

\*Multilayer Perceptron Network.

MLP y\_train (MLEVEL=S) WITH x1\_train x2\_train x3\_train

/RESCALE COVARIATE=NONE DEPENDENT=NONE

/PARTITION TRAINING=6 TESTING=3 HOLDOUT=1

/ARCHITECTURE AUTOMATIC=NO HIDDENLAYERS=2 (NUMUNITS=4,4) HIDDENFUNCTION=SIGMOID

OUTPUTFUNCTION=IDENTITY

/CRITERIA TRAINING=BATCH OPTIMIZATION=SCALEDCONJUGATE LAMBDAINITIAL=0.000005

SIGMAINITIAL=0.00005 INTERVALCENTER=0 INTERVALOFFSET=0.5 MEMSIZE=1000

/PRINT CPS NETWORKINFO SUMMARY SOLUTION IMPORTANCE

/PLOT NETWORK PREDICTED RESIDUAL

/SAVE PREDVAL(y\_predict )

/STOPPINGRULES ERRORSTEPS= 1 (DATA=AUTO) TRAININGTIMER=ON (MAXTIME=15) MAXEPOCHS=AUTO

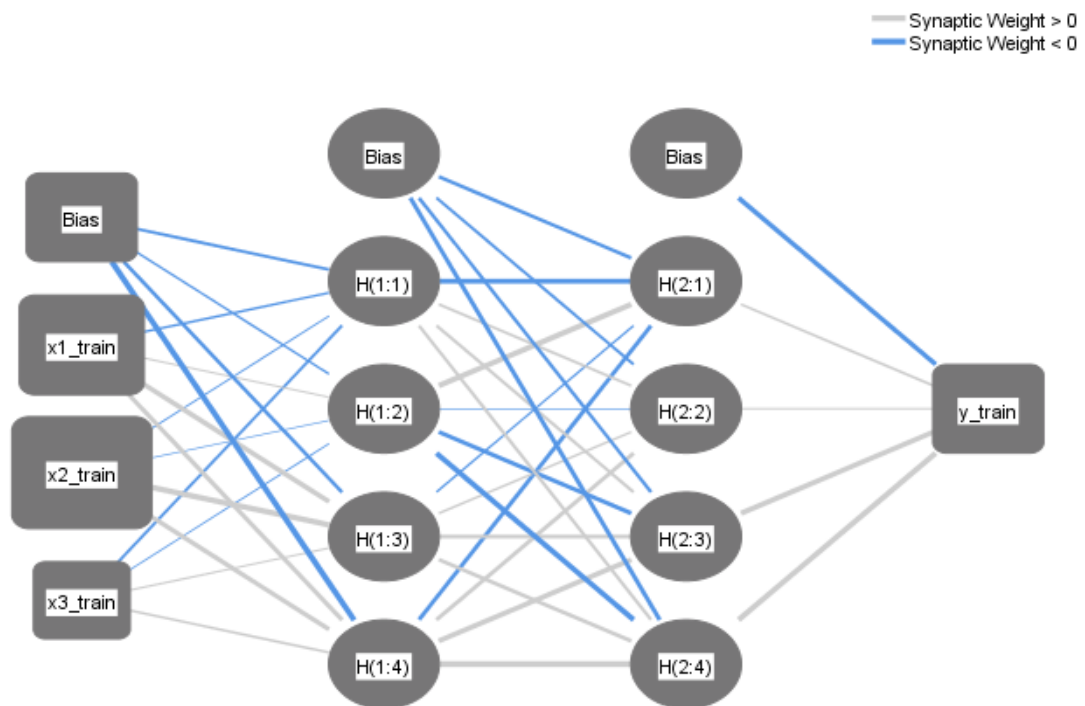
ERRORCHANGE=1.0E-4 ERRORRATIO=0.001

/MISSING USERMISSING=EXCLUDE .

