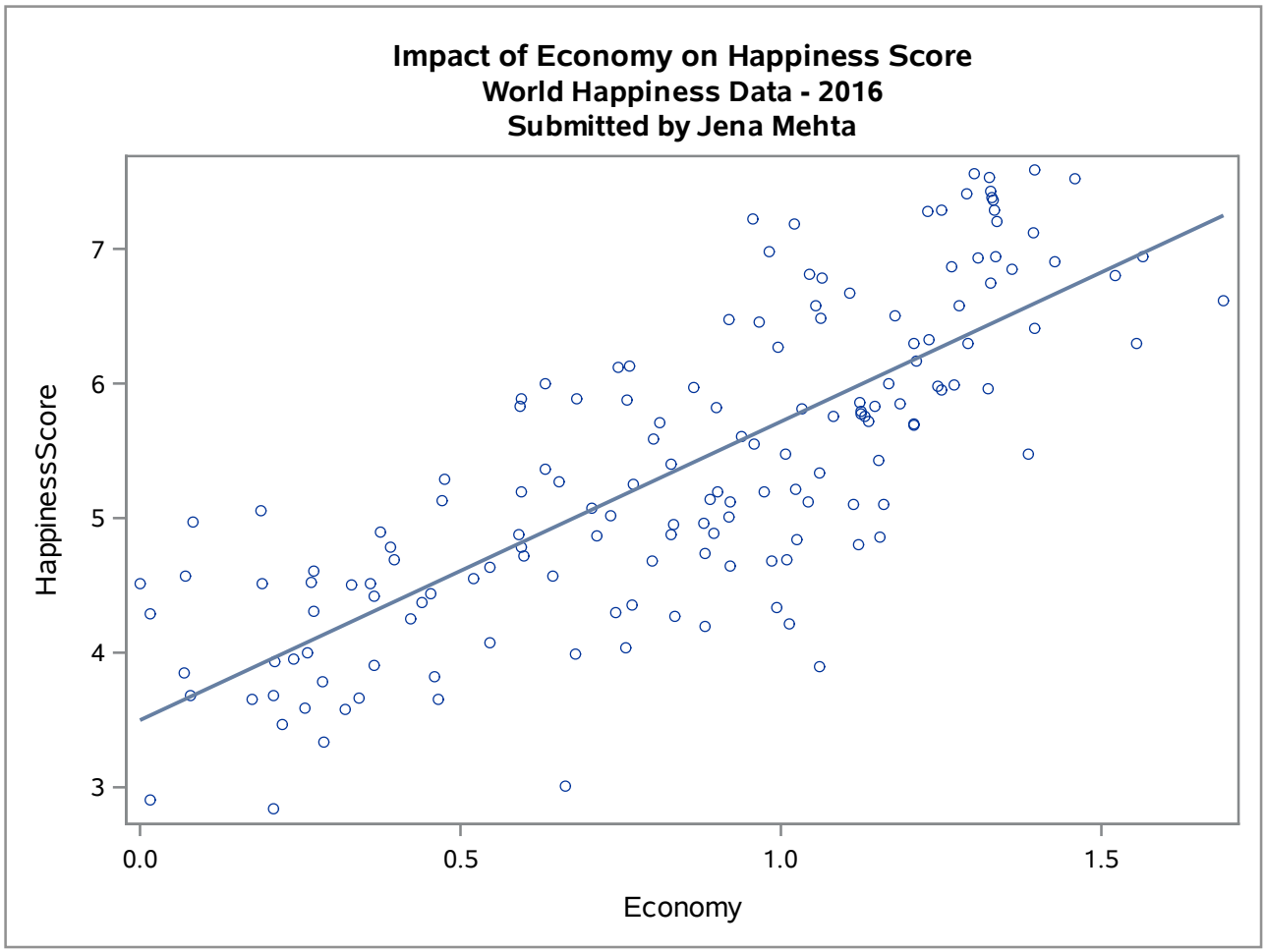
Engine/Host Dependent Information	
Data Set Page Size	65536
Number of Data Set Pages	1
First Data Page	1
Max Obs per Page	481
Obs in First Data Page	157
Number of Data Set Repairs	0
Filename	/folders/myfolders/world/wh2016.sas7bdat
Release Created	9.0401M4
Host Created	Linux
Inode Number	5128
Access Permission	rwxrwxrwx
Owner Name	root
File Size	128KB
File Size (bytes)	131072

