Complexity and the Sustainable Development Goals: A Computational Intelligence Approach to Support Policy Mix Designs

ANN and small data sets:

According to Ingrassia and Morlini (2005), Bartlett's (1998) theorem provides the theoretical basis for using neural network models with a total number of weights larger than the number of sample data points used to estimate the weights. Neural network modeling for small datasets is then justified from a theoretical point of view according to some of Bartlett's results showing that the generalization performance of a multilayer perceptron (MLP) depends more on the L1 norm of the weights between the hidden layer and the output layer rather than on the total number of weights. L1 is Lasso (Least Absolute Shrinkage and Selection Operator) regression, shrinks the less important parameters' coefficient to zero thus, it removes some parameters altogether. This works for parameter selection in case of a large number of parameters. As referred in Ingrassia and Morlini (2005), studies, regarding richly parameterized models have proposed various definitions of degrees of freedom which do not depend on the number of parameters in the models. Rather they depend on the sum of the sensitivity of each fitted value to perturbation in the corresponding observed value (Ye, 1998) or on the properties of the space in which the fitted values lie (Hodges and Sargent, 2001)). In deep networks (in this article, all MLPs come with four layers (1 input, 2 hidden, 1 output)), more than three layers (including input and output) qualifies as deep. In such networks, the degrees of freedom is generally much less than the number of parameters in the model (<16), and deeper networks tend to have less degrees of freedom (Gao, 2016). 16 parameters, number of observations (162), 2592 data points. Effective number of parameters is a function of regularization and is decreased by regularization in each MLP (Dunne, 2007, Section 5.3.3. pg. 59 Computational Learning Theory and Degrees of Freedom). In this article, batch training for small datasets and optimization algorithm, scaled conjugate gradient method are used. Additionally, achieved training, testing and holdout errors are against the issues of overtraining and overfitting.

Sources:
Ingrassia S, Morlini I. Neural network modeling for small datasets. Technometrics. 2005 Aug 1;47(3):297-311

Ye, J. (1998), "On Measuring and Correcting the Effects of Data Mining and Model Selection," Journal of the American Statistical Association, 93, 120–131

Hodges, J.S., and Sargent, D.J. (2001), "Counting Degrees of Freedom in Hierarchical and Other Richly Parameterized Models," Biometrika, 88, 367–379

Gao, T., & Jojic, V. (2016). Degrees of freedom in deep neural networks. arXiv preprint arXiv:1603.09260.

Dunne, R. A. (2007). A statistical approach to neural networks for pattern recognition (Vol. 702). John Wiley & Sons.

SUPPLEMENTARY FILE

```
*Multilayer Perceptron Network.
MLP Goal1RegionalScore (MLEVEL=S) WITH Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore
Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore
Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore
Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION  TRAINING=6  TESTING=2  HOLDOUT=2
/ARCHITECTURE   AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH
OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005
SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO
ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .
```

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal1RegionalScore (MLEVEL=S) WITH Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:02.20
	Elapsed Time	00:00:01.25
Variables Created or Modified	Predicted Value	MLP_PredictedValue

[DataSet1]

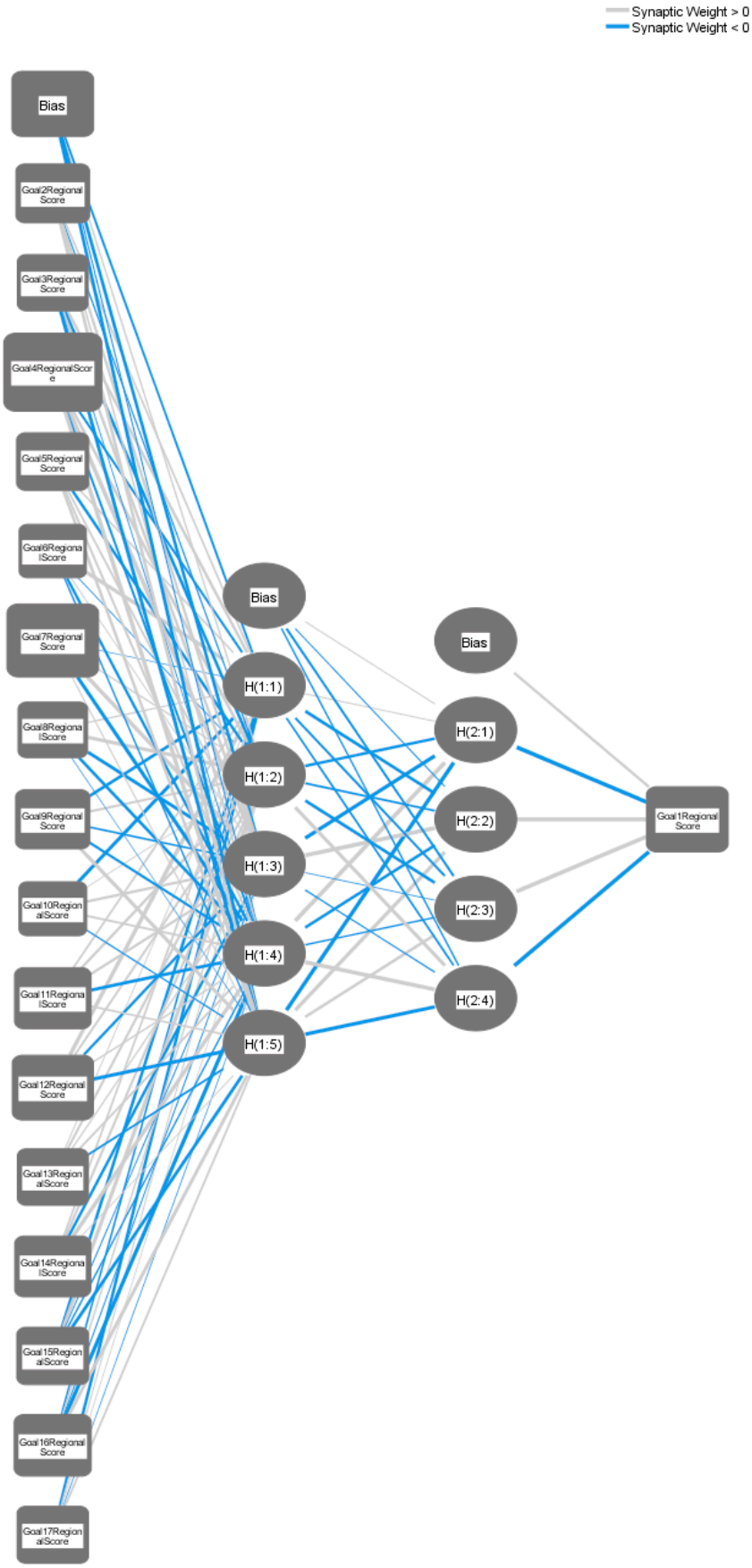
Case Processing Summary

		N	Percent
Sample	Training	100	61.7%
	Testing	27	16.7%
	Holdout	35	21.6%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 2 Regional Score
		2	Goal 3 Regional Score
		3	Goal 4 Regional Score
		4	Goal 5 Regional Score
		5	Goal 6 Regional Score
		6	Goal 7 Regional Score
		7	Goal 8 Regional Score
		8	Goal 9 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 1 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.006
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 1 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.260	.117	-.406	-.100	-.456
	Goal2RegionalScore	.165	-.110	.281	.140	.362
	Goal3RegionalScore	.330	-.382	.310	-.053	-.532
	Goal4RegionalScore	-.272	.356	.713	-.265	.700
	Goal5RegionalScore	.144	-.378	.206	.247	.352
	Goal6RegionalScore	.588	-.048	.034	-.349	-.148
	Goal7RegionalScore	-.014	.108	.654	-.591	.081
	Goal8RegionalScore	.103	.558	-.461	-.403	-.002
	Goal9RegionalScore	-.401	.257	-.206	-.316	.465
	Goal10RegionalScore	-.534	.014	.306	.230	-.135
	Goal11RegionalScore	.178	.297	.281	-.457	.176
	Goal12RegionalScore	.633	.236	-.337	.126	-.622
	Goal13RegionalScore	.034	.269	.106	.218	-.238
	Goal14RegionalScore	.195	.262	-.357	.608	.016
	Goal15RegionalScore	-.381	.468	-.075	-.143	-.450
	Goal16RegionalScore	-.194	.120	-.086	-.675	.441
	Goal17RegionalScore	-.391	.061	.004	-.033	.208
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

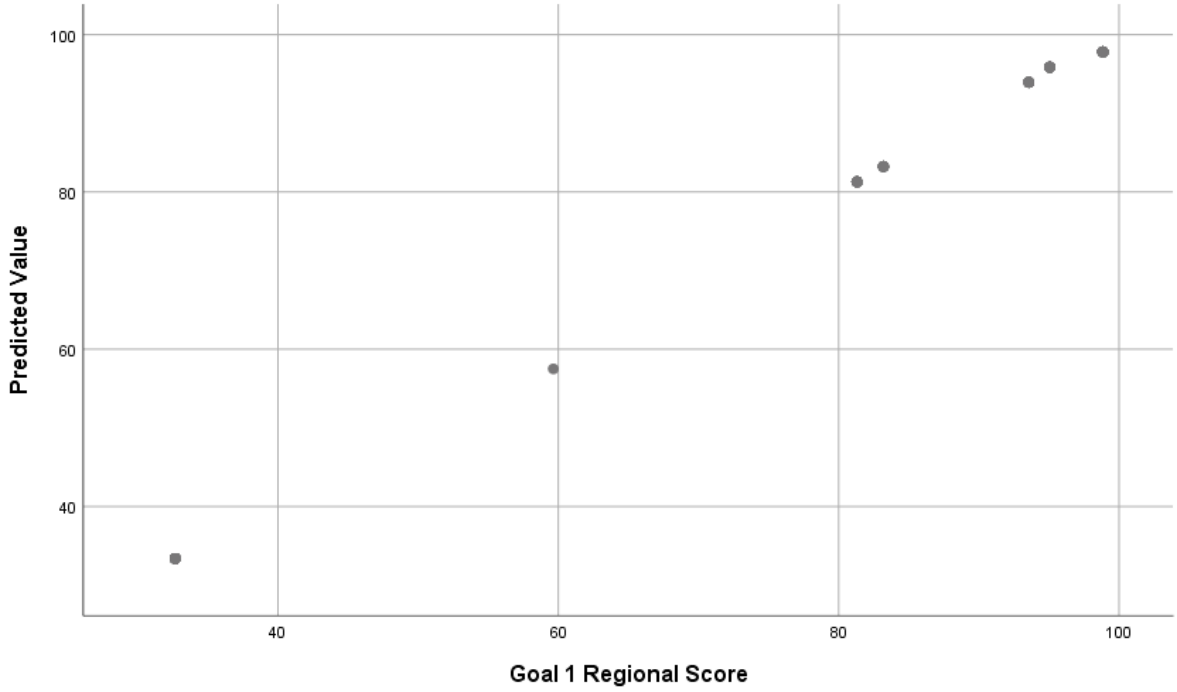
Parameter Estimates

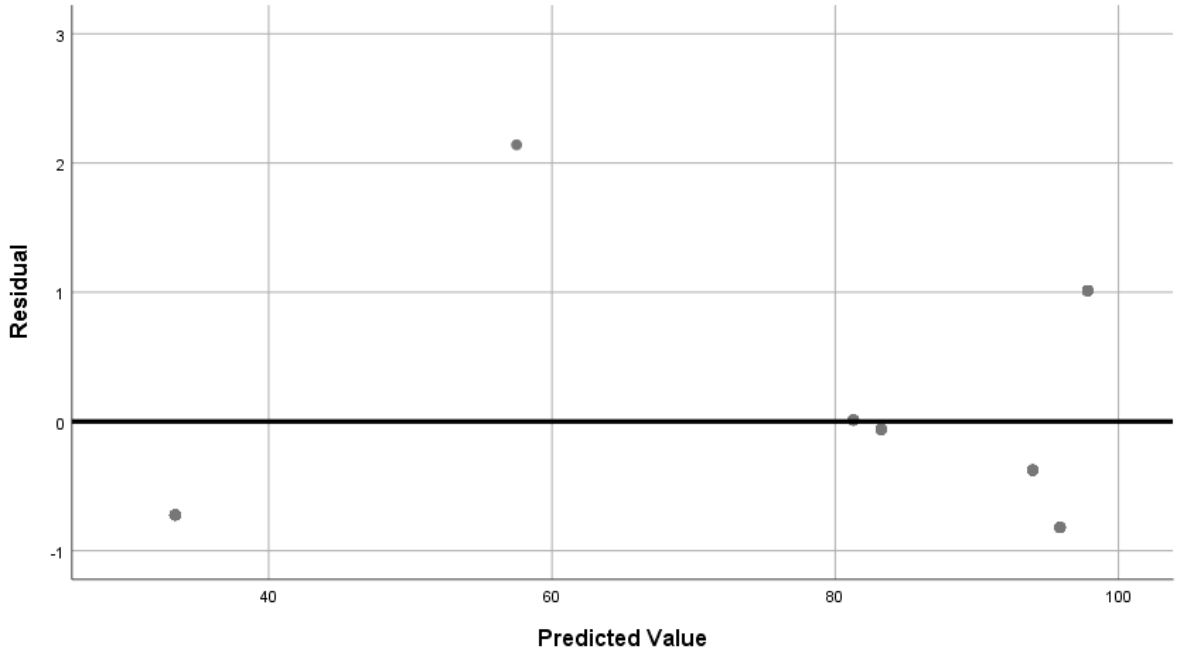
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				

	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.057	-.095	-.270	-.154
	H(1:1)	.064	-.440	-.271	-.236
	H(1:2)	-.361	-.246	-.406	.464
	H(1:3)	-.634	.930	-.041	-.123
	H(1:4)	1.036	-.379	-.164	.727
	H(1:5)	-.752	.565	.355	-.622
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal1RegionalScore
Input Layer	(Bias)	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	.301
	H(2:1)	-1.427
	H(2:2)	2.024
	H(2:3)	.781
	H(2:4)	-1.078

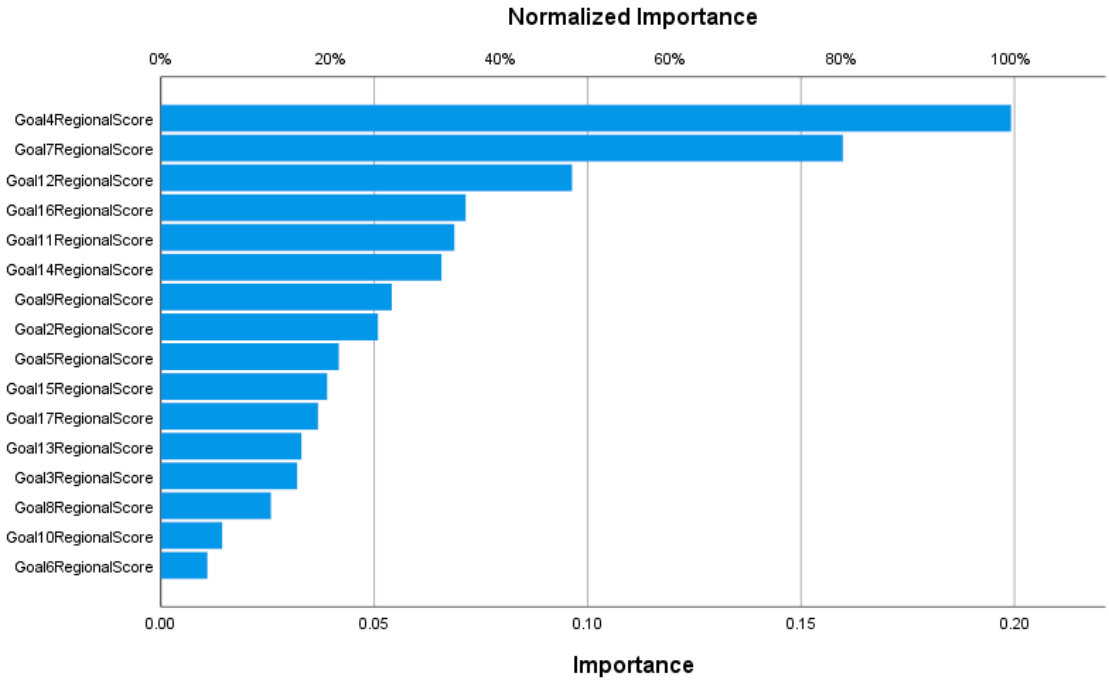




Dependent Variable: Goal 1 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 2 Regional Score	.051	25.6%
Goal 3 Regional Score	.032	16.0%
Goal 4 Regional Score	.199	100.0%
Goal 5 Regional Score	.042	20.9%
Goal 6 Regional Score	.011	5.5%
Goal 7 Regional Score	.160	80.2%
Goal 8 Regional Score	.026	12.9%
Goal 9 Regional Score	.054	27.2%
Goal 10 Regional Score	.014	7.2%
Goal 11 Regional Score	.069	34.5%
Goal 12 Regional Score	.096	48.4%
Goal 13 Regional Score	.033	16.5%
Goal 14 Regional Score	.066	33.0%
Goal 15 Regional Score	.039	19.6%
Goal 16 Regional Score	.071	35.9%
Goal 17 Regional Score	.037	18.5%



```
*Multilayer Perceptron Network.
MLP Goal2RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal3RegionalScore Goal4RegionalScore
Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore
Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore
Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION  TRAINING=6  TESTING=2  HOLDOUT=2
/ARCHITECTURE   AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH
OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005
SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO
ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .
```

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable

Syntax		MLP Goal2RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.78
	Elapsed Time	00:00:00.68

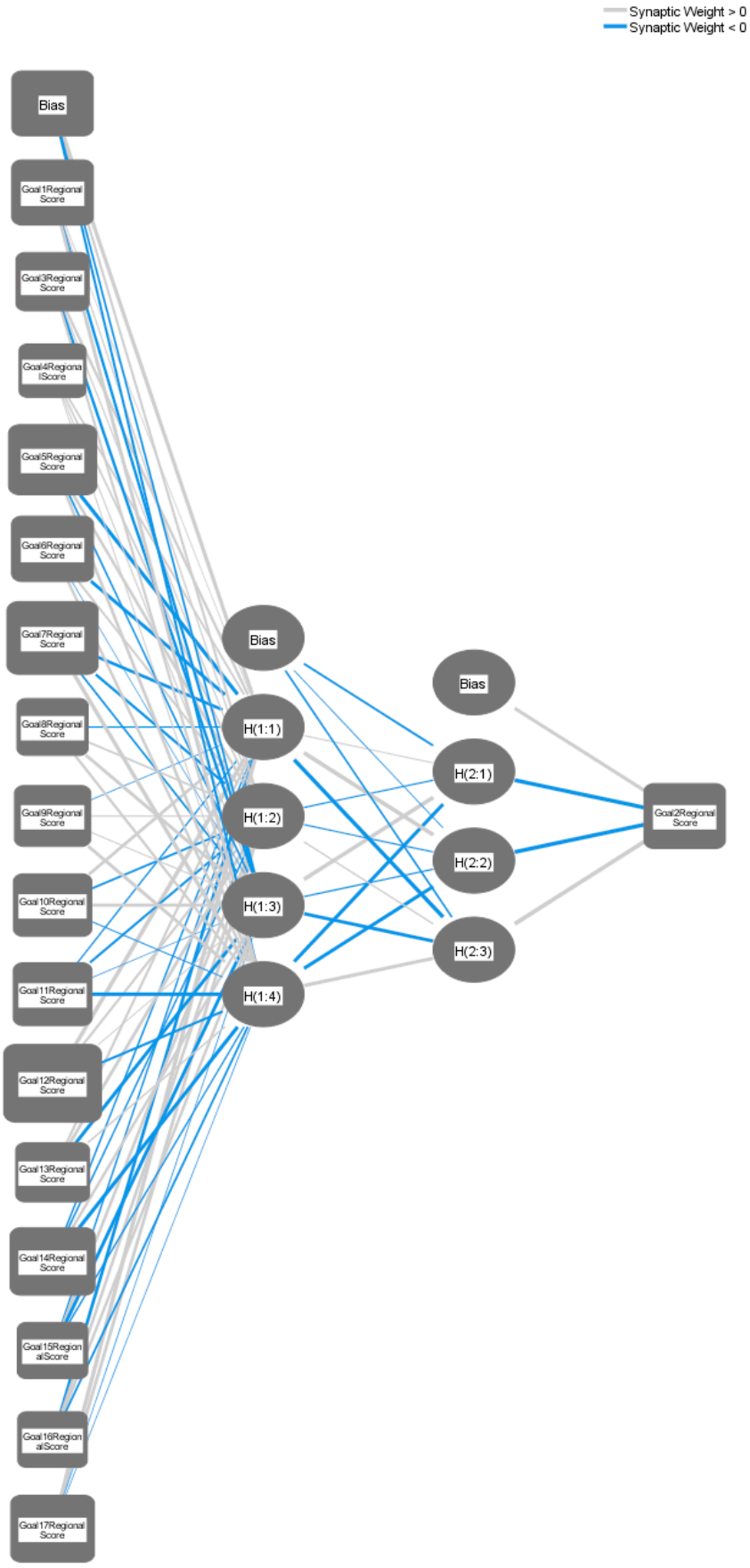
Case Processing Summary

		N	Percent
Sample	Training	90	55.6%
	Testing	39	24.1%
	Holdout	33	20.4%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 3 Regional Score
		3	Goal 4 Regional Score
		4	Goal 5 Regional Score
		5	Goal 6 Regional Score
		6	Goal 7 Regional Score
		7	Goal 8 Regional Score
		8	Goal 9 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		4
	Number of Units in Hidden Layer 2[a]		3
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 2 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.003
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 2 Regional Score

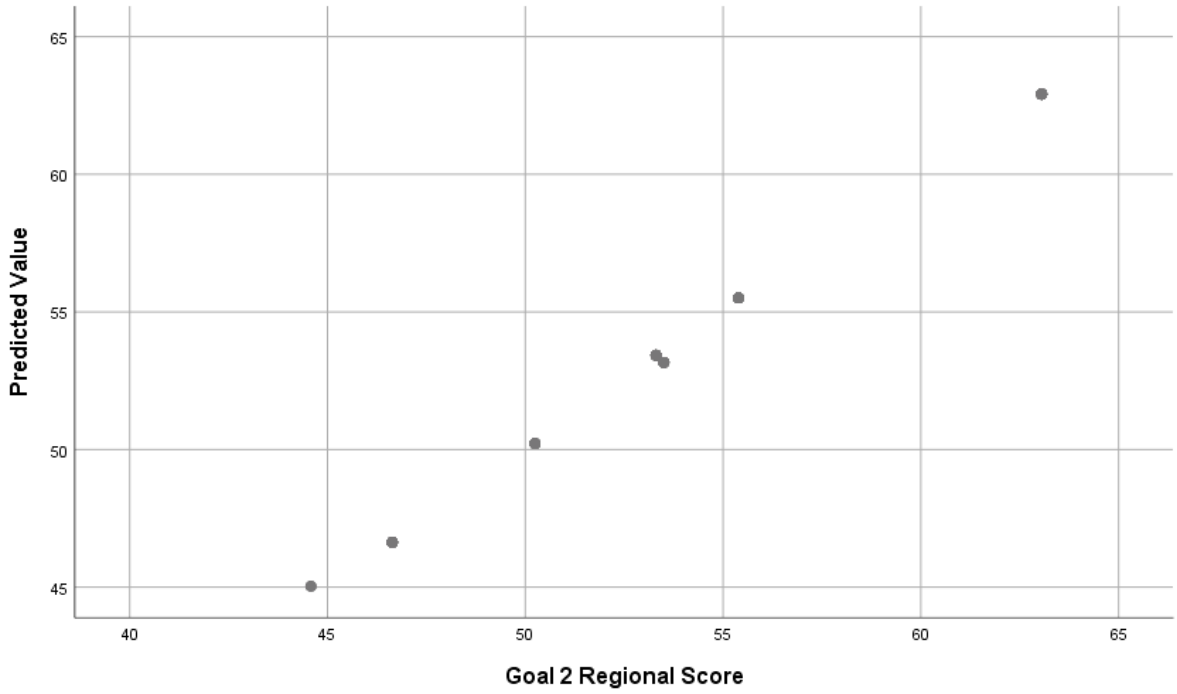
Parameter Estimates

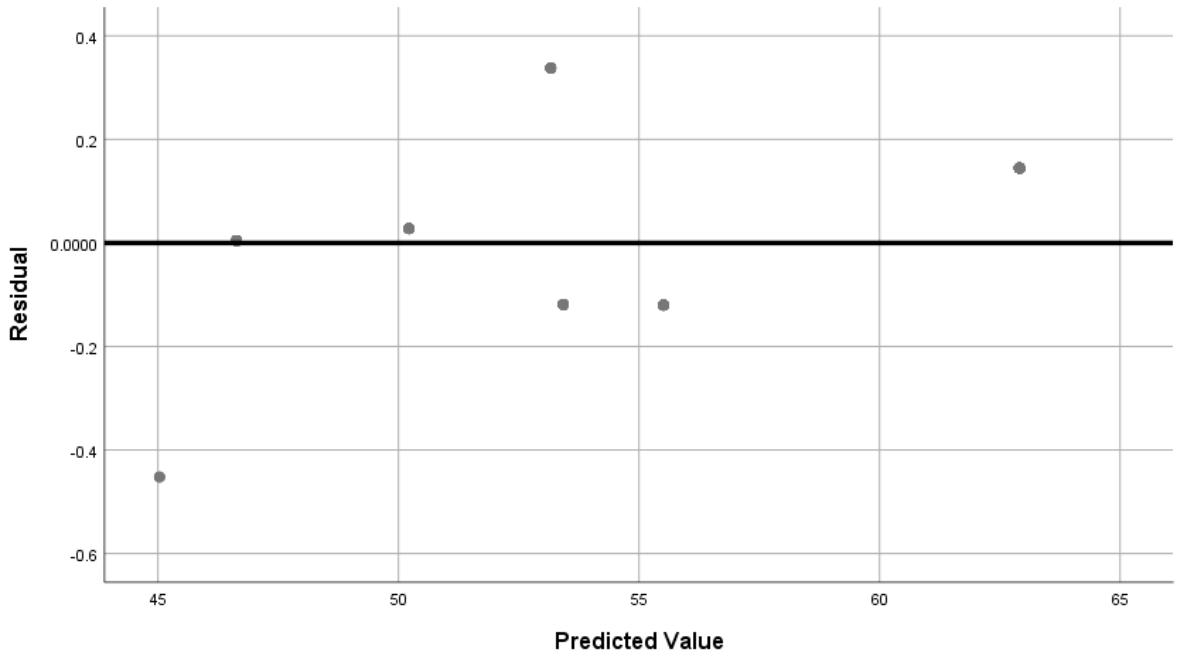
		Predicted				
		Hidden Layer 1				Hidden Layer 2
Predictor		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(2:1)
Input Layer	(Bias)	.650	.295	-.257	-.325	
	Goal1RegionalScore	.076	.135	-.387	.489	
	Goal3RegionalScore	.342	.126	-.398	.311	
	Goal4RegionalScore	.237	.225	.120	.100	
	Goal5RegionalScore	-.718	.380	-.231	.414	
	Goal6RegionalScore	-.538	.262	-.032	.364	
	Goal7RegionalScore	-.461	-.369	-.248	.773	
	Goal8RegionalScore	-.132	.231	.459	.326	
	Goal9RegionalScore	-.084	.136	.117	.473	
	Goal10RegionalScore	.422	-.275	.470	-.125	
	Goal11RegionalScore	-.184	-.324	-.035	-.744	
	Goal12RegionalScore	1.072	.302	.085	-.355	
	Goal13RegionalScore	.313	.440	-.636	.165	
	Goal14RegionalScore	-.201	-.201	.363	-.698	
	Goal15RegionalScore	-.194	.396	-.591	-.191	
	Goal16RegionalScore	-.479	.389	.378	-.270	
	Goal17RegionalScore	1.053	.442	-.082	-.068	
Hidden Layer 1	(Bias)					-.283
	H(1:1)					.114
	H(1:2)					-.157
	H(1:3)					.894
	H(1:4)					-.689
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					

Parameter Estimates

		Predicted Hidden Layer 2		
Predictor		H(2:2)	H(2:3)	Goal2RegionalScore
Input Layer	(Bias)			
	Goal1RegionalScore			
	Goal3RegionalScore			
	Goal4RegionalScore			
	Goal5RegionalScore			
	Goal6RegionalScore			
	Goal7RegionalScore			
	Goal8RegionalScore			
	Goal9RegionalScore			
	Goal10RegionalScore			
	Goal11RegionalScore			
	Goal12RegionalScore			
	Goal13RegionalScore			
	Goal14RegionalScore			
	Goal15RegionalScore			
	Goal16RegionalScore			
	Goal17RegionalScore			

Hidden Layer 1	(Bias)	-.096	-.235	
	H(1:1)	1.270	-1.109	
	H(1:2)	-.144	.153	
	H(1:3)	-.162	-.592	
	H(1:4)	-.656	.530	
Hidden Layer 2	(Bias)			.521
	H(2:1)			-1.331
	H(2:2)			-1.589
	H(2:3)			1.863