## Multilayer Perceptron

### Case Processing Summary

		N	Percent
Sample	Training	5961	59.6%
	Testing	3018	30.2%
	Holdout	1021	10.2%
Valid		10000	100.0%
Excluded		0	
Total		10000	



Hidden layer activation function: Sigmoid

Output layer activation function: Identity

### Model Summary

Training	Sum of Squares Error	1.391
	Relative Error	.014
	Stopping Rule Used	1 consecutive step(s) with no decrease in error <sup>a</sup>
	Training Time	0:00:00.08
Testing	Sum of Squares Error	.683
	Relative Error	.013
Holdout	Relative Error	.012

Dependent Variable: y\_train

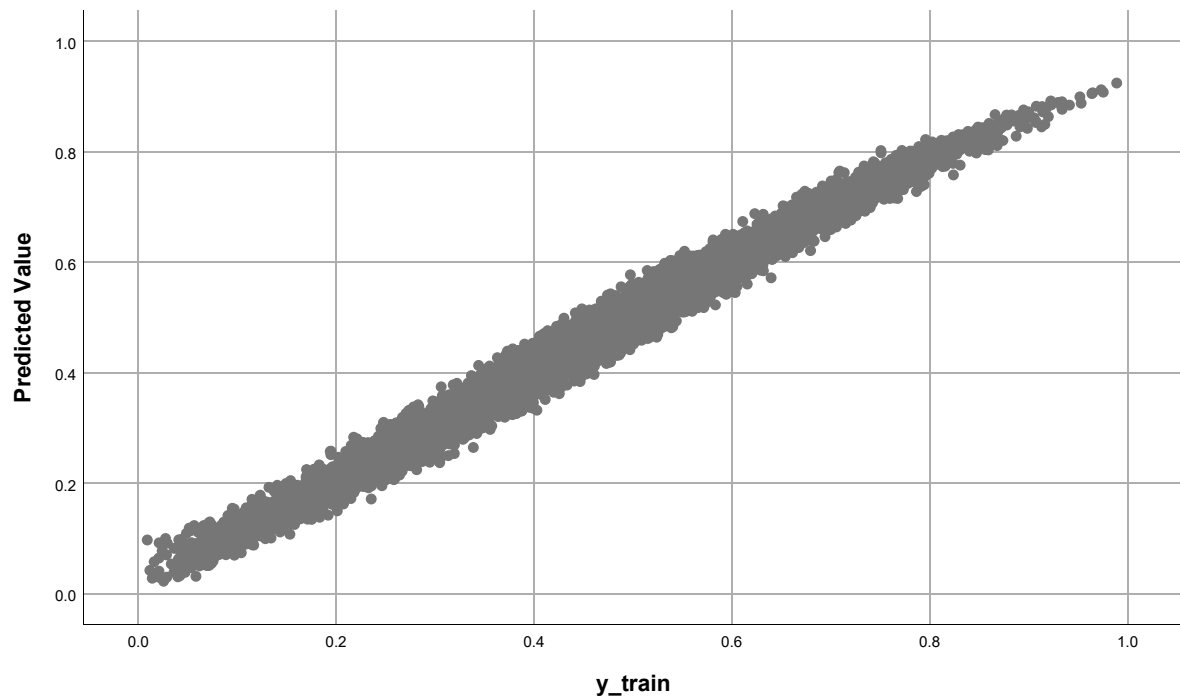
a. Error computations are based on the testing sample.