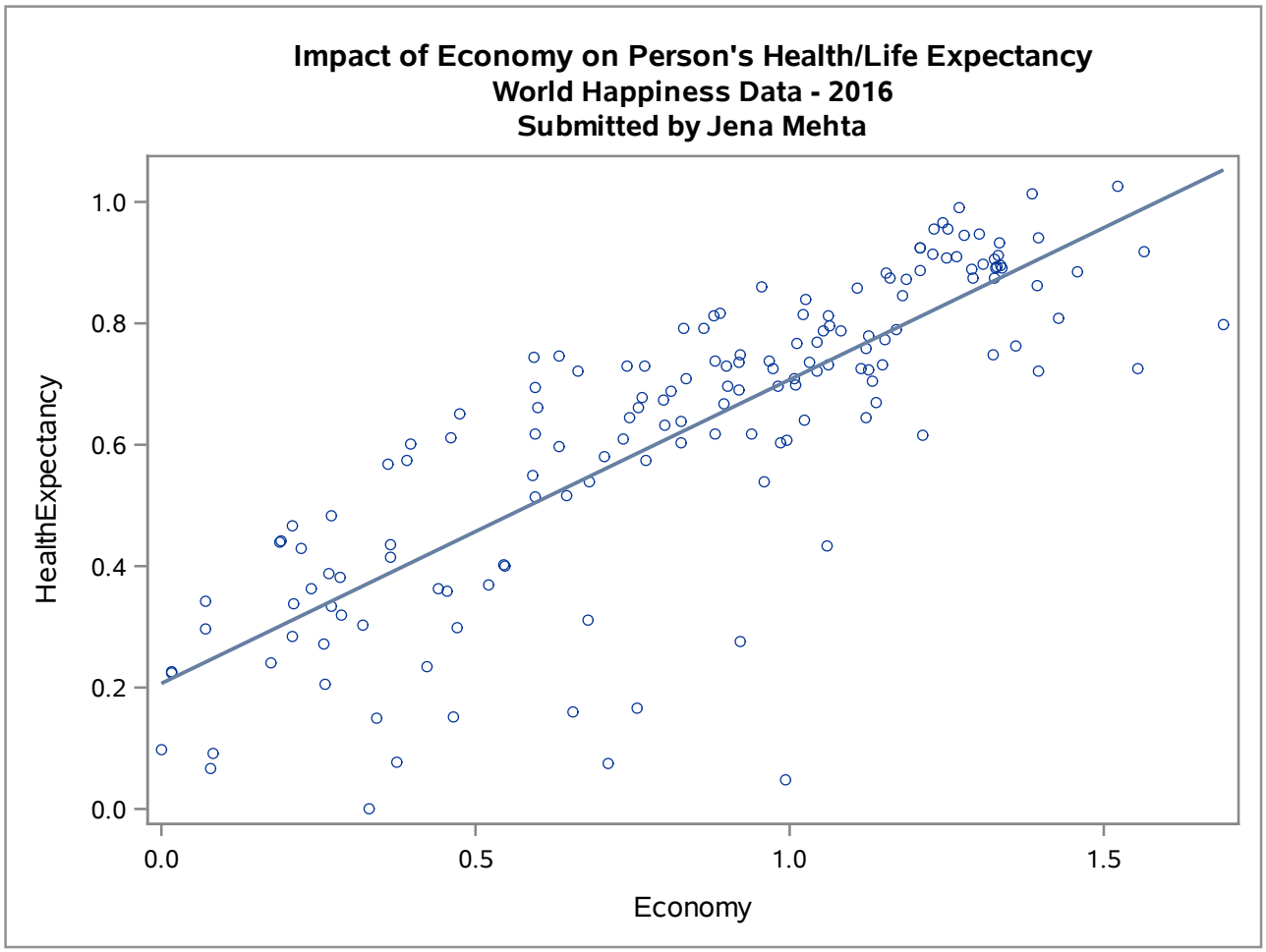
Alphabetic List of Variables and Attributes					
#	**Variable**	**Type**	**Len**	**Format**	**Informat**
1	Country	Char	13	$13.	$13.
13	DystopiaResidual	Num	8	BEST12.	BEST32.
7	Economy	Num	8	BEST12.	BEST32.
8	Family	Num	8	BEST12.	BEST32.
10	Freedom	Num	8	BEST12.	BEST32.
12	Generosity	Num	8	BEST12.	BEST32.
3	HappinessRank	Num	8	BEST12.	BEST32.
4	HappinessScore	Num	8	BEST12.	BEST32.
9	HealthExpectancy	Num	8	BEST12.	BEST32.