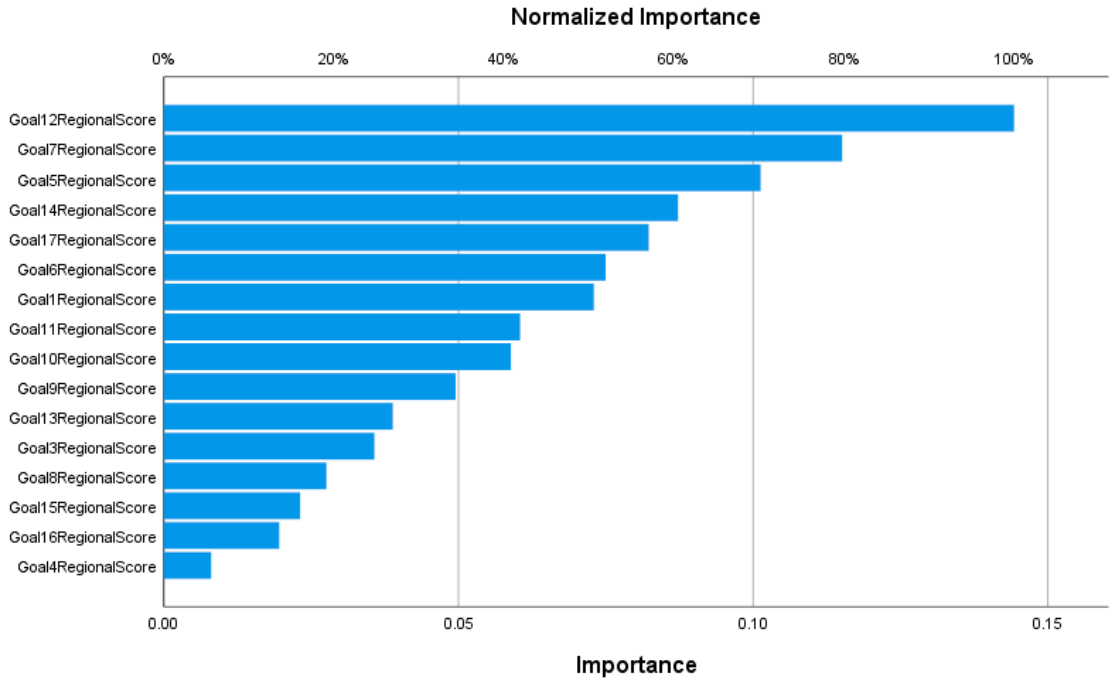




Dependent Variable: Goal 2 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.073	50.6%
Goal 3 Regional Score	.036	24.8%
Goal 4 Regional Score	.008	5.6%
Goal 5 Regional Score	.101	70.2%
Goal 6 Regional Score	.075	52.0%
Goal 7 Regional Score	.115	79.8%
Goal 8 Regional Score	.028	19.1%
Goal 9 Regional Score	.050	34.3%
Goal 10 Regional Score	.059	40.8%
Goal 11 Regional Score	.060	41.9%
Goal 12 Regional Score	.144	100.0%
Goal 13 Regional Score	.039	26.9%
Goal 14 Regional Score	.087	60.5%
Goal 15 Regional Score	.023	16.0%
Goal 16 Regional Score	.020	13.6%
Goal 17 Regional Score	.082	57.0%




```
*Multilayer Perceptron Network.
MLP Goal3RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal4RegionalScore
  Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore
  Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore
  Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
  /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
  /PARTITION  TRAINING=6  TESTING=2  HOLDOUT=2
  /ARCHITECTURE   AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH
  OUTPUTFUNCTION=SIGMOID
  /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005
  SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
  /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
  /PLOT NETWORK PREDICTED RESIDUAL
  /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO
  ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
  /MISSING USERMISSING=EXCLUDE .
```

Multilayer Perceptron

Notes

Output Created		17-JUL-2019 17:17:06
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal3RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.66
	Elapsed Time	00:00:00.70

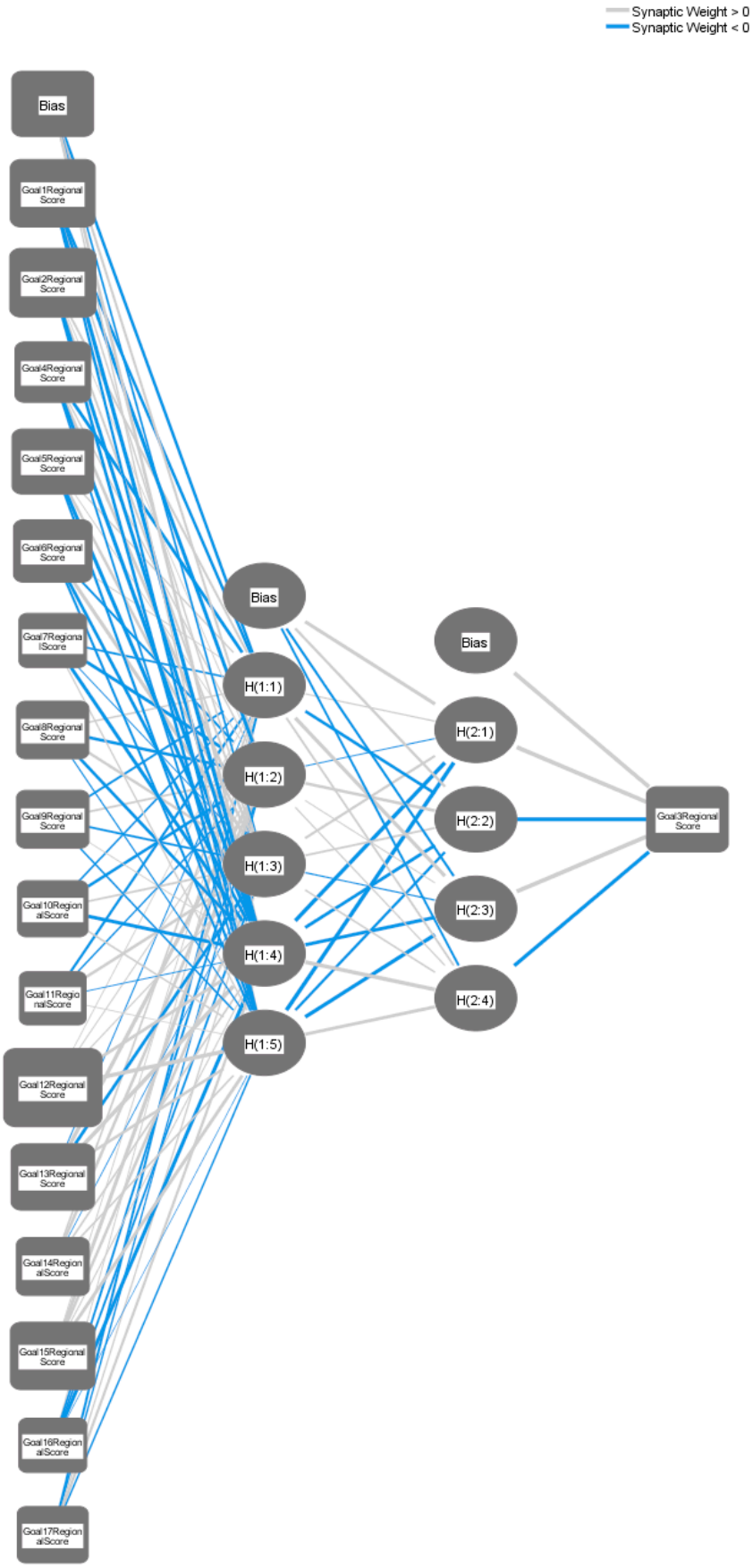
Case Processing Summary

		N	Percent
Sample	Training	99	61.1%
	Testing	32	19.8%
	Holdout	31	19.1%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 4 Regional Score
		4	Goal 5 Regional Score
		5	Goal 6 Regional Score
		6	Goal 7 Regional Score
		7	Goal 8 Regional Score
		8	Goal 9 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 3 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.003
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.000
Holdout	Relative Error	.001

Dependent Variable: Goal 3 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.503	.279	-.256	.477	.132
	Goal1RegionalScore	-.494	-.730	.166	-1.025	-.422
	Goal2RegionalScore	.273	.004	.256	-.668	-.561
	Goal4RegionalScore	-.596	.114	.454	-.779	-.277
	Goal5RegionalScore	.132	.023	.418	-.754	-.421
	Goal6RegionalScore	.031	-.337	.628	-.594	-.340
	Goal7RegionalScore	-.260	-.602	-.095	-.717	.129
	Goal8RegionalScore	.161	-.536	.409	-.576	-.140
	Goal9RegionalScore	-.302	.235	-.287	.009	-.209
	Goal10RegionalScore	-.220	-.499	.228	-.735	.184
	Goal11RegionalScore	-.425	-.197	.453	-.080	.003
	Goal12RegionalScore	.006	.070	.099	.528	1.016
	Goal13RegionalScore	-.100	.737	-.596	1.063	.443
	Goal14RegionalScore	.208	.462	-.033	.203	.199
	Goal15RegionalScore	.028	.639	.444	.087	.579
	Goal16RegionalScore	.045	-.306	-.276	-.772	.000
	Goal17RegionalScore	-.366	-.189	.125	.354	-.203
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

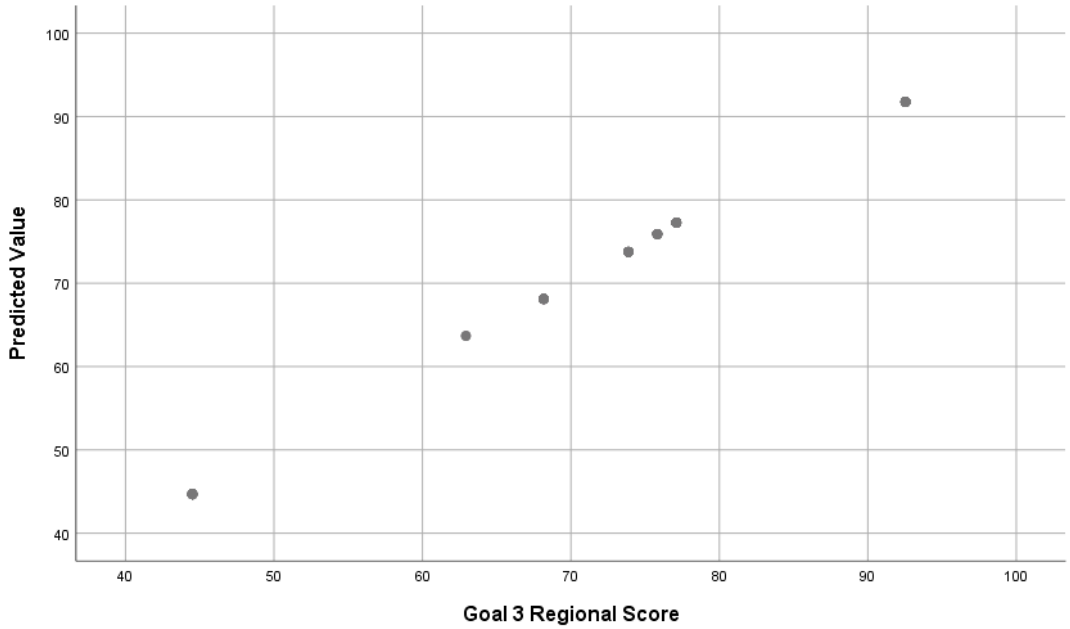
Parameter Estimates

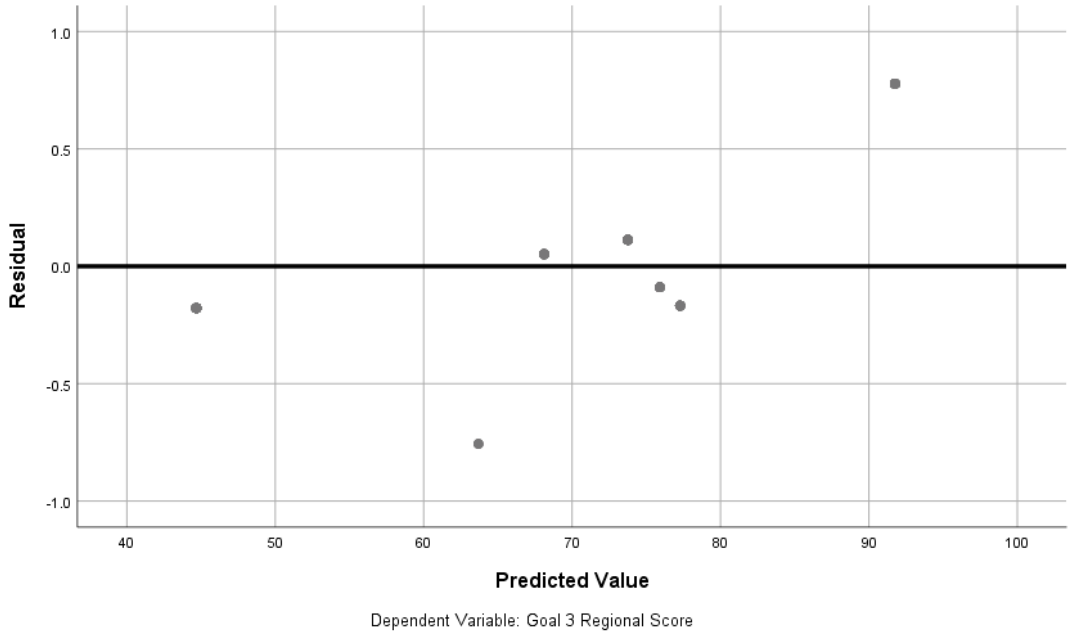
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				

	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.624	.369	-.384	-.313
	H(1:1)	.108	-.576	.644	.221
	H(1:2)	-.098	.482	.040	.108
	H(1:3)	.318	.229	-.131	.184
	H(1:4)	-1.243	-.600	-.687	1.006
	H(1:5)	-1.615	-.451	-1.009	.594
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal3RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	1.067
	H(2:1)	2.071
	H(2:2)	-1.169
	H(2:3)	3.740
	H(2:4)	-.988

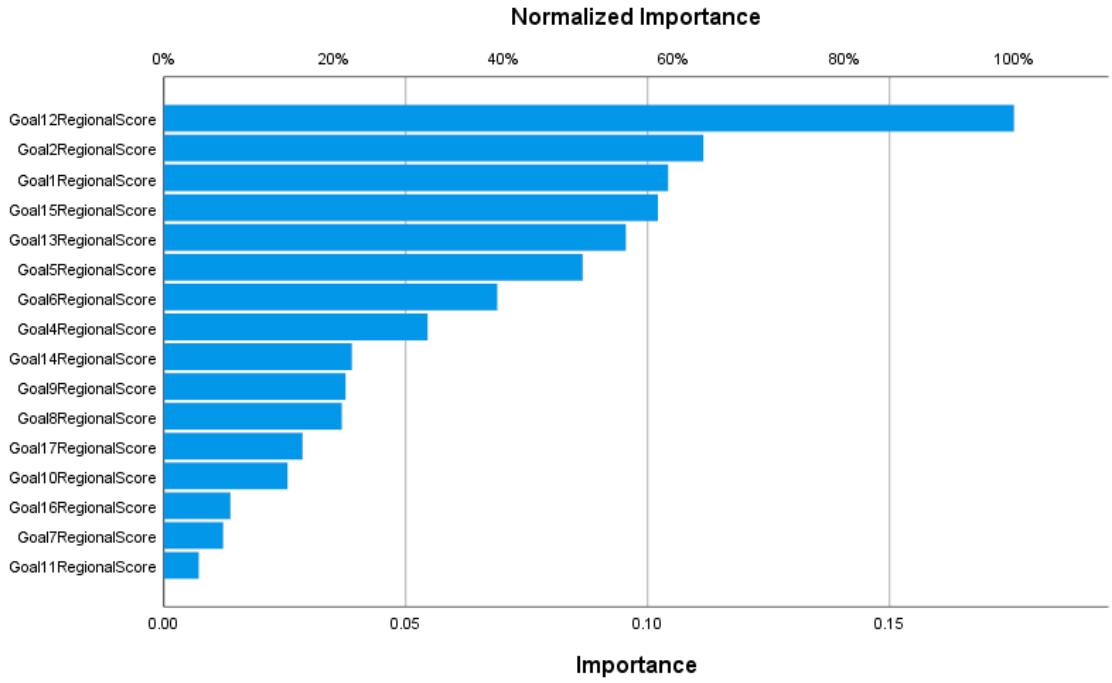




Dependent Variable: Goal 3 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.104	59.3%
Goal 2 Regional Score	.112	63.5%
Goal 4 Regional Score	.055	31.0%
Goal 5 Regional Score	.087	49.3%
Goal 6 Regional Score	.069	39.2%
Goal 7 Regional Score	.012	7.0%
Goal 8 Regional Score	.037	20.9%
Goal 9 Regional Score	.038	21.4%
Goal 10 Regional Score	.026	14.5%
Goal 11 Regional Score	.007	4.1%
Goal 12 Regional Score	.176	100.0%
Goal 13 Regional Score	.095	54.3%
Goal 14 Regional Score	.039	22.1%
Goal 15 Regional Score	.102	58.1%
Goal 16 Regional Score	.014	7.8%
Goal 17 Regional Score	.029	16.3%



*Multilayer Perceptron Network.
MLP Goal4RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable

Syntax		MLP Goal4RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.56
	Elapsed Time	00:00:00.62
Variables Created or Modified	Predicted Value	MLP_PredictedValue_AK

Model Summary

Training	Sum of Squares Error	.006
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 4 Regional Score

Parameter Estimates

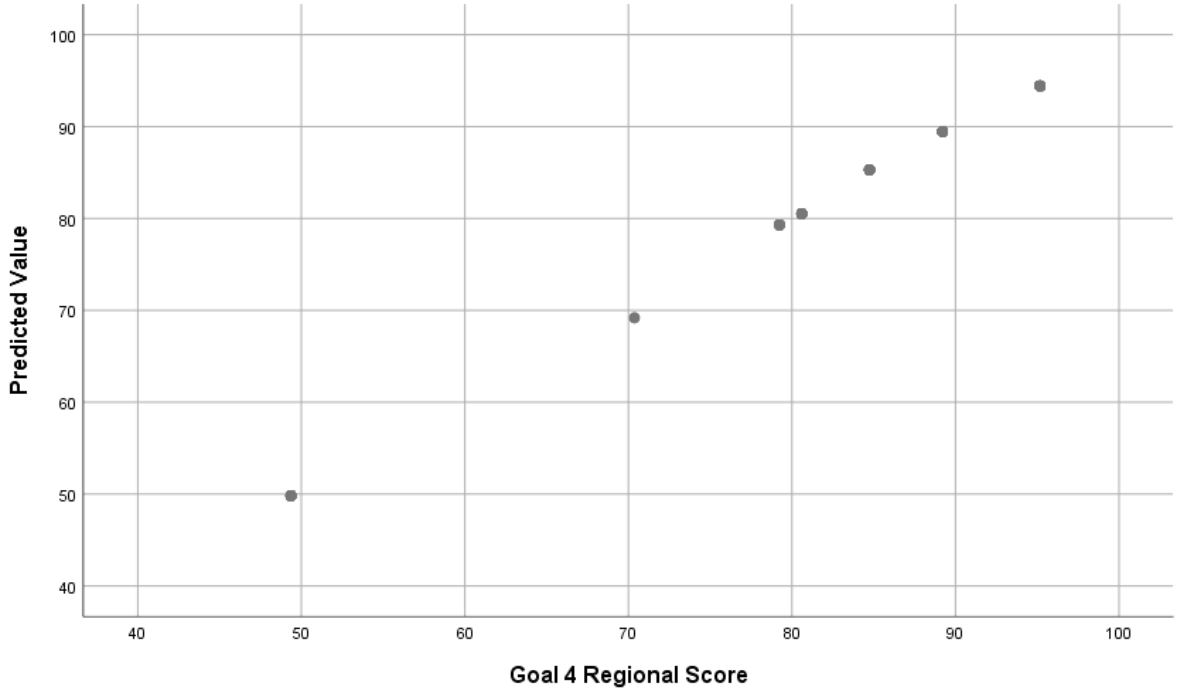
		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.027	.314	.334	-.231	-.114
	Goal1RegionalScore	-.130	-.533	-.033	.514	.148
	Goal2RegionalScore	.326	-.335	-.304	.109	.365
	Goal3RegionalScore	-.157	-.471	.471	.081	-.047
	Goal5RegionalScore	-.507	-.128	.411	.136	.468
	Goal6RegionalScore	.229	-.467	-.253	.306	.100
	Goal7RegionalScore	-.313	.343	.260	.405	-.078
	Goal8RegionalScore	.127	-.070	-.333	.429	.127
	Goal9RegionalScore	-.326	.184	.429	.485	-.395
	Goal10RegionalScore	-.018	-.266	-.156	.190	-.363
	Goal11RegionalScore	-.536	.439	-.080	.441	.419
	Goal12RegionalScore	.631	.724	-.366	-.587	-.293
	Goal13RegionalScore	.494	.166	.255	.234	-.532
	Goal14RegionalScore	-.305	-.024	.023	-.596	-.087
	Goal15RegionalScore	.520	-.118	-.073	-.239	.417
	Goal16RegionalScore	-.053	.429	.479	.509	-.387
	Goal17RegionalScore	.365	-.136	.092	-.363	.021
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

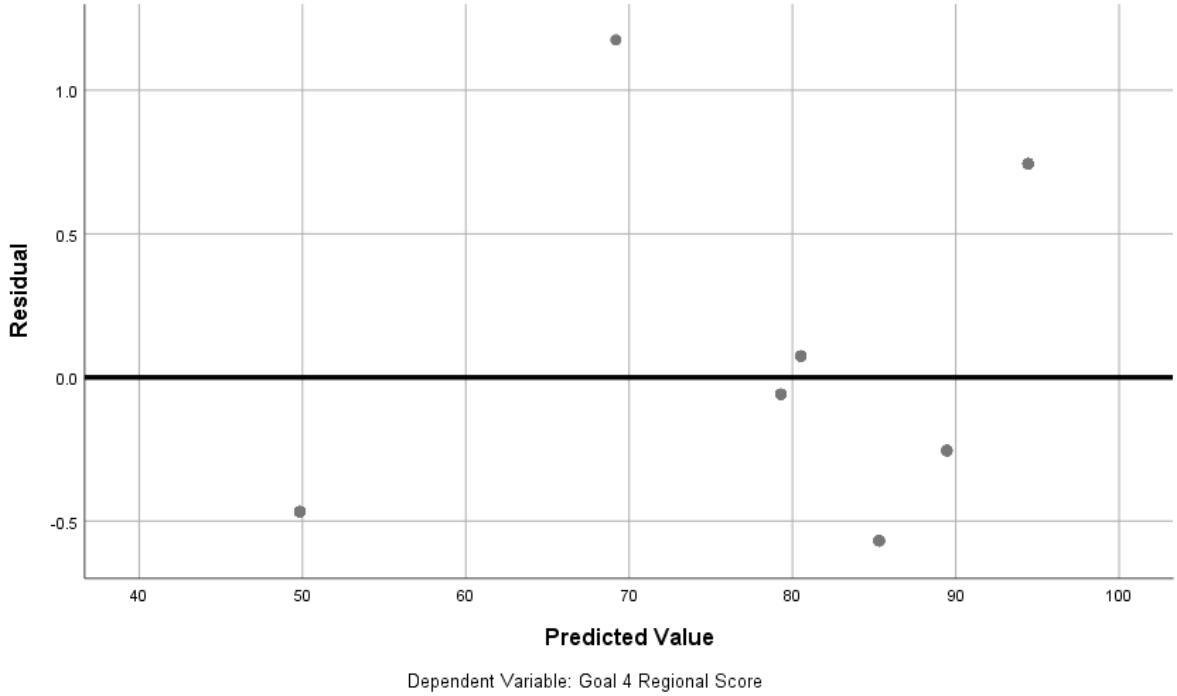
Parameter Estimates

		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.031	-.009	.048	-.192
	H(1:1)	.793	.399	-.577	-.085
	H(1:2)	.544	.385	-.323	-.028
	H(1:3)	-.269	-.074	-.277	.225
	H(1:4)	-.676	-1.050	.429	1.026
	H(1:5)	-.020	-.206	.362	-.079
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal4RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	-.156
	H(2:1)	-1.518
	H(2:2)	-1.551
	H(2:3)	.837
	H(2:4)	1.009

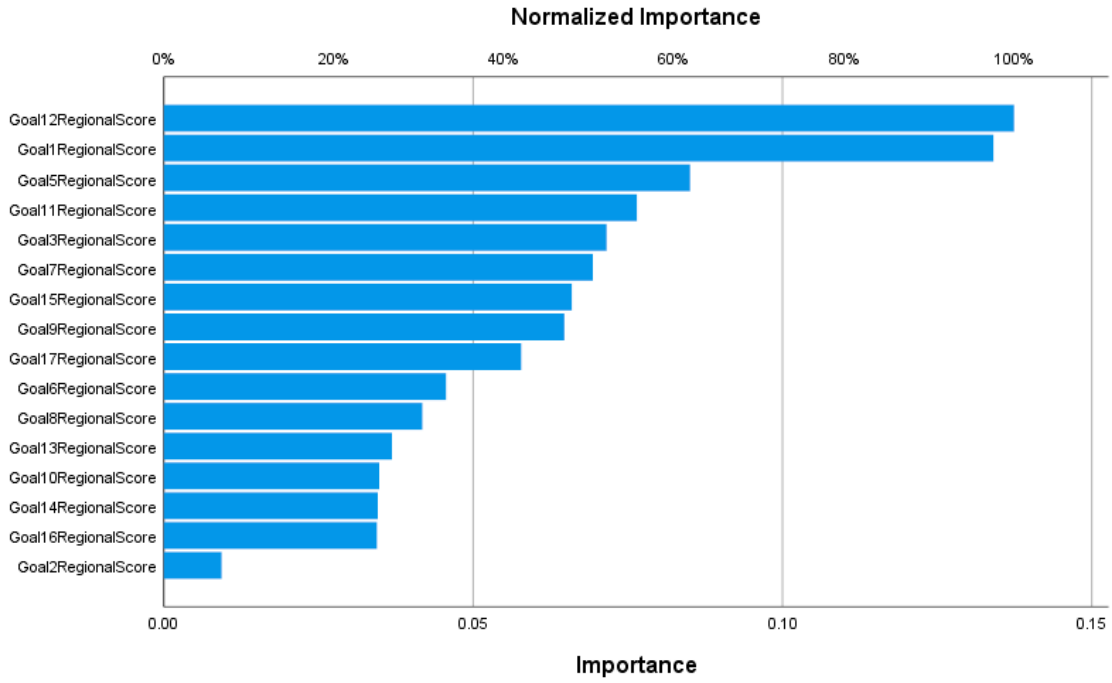




Dependent Variable: Goal 4 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.134	97.6%
Goal 2 Regional Score	.009	6.8%
Goal 3 Regional Score	.072	52.1%
Goal 5 Regional Score	.085	61.9%
Goal 6 Regional Score	.046	33.2%
Goal 7 Regional Score	.069	50.5%
Goal 8 Regional Score	.042	30.4%
Goal 9 Regional Score	.065	47.1%
Goal 10 Regional Score	.035	25.3%
Goal 11 Regional Score	.076	55.6%
Goal 12 Regional Score	.137	100.0%
Goal 13 Regional Score	.037	26.8%
Goal 14 Regional Score	.035	25.2%
Goal 15 Regional Score	.066	48.0%
Goal 16 Regional Score	.034	25.1%
Goal 17 Regional Score	.058	42.0%



*Multilayer Perceptron Network.
MLP Goal5RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable

Syntax		MLP Goal5RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.64
	Elapsed Time	00:00:00.66
Variables Created or Modified	Predicted Value	MLP_PredictedValue_U

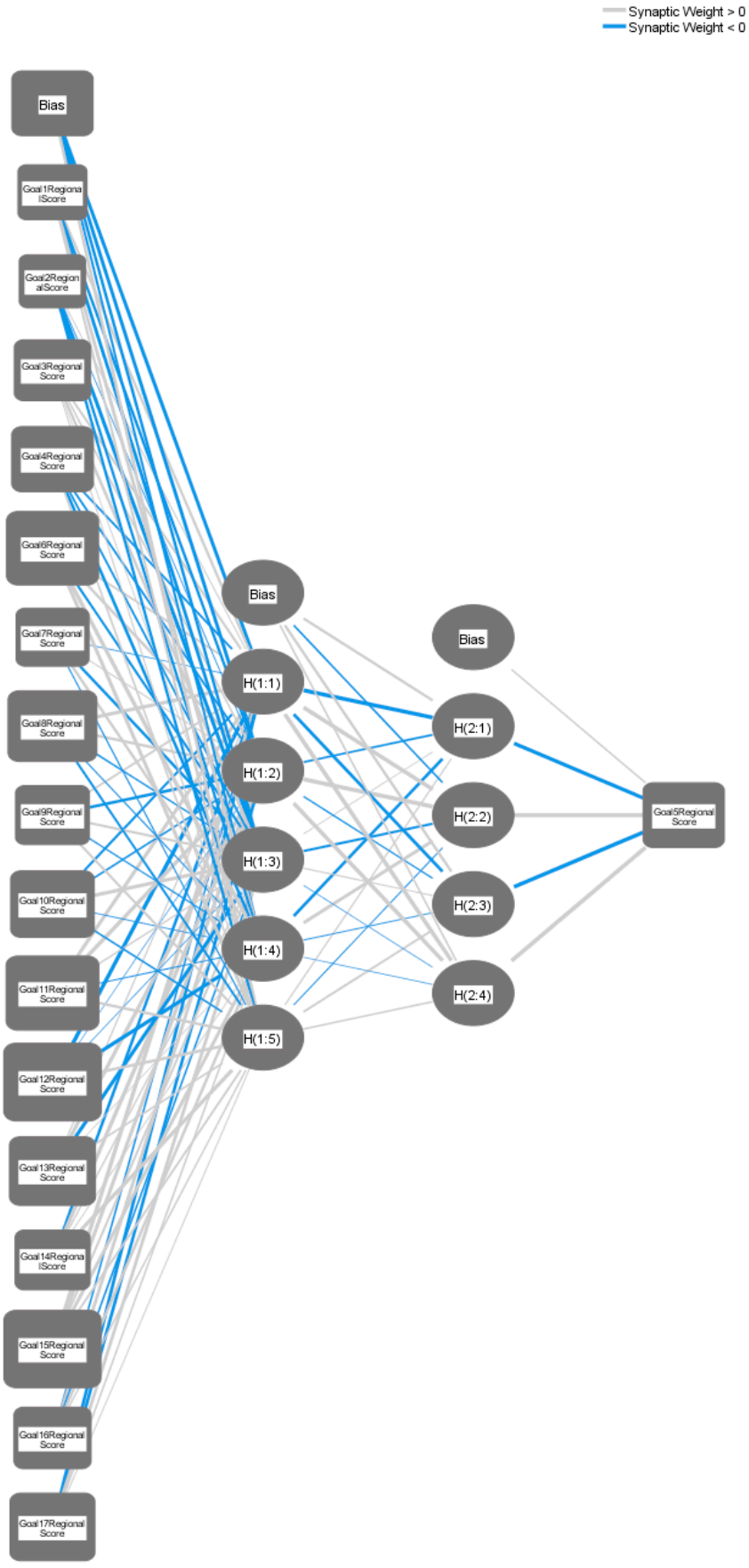
Case Processing Summary

		N	Percent
Sample	Training	97	59.9%
	Testing	37	22.8%
	Holdout	28	17.3%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 6 Regional Score
		6	Goal 7 Regional Score
		7	Goal 8 Regional Score
		8	Goal 9 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 5 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.004
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 5 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.537	-.505	-.354	-.287	.372
	Goal1RegionalScore	.295	-.346	-.433	.407	.268
	Goal2RegionalScore	.057	-.037	-.560	-.328	-.345
	Goal3RegionalScore	.267	.149	.340	.023	.068
	Goal4RegionalScore	-.264	-.257	-.251	-.390	.205
	Goal6RegionalScore	.238	.331	-.300	.572	.461
	Goal7RegionalScore	-.024	.064	-.368	.316	-.098
	Goal8RegionalScore	.485	.315	-.177	-.098	-.278
	Goal9RegionalScore	.239	-.387	.285	-.130	.269
	Goal10RegionalScore	-.305	-.236	.464	-.046	-.231
	Goal11RegionalScore	.437	.569	.115	-.084	.314
	Goal12RegionalScore	-.793	-.003	-.020	-.663	.347
	Goal13RegionalScore	.088	.558	-.560	.009	.210
	Goal14RegionalScore	-.381	.651	.113	.029	.544
	Goal15RegionalScore	.698	.515	.256	.424	.240
	Goal16RegionalScore	-.215	.400	-.220	.336	.144
	Goal17RegionalScore	-.436	-.408	.401	.158	.054
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

