Results: Forced Reduced Model

Forced Reduced Model

	Q8	Q17	Q11c	Q20c
H1	Q1	Q1	Q2	Q2
H2	Rev02	Rev02	Rev02	Rev02
H3	Q25	Q25	Q26	Q25, Q26
H4	Q72, Q73	Q73	Q72, Q73	Q62, Q72, Q73
H5	Q61	Q61	Q61	Q61
H6	Q69, Q78	Q78	AllGive02, Q78	AllGive02, Q57
H7	Q39, Q82	Q52, Q57	Q44, Q83	Q83

Original Reduced Model

	Q8	Q17	Q11c	Q20c
H1	Q1	Q1	Q2	Q2
H2	Rev02	--	Rev02	Rev02
H3	--	--	Q26	Q25, Q26
H4	Q72, Q73	Q73	Q72, Q73	Q62, Q72, Q73
H5	Q61	--	Q61	Q61
H6	Q69, Q78	Q78	--	--
H7	--	Q52, Q57	Q44, Q83	--

```
> summary(model.forced.q8)
Residuals:
    Min     1Q Median    3Q   Max
 -33.77 -7.627  0.654 9.002 27.22

Coefficients:
               Value Std. Error  t value Pr(>|t|)
(Intercept) -24.7824  11.7777    -2.1042   0.0407
        XQ1   3.3749   1.5015     2.2478   0.0293
       XQ61   5.0968   2.0937     2.4343   0.0188
     XRev02   0.0003   0.0001     1.8543   0.0700
       XQ69   3.7350   1.8145     2.0584   0.0451
       XQ78   3.6332   2.0231     1.7959   0.0789
       XQ72   1.0927   0.6455     1.6930   0.0971
       XQ73  -3.1028   1.6162    -1.9199   0.0610
       XQ39   1.4031   1.8384     0.7632   0.4491
       XQ82   0.1813   2.2668     0.0800   0.9366
       XQ25   0.7823   1.9658     0.3979   0.6925

Residual standard error: 15.64 on 47 degrees of freedom
Multiple R-Squared: 0.602
F-statistic: 7.11 on 10 and 47 degrees of freedom, the p-value is
1.098e-006
23 observations deleted due to missing values


> summary(model.forced.q17)
Residuals:
    Min     1Q Median   3Q   Max
 -24.24 -9.555 -1.766 5.64 53.36

Coefficients:
               Value Std. Error  t value Pr(>|t|)
(Intercept)   2.5171  10.6664     0.2360   0.8143
        XQ1   2.9255   1.3014     2.2479   0.0284
       XQ78   2.7482   1.8408     1.4930   0.1409
       XQ73  -0.5330   1.3547    -0.3934   0.6954
       XQ52  -4.1350   2.1150    -1.9550   0.0554
       XQ57   2.8529   1.5342     1.8595   0.0680
       XQ61  -0.6976   1.9045    -0.3663   0.7155
     XRev02  -0.0001   0.0001    -0.4575   0.6490
       XQ25  -2.5634   1.8746    -1.3674   0.1768

Residual standard error: 15.47 on 58 degrees of freedom
Multiple R-Squared: 0.269
F-statistic: 2.668 on 8 and 58 degrees of freedom, the p-value is
0.01446
14 observations deleted due to missing values
```

```
> summary(model.forced.q11c)
Residuals:
    Min     1Q Median    3Q   Max
 -108.1 -38.12  -5.16 24.46 228.9

Coefficients:
               Value Std. Error  t value Pr(>|t|)
(Intercept) -65.3891  35.2461    -1.8552   0.0689
        XQ2  29.1401   9.0610     3.2160   0.0022
       XQ61  12.7770   6.8149     1.8749   0.0661
     XRev02   0.0016   0.0005     2.9822   0.0043
       XQ72   5.1122   2.2099     2.3133   0.0245
       XQ73 -16.4089   5.3603    -3.0612   0.0034
       XQ44   9.4673   6.0127     1.5745   0.1211
       XQ83   0.0723  11.6638     0.0062   0.9951
       XQ26  -8.0407   5.7398    -1.4009   0.1669
       XQ78   3.2602   6.8997     0.4725   0.6384
 Xallgive02   0.0000   0.0000    -1.4261   0.1595

Residual standard error: 58.42 on 55 degrees of freedom
Multiple R-Squared: 0.4883
F-statistic: 5.249 on 10 and 55 degrees of freedom, the p-value is
0.00002212
15 observations deleted due to missing values

> summary(model.forced.q20c)
Residuals:
    Min     1Q Median    3Q  Max
 -60.75 -19.64  -2.76 14.71 93.9

Coefficients:
               Value Std. Error  t value Pr(>|t|)
(Intercept)  58.6183  35.4326     1.6544   0.1039
        XQ2  18.6445   5.0419     3.6979   0.0005
       XQ61  -7.3133   3.8883    -1.8808   0.0654
     XRev02   0.0005   0.0003     1.6632   0.1021
       XQ62 -34.1381  13.0582    -2.6143   0.0116
       XQ72   4.4340   1.2476     3.5541   0.0008
       XQ73  -7.3243   2.9212    -2.5073   0.0152
       XQ25  -6.4270   4.1079    -1.5646   0.1235
       XQ26  -5.8799   3.4354    -1.7116   0.0927
 Xallgive02   0.0000   0.0000    -0.9864   0.3283
       XQ57   6.5145   3.2147     2.0264   0.0477
       XQ83  12.8621   6.6881     1.9231   0.0597

Residual standard error: 32.46 on 54 degrees of freedom
Multiple R-Squared: 0.6538
F-statistic: 9.269 on 11 and 54 degrees of freedom, the p-value is
4.793e-009
15 observations deleted due to missing values
```

