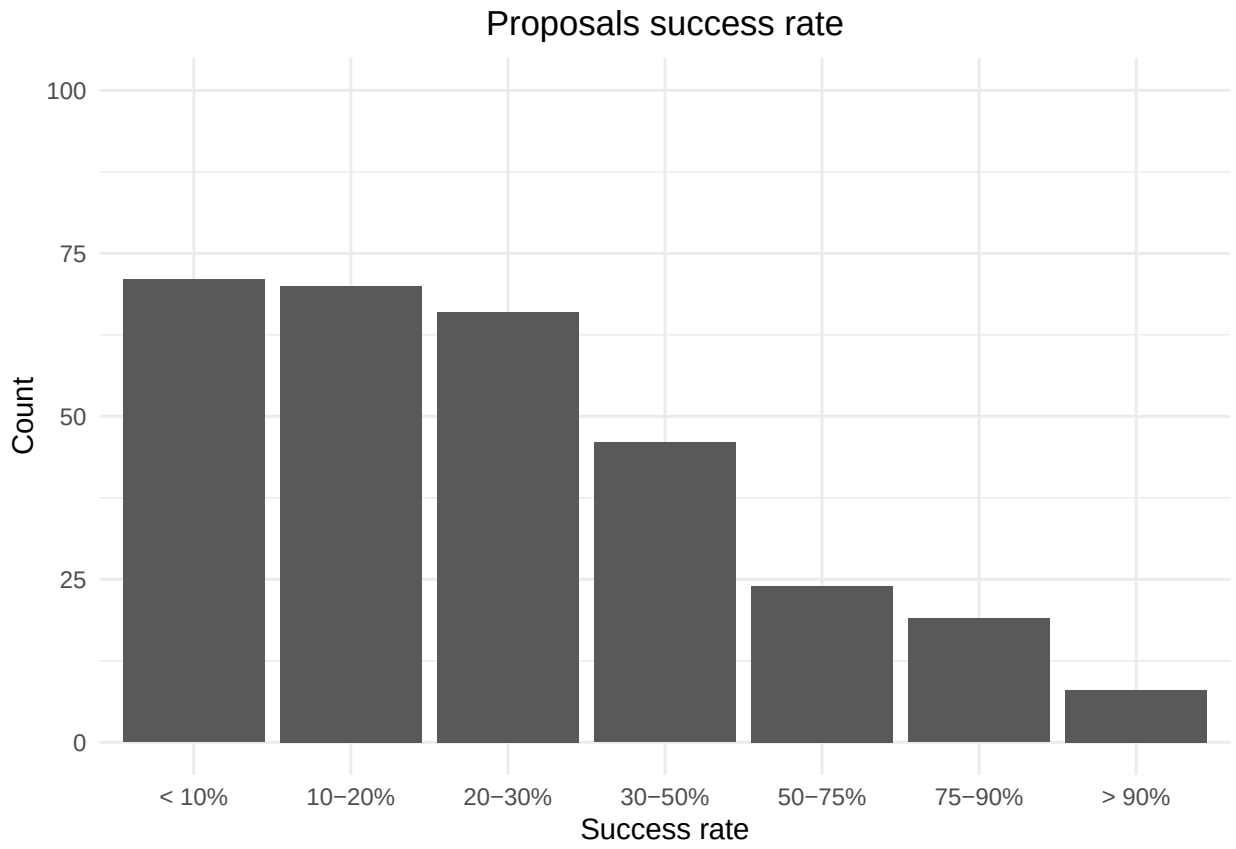
Ordinal Logistic Regression or Proportional Odds Logistic Regression


Proposals success rate
100
75
50
25
0
Count
< 10%
10−20%
20−30%
30−50%
50−75%
75−90%
> 90%
Success rate