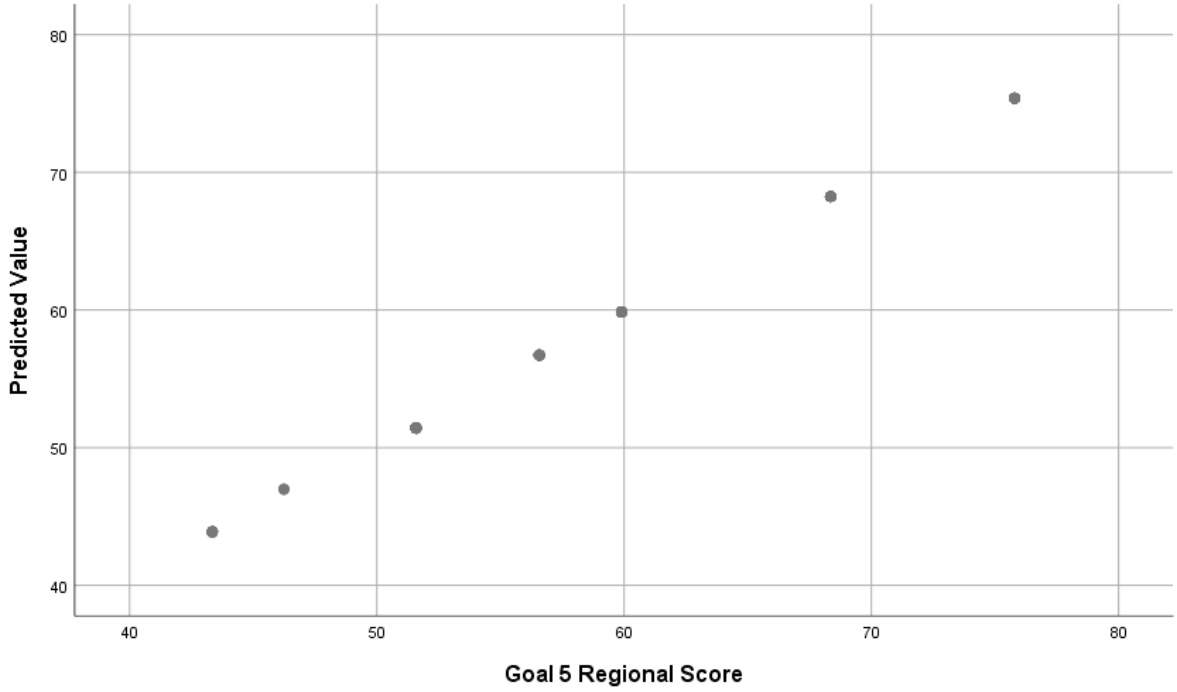
Parameter Estimates

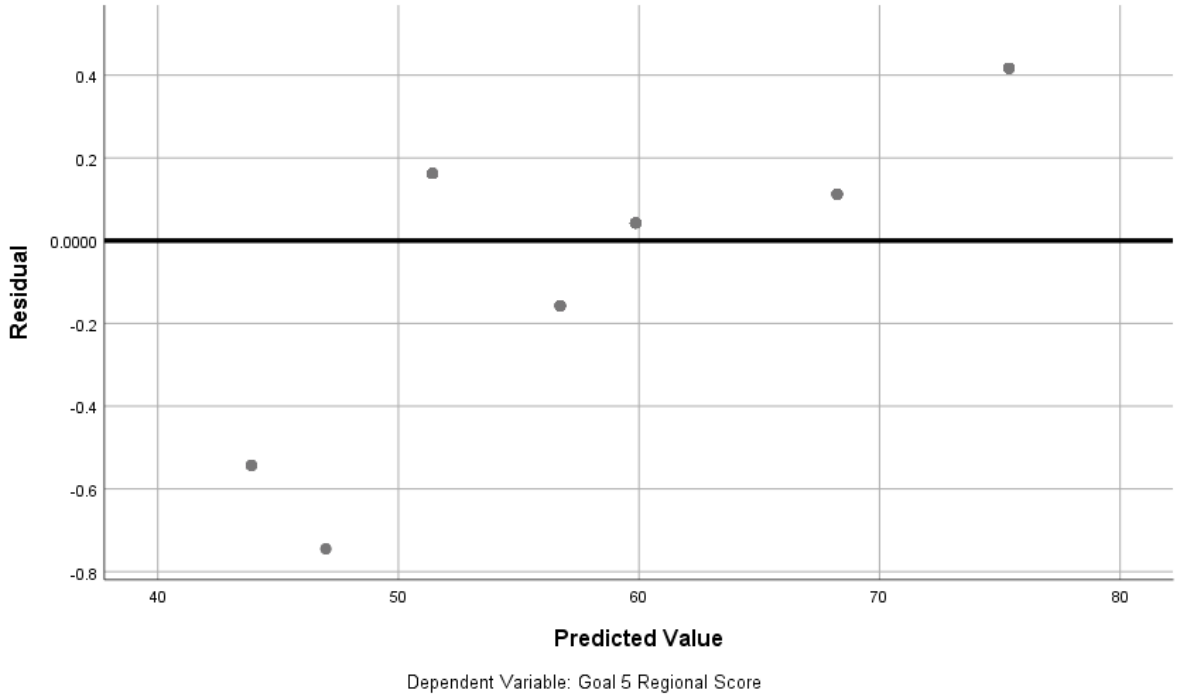
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				

	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.306	-.233	.309	.209
	H(1:1)	-1.045	.716	-.428	.732
	H(1:2)	-.257	1.085	-.134	.699
	H(1:3)	.026	-.308	.061	-.004
	H(1:4)	-.394	.410	-.059	-.007
	H(1:5)	.095	-.076	.241	.168
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal5RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	.148
	H(2:1)	-.689
	H(2:2)	2.330
	H(2:3)	-.796
	H(2:4)	1.694



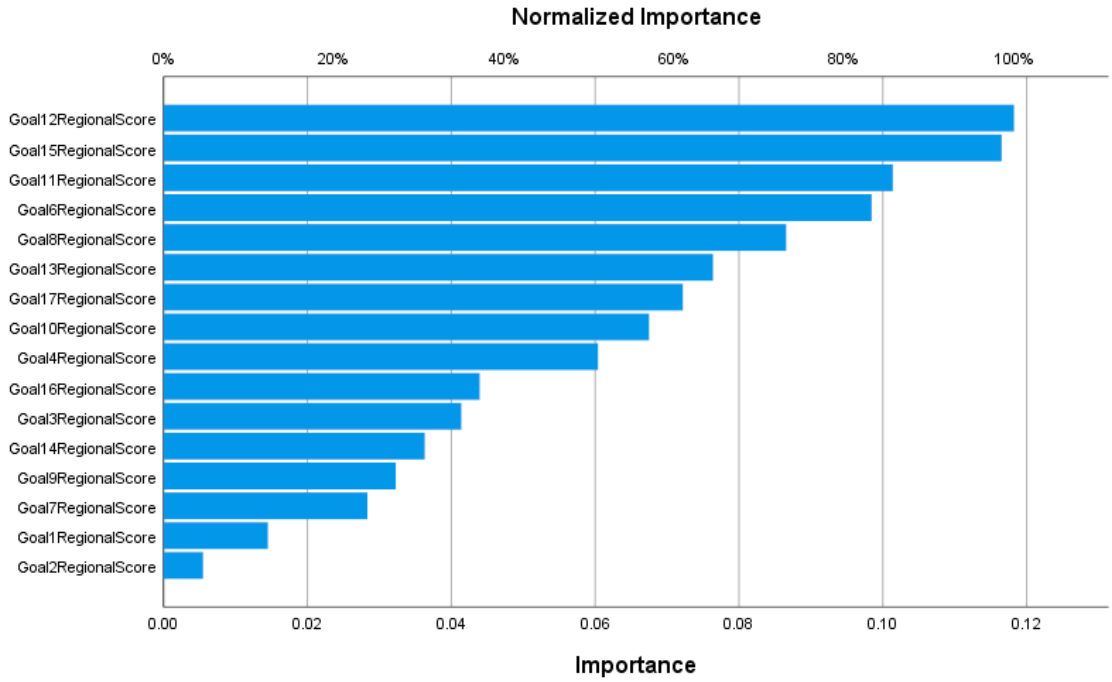


Dependent Variable: Goal 5 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.015	12.3%
Goal 2 Regional Score	.006	4.7%
Goal 3 Regional Score	.041	35.0%
Goal 4 Regional Score	.060	51.1%
Goal 6 Regional Score	.098	83.3%
Goal 7 Regional Score	.028	24.0%
Goal 8 Regional Score	.087	73.2%
Goal 9 Regional Score	.032	27.3%

Goal 10 Regional Score	.067	57.1%
Goal 11 Regional Score	.101	85.8%
Goal 12 Regional Score	.118	100.0%
Goal 13 Regional Score	.076	64.6%
Goal 14 Regional Score	.036	30.7%
Goal 15 Regional Score	.117	98.6%
Goal 16 Regional Score	.044	37.2%
Goal 17 Regional Score	.072	61.1%



```
*Multilayer Perceptron Network.
MLP Goal6RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore
Goal4RegionalScore Goal5RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore
Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore
Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION  TRAINING=6  TESTING=2  HOLDOUT=2
/ARCHITECTURE   AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH
OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005
SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO
ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .
```

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable

Syntax		MLP Goal6RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.62
	Elapsed Time	00:00:00.61
Variables Created or Modified	Predicted Value	MLP_PredictedValue_G

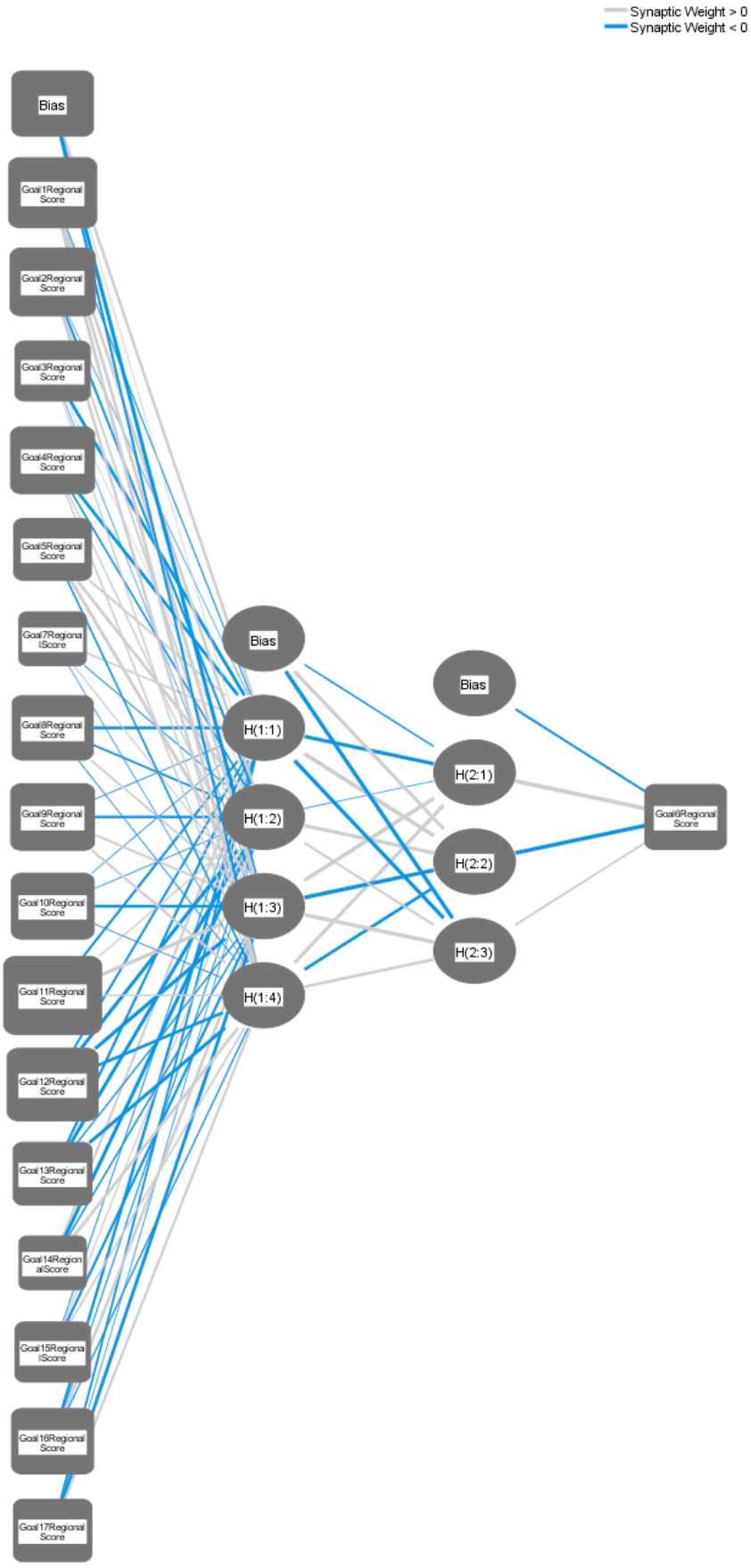
Case Processing Summary

		N	Percent
Sample	Training	90	55.6%
	Testing	30	18.5%
	Holdout	42	25.9%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 7 Regional Score
		7	Goal 8 Regional Score
		8	Goal 9 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		4
	Number of Units in Hidden Layer 2[a]		3
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 6 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.005
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 6 Regional Score

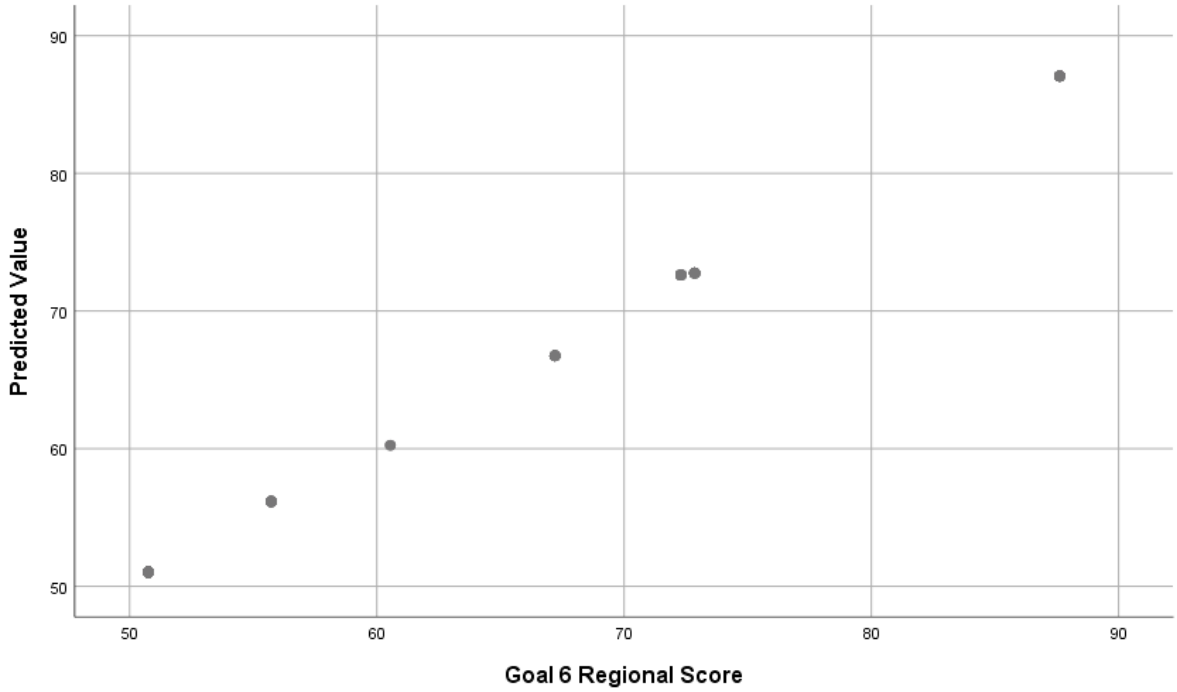
Parameter Estimates

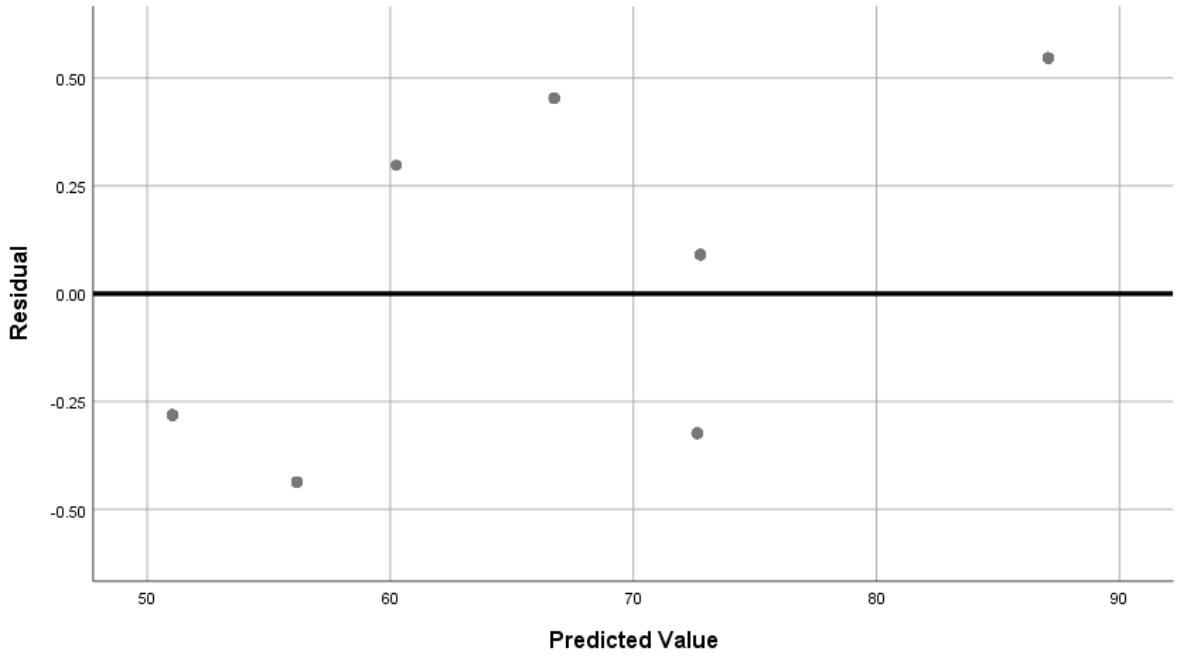
		Predicted				
		Hidden Layer 1				Hidden Layer 2
Predictor		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(2:1)
Input Layer	(Bias)	.363	.018	-.685	-.325	
	Goal1RegionalScore	-.136	.365	.411	.468	
	Goal2RegionalScore	-.022	-.294	.255	.364	
	Goal3RegionalScore	-.546	.009	-.022	.176	
	Goal4RegionalScore	-.547	-.221	.155	.199	
	Goal5RegionalScore	.263	.402	.480	-.246	
	Goal7RegionalScore	.206	-.095	.089	-.030	
	Goal8RegionalScore	-.495	-.265	.228	-.075	
	Goal9RegionalScore	-.080	-.393	.264	.318	
	Goal10RegionalScore	-.052	-.048	-.416	-.062	
	Goal11RegionalScore	-.329	.139	.671	.186	
	Goal12RegionalScore	-.304	-.665	-.729	-.438	
	Goal13RegionalScore	-.340	-.629	-.193	-.614	
	Goal14RegionalScore	.277	-.645	-.204	.414	
	Goal15RegionalScore	-.089	.109	-.351	.207	
	Goal16RegionalScore	-.398	-.120	.393	-.187	
	Goal17RegionalScore	-.277	-.035	-.564	.288	
Hidden Layer 1	(Bias)					-.209
	H(1:1)					-.820
	H(1:2)					-.031
	H(1:3)					1.298
	H(1:4)					.573
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					

Parameter Estimates

		Predicted		
		Hidden Layer 2		
Predictor		H(2:2)	H(2:3)	Goal6RegionalScore
Input Layer	(Bias)			
	Goal1RegionalScore			
	Goal2RegionalScore			
	Goal3RegionalScore			
	Goal4RegionalScore			
	Goal5RegionalScore			
	Goal7RegionalScore			
	Goal8RegionalScore			
	Goal9RegionalScore			
	Goal10RegionalScore			
	Goal11RegionalScore			
	Goal12RegionalScore			
	Goal13RegionalScore			
	Goal14RegionalScore			

	Goal15RegionalScore			
	Goal16RegionalScore			
	Goal17RegionalScore			
Hidden Layer 1	(Bias)	.570	-1.304	
	H(1:1)	1.390	-.936	
	H(1:2)	.592	.266	
	H(1:3)	-1.710	.841	
	H(1:4)	-.495	.401	
Hidden Layer 2	(Bias)			-.318
	H(2:1)			2.575
	H(2:2)			-1.926
	H(2:3)			.249

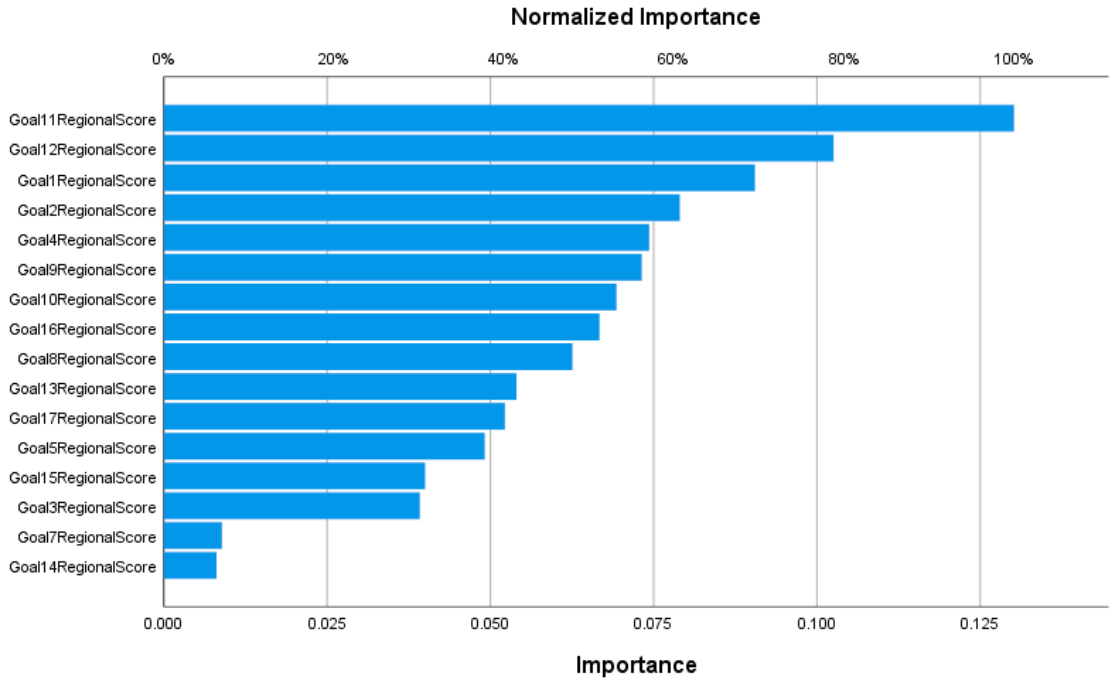




Dependent Variable: Goal 6 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.091	69.5%
Goal 2 Regional Score	.079	60.7%
Goal 3 Regional Score	.039	30.1%
Goal 4 Regional Score	.074	57.1%
Goal 5 Regional Score	.049	37.8%
Goal 7 Regional Score	.009	6.8%
Goal 8 Regional Score	.063	48.1%
Goal 9 Regional Score	.073	56.2%
Goal 10 Regional Score	.069	53.2%
Goal 11 Regional Score	.130	100.0%
Goal 12 Regional Score	.103	78.8%
Goal 13 Regional Score	.054	41.5%
Goal 14 Regional Score	.008	6.2%
Goal 15 Regional Score	.040	30.7%
Goal 16 Regional Score	.067	51.3%
Goal 17 Regional Score	.052	40.1%




```
*Multilayer Perceptron Network.
MLP Goal7RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore
  Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal8RegionalScore Goal9RegionalScore
  Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore
  Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
  /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
  /PARTITION  TRAINING=6  TESTING=2  HOLDOUT=2
  /ARCHITECTURE   AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH
  OUTPUTFUNCTION=SIGMOID
  /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005
  SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
  /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
  /PLOT NETWORK PREDICTED RESIDUAL
  /SAVE PREDVAL
  /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO
  ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
  /MISSING USERMISSING=EXCLUDE .
```

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal7RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.58
	Elapsed Time	00:00:00.60
Variables Created or Modified	Predicted Value	MLP_PredictedValue_W

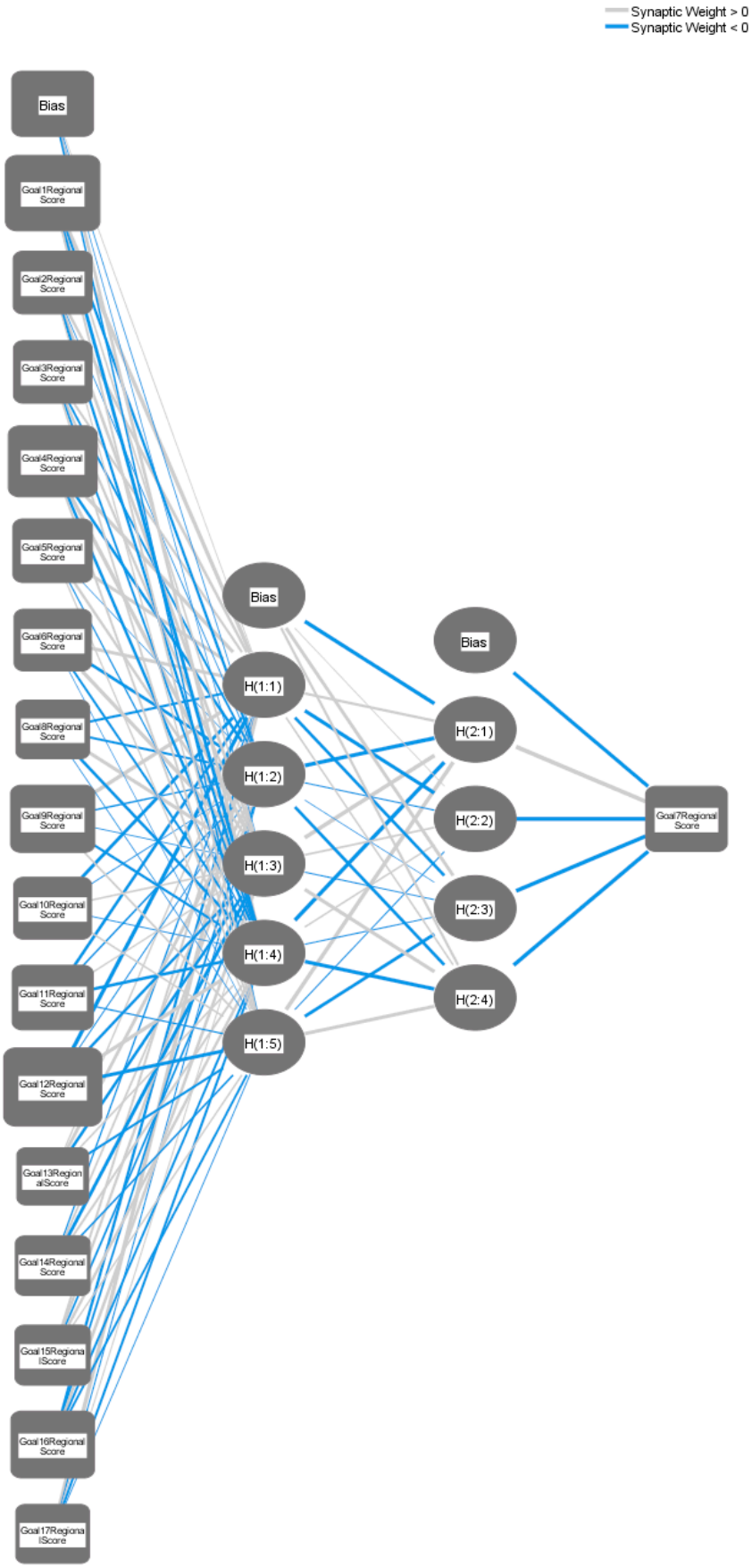
Case Processing Summary

		N	Percent
Sample	Training	95	58.6%
	Testing	33	20.4%
	Holdout	34	21.0%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 8 Regional Score
		8	Goal 9 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 7 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.006
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 7 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	.034	-.042	-.040	.735	-.346
	Goal1RegionalScore	1.258	-.631	.302	-.943	.452
	Goal2RegionalScore	.687	-.044	.704	-.653	.205
	Goal3RegionalScore	.496	-.484	.529	-.486	.375
	Goal4RegionalScore	.946	-.710	1.193	-.733	.449
	Goal5RegionalScore	.816	-.034	.603	-.247	.235
	Goal6RegionalScore	.838	-.810	1.001	-.519	-.006
	Goal8RegionalScore	-.583	-.525	.916	-.794	-.040
	Goal9RegionalScore	1.077	-.301	-.044	-.622	.344
	Goal10RegionalScore	-.928	-.054	.312	-.112	.284
	Goal11RegionalScore	-.794	-.324	.236	-.806	-.246
	Goal12RegionalScore	-1.383	-.127	-.701	1.026	-1.157
	Goal13RegionalScore	.254	.796	-.781	.302	-.583
	Goal14RegionalScore	-.284	.348	-.946	.459	-.346
	Goal15RegionalScore	.495	.577	-.432	.632	.263
	Goal16RegionalScore	-.680	-.453	.698	-.503	-.499
	Goal17RegionalScore	1.474	-.206	.114	-.564	-.094
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