One sample Kolmogorov-Smirnov Test of Composite Normality

data: model.forced.q8$residuals
ks = 0.0803, p-value = 0.5
mean of x standard deviation of x
2.450147e-016 14.20557

The calculated p-value is 0.433 and so is set to 0.5 . in:

data: model.forced.q17$residuals
ks = 0.1356, p-value = 0.0038
mean of x standard deviation of x
-1.017428e-015 14.50333

data: model.forced.q11c$residuals
ks = 0.1212, p-value = 0.0175
mean of x standard deviation of x
-4.84461e-016 53.7411

data: model.forced.q20c$residuals
ks = 0.1157, p-value = 0.0285
sample estimates:
mean of x standard deviation of x
7.536059e-016 29.59009

Forced Model Correlations

	Q8	Q11c	Q17	Q20c
Q8	1	0.5	0.71	0.51
Q11c	0.5	1	0.29	0.4
Q17	0.71	0.29	1	0.62
Q20c	0.51	0.4	0.62	1

Correlations for Q8

	Q8	Q1	Q61	Rev02	Q69	Q78	Q72	Q73	Q39	Q82	Q25
Q8	1	0.57	0.39	0.44	0.47	0.47	0.43	0.22	0.29	0.3	-0.14
Q1	0.57	1	0.29	0.43	0.32	0.4	0.25	0.37	0.2	0.2	-0.06
Q61	0.39	0.29	1	-0.03	0.08	0.15	0.21	0.18	0.16	0.27	-0.27
Rev02	0.44	0.43	-0.03	1	0.31	0.24	0.27	0.22	0.08	0.23	-0.04
Q69	0.47	0.32	0.08	0.31	1	0.33	0.35	0.39	0.33	0.12	-0.17
Q78	0.47	0.4	0.15	0.24	0.33	1	0.31	0.29	0.19	0.18	-0.3
Q72	0.43	0.25	0.21	0.27	0.35	0.31	1	0.49	0.13	0.4	-0.06
Q73	0.22	0.37	0.18	0.22	0.39	0.29	0.49	1	0.16	0.09	-0.13
Q39	0.29	0.2	0.16	0.08	0.33	0.19	0.13	0.16	1	-0.03	0
Q82	0.3	0.2	0.27	0.23	0.12	0.18	0.4	0.09	-0.03	1	-0.17
Q25	-0.14	-0.06	-0.27	-0.04	-0.17	-0.3	-0.06	-0.13	0	-0.17	1