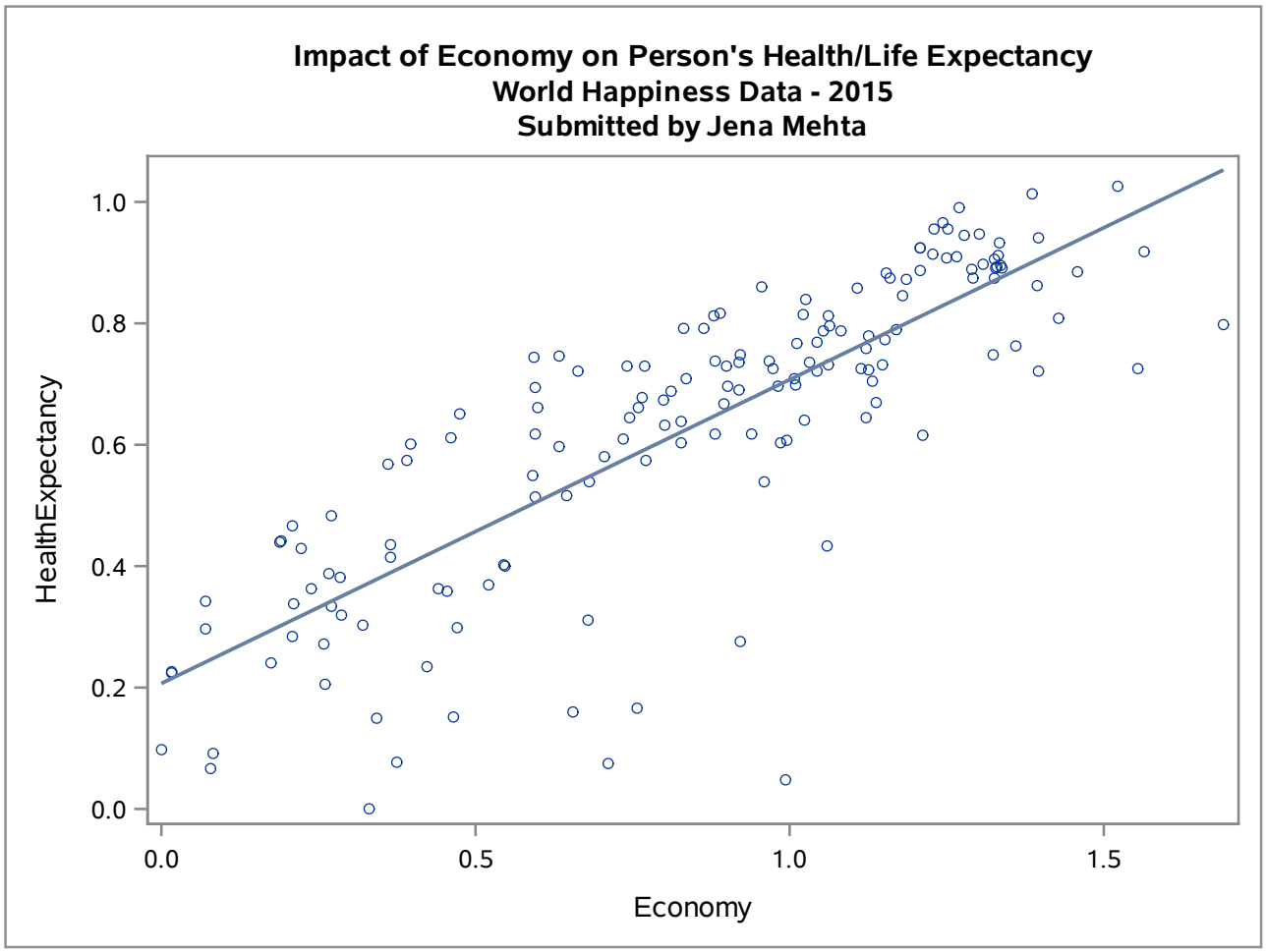
The CONTENTS Procedure

Alphabetic List of Variables and Attributes					
#	**Variable**	**Type**	**Len**	**Format**	**Informat**
5	LowerConfidenceInterval	Num	8	BEST12.	BEST32.
2	Region	Char	31	$31.	$31.
11	TrustGovernmentCorruption	Num	8	BEST12.	BEST32.
6	UpperConfidenceInterval	Num	8	BEST12.	BEST32.