Model with NP1 as reference

```
## Call:
## polr(formula = SR ~ H + NP + AGR + TA + RS + DWH + DS, data = lm_DF,
##     Hess = TRUE)
##
## Coefficients:
##        Value Std. Error t value
## H     0.0370    0.01185   3.124
## NP2  -1.3314    0.25144  -5.295
## NP3  -1.6943    0.28786  -5.886
## AGR   0.1101    0.06459   1.705
## TA   -0.0170    0.01074  -1.583
## RS2  -0.4857    0.21436  -2.266
## DWH2  4.8207    1.88231   2.561
## DWH3  2.6305    1.19983   2.192
## DWH4  1.6510    1.15632   1.428
## DWH5  1.4132    1.14669   1.232
## DS2  -0.6260    0.47010  -1.332
## DS3  -0.6284    0.44801  -1.403
##
## Intercepts:
##     Value   Std. Error t value
## 1|2 -1.4028  1.4044    -0.9989
## 2|3 -0.1768  1.4052    -0.1258
## 3|4  0.9738  1.4051     0.6930
## 4|5  1.9889  1.4072     1.4134
## 5|6  2.8123  1.4146     1.9880
## 6|7  4.2515  1.4495     2.9331
##
## Residual Deviance: 984.2559
## AIC: 1020.256
```

```
##             Value Std. Error    t value p value
## H     0.03700290 0.01184505  3.1239125  0.0018
## NP2  -1.33139630 0.25143920 -5.2951023  0.0000
## NP3  -1.69429392 0.28785682 -5.8858912  0.0000
## AGR   0.11012117 0.06458958  1.7049370  0.0882
## TA   -0.01699677 0.01073785 -1.5828841  0.1134
## RS2  -0.48571633 0.21436344 -2.2658543  0.0235
## DWH2  4.82068222 1.88231321  2.5610415  0.0104
## DWH3  2.63045737 1.19983257  2.1923537  0.0284
## DWH4  1.65103523 1.15631684  1.4278398  0.1533
## DWH5  1.41317303 1.14668650  1.2323970  0.2178
## DS2  -0.62601715 0.47010267 -1.3316605  0.1830
## DS3  -0.62838511 0.44801427 -1.4026007  0.1607
## 1|2  -1.40282962 1.40435456 -0.9989141  0.3178
## 2|3  -0.17682237 1.40521194 -0.1258332  0.8999
## 3|4   0.97377154 1.40509433  0.6930293  0.4883
## 4|5   1.98885379 1.40718200  1.4133593  0.1576
## 5|6   2.81226760 1.41464118  1.9879724  0.0468
## 6|7   4.25146569 1.44947011  2.9331172  0.0034
```

Model with NP3 as reference

```
## Call:
## polr(formula = SR ~ H + NP + AGR + TA + RS + DWH + DS, data = lm_DF,
##     Hess = TRUE)
##
## Coefficients:
##         Value Std. Error t value
## H     0.03700    0.01184   3.124
## NP1   1.69427    0.28786   5.886
## NP2   0.36286    0.27617   1.314
## AGR   0.11014    0.06459   1.705
## TA   -0.01699    0.01074  -1.583
## RS2  -0.48570    0.21436  -2.266
## DWH2  4.82057    1.88232   2.561
## DWH3  2.63052    1.19983   2.192
## DWH4  1.65111    1.15632   1.428
## DWH5  1.41325    1.14669   1.232
## DS2  -0.62606    0.47010  -1.332
## DS3  -0.62845    0.44802  -1.403
##
## Intercepts:
##     Value   Std. Error t value
## 1|2  0.2917  1.4129     0.2064
## 2|3  1.5177  1.4177     1.0705
## 3|4  2.6683  1.4229     1.8753
## 4|5  3.6834  1.4280     2.5794
## 5|6  4.5069  1.4369     3.1365
## 6|7  5.9460  1.4732     4.0362
##
## Residual Deviance: 984.2559
## AIC: 1020.256
```

```
##            Value Std. Error    t value p value
## H     0.03699827 0.01184399  3.1238000  0.0018
## NP1   1.69427029 0.28785721  5.8858010  0.0000
## NP2   0.36285962 0.27616573  1.3139198  0.1889
## AGR   0.11014315 0.06458979  1.7052718  0.0881
## TA   -0.01699449 0.01073786 -1.5826697  0.1135
## RS2  -0.48569735 0.21436377 -2.2657623  0.0235
## DWH2  4.82057351 1.88231554  2.5609806  0.0104
## DWH3  2.63052296 1.19983277  2.1924080  0.0284
## DWH4  1.65111063 1.15631684  1.4279050  0.1533
## DWH5  1.41325206 1.14668655  1.2324659  0.2178
## DS2  -0.62606016 0.47010479 -1.3317460  0.1829
## DS3  -0.62845008 0.44801652 -1.4027386  0.1607
## 1|2   0.29169320 1.41291739  0.2064475  0.8364
## 2|3   1.51770160 1.41773135  1.0705142  0.2844
## 3|4   2.66832141 1.42290033  1.8752694  0.0608
## 4|5   3.68340418 1.42802071  2.5793773  0.0099
## 5|6   4.50685180 1.43689028  3.1365316  0.0017
## 6|7   5.94600365 1.47315496  4.0362377  0.0001
```