Correlations for Q17

	Q17	Q1	Q78	Q73	Q52	Q57	Q61	Rev02	Q25
Q17	1	0.32	0.32	0.11	-0.04	0.28	0.07	0.12	-0.26
Q1	0.32	1	0.38	0.34	0.31	0.23	0.22	0.43	-0.01
Q78	0.32	0.38	1	0.3	0.2	0.19	0.16	0.27	-0.3
Q73	0.11	0.34	0.3	1	0.1	0.07	0.18	0.26	-0.13
Q52	-0.04	0.31	0.2	0.1	1	0.37	0.32	0.2	-0.1
Q57	0.28	0.23	0.19	0.07	0.37	1	0.23	0.17	-0.29
Q61	0.07	0.22	0.16	0.18	0.32	0.23	1	-0.01	-0.29
Rev02	0.12	0.43	0.27	0.26	0.2	0.17	-0.01	1	-0.05
Q25	-0.26	-0.01	-0.3	-0.13	-0.1	-0.29	-0.29	-0.05	1

Correlations for Q11c

	Q11c	Q2	Q61	Rev02	Q72	Q73	Q44	Q83	Q26	Q78	allgive02
Q11c	1	0.48	0.23	0.39	0.22	-0.08	0.31	0.2	-0.02	0.27	0.25
Q2	0.48	1	0.12	0.35	0.08	0.15	0.34	0.36	0.25	0.32	0.25
Q61	0.23	0.12	1	0	0.15	0.18	0.26	0.22	0.04	0.17	0.21
Rev02	0.39	0.35	0	1	0.21	0.26	0.11	0.18	0	0.26	0.45
Q72	0.22	0.08	0.15	0.21	1	0.38	0.14	0.27	0.03	0.24	0.81
Q73	-0.08	0.15	0.18	0.26	0.38	1	0.23	0.27	0.05	0.3	0.44
Q44	0.31	0.34	0.26	0.11	0.14	0.23	1	0.21	0.11	0.35	0.21
Q83	0.2	0.36	0.22	0.18	0.27	0.27	0.21	1	-0.07	0.21	0.41
Q26	-0.02	0.25	0.04	0	0.03	0.05	0.11	-0.07	1	0.12	0.01
Q78	0.27	0.32	0.17	0.26	0.24	0.3	0.35	0.21	0.12	1	0.27
allgive02	0.25	0.25	0.21	0.45	0.81	0.44	0.21	0.41	0.01	0.27	1