Impact of Economy on Happiness Score
World Happiness Data - 2015
Submitted by Jena Mehta
HappinessScore
7
6
5
4
3
0.0
0.5
1.0
1.5
Economy


Impact of Economy on Happiness Score
World Happiness Data - 2016
Submitted by Jena Mehta
HappinessScore
7
6
5
4
3
0.0
0.5
1.0
1.5
Economy


Impact of Economy on Person's Health/Life Expectancy
World Happiness Data - 2016
Submitted by Jena Mehta
HealthExpectancy
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
Economy


Impact of Economy on Person's Health/Life Expectancy
World Happiness Data - 2015
Submitted by Jena Mehta
HealthExpectancy
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
Economy

The CORR Procedure

5 Variables:	Economy	HealthExpectancy	HappinessScore	Family	Freedom

Simple Statistics						
Variable	**N**	**Mean**	**Std Dev**	**Sum**	**Minimum**	**Maximum**
Economy	158	0.84614	0.40312	133.68968	0	1.69042
HealthExpectancy	158	0.63026	0.24708	99.58098	0	1.02525
HappinessScore	158	5.37573	1.14501	849.36600	2.83900	7.58700
Family	158	0.99105	0.27237	156.58526	0	1.40223
Freedom	158	0.42861	0.15069	67.72116	0	0.66973

Pearson Correlation Coefficients, N = 158 Prob > |r| under H0: Rho=0					
	Economy	**HealthExpectancy**	**HappinessScore**	**Family**	**Freedom**
Economy	1.00000	0.81648 <.0001	0.78097 <.0001	0.64530 <.0001	0.37030 <.0001
HealthExpectancy	0.81648 <.0001	1.00000	0.72420 <.0001	0.53110 <.0001	0.36048 <.0001
HappinessScore	0.78097 <.0001	0.72420 <.0001	1.00000	0.74061 <.0001	0.56821 <.0001
Family	0.64530 <.0001	0.53110 <.0001	0.74061 <.0001	1.00000	0.44152 <.0001
Freedom	0.37030 <.0001	0.36048 <.0001	0.56821 <.0001	0.44152 <.0001	1.00000

Initial Regression Analysis Result

R square value = 0.7007
F value = 382.84
P value corresponding to this F value = <.0001
P value corresponding to this t value = <.0001
Slope = 0.46530
Intercept = 0.11378

Use equation to find magnitude of change –

Y = mx + c
M = Change in Y/ Change in x
Magnitude of change means how change of X influences change on Y
If change in x is smaller than change in Y then the change of magnitude will be as 9/2 = 4.5 or 6/-3 = -2.
If change in x is smaller than change in Y then the change of magnitude will be as 2/9 = 0.222 or -6/3 =-2

Validate the equation

Y = (0.46530) x + 0.11378
When x=0, Y = 0.11378
When x=1, Y = 0.57908
When x=2, Y = 1.04438

Generating model and predicting economy values for 5 values and the corresponding HealthExpectancy for the same**. –** 0.25,0.75,1.05,1.25,1.35

SAS Code

```
ods graphics;
proc reg data=world.wh2016;
 model HealthExpectancy=economy;
 title "Simple Regression with Economy as Regressor";
 title2 "World Happiness Data - 2016";
 title3 "Submitted by Jena Mehta";
run;
quit;

data need_predictions;
  input economy @@;
  datalines;
0.25 0.75 1.05 1.25 1.35
;
run;
```

```
data predEco;
  set need_predictions
     world;
run;

proc reg data=predEco;
  model HealthyExpectancy=Economy / p;
  id Economy;

  title 'HealthExpectancy=Economy with Predicted Values';
run;
quit;
title;

proc reg data=world.wh2016 noprint outest=estimates;
  model HealthExpectancy=Economy;
run;
quit;

proc print data=estimates;
  title "OUTEST= Data Set from PROC REG";
run;

title;

proc score data=need_predictions score=estimates
    out=scored type=parms;
  var economy;
run;

proc print data=scored;
  title "Scored New Observations";
run;

title;
```

Simple Regression with Economy as Regressor
World Happiness Data - 2016
Submitted by Jena Mehta