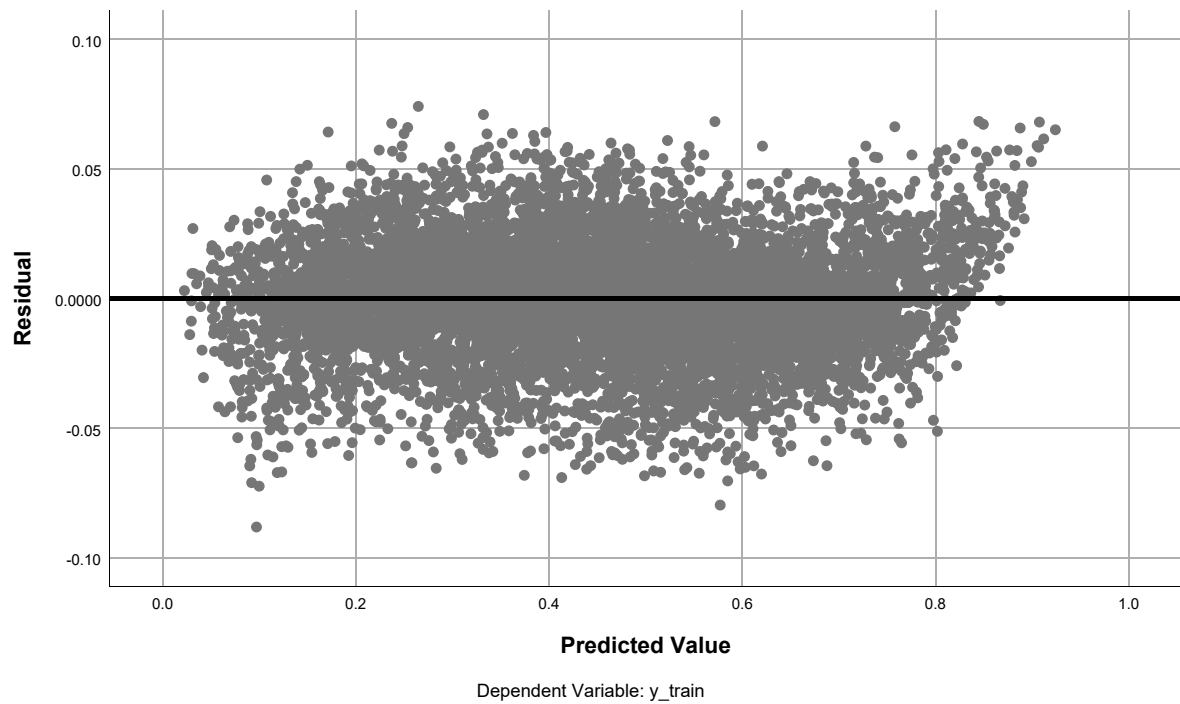
### Parameter Estimates

Predictor		Predicted					
		Hidden Layer 1				Hidden Layer 2	
		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(2:1)	H(2:2)
Input Layer	(Bias)	-.485	-.275	-.550	-1.991		
	x1_train	-.393	.106	1.411	.989		
	x2_train	-.099	-.040	1.817	1.146		
	x3_train	-.449	-.093	.211	.400		
Hidden Layer 1	(Bias)					-.542	-.460
	H(1:1)					-1.390	.446
	H(1:2)					1.626	-.091
	H(1:3)					-.252	.285
	H(1:4)					-.811	.700
Hidden Layer 2	(Bias)						
	H(2:1)						
	H(2:2)						
	H(2:3)						
	H(2:4)						

## Parameter Estimates

Predictor		Predicted		Output Layer y_train
		Hidden Layer 2 H(2:3)	H(2:4)	
Input Layer	(Bias)			
	x1_train			
	x2_train			
	x3_train			
Hidden Layer 1	(Bias)	-.539	-.946	
	H(1:1)	.510	.516	
	H(1:2)	-.845	-1.619	
	H(1:3)	.641	.654	
	H(1:4)	1.452	2.010	
Hidden Layer 2	(Bias)			-1.381
	H(2:1)			.442
	H(2:2)			.182
	H(2:3)			1.525
	H(2:4)			1.793





### Independent Variable Importance

	Importance	Normalized Importance
x1_train	.370	73.9%
x2_train	.501	100.0%
x3_train	.129	25.8%