Correlations for Q20c

	Q20c	Q2	Q61	Rev02	Q62	Q72	Q73	Q25	Q26	allgive02	Q57	Q83
Q20c	1	0.47	0.03	0.4	-0.46	0.48	0.1	-0.16	0.04	0.5	0.29	0.46
Q2	0.47	1	0.12	0.35	-0.22	0.08	0.15	0.08	0.25	0.25	0.17	0.36
Q61	0.03	0.12	1	0	-0.12	0.15	0.18	-0.3	0.04	0.21	0.23	0.22
Rev02	0.4	0.35	0	1	-0.24	0.21	0.26	-0.04	0	0.45	0.19	0.18
Q62	-0.46	-0.22	-0.12	-0.24	1	-0.27	-0.21	0.15	-0.21	-0.32	-0.2	-0.29
Q72	0.48	0.08	0.15	0.21	-0.27	1	0.38	-0.1	0.03	0.81	0.02	0.27
Q73	0.1	0.15	0.18	0.26	-0.21	0.38	1	-0.13	0.05	0.44	0.07	0.27
Q25	-0.16	0.08	-0.3	-0.04	0.15	-0.1	-0.13	1	-0.18	-0.22	-0.3	-0.19
Q26	0.04	0.25	0.04	0	-0.21	0.03	0.05	-0.18	1	0.01	0.25	-0.07
allgive02	0.5	0.25	0.21	0.45	-0.32	0.81	0.44	-0.22	0.01	1	0.08	0.41
Q57	0.29	0.17	0.23	0.19	-0.2	0.02	0.07	-0.3	0.25	0.08	1	0.14
Q83	0.46	0.36	0.22	0.18	-0.29	0.27	0.27	-0.19	-0.07	0.41	0.14	1

```
> summary(model.reduced.q8)
Residuals:
    Min     1Q  Median    3Q   Max
 -33.62 -8.091 -0.7065 8.312 28.87

Coefficients:
               Value Std. Error  t value Pr(>|t|)
(Intercept) -19.2198   8.7028    -2.2085   0.0318
        XQ1   3.5566   1.4424     2.4657   0.0172
       XQ61   5.0573   1.9052     2.6544   0.0106
     XRev02   0.0003   0.0001     1.8769   0.0664
       XQ69   4.0288   1.6930     2.3798   0.0212
       XQ78   3.4951   1.8895     1.8498   0.0703
       XQ72   1.1293   0.5835     1.9356   0.0586
       XQ73  -3.1654   1.5508    -2.0412   0.0465

Residual standard error: 15.3 on 50 degrees of freedom
Multiple R-Squared: 0.5951
F-statistic: 10.5 on 7 and 50 degrees of freedom, the p-value is 4.953e-
008

23 observations deleted due to missing values


summary(model.reduced.q17)
Residuals:
    Min     1Q Median    3Q   Max
 -23.49 -9.778 -3.565 5.124 56.22

Coefficients:
              Value Std. Error t value Pr(>|t|)
(Intercept) -5.2422  6.9314    -0.7563  0.4520
        XQ1  2.0418  1.1020     1.8528  0.0681
       XQ78  3.1712  1.5296     2.0733  0.0418
       XQ73 -0.5545  1.1611    -0.4776  0.6344
       XQ52 -2.0330  1.7666    -1.1508  0.2537
       XQ57  1.9668  1.2781     1.5388  0.1283

Residual standard error: 15.43 on 71 degrees of freedom
Multiple R-Squared: 0.1867
F-statistic: 3.261 on 5 and 71 degrees of freedom, the p-value is
0.01045
4 observations deleted due to missing values
```

```
> summary(model.reduced.q11c)
Residuals:
    Min     1Q Median    3Q   Max
 -100.1 -40.81 -8.254 23.55 217.4

Coefficients:
               Value Std. Error  t value Pr(>|t|)
(Intercept) -42.7529  29.0047    -1.4740   0.1460
        XQ2  28.6258   8.9536     3.1971   0.0023
       XQ61  11.8148   6.7793     1.7428   0.0868
     XRev02   0.0013   0.0005     2.7106   0.0089
       XQ72   2.6921   1.3275     2.0280   0.0472
       XQ73 -16.8358   5.2928    -3.1809   0.0024
       XQ44   9.8264   5.8789     1.6715   0.1001
       XQ83  -3.5366  11.4193    -0.3097   0.7579
       XQ26  -7.5047   5.7471    -1.3058   0.1969

Residual standard error: 58.63 on 57 degrees of freedom
Multiple R-Squared: 0.466
F-statistic: 6.217 on 8 and 57 degrees of freedom,
p-value is 9.251e-006
15 observations deleted due to missing values

> summary(model.reduced.q20c)
ction = na.exclude)
Residuals:
    Min     1Q Median    3Q   Max
 -55.34 -20.14  -7.01 15.72 106.7

Coefficients:
               Value Std. Error  t value Pr(>|t|)
(Intercept)  95.3397  34.6945     2.7480   0.0080
        XQ2  21.7173   4.8415     4.4857   0.0000
       XQ61  -5.8297   4.0215    -1.4496   0.1526
     XRev02   0.0004   0.0003     1.5301   0.1315
       XQ62 -40.4847  13.4572    -3.0084   0.0039
       XQ72   3.5257   0.7728     4.5625   0.0000
       XQ73  -7.1483   3.0311    -2.3583   0.0218
       XQ25  -8.6599   3.9898    -2.1705   0.0341
       XQ26  -5.9228   3.4053    -1.7393   0.0874

Residual standard error: 34.13 on 57 degrees of freedom
Multiple R-Squared: 0.5962
F-statistic: 10.52 on 8 and 57 degrees of freedom, the p-value is
6.423e-00
9
15 observations deleted due to missing values
```

I think the decision should be to always include Q2 (H1), REV02 (H2), Q25, Q26 (H3).

Then, with the approximately 20 other variables, just use whatever combination maximizes the model fit (or at least gives a good enough fit), with the constraint of choosing at least one variable (even if it turns out to be statistically NS) for each of the H4, H5, and H6.

But if you don't like this, we'll give you something set for each of H4 through H6.