The REG Procedure
Model: MODEL1
Dependent Variable: HealthExpectancy

Number of Observations Read	157
Number of Observations Used	157

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	5.74963	5.74963	362.84	<.0001
Error	155	2.45614	0.01585		
Corrected Total	156	8.20576			

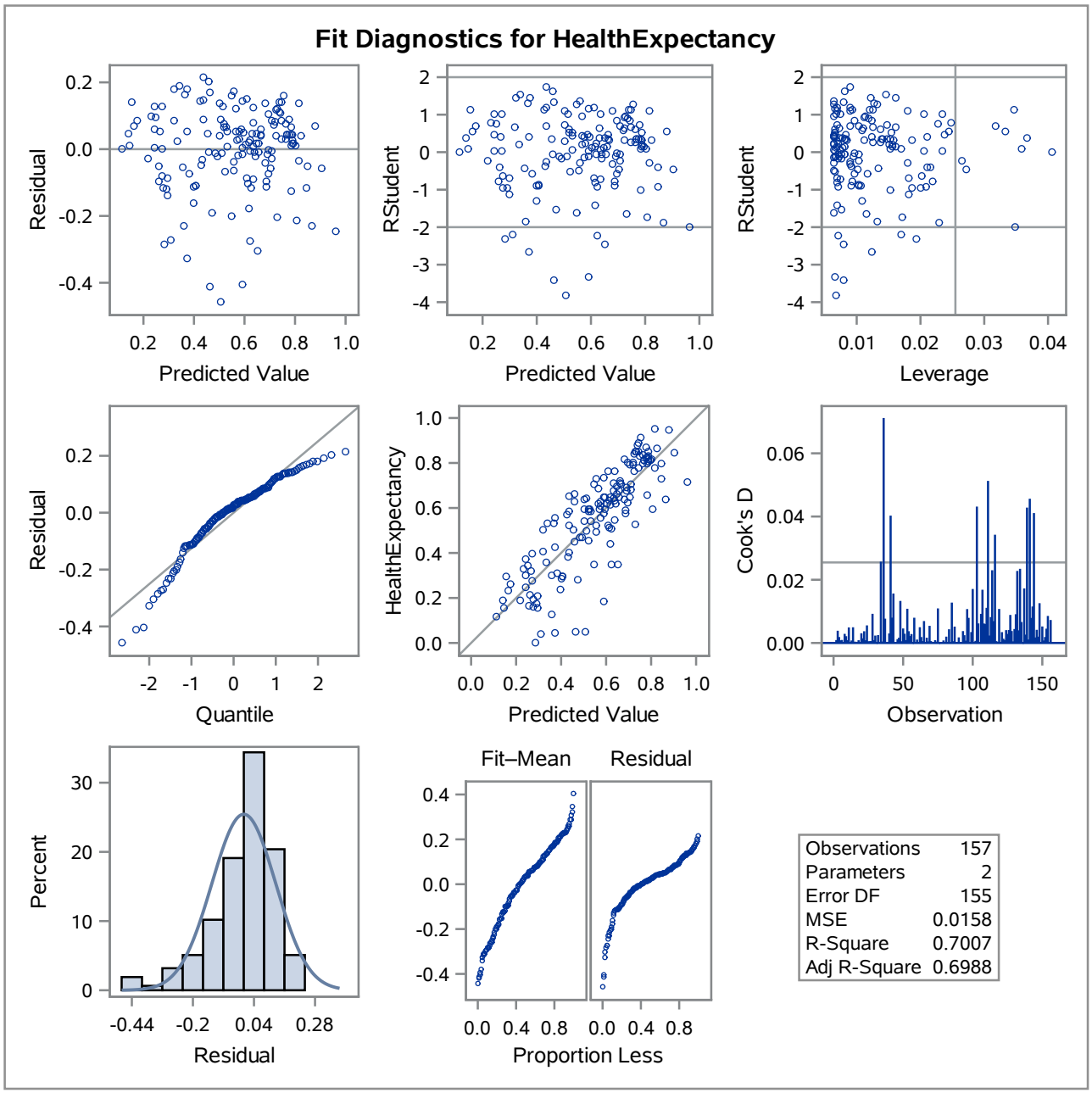
Root MSE	0.12588	R-Square	0.7007
Dependent Mean	0.55762	Adj R-Sq	0.6988
Coeff Var	22.57475		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	0.11378	0.02537	4.48	<.0001
Economy	1	0.46530	0.02443	19.05	<.0001