Model with all variables NP1, DWH5 and DS1 as reference

```
## Call:
## polr(formula = SR ~ H + NP + AGR + TA + RS + DWH + DS, data = lm_DF,
##     Hess = TRUE)
##
## Coefficients:
##        Value Std. Error t value
## H     0.0370    0.01184  3.1238
## NP3  -1.6942    0.28786 -5.8857
## NP2  -1.3314    0.25144 -5.2951
## AGR   0.1101    0.06459  1.7052
## TA   -0.0170    0.01074 -1.5828
## RS2  -0.4857    0.21436 -2.2657
## DWH1 -1.4132    1.14668 -1.2324
## DWH2  3.4074    1.49817  2.2743
## DWH3  1.2173    0.40037  3.0403
## DWH4  0.2379    0.24618  0.9662
## DS2  -0.6260    0.47010 -1.3316
## DS3  -0.6284    0.44802 -1.4026
##
## Intercepts:
##     Value   Std. Error t value
## 1|2 -2.8158  0.8884    -3.1694
## 2|3 -1.5898  0.8795    -1.8077
## 3|4 -0.4392  0.8728    -0.5032
## 4|5  0.5759  0.8747     0.6584
## 5|6  1.3993  0.8859     1.5796
## 6|7  2.8385  0.9390     3.0227
##
## Residual Deviance: 984.2559
## AIC: 1020.256
```

```
##             Value Std. Error    t value p value
## H     0.03699993 0.01184439  3.1238351  0.0018
## NP3  -1.69424701 0.28785670 -5.8857306  0.0000
## NP2  -1.33139794 0.25143962 -5.2950999  0.0000
## AGR   0.11014086 0.06458972  1.7052383  0.0881
## TA   -0.01699558 0.01073786 -1.5827714  0.1135
## RS2  -0.48567895 0.21436355 -2.2656788  0.0235
## DWH1 -1.41318207 1.14667902 -1.2324129  0.2178
## DWH2  3.40736318 1.49817298  2.2743456  0.0229
## DWH3  1.21725105 0.40037476  3.0402792  0.0024
## DWH4  0.23787324 0.24618190  0.9662499  0.3339
## DS2  -0.62601403 0.47010445 -1.3316488  0.1830
## DS3  -0.62839251 0.44801615 -1.4026113  0.1607
## 1|2  -2.81581072 0.88843211 -3.1694158  0.0015
## 2|3  -1.58980661 0.87947303 -1.8076809  0.0707
## 3|4  -0.43919196 0.87281457 -0.5031904  0.6148
## 4|5   0.57590005 0.87473835  0.6583684  0.5103
## 5|6   1.39933755 0.88589409  1.5795766  0.1142
## 6|7   2.83845860 0.93904156  3.0227188  0.0025
```

Model with all variables, NP3, DWH1 and DS1 as reference

```
## Call:
## polr(formula = SR ~ H + NP + AGR + TA + RS + DWH + DS, data = lm_DF,
##     Hess = TRUE)
##
## Coefficients:
##         Value Std. Error t value
## H     0.03700    0.01184   3.124
## NP1   1.69427    0.28786   5.886
## NP2   0.36286    0.27617   1.314
## AGR   0.11014    0.06459   1.705
## TA   -0.01699    0.01074  -1.583
## RS2  -0.48570    0.21436  -2.266
## DWH5  1.41325    1.14669   1.232
## DWH2  4.82057    1.88232   2.561
## DWH3  2.63052    1.19983   2.192
## DWH4  1.65111    1.15632   1.428
## DS2  -0.62606    0.47010  -1.332
## DS3  -0.62845    0.44802  -1.403
##
## Intercepts:
##     Value   Std. Error t value
## 1|2  0.2917  1.4129     0.2064
## 2|3  1.5177  1.4177     1.0705
## 3|4  2.6683  1.4229     1.8753
## 4|5  3.6834  1.4280     2.5794
## 5|6  4.5069  1.4369     3.1365
## 6|7  5.9460  1.4732     4.0362
##
## Residual Deviance: 984.2559
## AIC: 1020.256
```

```
##            Value Std. Error    t value p value
## H     0.03699827 0.01184399  3.1238000  0.0018
## NP1   1.69427029 0.28785721  5.8858010  0.0000
## NP2   0.36285962 0.27616573  1.3139198  0.1889
## AGR   0.11014315 0.06458979  1.7052718  0.0881
## TA   -0.01699449 0.01073786 -1.5826697  0.1135
## RS2  -0.48569735 0.21436377 -2.2657623  0.0235
## DWH5  1.41325206 1.14668655  1.2324659  0.2178
## DWH2  4.82057351 1.88231554  2.5609806  0.0104
## DWH3  2.63052296 1.19983277  2.1924080  0.0284
## DWH4  1.65111063 1.15631684  1.4279050  0.1533
## DS2  -0.62606016 0.47010479 -1.3317460  0.1829
## DS3  -0.62845008 0.44801652 -1.4027386  0.1607
## 1|2   0.29169320 1.41291739  0.2064475  0.8364
## 2|3   1.51770160 1.41773135  1.0705142  0.2844
## 3|4   2.66832141 1.42290033  1.8752694  0.0608
## 4|5   3.68340418 1.42802071  2.5793773  0.0099
## 5|6   4.50685180 1.43689028  3.1365316  0.0017
## 6|7   5.94600365 1.47315496  4.0362377  0.0001
```