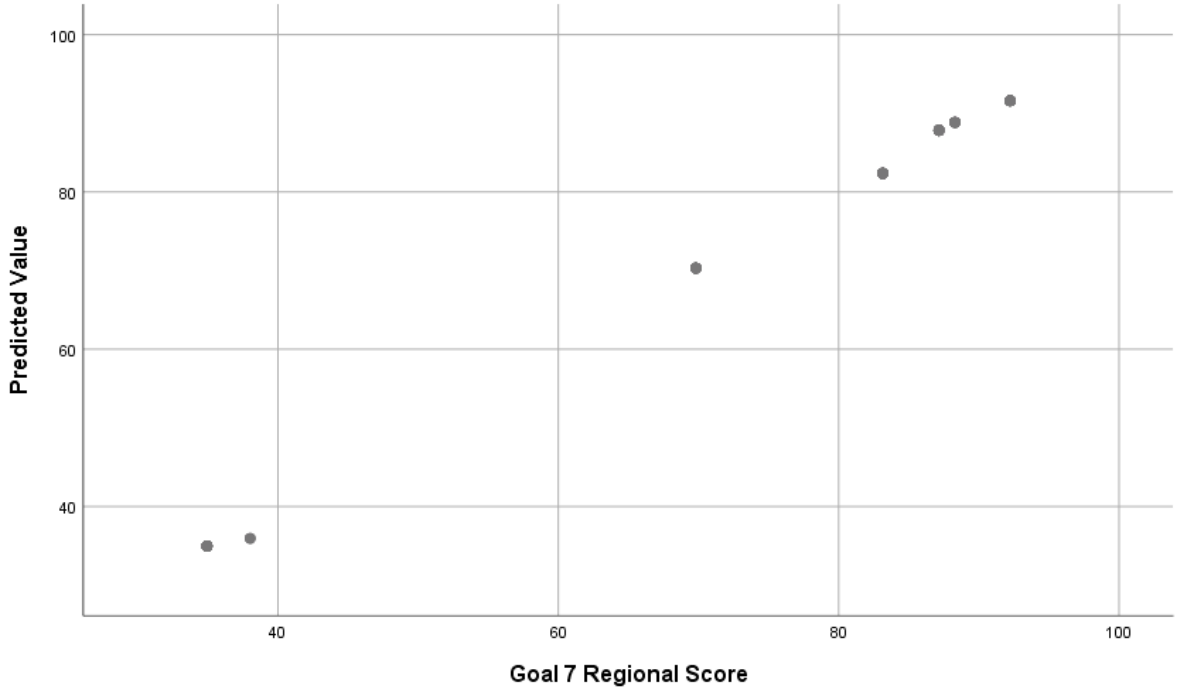
Parameter Estimates

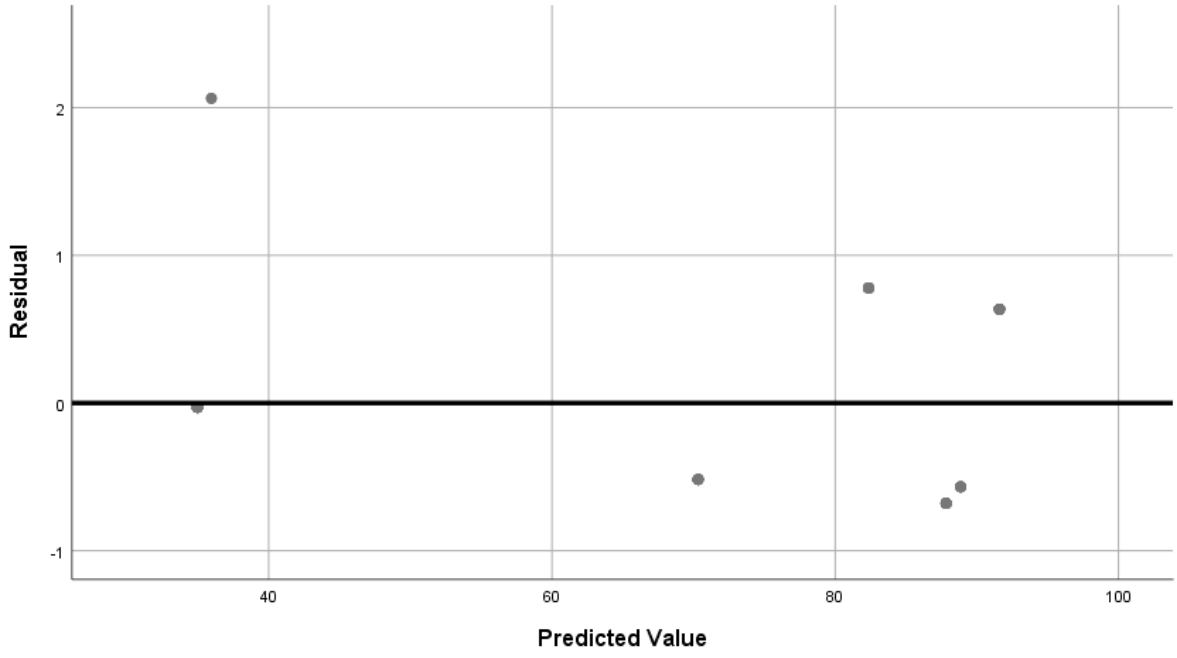
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				

	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	-1.338	.033	.831	.535
	H(1:1)	.586	-1.266	-.813	.298
	H(1:2)	-2.063	-.176	-.023	-.818
	H(1:3)	1.349	.350	-.133	.937
	H(1:4)	-2.101	.283	-.166	-1.302
	H(1:5)	1.313	-.175	-.870	.923
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal7RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	-1.268
	H(2:1)	3.965
	H(2:2)	-2.800
	H(2:3)	-2.390
	H(2:4)	-1.643



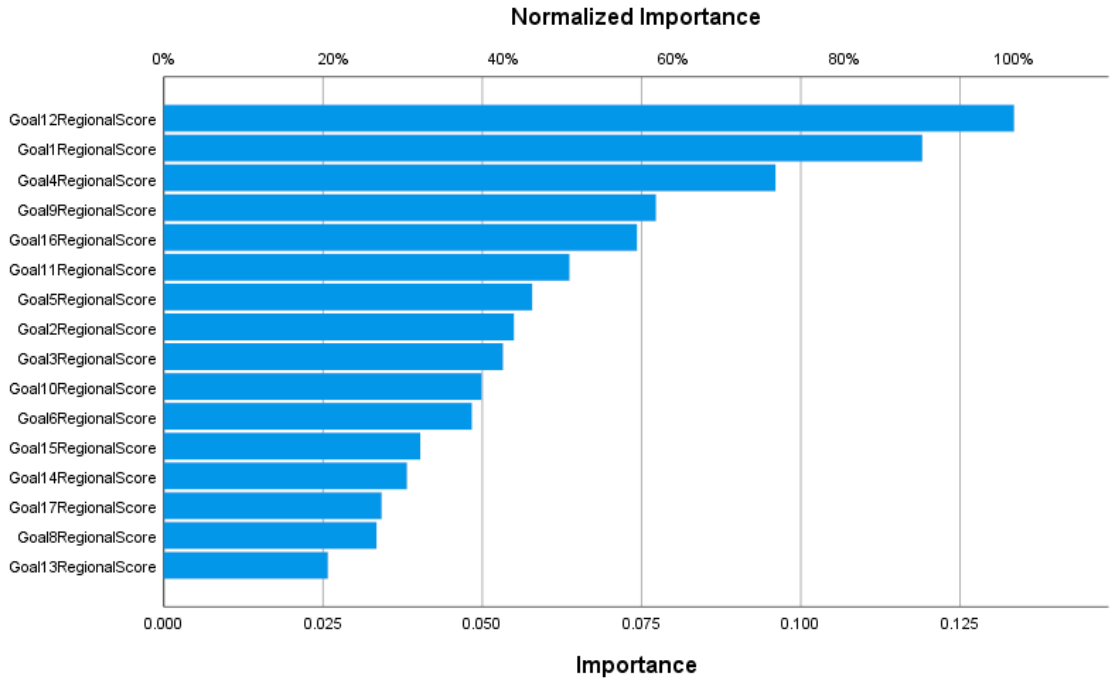


Dependent Variable: Goal 7 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.119	89.2%
Goal 2 Regional Score	.055	41.2%
Goal 3 Regional Score	.053	39.9%
Goal 4 Regional Score	.096	71.9%
Goal 5 Regional Score	.058	43.3%
Goal 6 Regional Score	.048	36.2%
Goal 8 Regional Score	.033	25.0%
Goal 9 Regional Score	.077	57.9%

Goal 10 Regional Score	.050	37.4%
Goal 11 Regional Score	.064	47.7%
Goal 12 Regional Score	.133	100.0%
Goal 13 Regional Score	.026	19.3%
Goal 14 Regional Score	.038	28.6%
Goal 15 Regional Score	.040	30.2%
Goal 16 Regional Score	.074	55.7%
Goal 17 Regional Score	.034	25.6%



*Multilayer Perceptron Network.
MLP Goal8RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193

Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal8RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.59
	Elapsed Time	00:00:00.62
Variables Created or Modified	Predicted Value	MLP_PredictedValue_CA

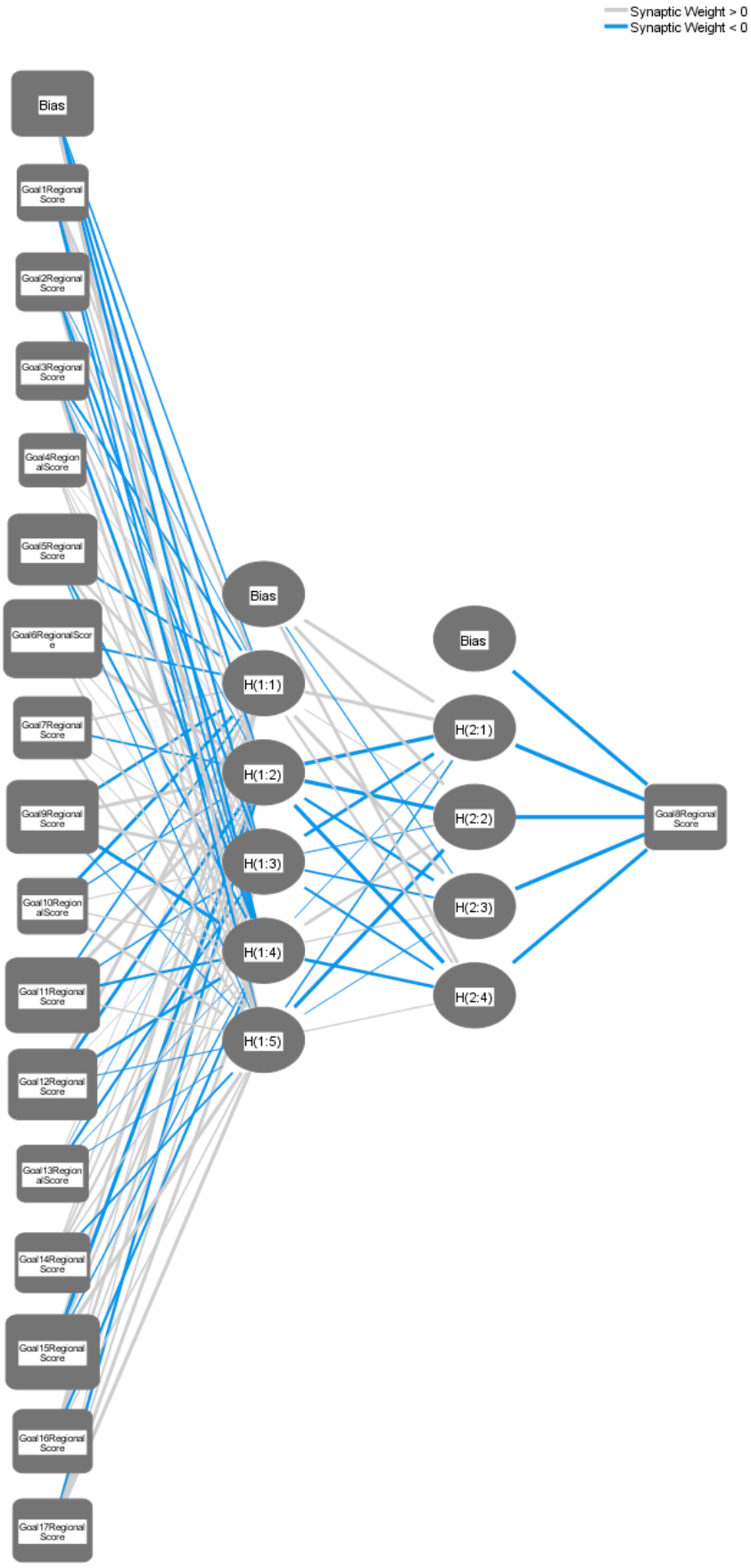
Case Processing Summary

		N	Percent
Sample	Training	104	64.2%
	Testing	30	18.5%
	Holdout	28	17.3%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 9 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 8 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.005
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 8 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.185	-.344	-.357	-.364	.482
	Goal1RegionalScore	.360	.266	.153	-.210	-.325
	Goal2RegionalScore	-.093	.237	-.330	-.263	.232
	Goal3RegionalScore	-.322	-.098	.268	-.386	.394
	Goal4RegionalScore	.029	.032	.041	.130	.181
	Goal5RegionalScore	-.309	.353	.355	-.325	-.134
	Goal6RegionalScore	-.308	.711	.069	.020	.252
	Goal7RegionalScore	.236	-.261	.109	.073	.308
	Goal9RegionalScore	-.386	.497	.450	-.609	-.122
	Goal10RegionalScore	-.454	-.150	.092	.145	.360
	Goal11RegionalScore	-.262	.640	-.163	-.349	.177
	Goal12RegionalScore	.603	-.463	.021	-.376	-.101
	Goal13RegionalScore	.038	-.028	-.340	-.037	-.080
	Goal14RegionalScore	.145	.220	.321	.153	-.268
	Goal15RegionalScore	.426	-.776	.321	-.159	.530
	Goal16RegionalScore	.097	.364	.172	-.336	.157
	Goal17RegionalScore	.121	-.373	.201	.447	.480
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

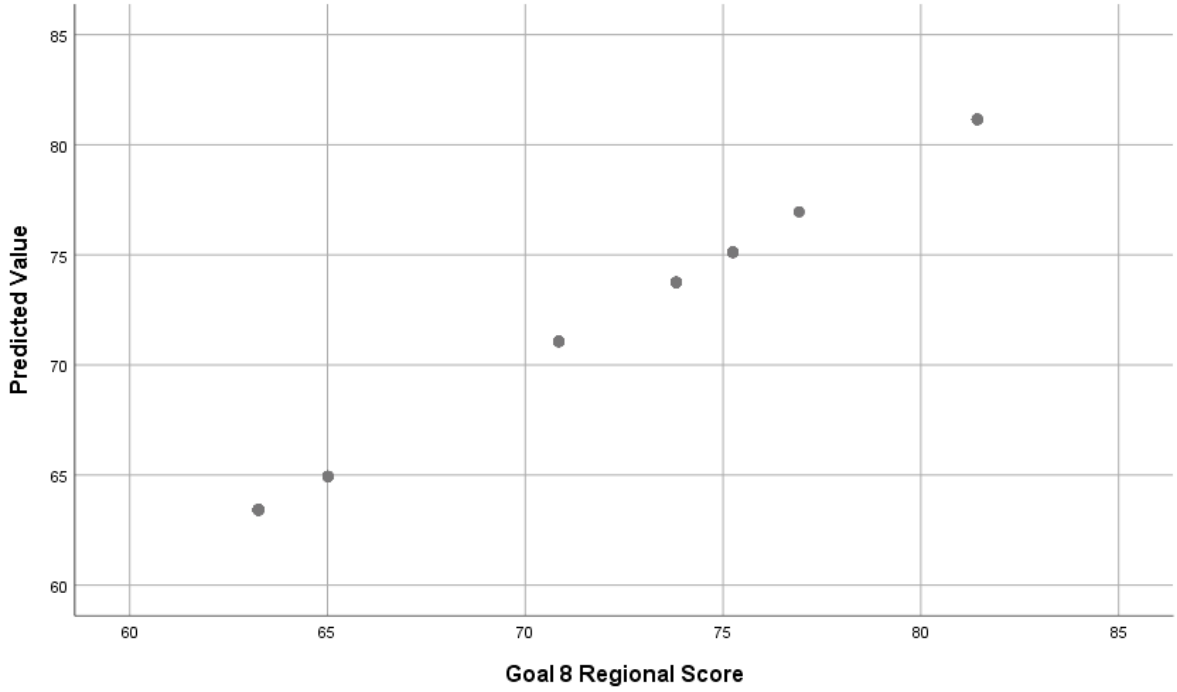
Parameter Estimates

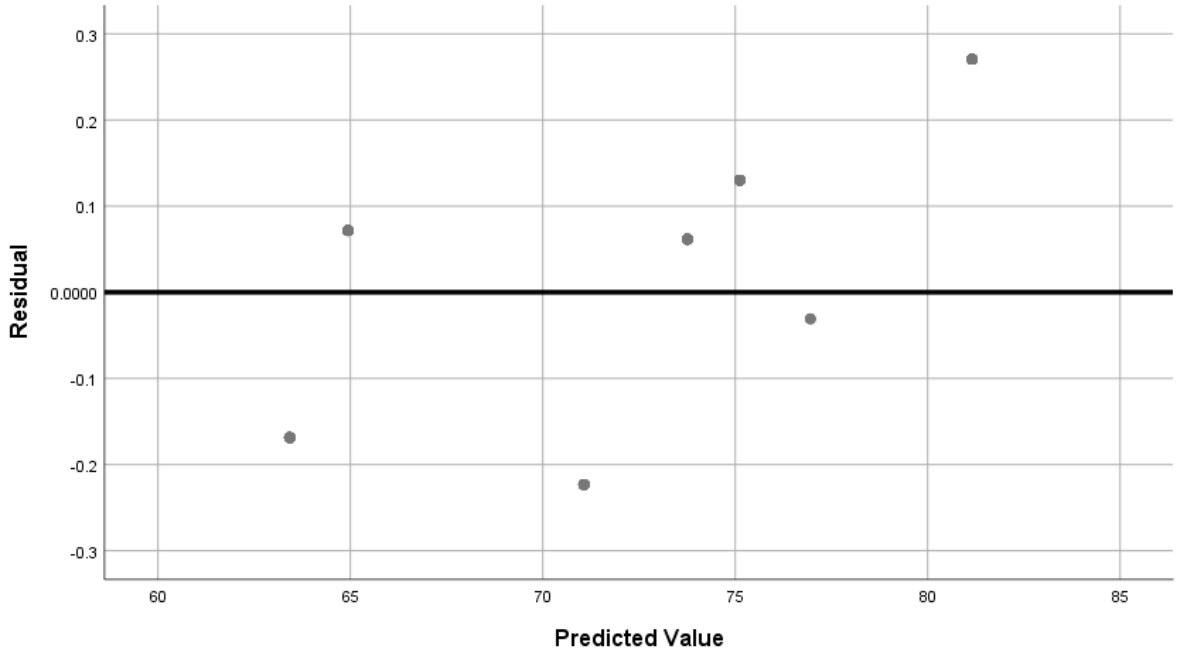
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				

	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.401	.406	-.111	.389
	H(1:1)	.453	.039	.515	.308
	H(1:2)	-.871	-1.023	-.360	-1.329
	H(1:3)	-.464	-.102	-.270	-.325
	H(1:4)	-.041	.358	.135	-.439
	H(1:5)	-.190	-.693	-.049	.127
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal8RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	-.779
	H(2:1)	-1.775
	H(2:2)	-1.624
	H(2:3)	-1.738
	H(2:4)	-.625



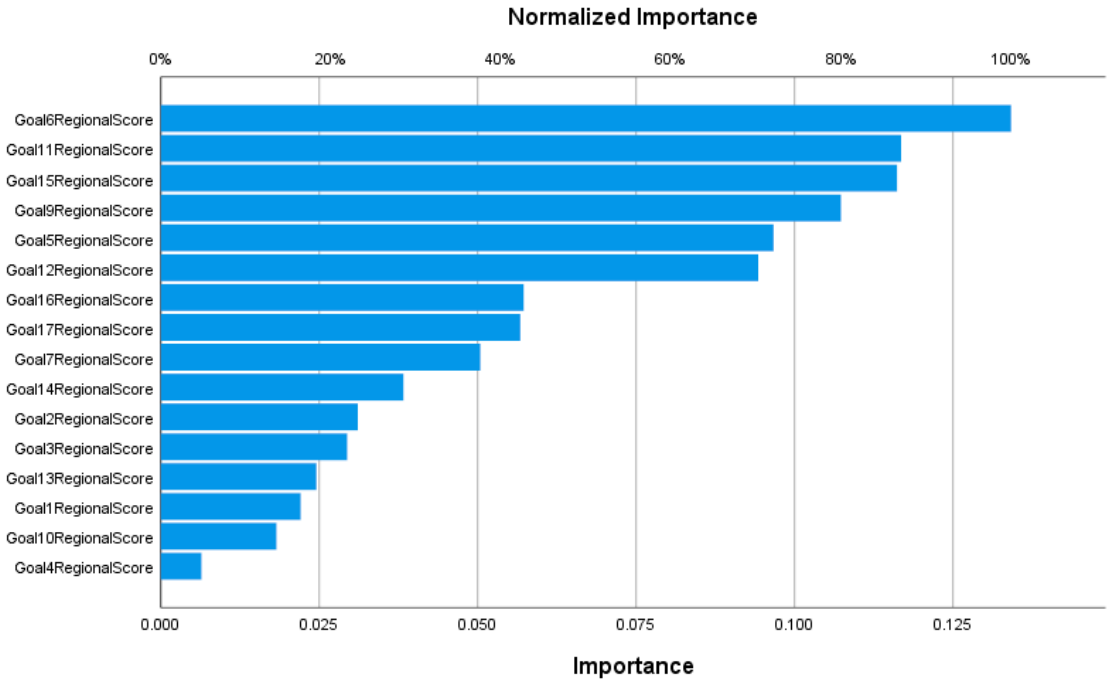


Dependent Variable: Goal 8 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.022	16.5%
Goal 2 Regional Score	.031	23.2%
Goal 3 Regional Score	.029	21.9%
Goal 4 Regional Score	.006	4.8%
Goal 5 Regional Score	.097	72.1%
Goal 6 Regional Score	.134	100.0%
Goal 7 Regional Score	.050	37.6%
Goal 9 Regional Score	.107	80.0%
Goal 10 Regional Score	.018	13.6%

Goal 11 Regional Score	.117	87.1%
Goal 12 Regional Score	.094	70.3%
Goal 13 Regional Score	.025	18.3%
Goal 14 Regional Score	.038	28.5%
Goal 15 Regional Score	.116	86.6%
Goal 16 Regional Score	.057	42.7%
Goal 17 Regional Score	.057	42.3%



*Multilayer Perceptron Network.
MLP Goal9RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.

Weight Handling		not applicable
Syntax		MLP Goal9RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.66
	Elapsed Time	00:00:00.68
Variables Created or Modified	Predicted Value	MLP_PredictedValue_J

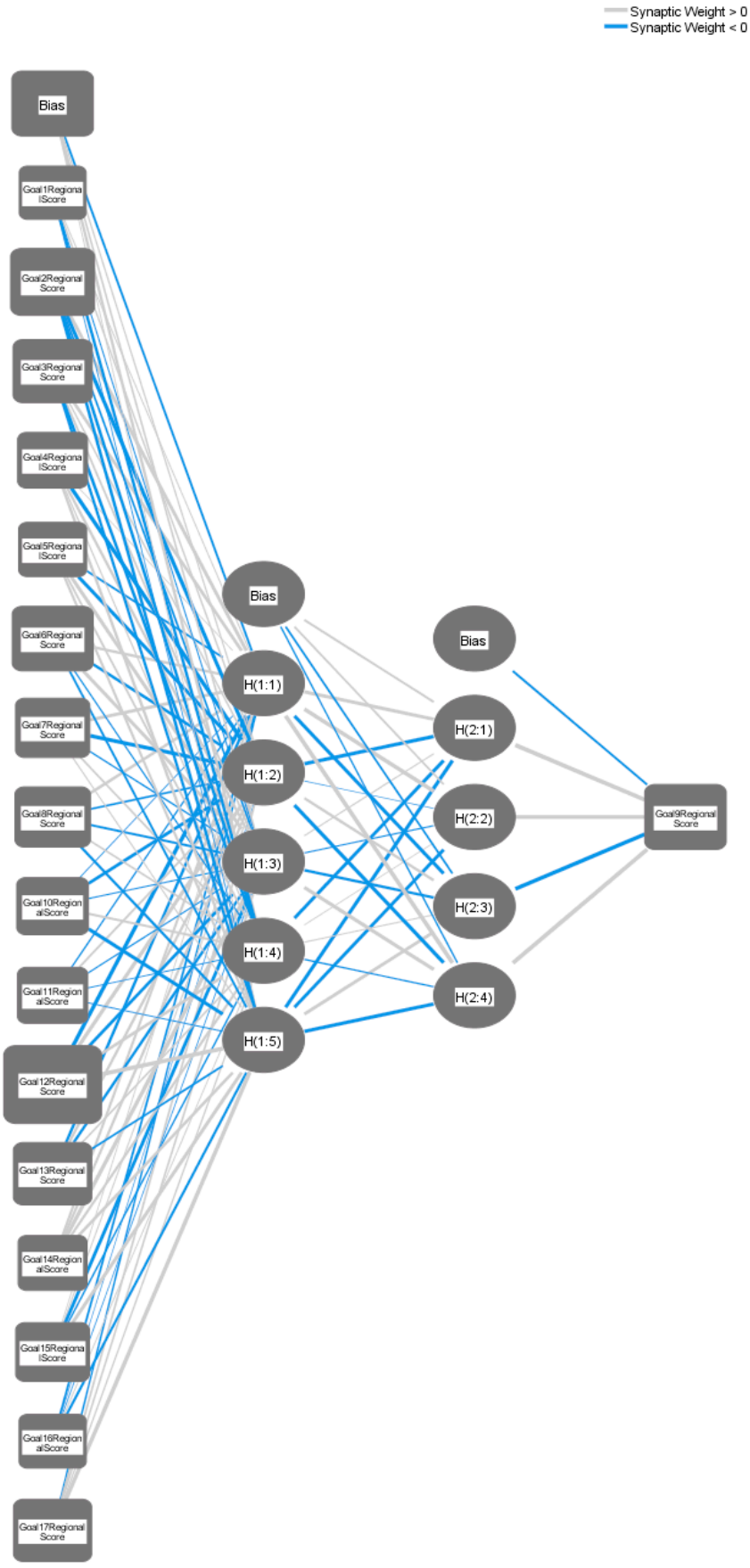
Case Processing Summary

		N	Percent
Sample	Training	99	61.1%
	Testing	32	19.8%
	Holdout	31	19.1%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 10 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 9 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.004
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 9 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.253	.112	.175	.338	.016
	Goal1RegionalScore	.053	.148	-.084	-.412	-.049
	Goal2RegionalScore	.441	-.649	-.202	-.419	-.428
	Goal3RegionalScore	.420	.146	.196	-.432	-.356
	Goal4RegionalScore	.010	-.726	.315	.083	.339
	Goal5RegionalScore	-.224	-.548	.474	.198	.274
	Goal6RegionalScore	.329	-.418	.439	-.148	-.253
	Goal7RegionalScore	.428	-.670	-.151	.183	.068
	Goal8RegionalScore	.360	-.208	-.294	.171	-.355
	Goal10RegionalScore	-.046	-.459	-.101	.247	-.560
	Goal11RegionalScore	-.149	.200	-.137	-.060	-.077
	Goal12RegionalScore	-.920	.533	-.433	.398	1.059
	Goal13RegionalScore	-.386	.318	-.371	.160	-.219
	Goal14RegionalScore	.282	.295	.619	.284	.382
	Goal15RegionalScore	.028	.059	-.483	-.164	.468
	Goal16RegionalScore	-.240	-.004	-.033	.036	-.320
	Goal17RegionalScore	-.177	.180	.175	.144	.689
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

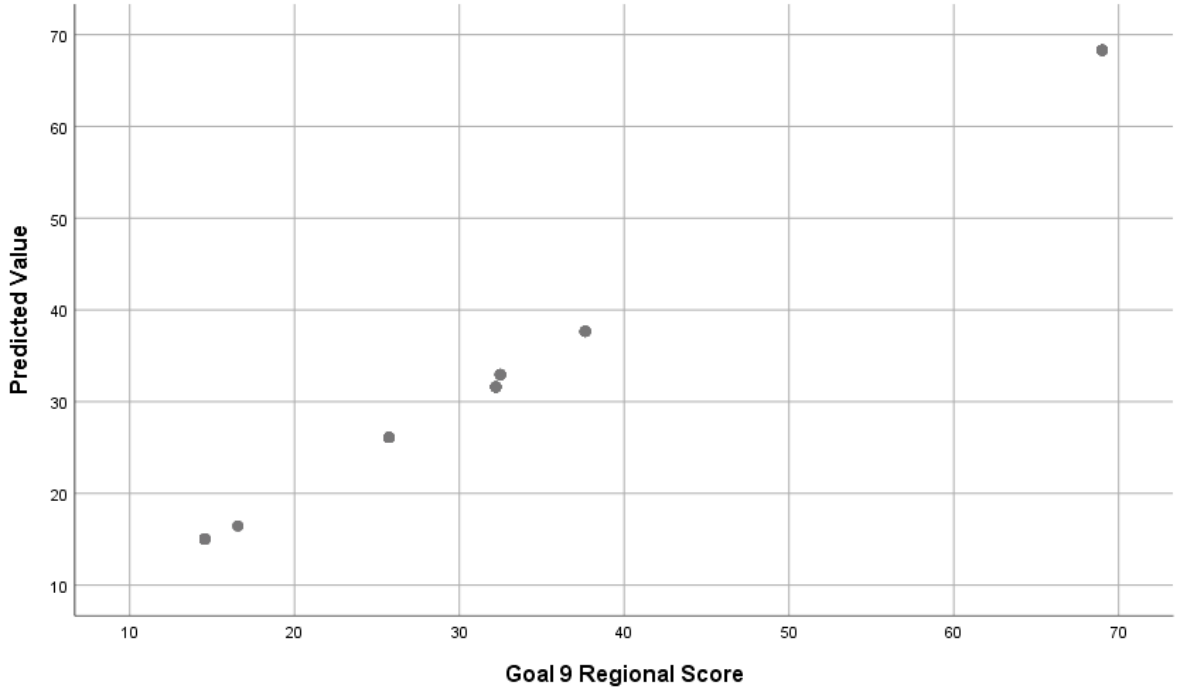
Parameter Estimates

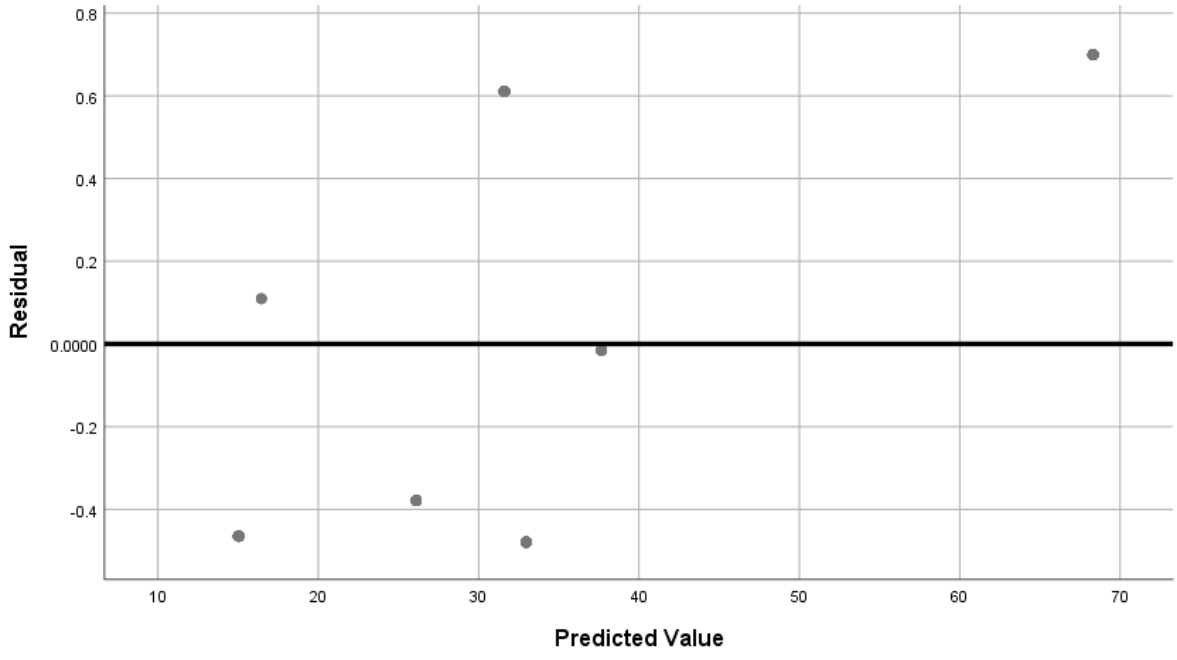
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				