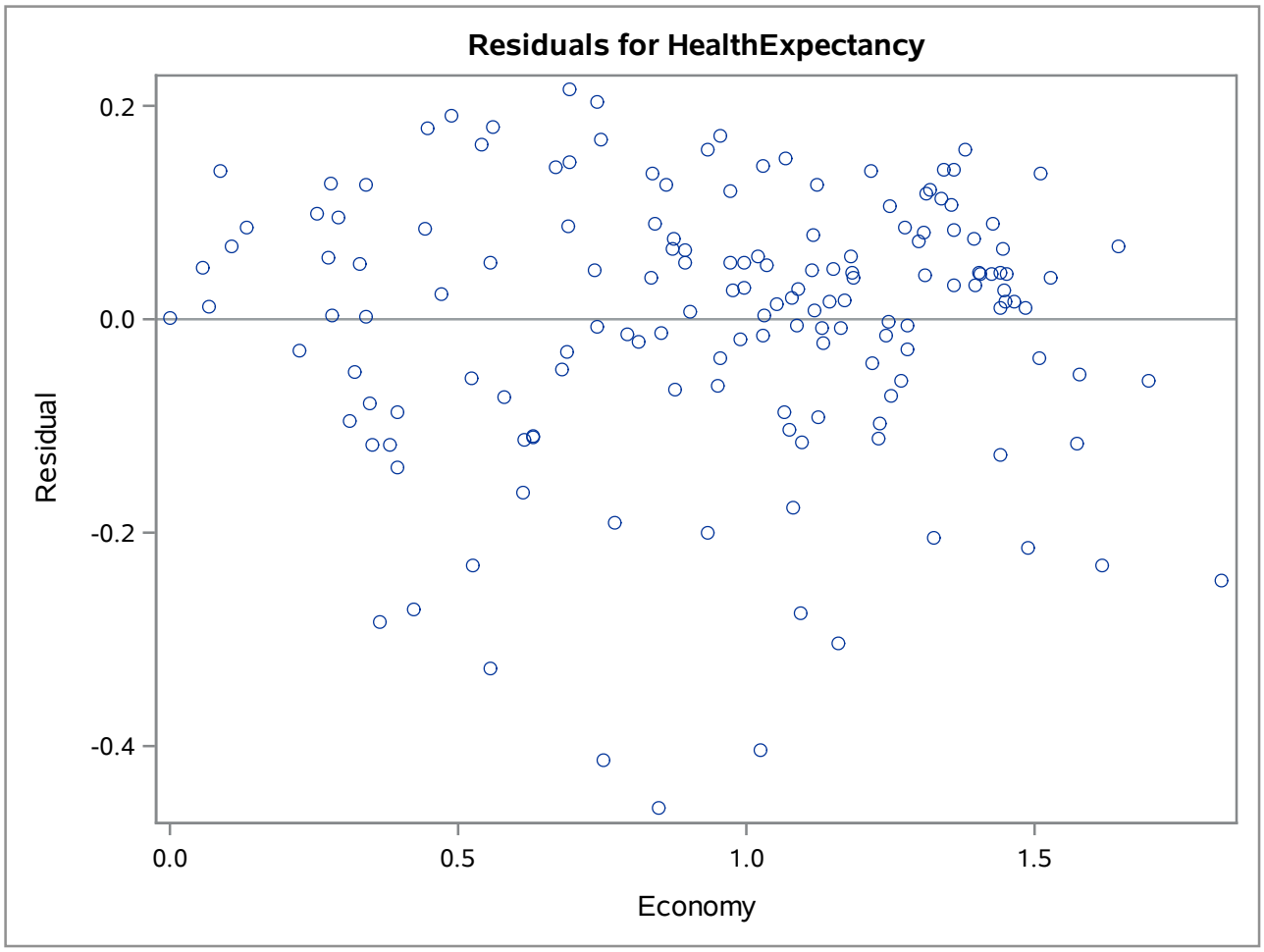
Simple Regression with Economy as Regressor
World Happiness Data - 2016
Submitted by Jena Mehta