	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.223	.190	-.219	-.155
	H(1:1)	.482	.660	-.563	.979
	H(1:2)	-.619	-.008	.324	-.645
	H(1:3)	.082	-.125	-.362	.528
	H(1:4)	-.504	.023	.054	-.151
	H(1:5)	-.612	-.490	.433	-.593
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal9RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	-.254
	H(2:1)	1.263
	H(2:2)	.725
	H(2:3)	-1.098
	H(2:4)	1.967



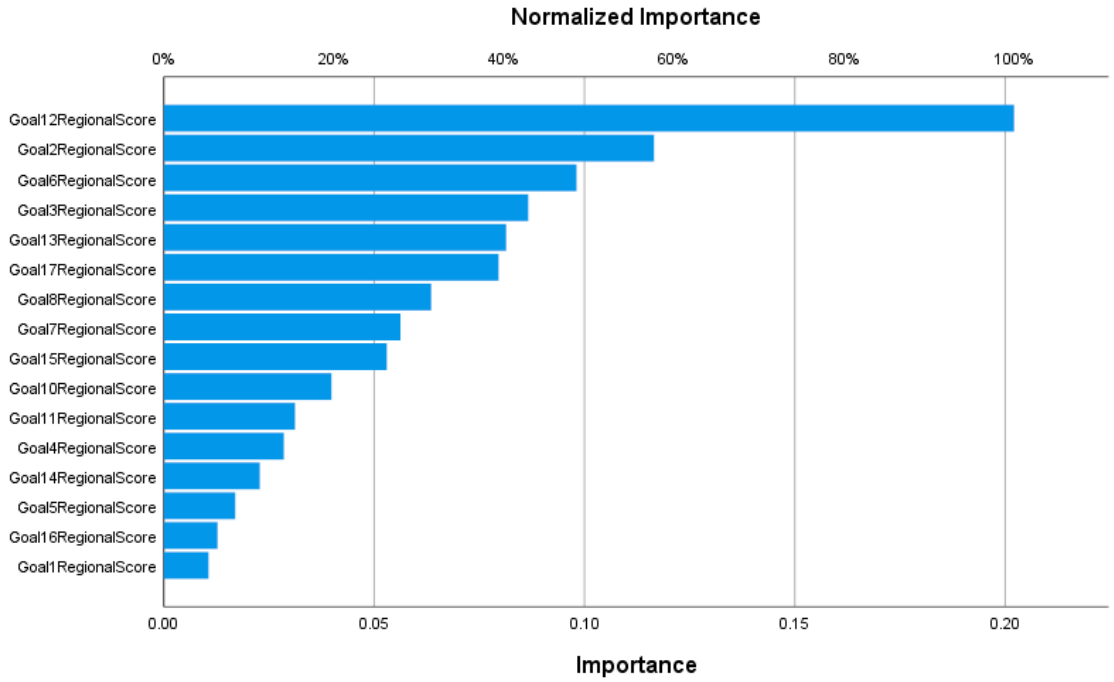


Dependent Variable: Goal 9 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.011	5.3%
Goal 2 Regional Score	.117	57.7%
Goal 3 Regional Score	.087	42.9%
Goal 4 Regional Score	.029	14.1%
Goal 5 Regional Score	.017	8.4%
Goal 6 Regional Score	.098	48.5%
Goal 7 Regional Score	.056	27.8%
Goal 8 Regional Score	.064	31.4%

Goal 10 Regional Score	.040	19.7%
Goal 11 Regional Score	.031	15.4%
Goal 12 Regional Score	.202	100.0%
Goal 13 Regional Score	.081	40.3%
Goal 14 Regional Score	.023	11.3%
Goal 15 Regional Score	.053	26.2%
Goal 16 Regional Score	.013	6.3%
Goal 17 Regional Score	.080	39.4%



*Multilayer Perceptron Network.
MLP Goal10RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>

	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal10RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.58
	Elapsed Time	00:00:00.66
Variables Created or Modified	Predicted Value	MLP_PredictedValue_BT

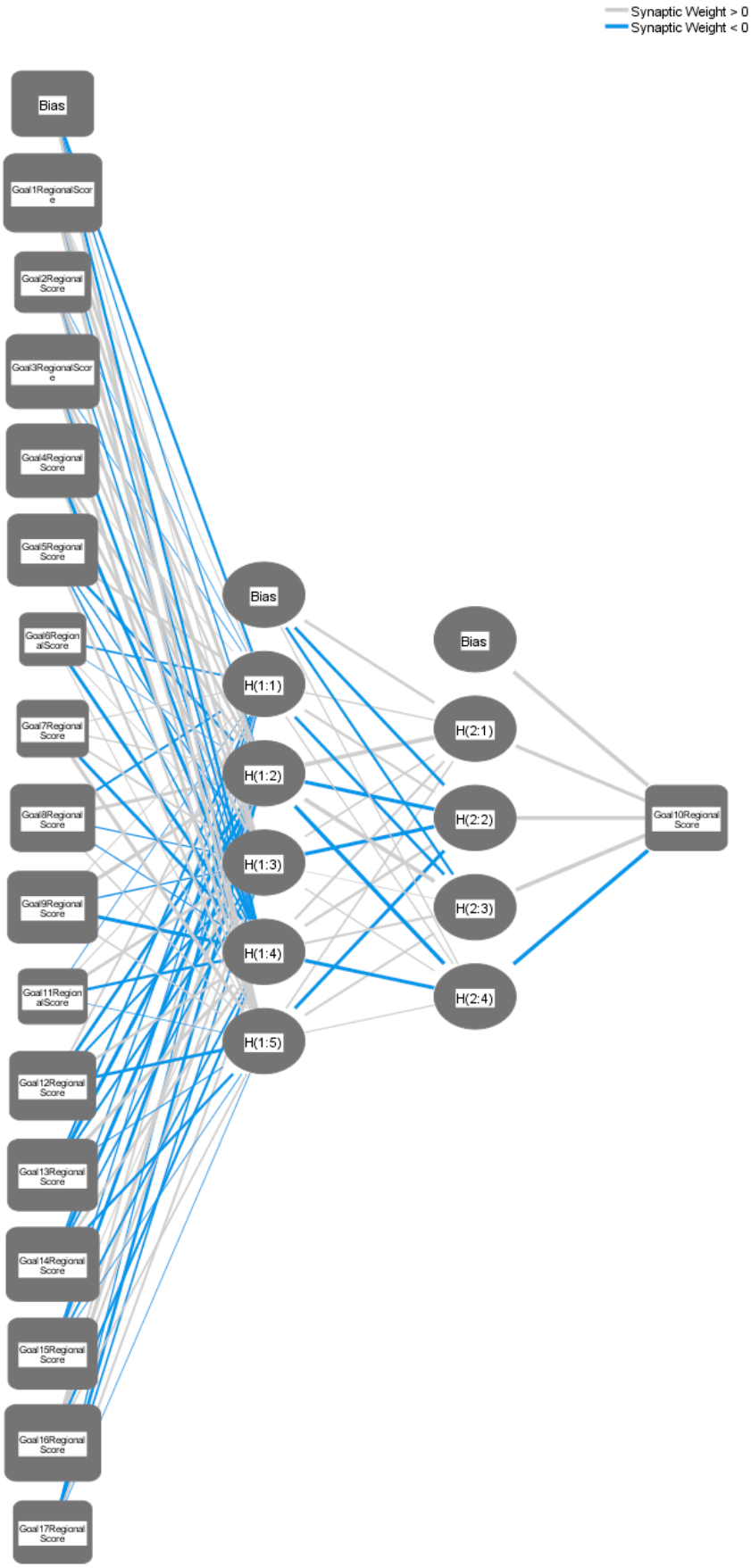
Case Processing Summary

		N	Percent
Sample	Training	98	60.5%
	Testing	35	21.6%
	Holdout	29	17.9%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 11 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 10 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.004
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.02
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 10 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.413	-.146	.086	-.467	.601
	Goal1RegionalScore	.047	.918	.790	-.213	1.015
	Goal2RegionalScore	-.017	.269	.617	-.189	.329
	Goal3RegionalScore	-.042	.622	.367	-.584	.929
	Goal4RegionalScore	.019	.600	.602	-.946	.227
	Goal5RegionalScore	.469	-.509	-.149	-.203	.402
	Goal6RegionalScore	-.259	-.017	.028	-.803	.072
	Goal7RegionalScore	.082	.110	.211	-.766	.924
	Goal8RegionalScore	-.341	.662	-.129	-.103	.120
	Goal9RegionalScore	.057	.932	-.155	-1.057	.142
	Goal11RegionalScore	-.037	.079	.551	-.536	-.014
	Goal12RegionalScore	.219	-.721	-.286	.371	-.677
	Goal13RegionalScore	-.343	-1.126	-.356	.772	-.102
	Goal14RegionalScore	-.186	-1.023	-.234	.378	-.505
	Goal15RegionalScore	-.139	-.788	.076	-.270	-.049
	Goal16RegionalScore	.186	1.060	.275	-.406	.176
	Goal17RegionalScore	-.131	-.717	-.223	.257	-.028
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

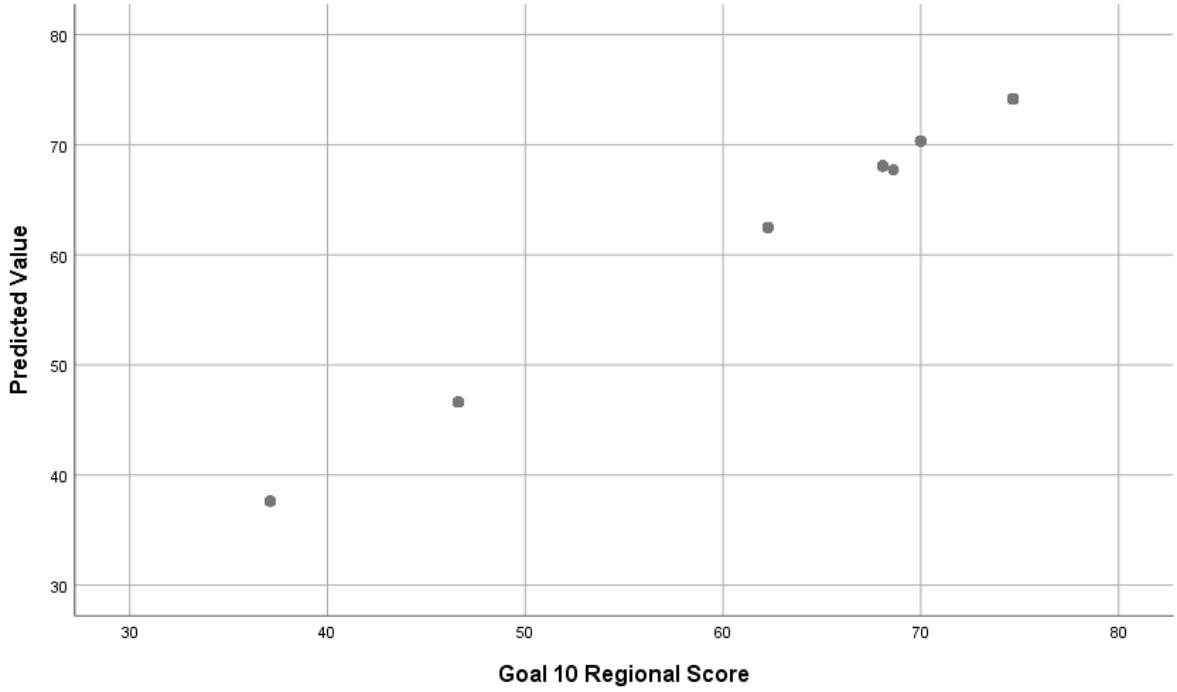
Parameter Estimates

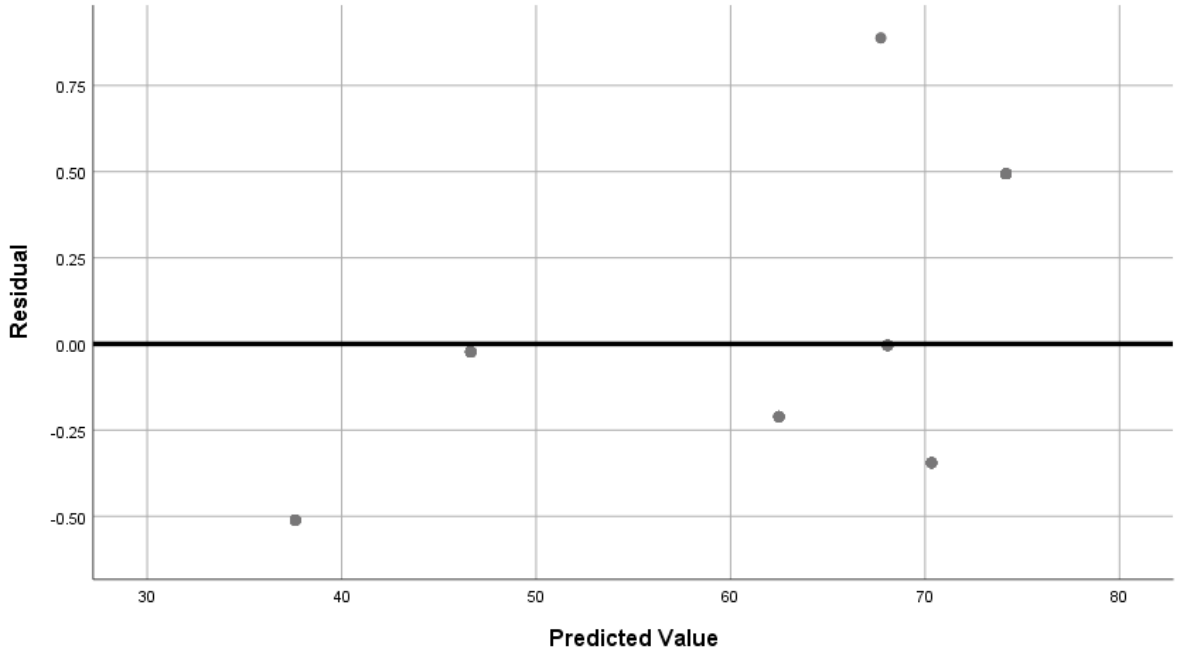
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal11RegionalScore				
	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				

	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.503	-.704	-.418	.103
	H(1:1)	.123	.291	-.651	.121
	H(1:2)	2.639	-1.417	2.521	-2.947
	H(1:3)	.173	-1.130	.006	.114
	H(1:4)	.288	.458	.274	-1.049
	H(1:5)	.161	-.914	.235	.092
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal10RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	1.670
	H(2:1)	.811
	H(2:2)	1.632
	H(2:3)	1.737
	H(2:4)	-1.877



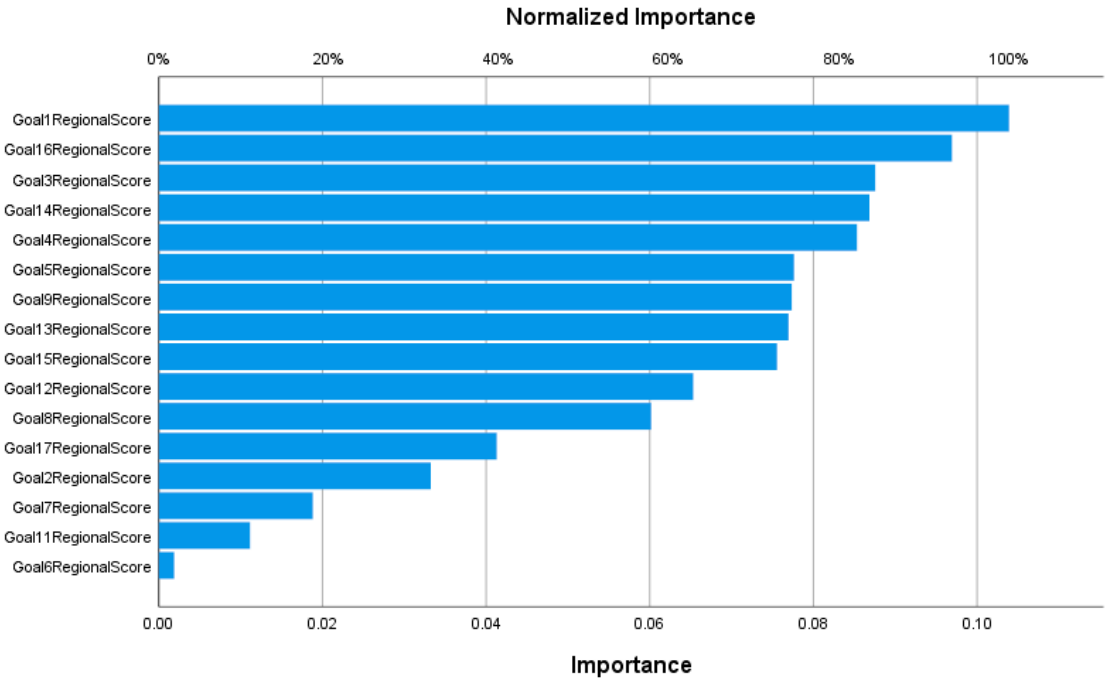


Dependent Variable: Goal 10 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.104	100.0%
Goal 2 Regional Score	.033	32.0%
Goal 3 Regional Score	.088	84.3%
Goal 4 Regional Score	.085	82.1%
Goal 5 Regional Score	.078	74.7%
Goal 6 Regional Score	.002	1.8%
Goal 7 Regional Score	.019	18.1%
Goal 8 Regional Score	.060	57.9%

Goal 9 Regional Score	.077	74.4%
Goal 11 Regional Score	.011	10.7%
Goal 12 Regional Score	.065	62.9%
Goal 13 Regional Score	.077	74.1%
Goal 14 Regional Score	.087	83.6%
Goal 15 Regional Score	.076	72.7%
Goal 16 Regional Score	.097	93.3%
Goal 17 Regional Score	.041	39.8%



*Multilayer Perceptron Network.
MLP Goal11RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>

	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal11RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.59
	Elapsed Time	00:00:00.66
Variables Created or Modified	Predicted Value	MLP_PredictedValue_AJ

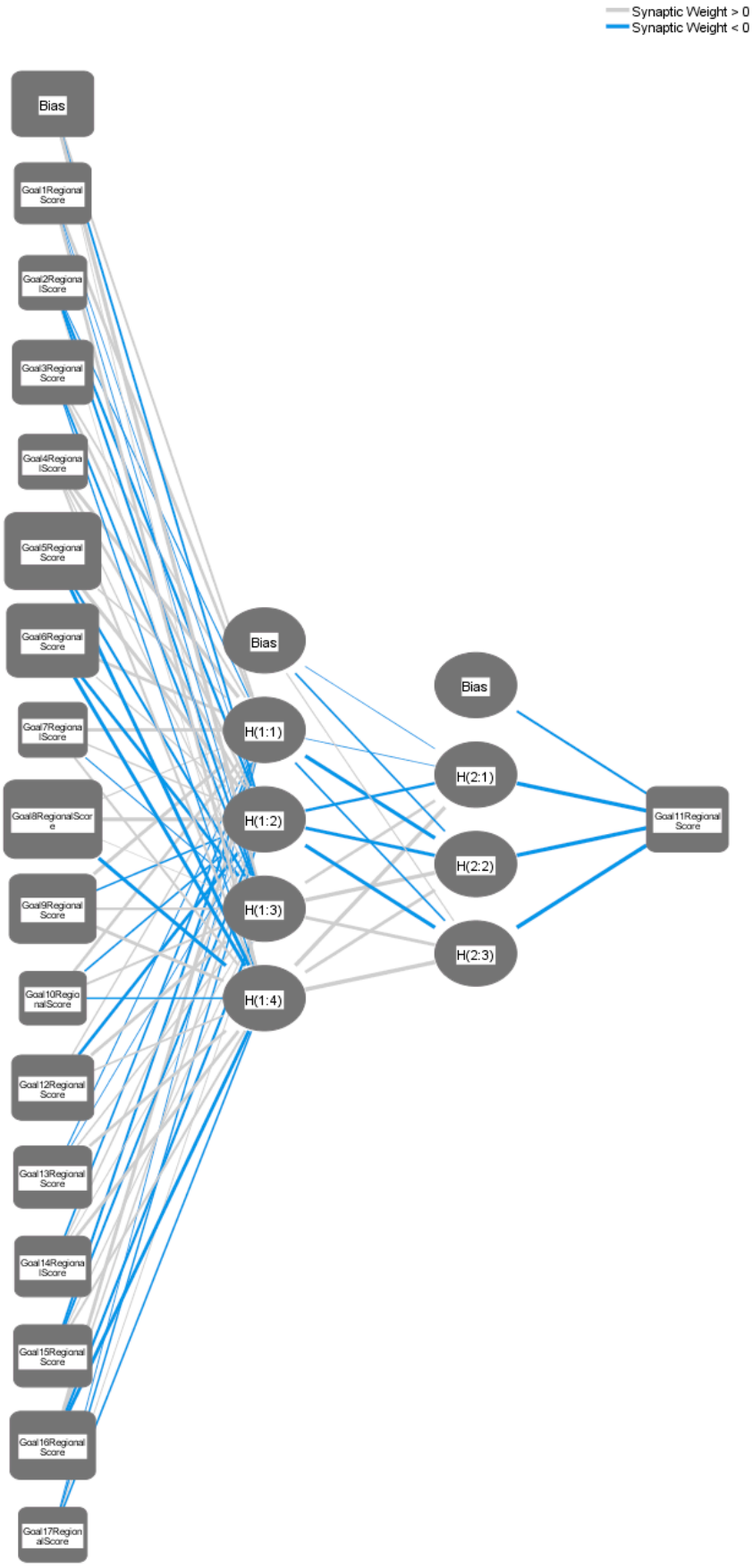
Case Processing Summary

		N	Percent
Sample	Training	86	53.1%
	Testing	29	17.9%
	Holdout	47	29.0%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 10 Regional Score
		11	Goal 12 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		4
	Number of Units in Hidden Layer 2[a]		3
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 11 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.005
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.002
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 11 Regional Score

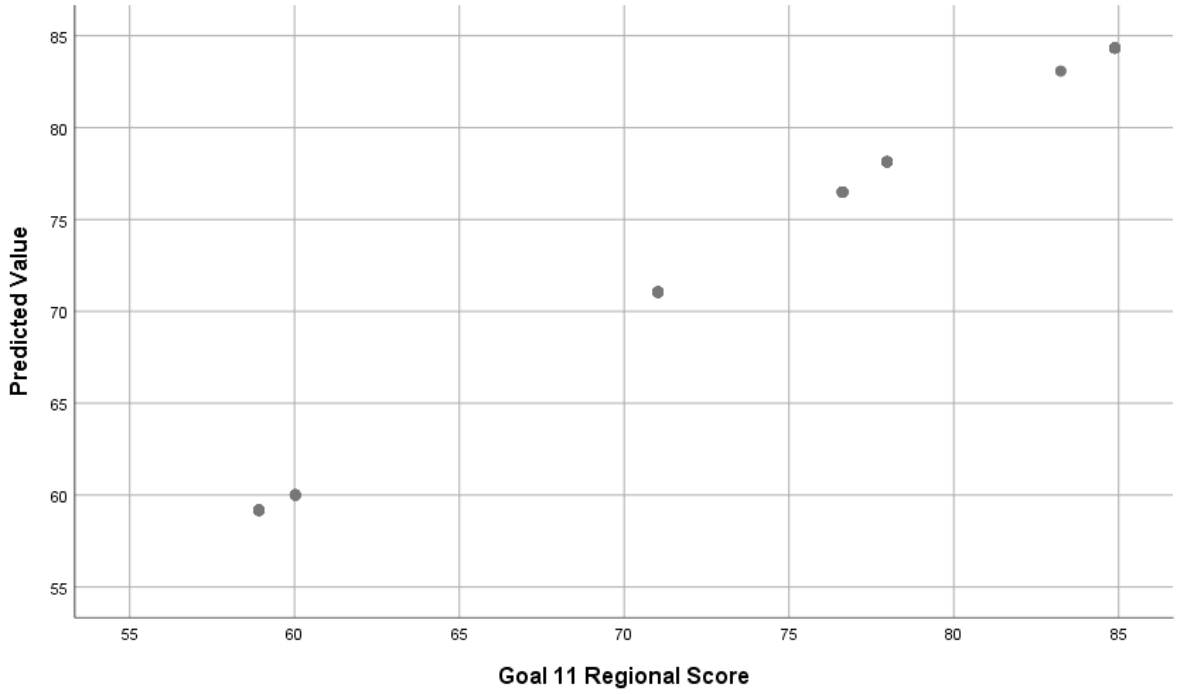
Parameter Estimates

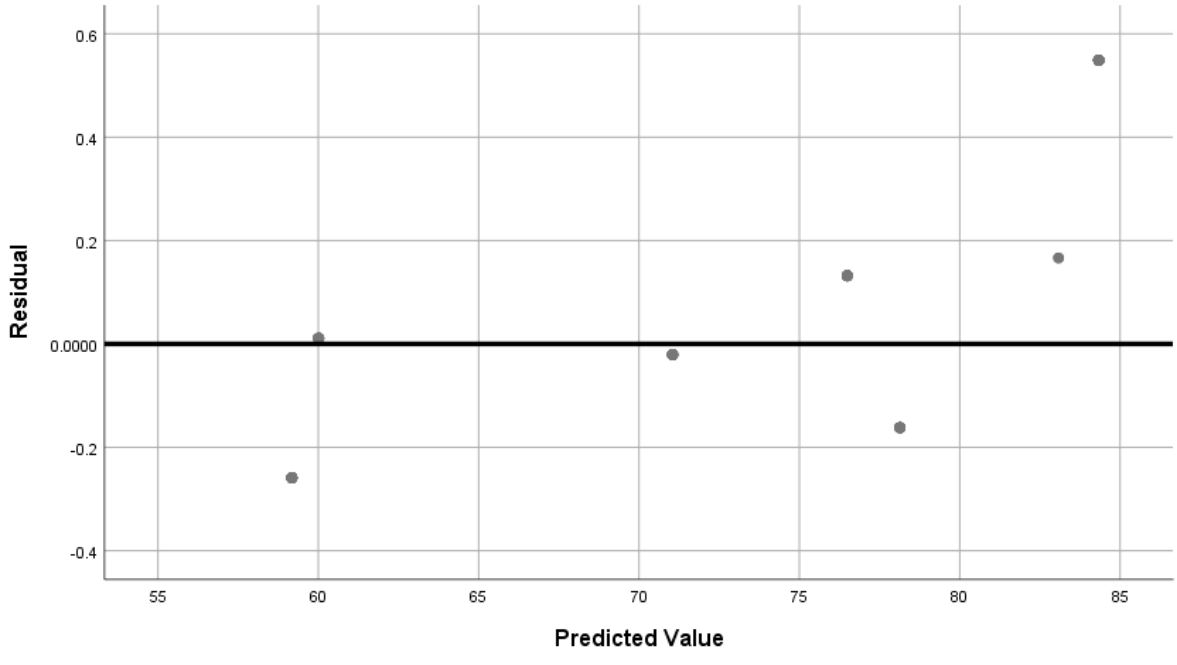
		Predicted				
		Hidden Layer 1				Hidden Layer 2
Predictor		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(2:1)
Input Layer	(Bias)	.290	-.302	.740	.014	
	Goal1RegionalScore	.471	-.068	-.075	.498	
	Goal2RegionalScore	-.143	-.389	-.365	.014	
	Goal3RegionalScore	.260	.367	-.306	-.192	
	Goal4RegionalScore	.658	.384	.101	.307	
	Goal5RegionalScore	.222	.678	-.379	-.697	
	Goal6RegionalScore	.500	.169	-.574	-.729	
	Goal7RegionalScore	.654	.210	-.133	.300	
	Goal8RegionalScore	.084	1.090	.009	-.799	
	Goal9RegionalScore	.630	-.262	.327	.554	
	Goal10RegionalScore	.431	-.277	.295	-.231	
	Goal12RegionalScore	.172	-.560	.537	.239	
	Goal13RegionalScore	-.109	-.068	.195	.427	
	Goal14RegionalScore	-.290	.189	.070	.505	
	Goal15RegionalScore	-.368	-.319	.096	.297	
	Goal16RegionalScore	.612	.223	-.380	-.670	
	Goal17RegionalScore	-.071	-.254	.059	-.265	
Hidden Layer 1	(Bias)					-.022
	H(1:1)					-.056
	H(1:2)					-.472
	H(1:3)					.419
	H(1:4)					.868
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					

Parameter Estimates

		Predicted Hidden Layer 2		
Predictor		H(2:2)	H(2:3)	Goal11RegionalScore
Input Layer	(Bias)			
	Goal1RegionalScore			
	Goal2RegionalScore			
	Goal3RegionalScore			
	Goal4RegionalScore			
	Goal5RegionalScore			
	Goal6RegionalScore			
	Goal7RegionalScore			
	Goal8RegionalScore			
	Goal9RegionalScore			
	Goal10RegionalScore			
	Goal12RegionalScore			
	Goal13RegionalScore			
	Goal14RegionalScore			
	Goal15RegionalScore			
	Goal16RegionalScore			

	Goal17RegionalScore			
Hidden Layer 1	(Bias)	-.278	.081	
	H(1:1)	-.985	-.289	
	H(1:2)	-.657	-.892	
	H(1:3)	1.022	.556	
	H(1:4)	.529	1.414	
Hidden Layer 2	(Bias)			-.362
	H(2:1)			-1.499
	H(2:2)			-1.210
	H(2:3)			-1.719

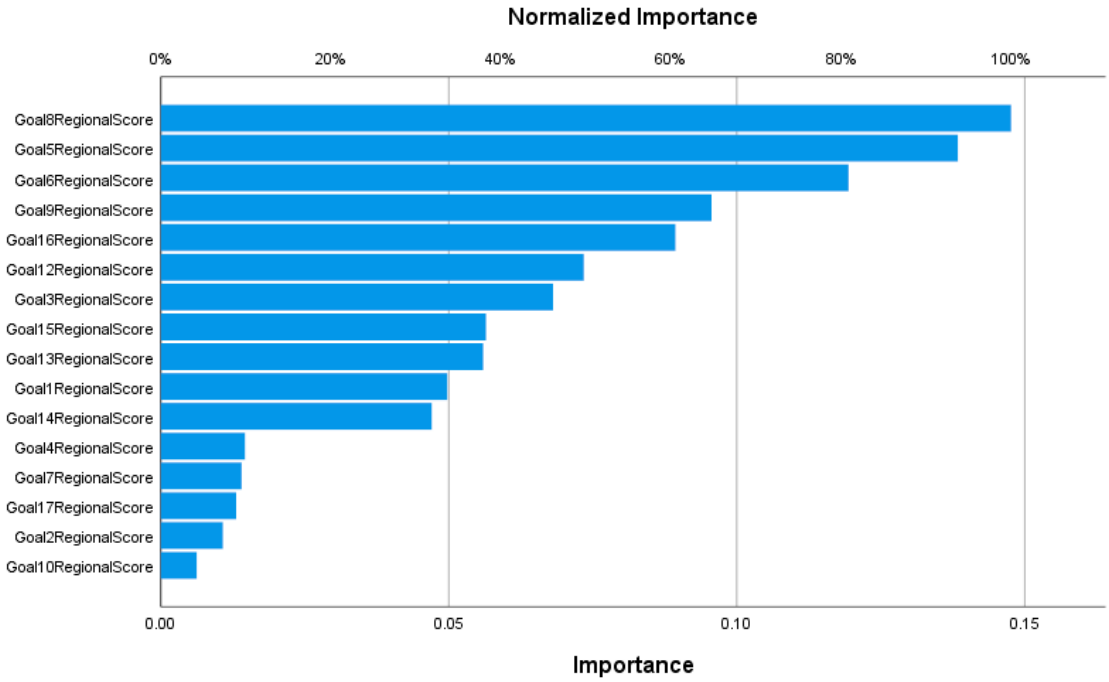




Dependent Variable: Goal 11 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.050	33.7%
Goal 2 Regional Score	.011	7.3%
Goal 3 Regional Score	.068	46.1%
Goal 4 Regional Score	.015	9.9%
Goal 5 Regional Score	.138	93.7%
Goal 6 Regional Score	.119	80.9%
Goal 7 Regional Score	.014	9.5%
Goal 8 Regional Score	.148	100.0%
Goal 9 Regional Score	.096	64.8%
Goal 10 Regional Score	.006	4.2%
Goal 12 Regional Score	.073	49.8%
Goal 13 Regional Score	.056	37.9%
Goal 14 Regional Score	.047	31.9%
Goal 15 Regional Score	.056	38.3%
Goal 16 Regional Score	.089	60.5%
Goal 17 Regional Score	.013	8.9%




```
*Multilayer Perceptron Network.
MLP Goal12RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore
  Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore
  Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal13RegionalScore Goal14RegionalScore
  Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
  /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
  /PARTITION  TRAINING=6  TESTING=2  HOLDOUT=2
  /ARCHITECTURE   AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH
  OUTPUTFUNCTION=SIGMOID
  /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005
  SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
  /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
  /PLOT NETWORK PREDICTED RESIDUAL
  /SAVE PREDVAL
  /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO
  ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
  /MISSING USERMISSING=EXCLUDE .
```

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal12RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.59
	Elapsed Time	00:00:00.66
Variables Created or Modified	Predicted Value	MLP_PredictedValue_BQ

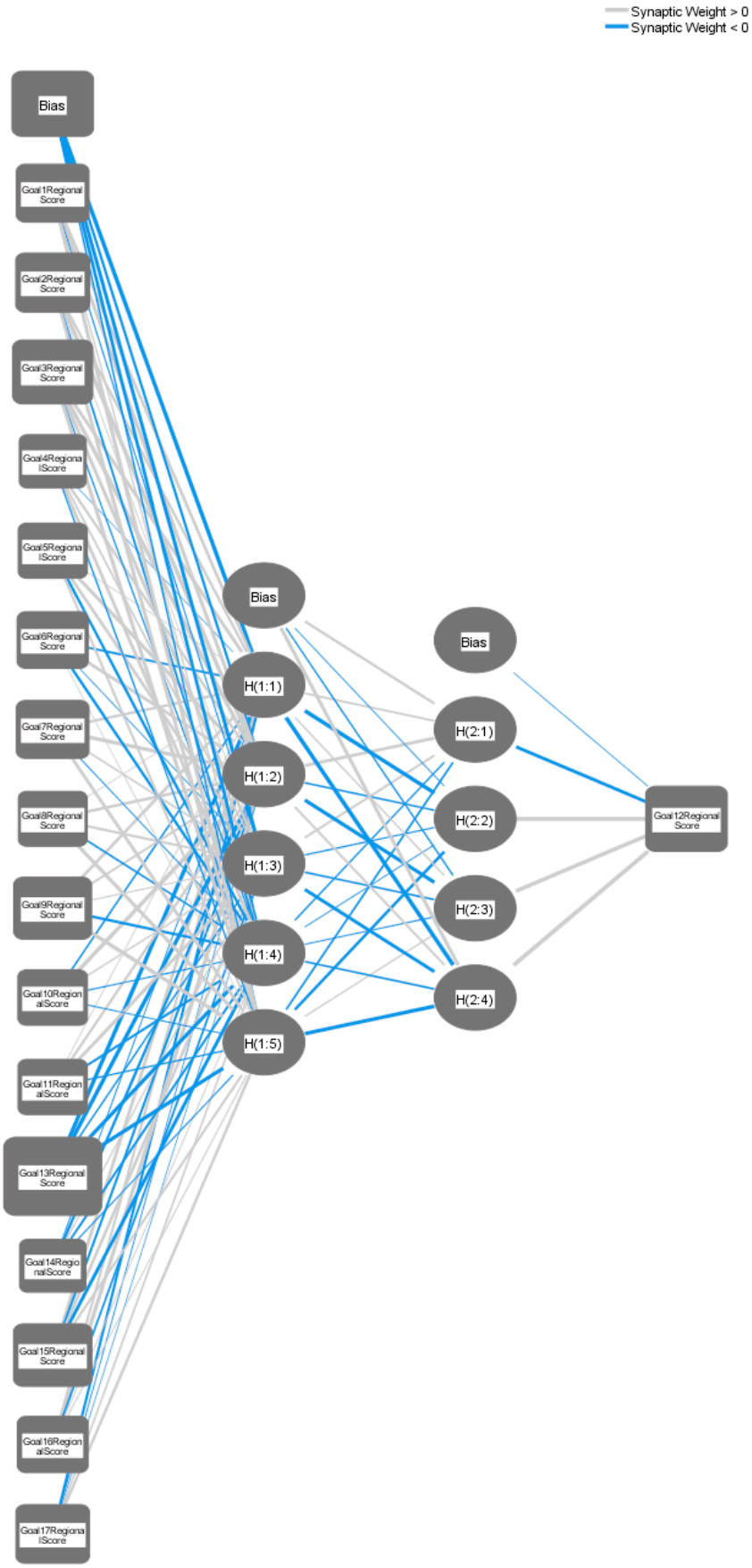
Case Processing Summary

		N	Percent
Sample	Training	106	65.4%
	Testing	21	13.0%
	Holdout	35	21.6%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 10 Regional Score
		11	Goal 11 Regional Score
		12	Goal 13 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 12 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.005
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 12 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-1.390	-.389	-.705	-.573	-.237
	Goal1RegionalScore	.462	.602	-.097	.123	.706
	Goal2RegionalScore	.374	1.020	.026	-.305	.577
	Goal3RegionalScore	.551	.861	.576	-.141	.649
	Goal4RegionalScore	-.001	.373	.242	.523	-.165
	Goal5RegionalScore	.024	.616	.470	-.444	.333
	Goal6RegionalScore	-.325	.494	-.039	-.448	.010
	Goal7RegionalScore	.381	.735	.189	-.074	.554
	Goal8RegionalScore	.026	.449	.350	-.258	.693
	Goal9RegionalScore	.470	.296	.072	-.418	.761
	Goal10RegionalScore	-.255	1.006	.154	-.128	-.075
	Goal11RegionalScore	.035	.378	.556	-.353	-.165
	Goal13RegionalScore	-1.227	-1.020	-.178	-.828	-.902
	Goal14RegionalScore	-.073	-.409	.088	-.338	-.098
	Goal15RegionalScore	.514	-.352	.433	-.648	.328
	Goal16RegionalScore	.344	.748	-.278	.036	.072
	Goal17RegionalScore	-.392	-.051	-.019	.220	.413
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

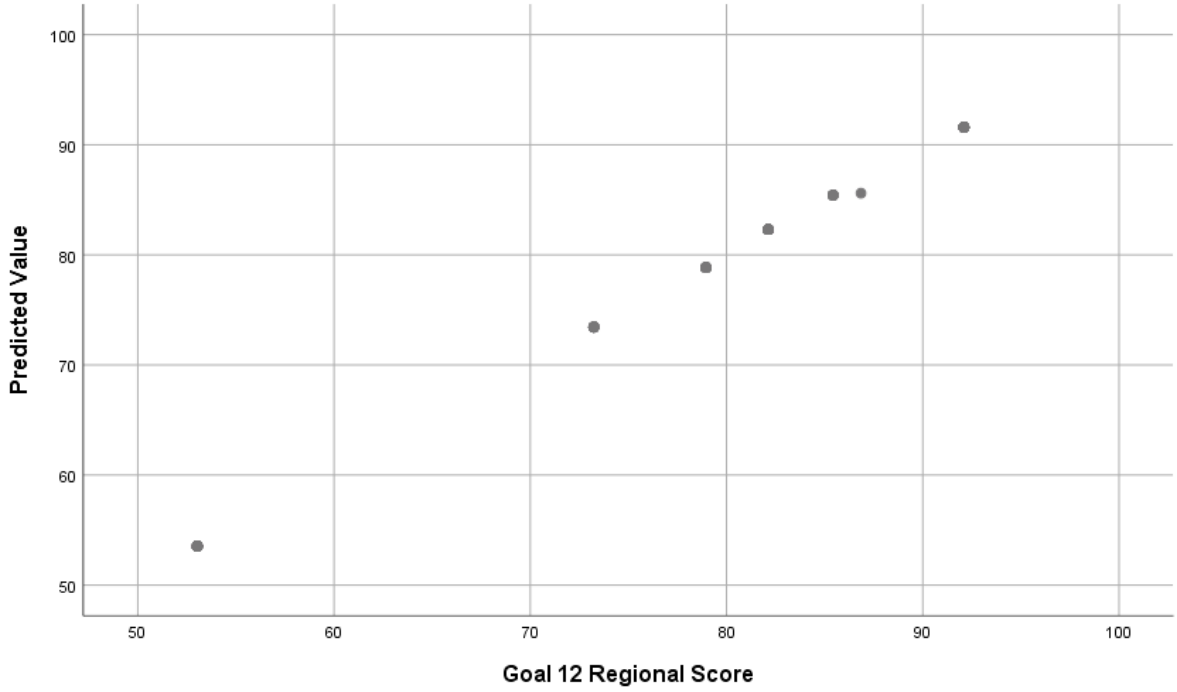
Parameter Estimates

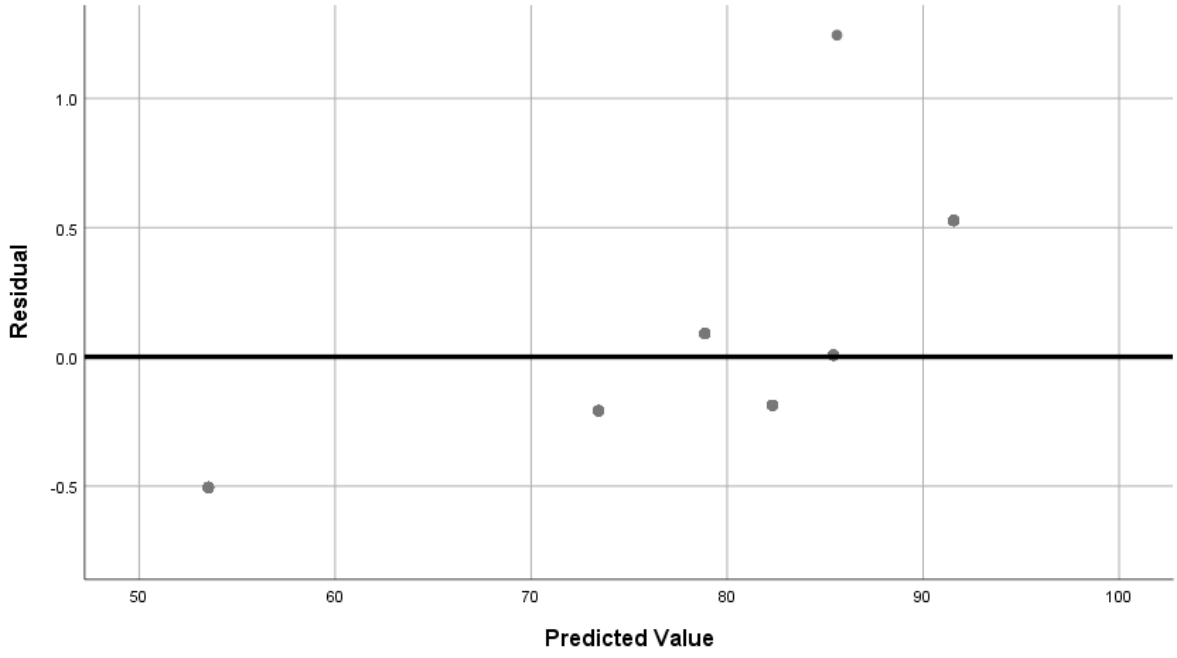
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				

	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	.383	-.050	-.172	.585
	H(1:1)	.265	-1.182	.154	-1.797
	H(1:2)	.529	-.229	-.796	.296
	H(1:3)	.315	-.153	-.259	-.610
	H(1:4)	-.174	-.051	-.093	-.262
	H(1:5)	-.266	-.465	.137	-.983
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal12RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	-.031
	H(2:1)	-.591
	H(2:2)	1.570
	H(2:3)	.948
	H(2:4)	2.322



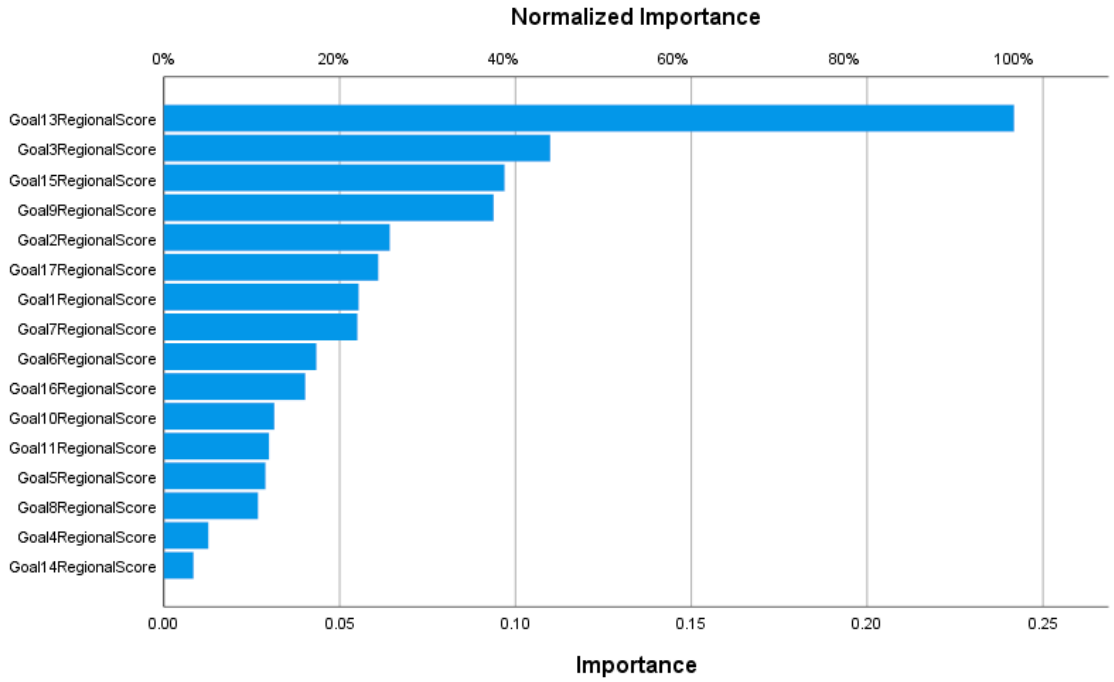


Dependent Variable: Goal 12 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.055	22.9%
Goal 2 Regional Score	.064	26.6%
Goal 3 Regional Score	.110	45.5%
Goal 4 Regional Score	.013	5.2%
Goal 5 Regional Score	.029	12.0%
Goal 6 Regional Score	.043	18.0%
Goal 7 Regional Score	.055	22.8%
Goal 8 Regional Score	.027	11.1%

Goal 9 Regional Score	.094	38.8%
Goal 10 Regional Score	.031	13.0%
Goal 11 Regional Score	.030	12.4%
Goal 13 Regional Score	.242	100.0%
Goal 14 Regional Score	.008	3.5%
Goal 15 Regional Score	.097	40.1%
Goal 16 Regional Score	.040	16.6%
Goal 17 Regional Score	.061	25.2%



*Multilayer Perceptron Network.
MLP Goal13RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Output Created		17-JUL-2019 08:44:07
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal13RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.64
	Elapsed Time	00:00:00.69
Variables Created or Modified	Predicted Value	MLP_PredictedValue_N

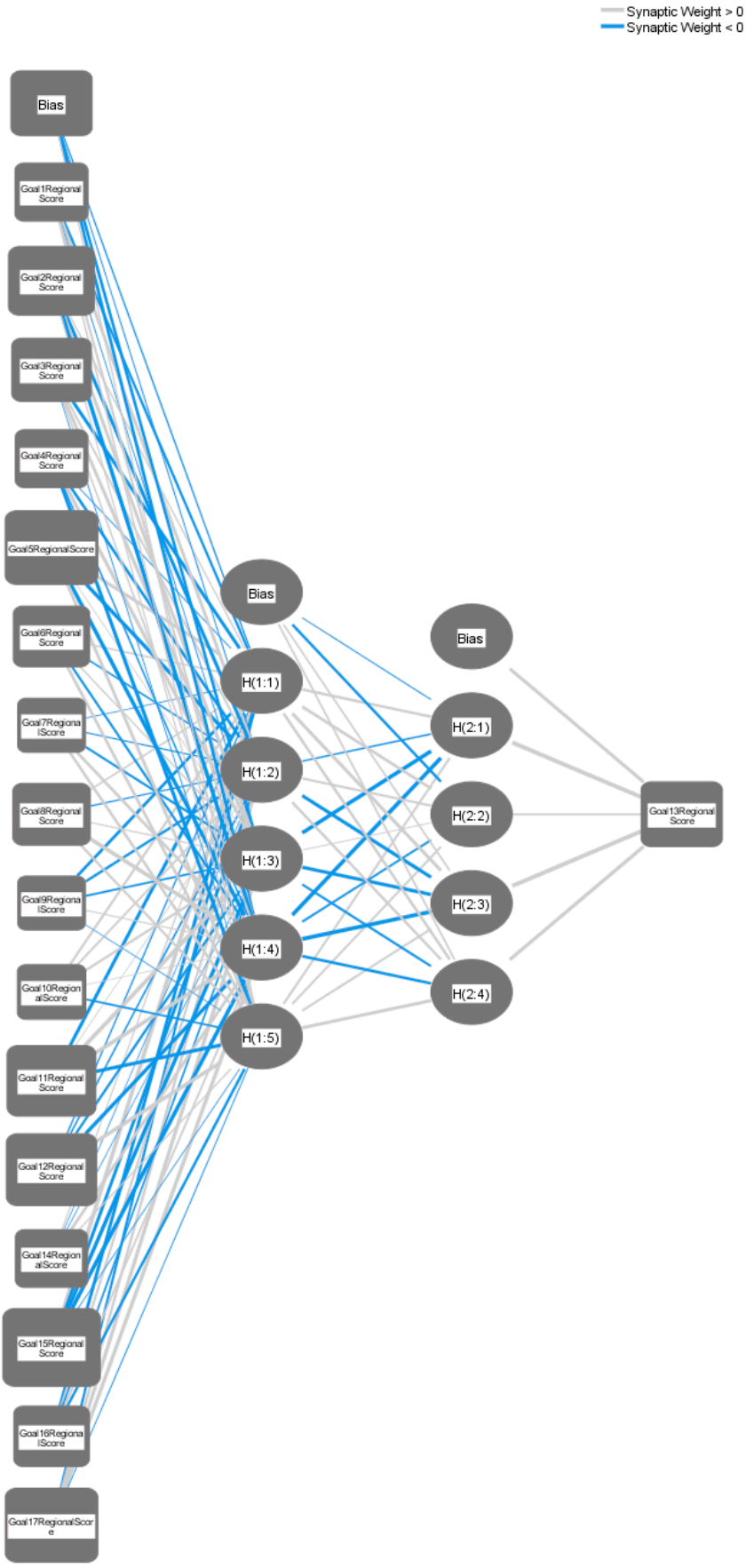
Case Processing Summary

		N	Percent
Sample	Training	96	59.3%
	Testing	33	20.4%
	Holdout	33	20.4%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 10 Regional Score
		11	Goal 11 Regional Score
		12	Goal 12 Regional Score
		13	Goal 14 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 13 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.003
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 13 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
Predictor		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.120	-.073	-.419	-.461	.099
	Goal1RegionalScore	-.324	.416	-.048	.256	.129
	Goal2RegionalScore	.103	-.568	.467	-.934	.079
	Goal3RegionalScore	-.554	.178	.476	.136	-.045
	Goal4RegionalScore	-.065	-.410	.532	-.140	-.645
	Goal5RegionalScore	.444	-.713	.022	-.764	.438
	Goal6RegionalScore	.131	-.156	.108	-.299	.371
	Goal7RegionalScore	-.036	-.105	-.285	.359	.350
	Goal8RegionalScore	.138	-.112	.087	.735	.270
	Goal9RegionalScore	-.440	-.343	-.189	.064	-.026
	Goal10RegionalScore	.284	.180	.297	.002	-.183
	Goal11RegionalScore	-.560	.012	.764	.727	-.666
	Goal12RegionalScore	-.112	-.158	-.312	-.667	.664
	Goal14RegionalScore	.091	-.029	-.026	.374	.098
	Goal15RegionalScore	.777	-.512	-.760	-.955	-.032
	Goal16RegionalScore	-.544	.246	-.167	.179	-.354
	Goal17RegionalScore	-.309	.305	.635	.662	-.071
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

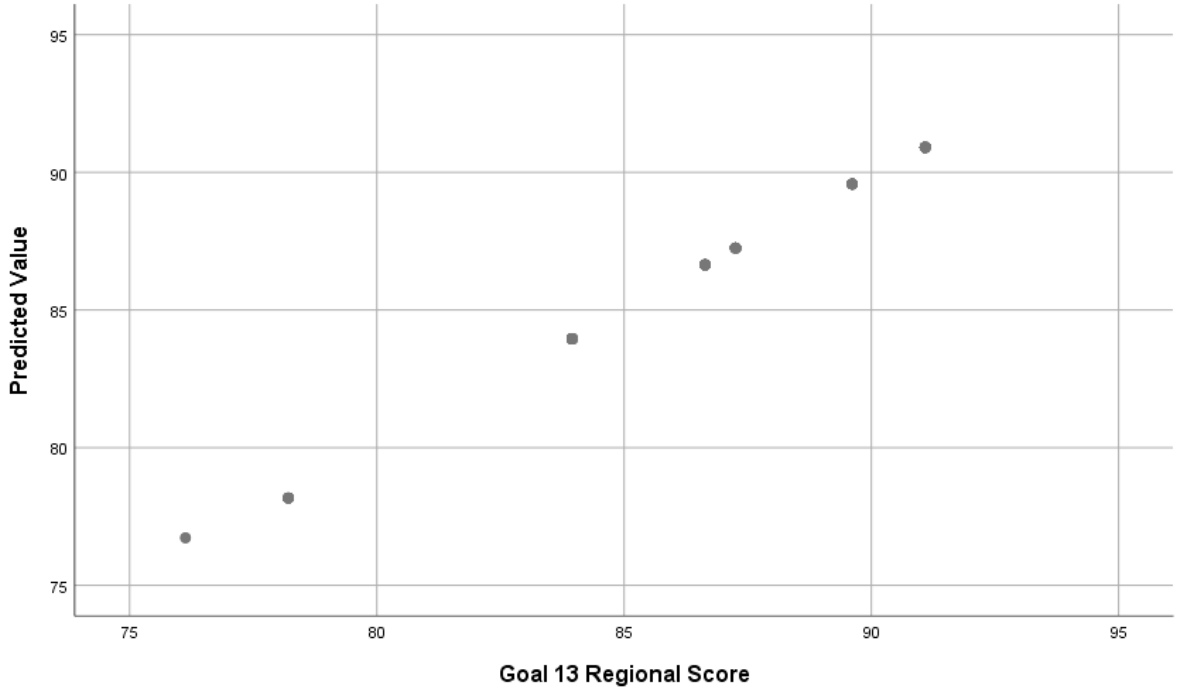
Parameter Estimates

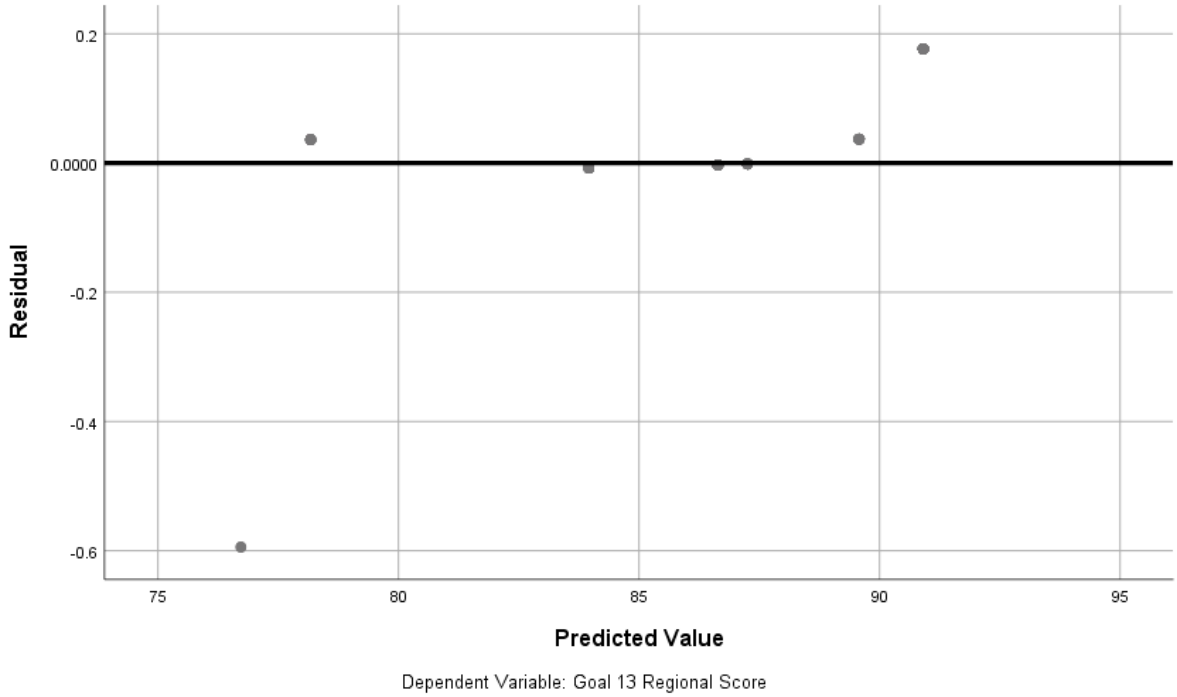
		Predicted Hidden Layer 2			
Predictor		H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				

	Goal12RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	-.075	-.358	.143	.164
	H(1:1)	.325	.372	.510	.348
	H(1:2)	-.163	.212	-.639	.308
	H(1:3)	-.856	.039	-.596	-.299
	H(1:4)	-1.001	-.263	-1.100	-.382
	H(1:5)	.242	.184	.192	.469
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal13RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	.524
	H(2:1)	1.699
	H(2:2)	.176
	H(2:3)	1.730
	H(2:4)	.584



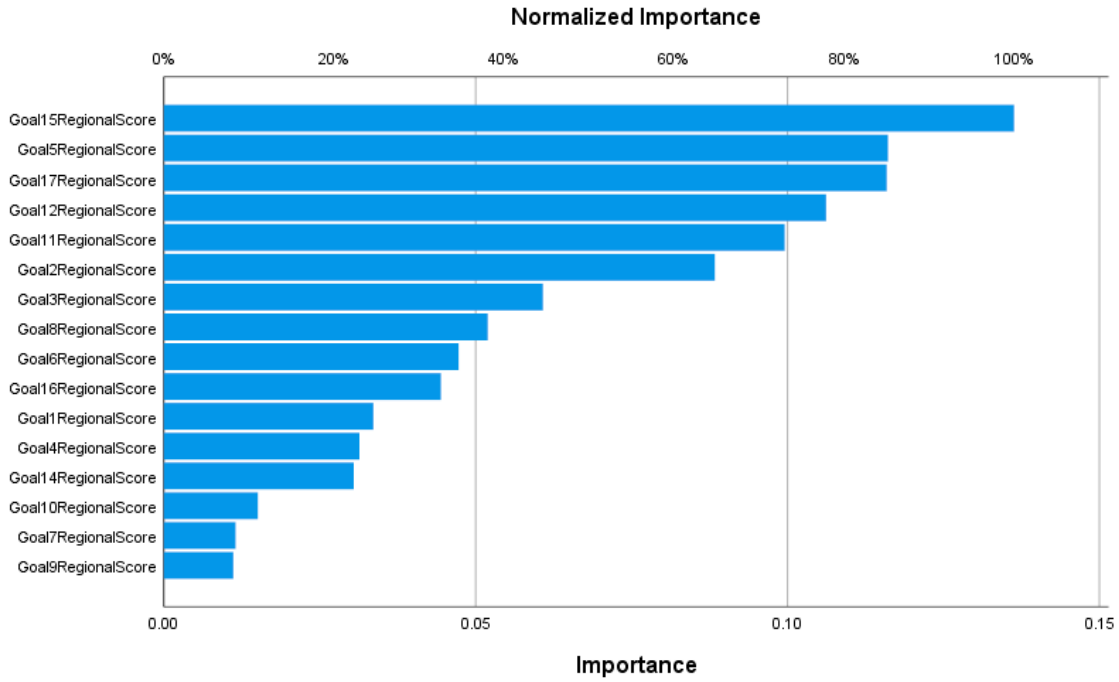


Dependent Variable: Goal 13 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.034	24.6%
Goal 2 Regional Score	.088	64.8%
Goal 3 Regional Score	.061	44.6%
Goal 4 Regional Score	.031	23.0%
Goal 5 Regional Score	.116	85.2%
Goal 6 Regional Score	.047	34.7%
Goal 7 Regional Score	.012	8.4%
Goal 8 Regional Score	.052	38.1%