The REG Procedure
Model: MODEL1
Dependent Variable: HealthExpectancy



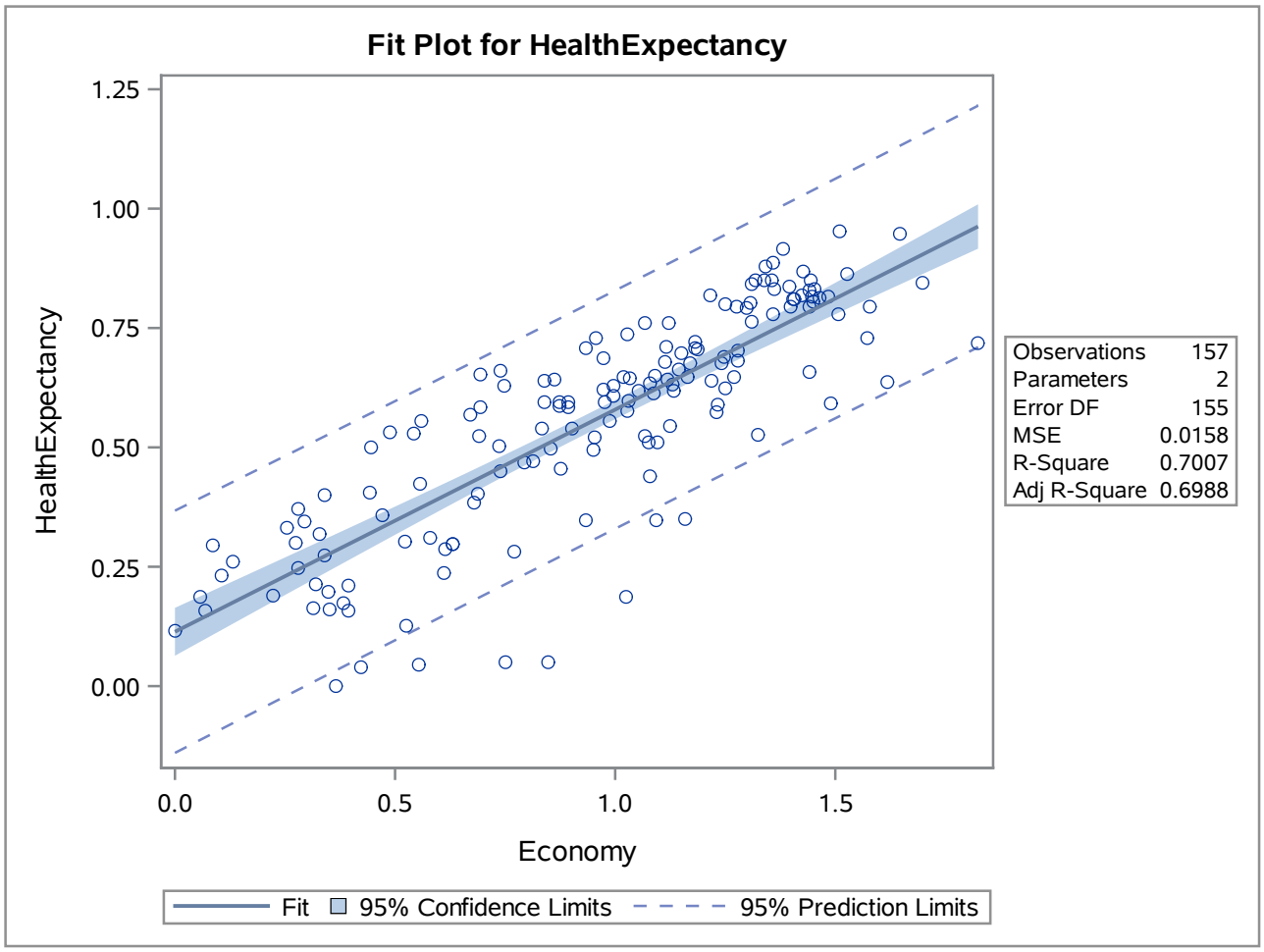
Simple Regression with Economy as Regressor
World Happiness Data - 2016
Submitted by Jena Mehta

The REG Procedure
Model: MODEL1
Dependent Variable: HealthExpectancy



Simple Regression with Economy as Regressor
World Happiness Data - 2016
Submitted by Jena Mehta

The REG Procedure
Model: MODEL1
Dependent Variable: HealthExpectancy



Obs	economy	MODEL1
1	0.25	0.23010
2	0.75	0.46275
3	1.05	0.60234
4	1.25	0.69540
5	1.35	0.74193