Goal 9 Regional Score	.011	8.2%
Goal 10 Regional Score	.015	11.1%
Goal 11 Regional Score	.100	73.0%
Goal 12 Regional Score	.106	77.9%
Goal 14 Regional Score	.030	22.3%
Goal 15 Regional Score	.136	100.0%
Goal 16 Regional Score	.044	32.6%
Goal 17 Regional Score	.116	85.0%



*Multilayer Perceptron Network.
MLP Goal14RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Output Created		17-JUL-2019 08:45:15
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193

Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal14RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal15RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.58
	Elapsed Time	00:00:00.57
Variables Created or Modified	Predicted Value	MLP_PredictedValue_Q

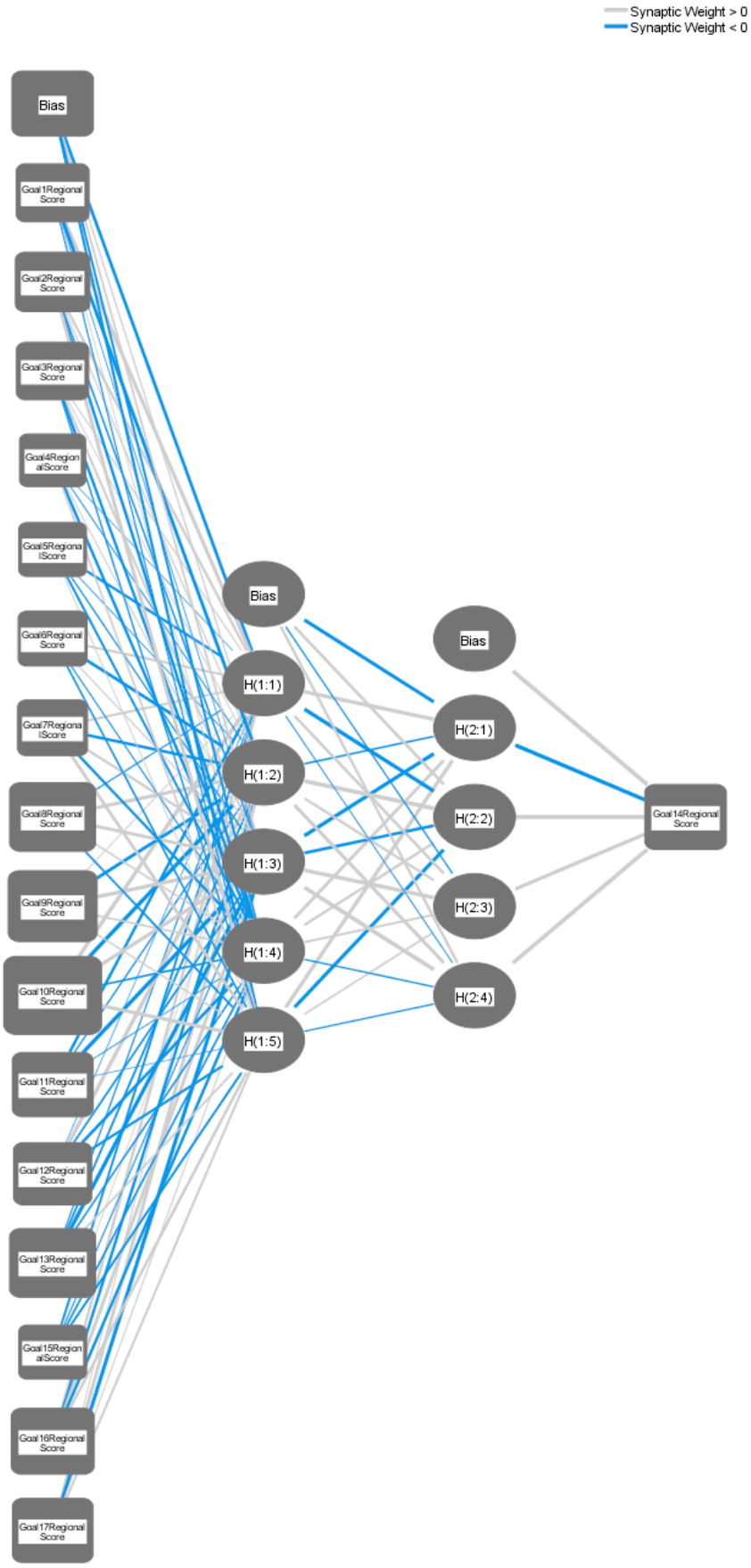
Case Processing Summary

		N	Percent
Sample	Training	104	64.2%
	Testing	29	17.9%
	Holdout	29	17.9%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 10 Regional Score
		11	Goal 11 Regional Score
		12	Goal 12 Regional Score
		13	Goal 13 Regional Score
		14	Goal 15 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 14 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.005
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 14 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
Predictor		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.581	.118	.236	-.367	-.426
	Goal1RegionalScore	.774	-.779	-.050	.034	-.152
	Goal2RegionalScore	.404	.101	-.193	-.462	.616
	Goal3RegionalScore	.091	.048	.322	-.456	-.173
	Goal4RegionalScore	-.035	-.097	.081	-.470	.225
	Goal5RegionalScore	-.443	-.062	-.153	-.369	.051
	Goal6RegionalScore	.393	-.579	.105	-.137	-.261
	Goal7RegionalScore	.359	-.489	.384	-.444	.502
	Goal8RegionalScore	-.147	.792	.611	.183	-.338
	Goal9RegionalScore	.063	-.634	.915	.235	.152
	Goal10RegionalScore	1.086	-1.447	.809	-.279	.799
	Goal11RegionalScore	-.479	-.155	-1.176	-.079	-.029
	Goal12RegionalScore	-.042	.983	-.285	-.557	-.437
	Goal13RegionalScore	-.152	-.334	-1.151	-.228	.261
	Goal15RegionalScore	-.363	.018	-.134	-.266	-.374
	Goal16RegionalScore	.437	-.470	.569	-.473	.450
	Goal17RegionalScore	.056	.613	-1.069	.085	.344
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

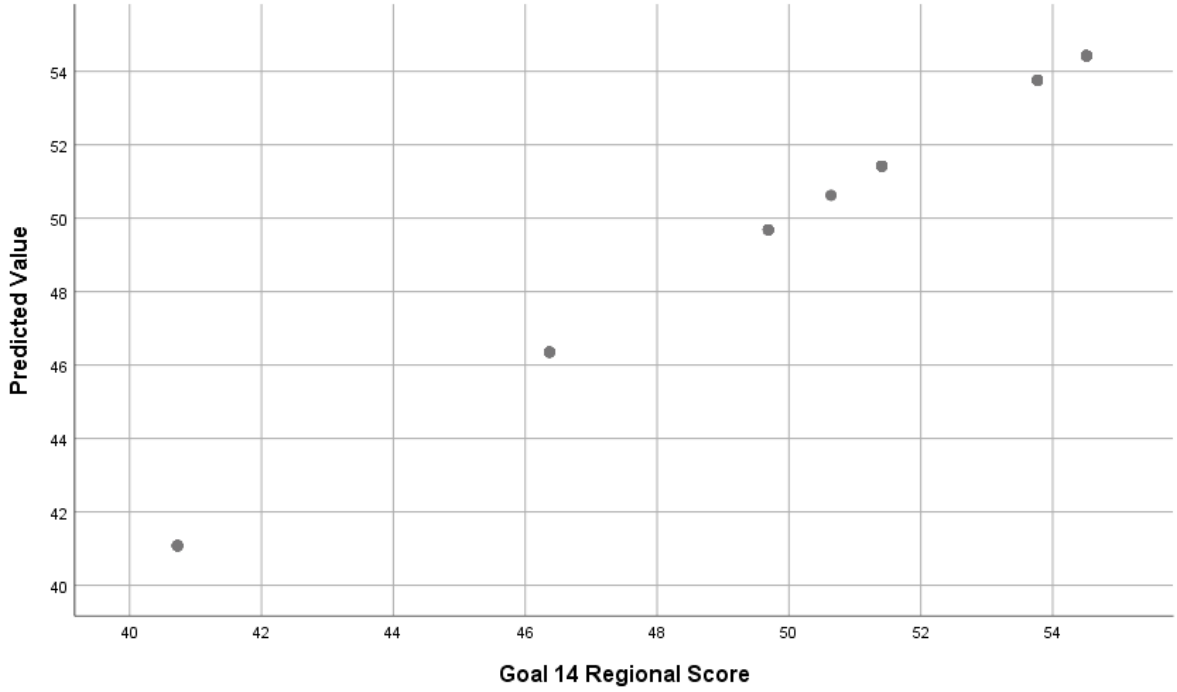
Parameter Estimates

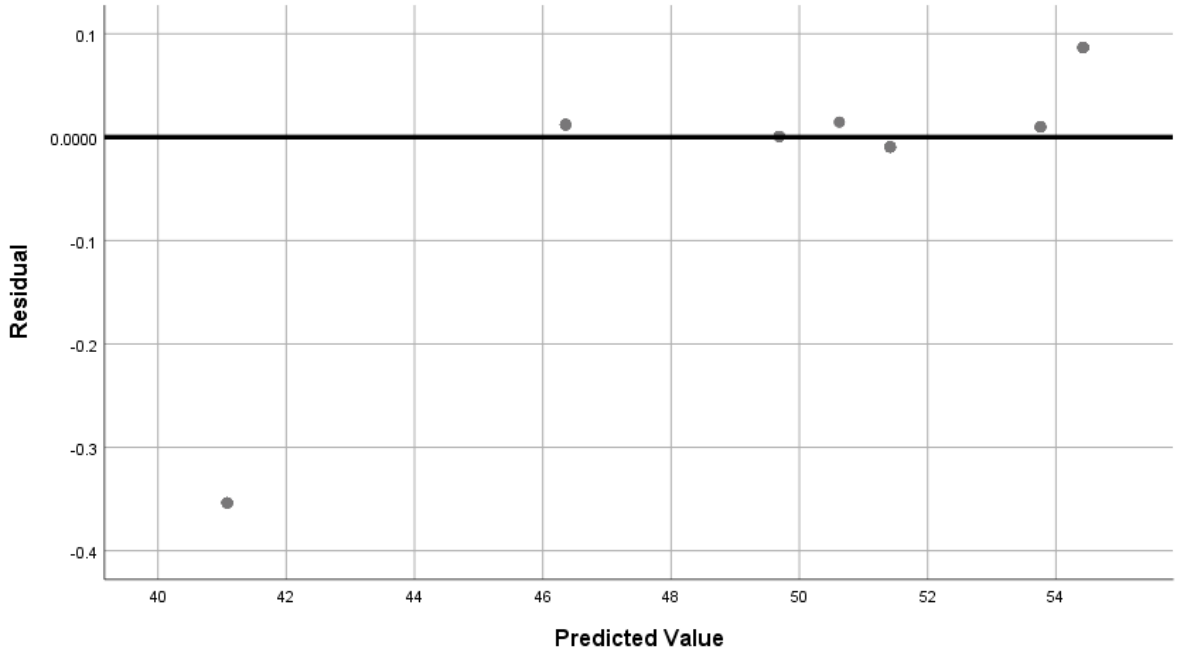
		Predicted Hidden Layer 2			
Predictor		H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				

	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	-.869	.465	-.153	.404
	H(1:1)	.918	-1.162	.452	-.091
	H(1:2)	-.239	1.958	.379	.635
	H(1:3)	-1.151	-.565	1.115	1.315
	H(1:4)	.534	.422	.327	-.183
	H(1:5)	.874	-.997	.196	-.161
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal14RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	1.723
	H(2:1)	-1.613
	H(2:2)	2.682
	H(2:3)	.863
	H(2:4)	1.312



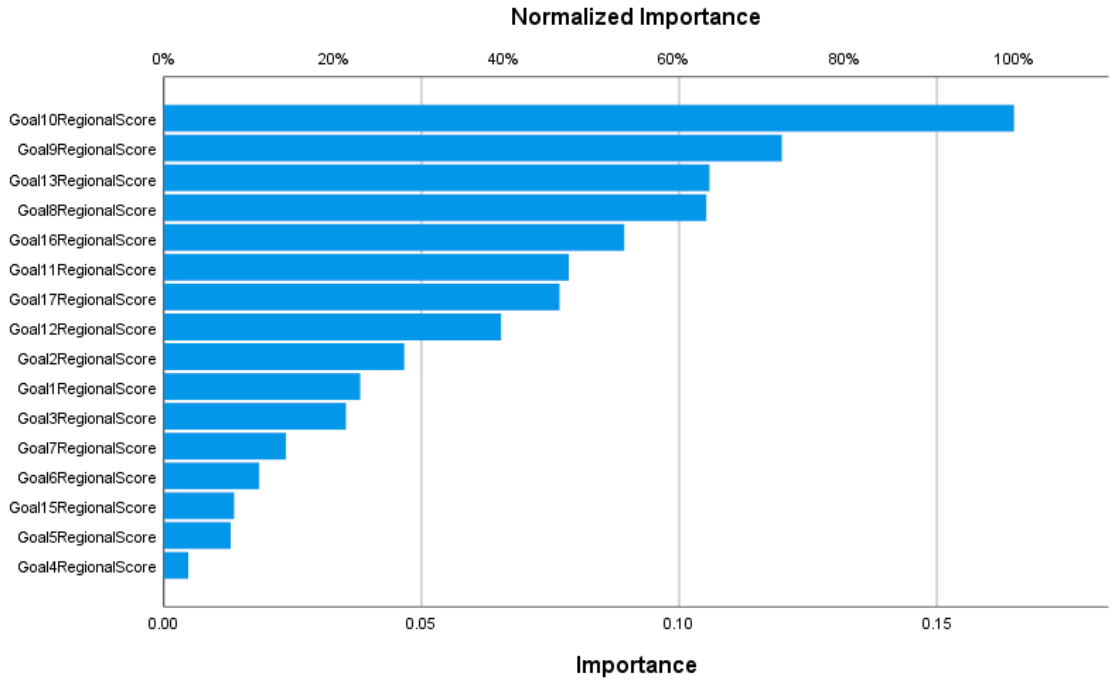


Dependent Variable: Goal 14 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.038	23.1%
Goal 2 Regional Score	.047	28.3%
Goal 3 Regional Score	.035	21.4%
Goal 4 Regional Score	.005	2.9%
Goal 5 Regional Score	.013	7.9%
Goal 6 Regional Score	.018	11.2%
Goal 7 Regional Score	.024	14.4%
Goal 8 Regional Score	.105	63.8%

Goal 9 Regional Score	.120	72.7%
Goal 10 Regional Score	.165	100.0%
Goal 11 Regional Score	.079	47.6%
Goal 12 Regional Score	.065	39.7%
Goal 13 Regional Score	.106	64.2%
Goal 15 Regional Score	.014	8.3%
Goal 16 Regional Score	.089	54.2%
Goal 17 Regional Score	.077	46.5%



*Multilayer Perceptron Network.
MLP Goal15RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal16RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>

	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal15RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal16RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.58
	Elapsed Time	00:00:00.63
Variables Created or Modified	Predicted Value	MLP_PredictedValue_R

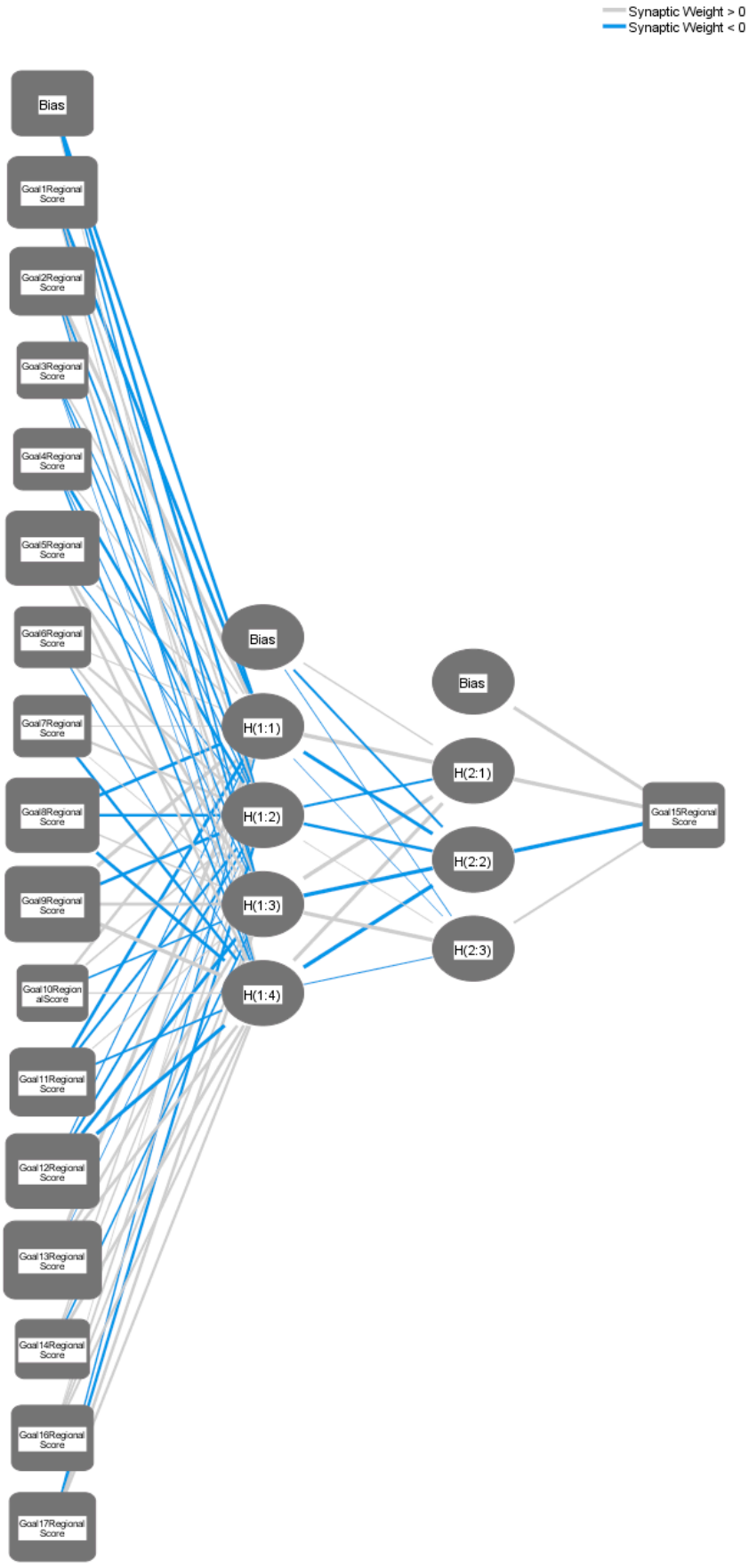
Case Processing Summary

		N	Percent
Sample	Training	87	53.7%
	Testing	29	17.9%
	Holdout	46	28.4%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 10 Regional Score
		11	Goal 11 Regional Score
		12	Goal 12 Regional Score
		13	Goal 13 Regional Score
		14	Goal 14 Regional Score
		15	Goal 16 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		4
	Number of Units in Hidden Layer 2[a]		3
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 15 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.003
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 15 Regional Score

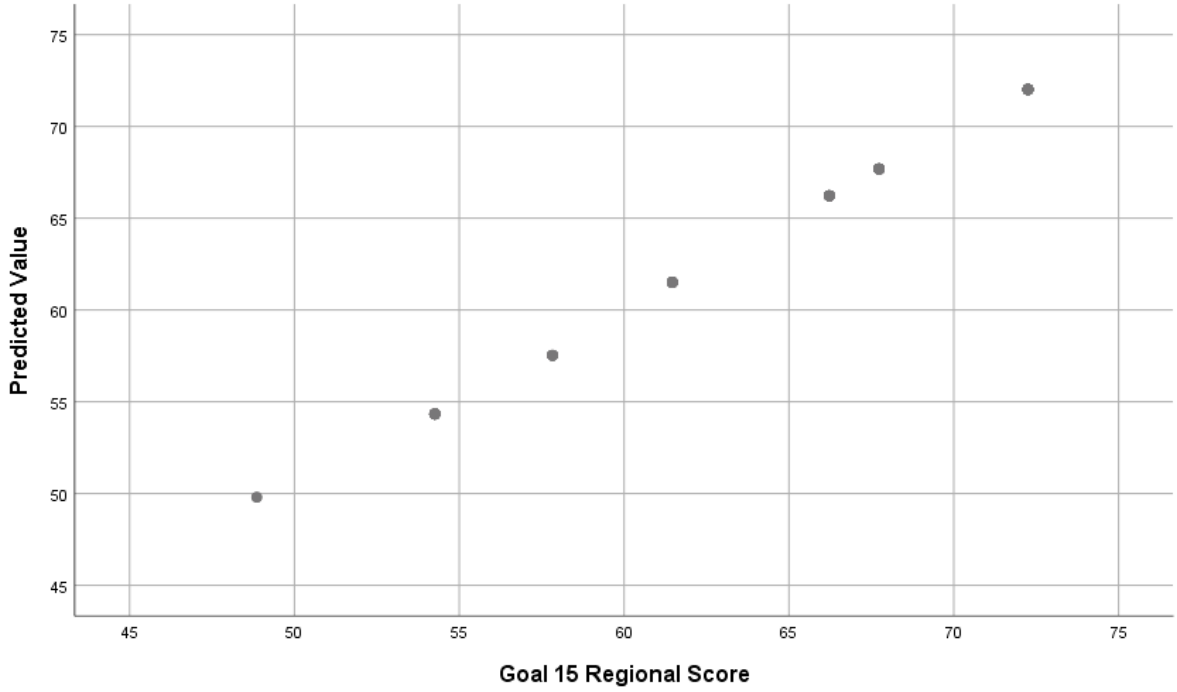
Parameter Estimates

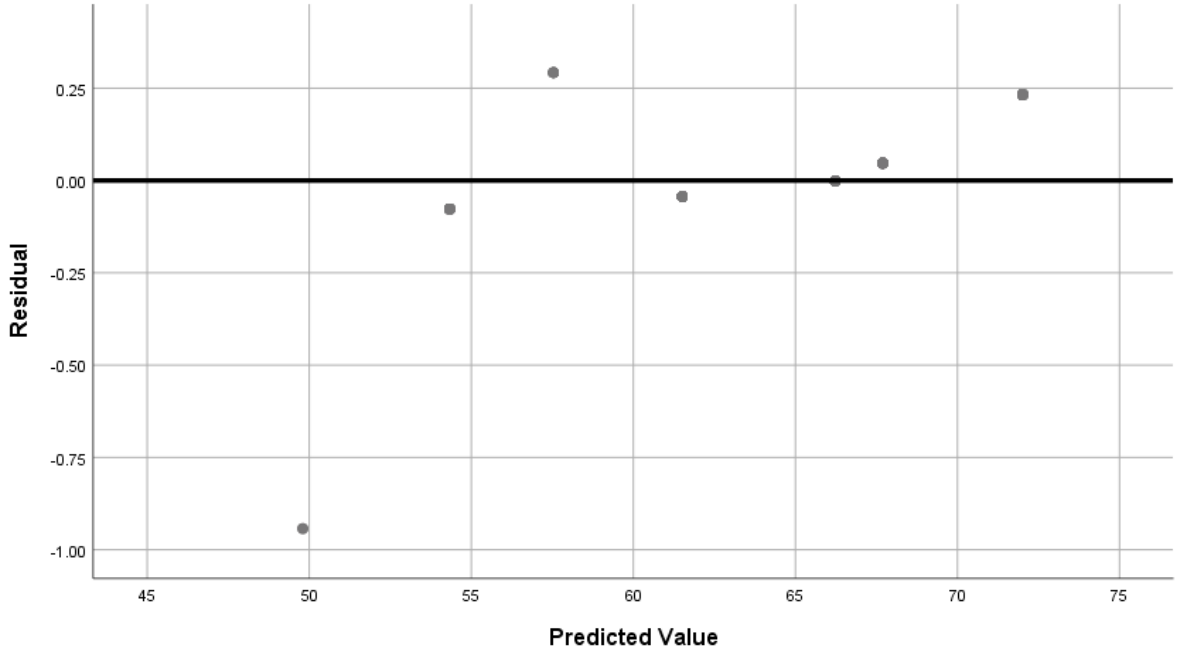
		Predicted				
		Hidden Layer 1				Hidden Layer 2
Predictor		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(2:1)
Input Layer	(Bias)	-.533	-.547	-.225	.040	
	Goal1RegionalScore	-.701	.256	-.282	.065	
	Goal2RegionalScore	.714	-.318	.324	-.184	
	Goal3RegionalScore	.184	-.152	-.219	-.032	
	Goal4RegionalScore	.083	-.509	-.105	-.272	
	Goal5RegionalScore	.191	-.134	.536	.421	
	Goal6RegionalScore	.072	.358	.315	-.129	
	Goal7RegionalScore	.024	.403	.038	-.487	
	Goal8RegionalScore	-.610	-.447	.164	-.652	
	Goal9RegionalScore	.785	-.553	.499	.871	
	Goal10RegionalScore	.433	.207	-.228	.130	
	Goal11RegionalScore	-.596	-.376	.078	-.261	
	Goal12RegionalScore	-.144	-.343	-.705	-.807	
	Goal13RegionalScore	.755	-.047	.433	.468	
	Goal14RegionalScore	.156	.153	-.238	.489	
	Goal16RegionalScore	.035	.249	.256	.324	
	Goal17RegionalScore	-.203	-.467	.463	.343	
Hidden Layer 1	(Bias)					.154
	H(1:1)					1.206
	H(1:2)					-.344
	H(1:3)					1.074
	H(1:4)					.664
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					

Parameter Estimates

		Predicted Hidden Layer 2		
Predictor		H(2:2)	H(2:3)	Goal15RegionalScore
Input Layer	(Bias)			
	Goal1RegionalScore			
	Goal2RegionalScore			
	Goal3RegionalScore			
	Goal4RegionalScore			
	Goal5RegionalScore			
	Goal6RegionalScore			
	Goal7RegionalScore			
	Goal8RegionalScore			
	Goal9RegionalScore			
	Goal10RegionalScore			
	Goal11RegionalScore			
	Goal12RegionalScore			

	Goal13RegionalScore			
	Goal14RegionalScore			
	Goal16RegionalScore			
	Goal17RegionalScore			
Hidden Layer 1	(Bias)	-.338	-.057	
	H(1:1)	-.783	-.010	
	H(1:2)	-.528	.040	
	H(1:3)	-1.629	.919	
	H(1:4)	-1.296	-.104	
Hidden Layer 2	(Bias)			.644
	H(2:1)			1.169
	H(2:2)			-2.602
	H(2:3)			.295

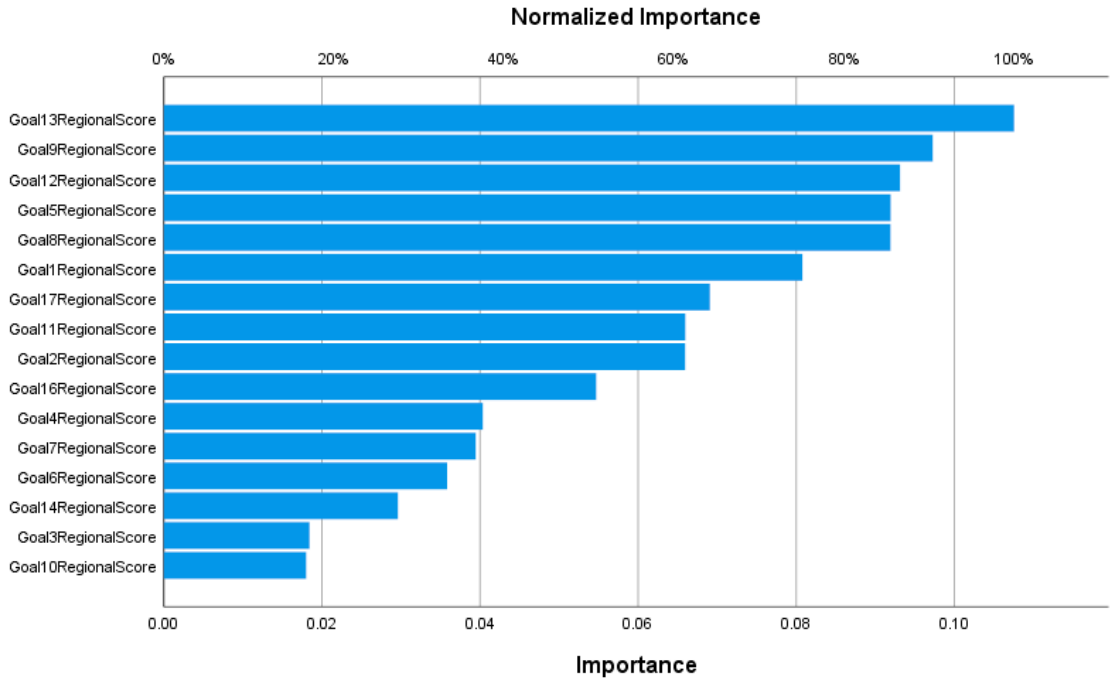




Dependent Variable: Goal 15 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.081	75.1%
Goal 2 Regional Score	.066	61.3%
Goal 3 Regional Score	.018	17.1%
Goal 4 Regional Score	.040	37.5%
Goal 5 Regional Score	.092	85.5%
Goal 6 Regional Score	.036	33.3%
Goal 7 Regional Score	.039	36.7%
Goal 8 Regional Score	.092	85.5%
Goal 9 Regional Score	.097	90.4%
Goal 10 Regional Score	.018	16.7%
Goal 11 Regional Score	.066	61.3%
Goal 12 Regional Score	.093	86.6%
Goal 13 Regional Score	.108	100.0%
Goal 14 Regional Score	.030	27.5%
Goal 16 Regional Score	.055	50.9%
Goal 17 Regional Score	.069	64.2%



*Multilayer Perceptron Network.
MLP Goal16RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal17RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable

Syntax		MLP Goal16RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal17RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.69
	Elapsed Time	00:00:00.66
Variables Created or Modified	Predicted Value	MLP_PredictedValue_BK

Case Processing Summary

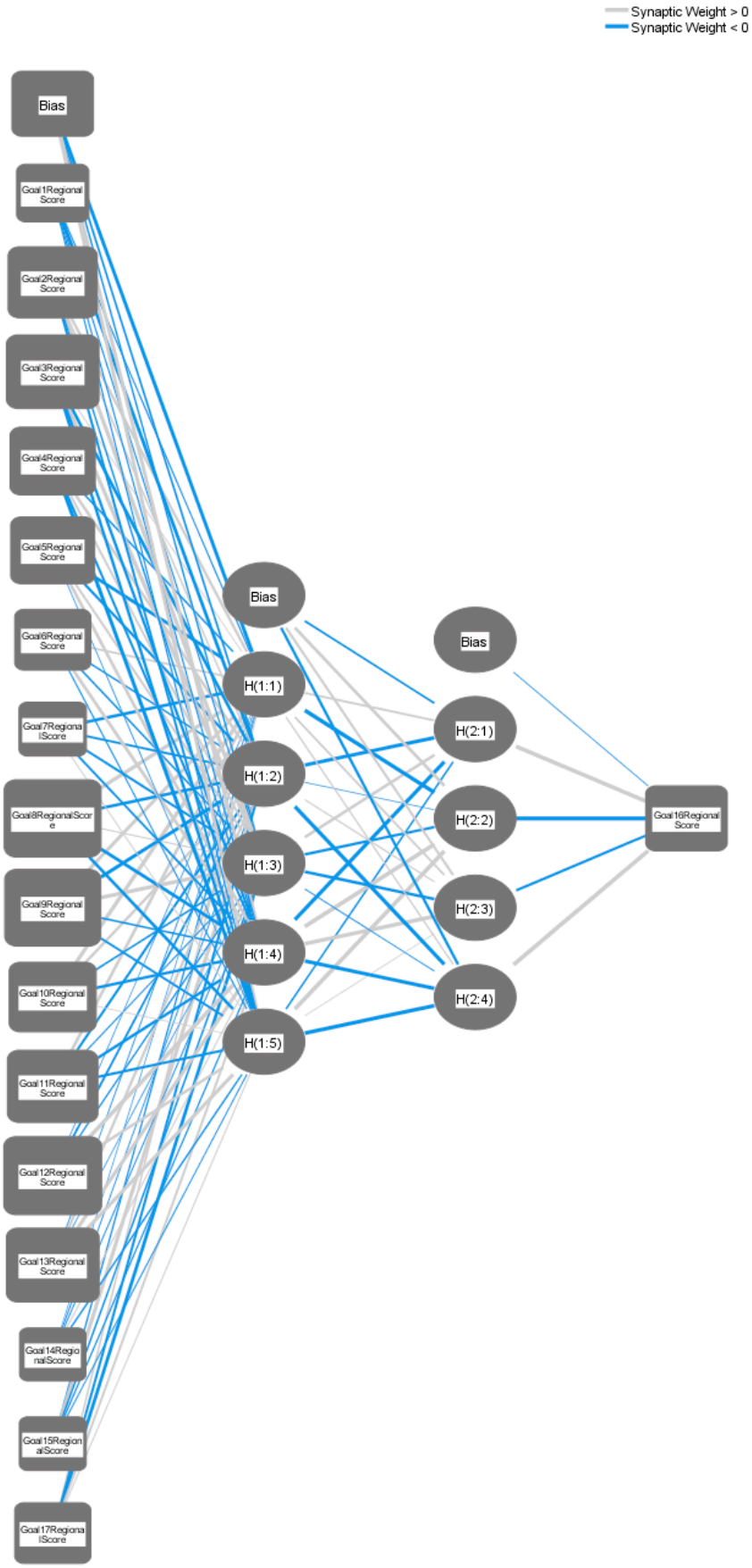
		N	Percent
Sample	Training	94	58.0%
	Testing	35	21.6%
	Holdout	33	20.4%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score

		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 10 Regional Score
		11	Goal 11 Regional Score
		12	Goal 12 Regional Score
		13	Goal 13 Regional Score
		14	Goal 14 Regional Score
		15	Goal 15 Regional Score
		16	Goal 17 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 16 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.004
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 16 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.500	-.223	-.162	.478	.439
	Goal1RegionalScore	-.114	-.470	-.101	-.137	-.115
	Goal2RegionalScore	.316	.154	.545	-.166	-.291
	Goal3RegionalScore	.014	-.438	.559	-.353	-.368
	Goal4RegionalScore	-.170	.338	.241	-.292	-.586
	Goal5RegionalScore	-.454	-.325	.253	.385	-.028
	Goal6RegionalScore	.200	-.176	-.199	.411	-.094
	Goal7RegionalScore	-.425	-.279	-.298	-.277	.025
	Goal8RegionalScore	.522	-.423	.053	-.479	-.436
	Goal9RegionalScore	.451	-.486	.600	-.204	-.268
	Goal10RegionalScore	.592	.321	-.222	-.366	.002
	Goal11RegionalScore	.375	-.316	-.093	-.364	-.318
	Goal12RegionalScore	-.015	-.257	-.156	.728	.334
	Goal13RegionalScore	-.040	.310	-.023	.486	.484
	Goal14RegionalScore	-.014	-.053	-.065	.045	-.167
	Goal15RegionalScore	-.151	.493	-.186	-.115	-.076
	Goal17RegionalScore	.158	-.294	-.462	.243	.039
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

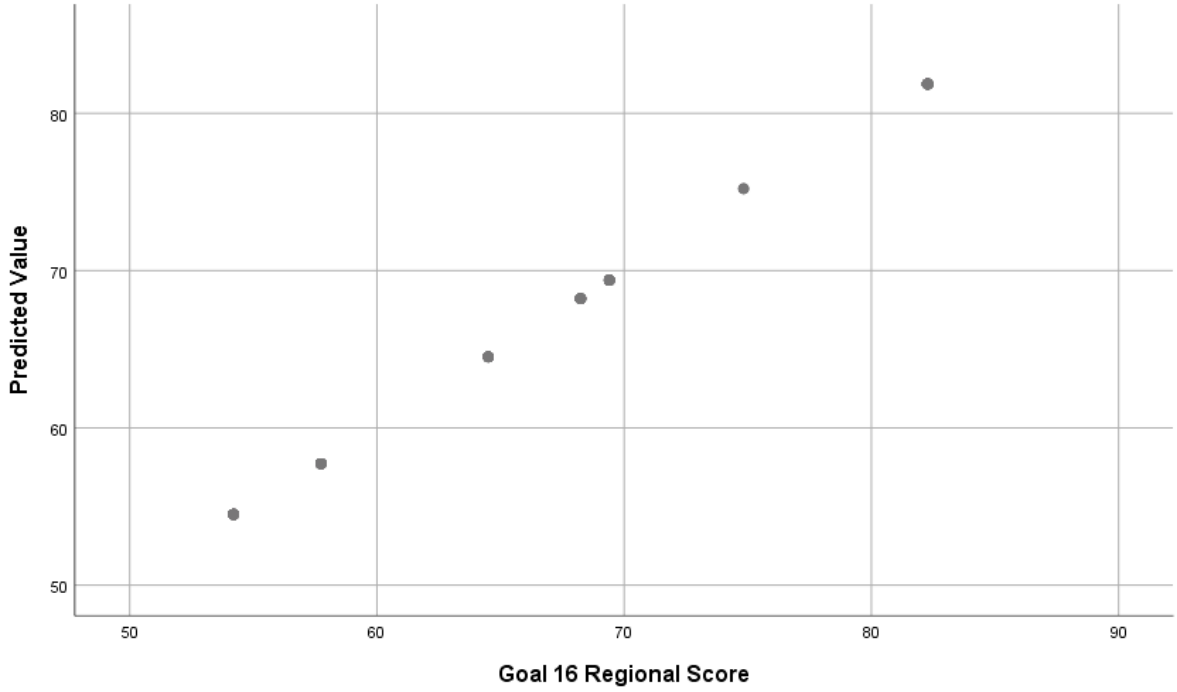
Parameter Estimates

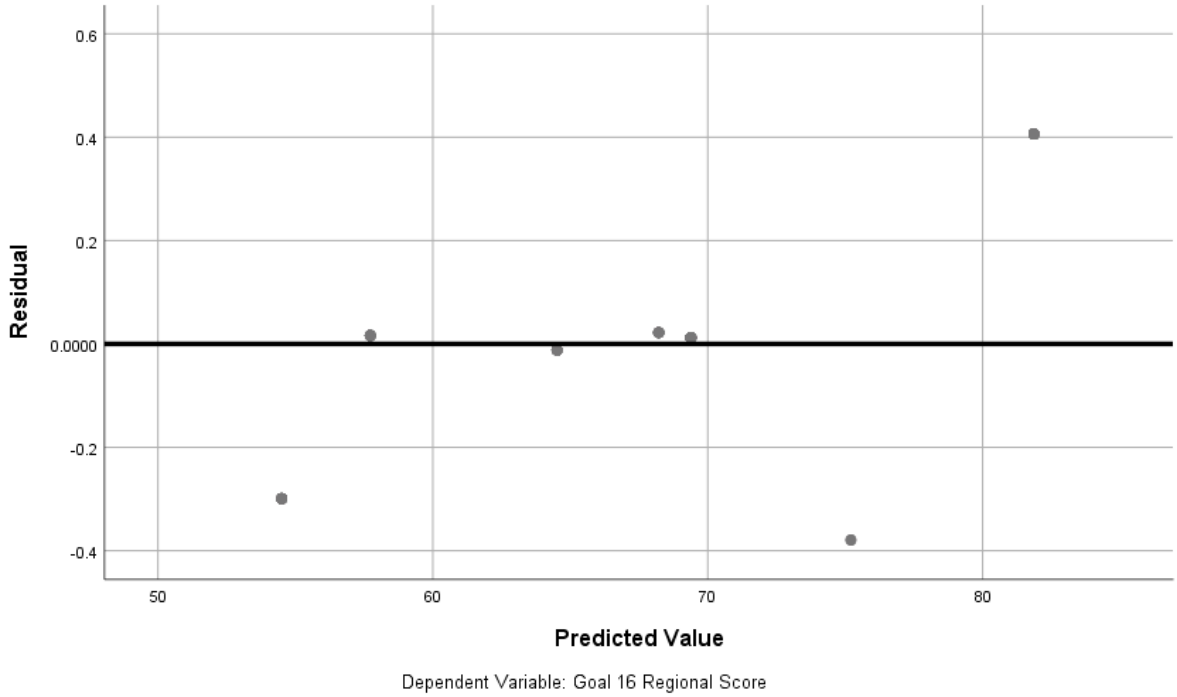
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				

	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal17RegionalScore				
Hidden Layer 1	(Bias)	-.242	.393	.290	-.358
	H(1:1)	.224	-.842	.217	.097
	H(1:2)	-.568	-.006	.092	-.638
	H(1:3)	.361	-.355	-.393	-.058
	H(1:4)	-.633	1.021	.619	-.596
	H(1:5)	-.199	.741	.003	-.678
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal16RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal17RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	-.028
	H(2:1)	.957
	H(2:2)	-2.336
	H(2:3)	-.332
	H(2:4)	1.149



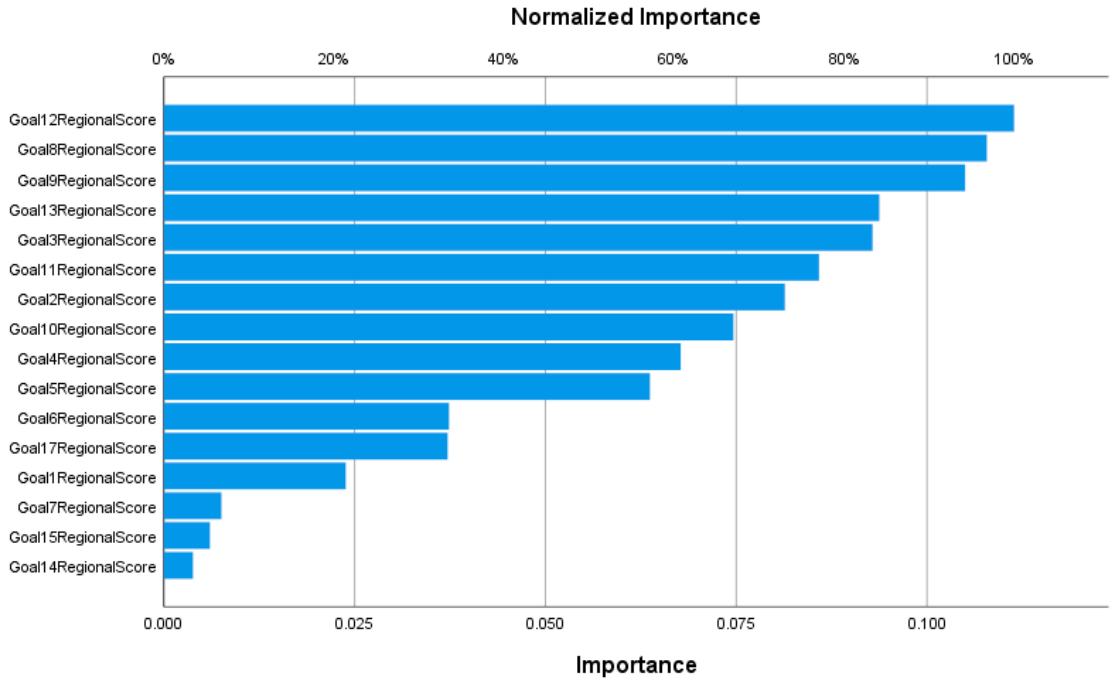


Dependent Variable: Goal 16 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.024	21.4%
Goal 2 Regional Score	.081	73.1%
Goal 3 Regional Score	.093	83.4%
Goal 4 Regional Score	.068	60.8%
Goal 5 Regional Score	.064	57.2%
Goal 6 Regional Score	.037	33.5%
Goal 7 Regional Score	.008	6.8%
Goal 8 Regional Score	.108	96.8%

Goal 9 Regional Score	.105	94.2%
Goal 10 Regional Score	.075	67.0%
Goal 11 Regional Score	.086	77.1%
Goal 12 Regional Score	.111	100.0%
Goal 13 Regional Score	.094	84.2%
Goal 14 Regional Score	.004	3.4%
Goal 15 Regional Score	.006	5.4%
Goal 17 Regional Score	.037	33.4%



*Multilayer Perceptron Network.
MLP Goal17RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore
/RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02)
/PARTITION TRAINING=6 TESTING=2 HOLDOUT=2
/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID
/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000
/PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE
/PLOT NETWORK PREDICTED RESIDUAL
/SAVE PREDVAL
/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001
/MISSING USERMISSING=EXCLUDE .

Multilayer Perceptron

Notes

Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>

	Split File	<none>
	N of Rows in Working Data File	193
Missing Value Handling	Definition of Missing	User- and system-missing values are treated as missing.
	Cases Used	Statistics are based on cases with valid data for all variables used by the procedure.
Weight Handling		not applicable
Syntax		MLP Goal17RegionalScore (MLEVEL=S) WITH Goal1RegionalScore Goal2RegionalScore Goal3RegionalScore Goal4RegionalScore Goal5RegionalScore Goal6RegionalScore Goal7RegionalScore Goal8RegionalScore Goal9RegionalScore Goal10RegionalScore Goal11RegionalScore Goal12RegionalScore Goal13RegionalScore Goal14RegionalScore Goal15RegionalScore Goal16RegionalScore /RESCALE COVARIATE=NORMALIZED DEPENDENT=NORMALIZED (CORRECTION=0.02) /PARTITION TRAINING=6 TESTING=2 HOLDOUT=2 /ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=AUTO) HIDDENFUNCTION=TANH OUTPUTFUNCTION=SIGMOID /CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.0000005 SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000 /PRINT CPS NETWORKINFO SUMMARY CLASSIFICATION SOLUTION IMPORTANCE /PLOT NETWORK PREDICTED RESIDUAL /SAVE PREDVAL /STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO ERRORCHANGE=1.0E-4 ERRORRATIO=0.001 /MISSING USERMISSING=EXCLUDE .
Resources	Processor Time	00:00:00.62
	Elapsed Time	00:00:00.62
Variables Created or Modified	Predicted Value	MLP_PredictedValue_T

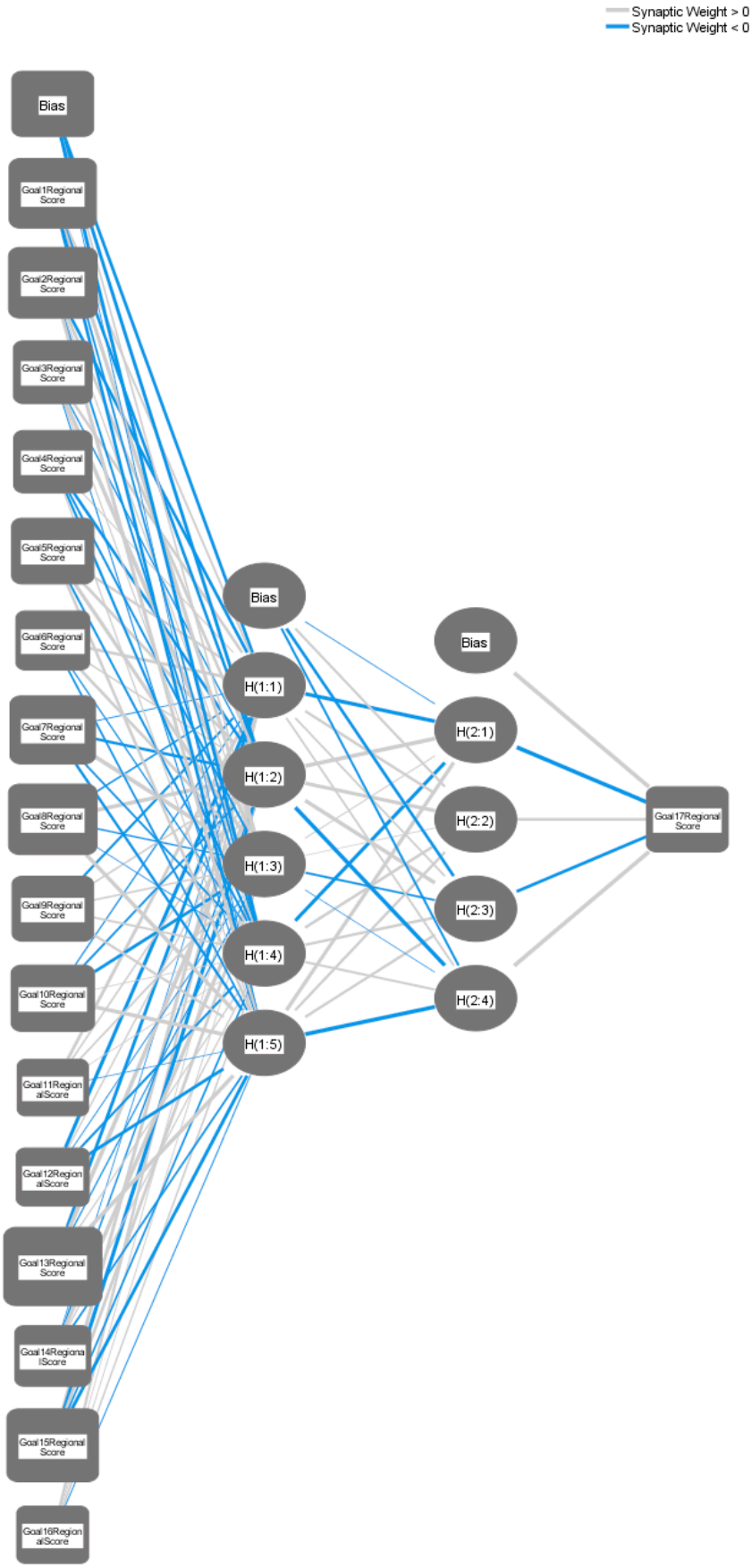
Case Processing Summary

		N	Percent
Sample	Training	91	56.2%
	Testing	38	23.5%
	Holdout	33	20.4%
Valid		162	100.0%
Excluded		31	
Total		193	

Network Information

Input Layer	Covariates	1	Goal 1 Regional Score
		2	Goal 2 Regional Score
		3	Goal 3 Regional Score
		4	Goal 4 Regional Score
		5	Goal 5 Regional Score
		6	Goal 6 Regional Score
		7	Goal 7 Regional Score
		8	Goal 8 Regional Score
		9	Goal 9 Regional Score
		10	Goal 10 Regional Score
		11	Goal 11 Regional Score
		12	Goal 12 Regional Score
		13	Goal 13 Regional Score
		14	Goal 14 Regional Score
		15	Goal 15 Regional Score
		16	Goal 16 Regional Score
	Number of Units[a]		16
	Rescaling Method for Covariates		Normalized
Hidden Layer(s)	Number of Hidden Layers		2
	Number of Units in Hidden Layer 1[a]		5
	Number of Units in Hidden Layer 2[a]		4
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Goal 17 Regional Score
	Number of Units		1
	Rescaling Method for Scale Dependents		Normalized
	Activation Function		Sigmoid
	Error Function		Sum of Squares

a. Excluding the bias unit



Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Sigmoid

Model Summary

Training	Sum of Squares Error	.002
	Relative Error	.001
	Stopping Rule Used	Training error ratio criterion (.001) achieved
	Training Time	0:00:00.01
Testing	Sum of Squares Error	.001
	Relative Error	.001
Holdout	Relative Error	.001

Dependent Variable: Goal 17 Regional Score

Parameter Estimates

		Predicted Hidden Layer 1				
	Predictor	H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)
Input Layer	(Bias)	-.584	-.678	.178	-.698	-.054
	Goal1RegionalScore	.212	-.531	.743	-.221	-.579
	Goal2RegionalScore	-.578	.491	.094	-.278	.682
	Goal3RegionalScore	.423	-.162	.974	.092	-.111
	Goal4RegionalScore	.076	-.532	-.282	-.406	.122
	Goal5RegionalScore	.311	.483	.711	-.282	.435
	Goal6RegionalScore	.521	.152	.502	-.153	-.235
	Goal7RegionalScore	-.072	-.518	1.246	-.266	-.445
	Goal8RegionalScore	-.187	.831	-.166	-.056	.836
	Goal9RegionalScore	-.344	.179	.169	.226	.294
	Goal10RegionalScore	-.155	-.268	-.607	.014	.866
	Goal11RegionalScore	.544	.167	.192	.010	-.013
	Goal12RegionalScore	-.776	.125	-.075	-.342	-.609
	Goal13RegionalScore	-.664	1.187	-.126	.098	.870
	Goal14RegionalScore	-.052	-.185	.819	.113	-.231
	Goal15RegionalScore	.617	-.954	.524	-.207	-.674
	Goal16RegionalScore	.408	.036	.050	.165	-.078
Hidden Layer 1	(Bias)					
	H(1:1)					
	H(1:2)					
	H(1:3)					
	H(1:4)					
	H(1:5)					
Hidden Layer 2	(Bias)					
	H(2:1)					
	H(2:2)					
	H(2:3)					
	H(2:4)					

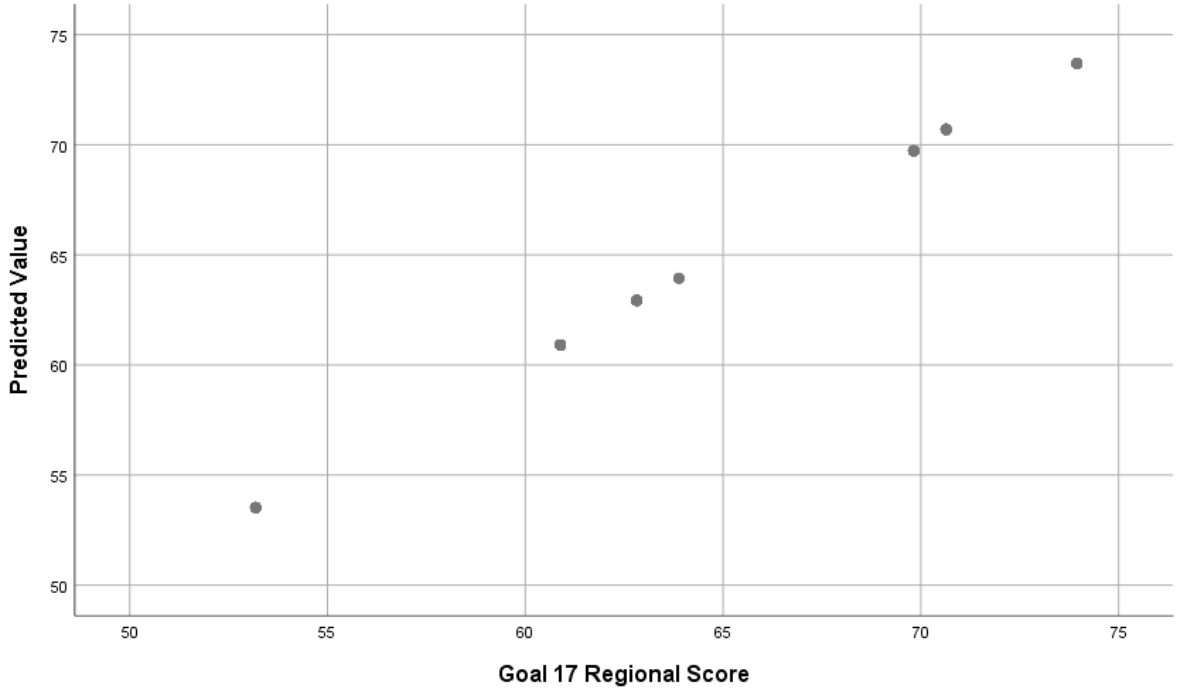
Parameter Estimates

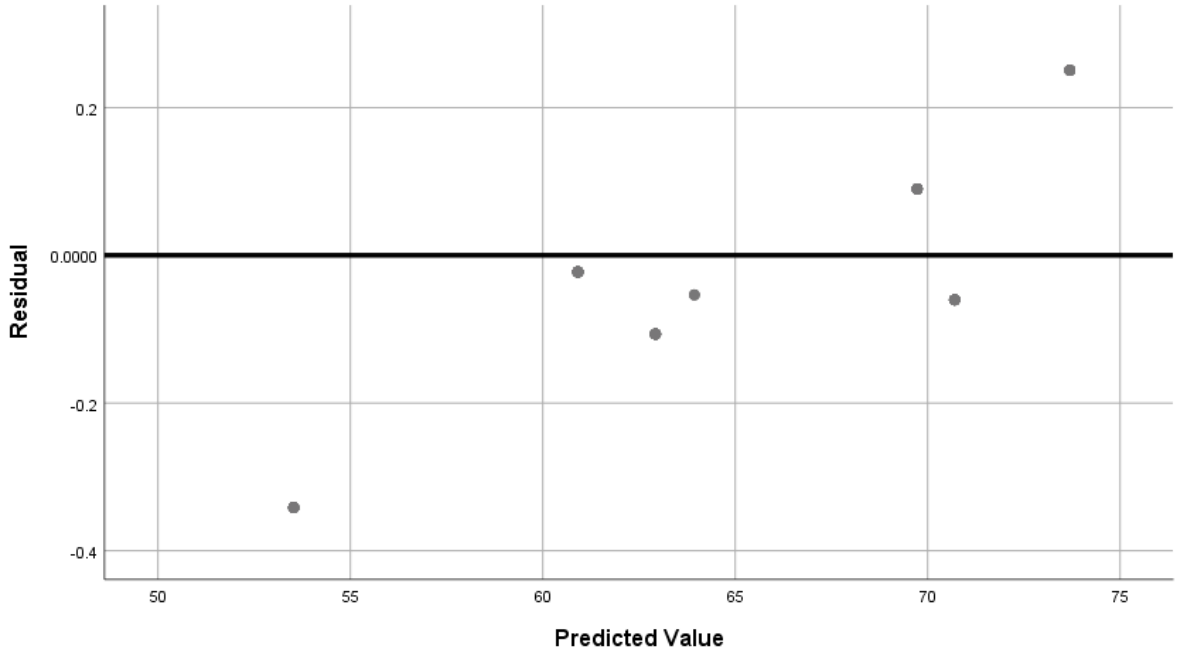
		Predicted Hidden Layer 2			
	Predictor	H(2:1)	H(2:2)	H(2:3)	H(2:4)
Input Layer	(Bias)				
	Goal1RegionalScore				
	Goal2RegionalScore				
	Goal3RegionalScore				
	Goal4RegionalScore				
	Goal5RegionalScore				
	Goal6RegionalScore				
	Goal7RegionalScore				
	Goal8RegionalScore				
	Goal9RegionalScore				
	Goal10RegionalScore				
	Goal11RegionalScore				

	Goal12RegionalScore				
	Goal13RegionalScore				
	Goal14RegionalScore				
	Goal15RegionalScore				
	Goal16RegionalScore				
Hidden Layer 1	(Bias)	-.072	.285	-.548	-.284
	H(1:1)	-.987	.408	.192	.205
	H(1:2)	1.003	.746	.820	-2.716
	H(1:3)	.076	.000	-.278	-.010
	H(1:4)	-.755	.454	.422	.281
	H(1:5)	.740	.349	.363	-2.735
Hidden Layer 2	(Bias)				
	H(2:1)				
	H(2:2)				
	H(2:3)				
	H(2:4)				

Parameter Estimates

	Predictor	Predicted Output Layer Goal17RegionalScore
Input Layer	(Bias)	
	Goal1RegionalScore	
	Goal2RegionalScore	
	Goal3RegionalScore	
	Goal4RegionalScore	
	Goal5RegionalScore	
	Goal6RegionalScore	
	Goal7RegionalScore	
	Goal8RegionalScore	
	Goal9RegionalScore	
	Goal10RegionalScore	
	Goal11RegionalScore	
	Goal12RegionalScore	
	Goal13RegionalScore	
	Goal14RegionalScore	
	Goal15RegionalScore	
	Goal16RegionalScore	
Hidden Layer 1	(Bias)	
	H(1:1)	
	H(1:2)	
	H(1:3)	
	H(1:4)	
	H(1:5)	
Hidden Layer 2	(Bias)	1.304
	H(2:1)	-3.406
	H(2:2)	.457
	H(2:3)	-.608
	H(2:4)	2.450





Dependent Variable: Goal 17 Regional Score

Independent Variable Importance

	Importance	Normalized Importance
Goal 1 Regional Score	.083	66.7%
Goal 2 Regional Score	.089	71.0%
Goal 3 Regional Score	.050	40.2%
Goal 4 Regional Score	.049	39.0%
Goal 5 Regional Score	.065	52.0%
Goal 6 Regional Score	.032	25.7%
Goal 7 Regional Score	.076	60.8%
Goal 8 Regional Score	.088	70.3%

Goal 9 Regional Score	.062	49.3%
Goal 10 Regional Score	.068	54.2%
Goal 11 Regional Score	.022	17.4%
Goal 12 Regional Score	.028	22.7%
Goal 13 Regional Score	.125	100.0%
Goal 14 Regional Score	.040	32.3%
Goal 15 Regional Score	.100	79.8%
Goal 16 Regional Score	.025	20.0%