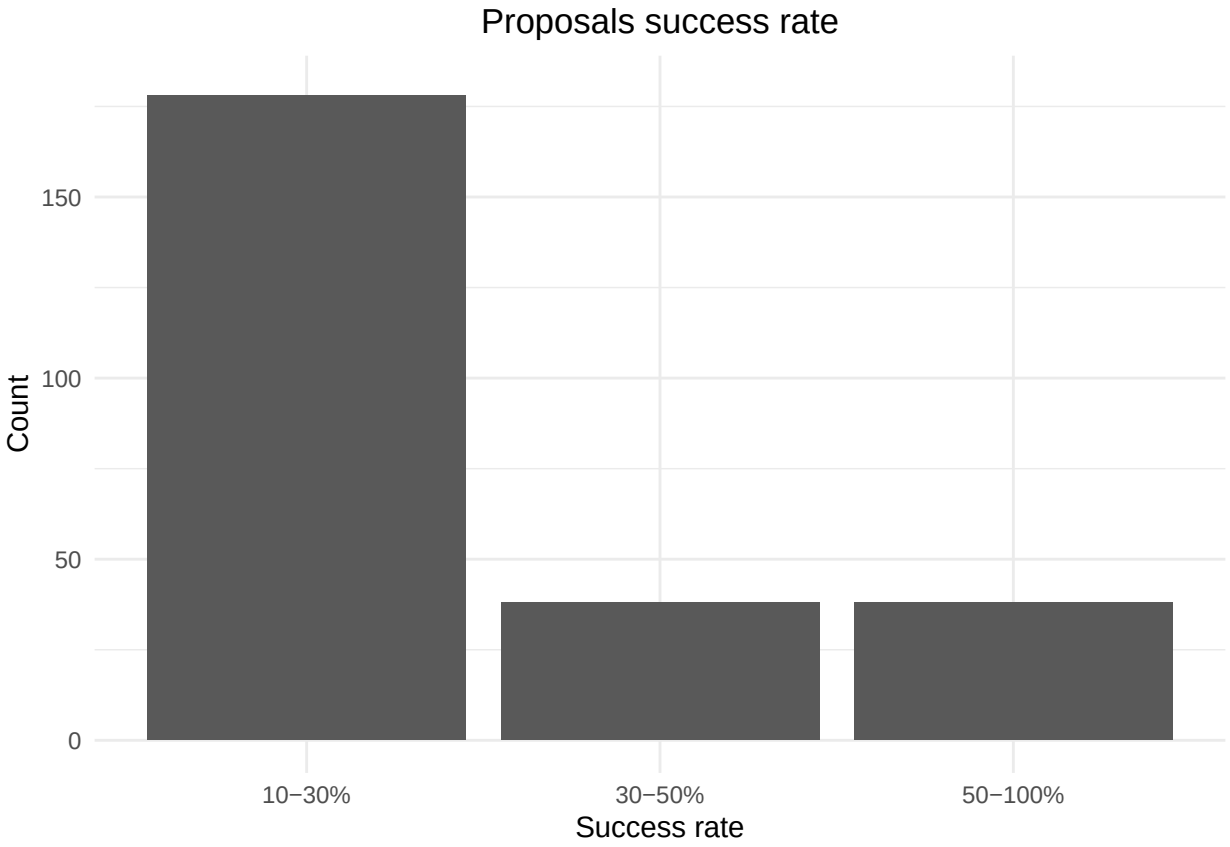
Ordinal Logistic Regression or Proportional Odds Logistic Regression


Proposals success rate
Count
150
100
50
0
10−30%
30−50%
50−100%
Success rate

Model with NP1 as reference

```
## Call:
## polr(formula = SR ~ H + NP + RS + AGR + TA + DWH + DS, data = lm_DF,
##     Hess = TRUE)
##
## Coefficients:
##          Value Std. Error    t value
## H     0.260163  1.522e-01  1.709e+00
## NP2  -1.099619  3.302e-01 -3.331e+00
## NP3  -1.860351  4.786e-01 -3.887e+00
## RS2  -0.620896  3.034e-01 -2.047e+00
## AGR   0.158689  9.273e-02  1.711e+00
## TA   -0.004805  1.556e-02 -3.089e-01
## DWH2 17.150086  9.082e-06  1.888e+06
## DWH3  1.220247  1.332e+00  9.164e-01
## DWH4  0.879362  1.289e+00  6.822e-01
## DWH5  0.379691  1.278e+00  2.970e-01
## DS2  -0.967778  5.839e-01 -1.657e+00
## DS3  -1.290300  5.567e-01 -2.318e+00
##
## Intercepts:
##     Value        Std. Error   t value
## 1|2       1.1272       1.7230       0.6542
## 2|3       2.2514       1.7292       1.3020
##
## Residual Deviance: 350.4739
## AIC: 378.4739
```

```
##             Value   Std. Error       t value p value
## H     0.260163217 1.521908e-01  1.709455e+00  0.0874
## NP2  -1.099619240 3.301537e-01 -3.330629e+00  0.0009
## NP3  -1.860350563 4.786200e-01 -3.886905e+00  0.0001
## RS2  -0.620896258 3.033589e-01 -2.046739e+00  0.0407
## AGR   0.158688938 9.273275e-02  1.711250e+00  0.0870
## TA   -0.004804919 1.555661e-02 -3.088667e-01  0.7574
## DWH2 17.150086422 9.082146e-06  1.888330e+06  0.0000
## DWH3  1.220247055 1.331506e+00  9.164415e-01  0.3594
## DWH4  0.879361551 1.289074e+00  6.821655e-01  0.4951
## DWH5  0.379691062 1.278363e+00  2.970134e-01  0.7665
## DS2  -0.967777607 5.839107e-01 -1.657407e+00  0.0974
## DS3  -1.290299830 5.567346e-01 -2.317621e+00  0.0205
## 1|2   1.127174864 1.723025e+00  6.541836e-01  0.5130
## 2|3   2.251375558 1.729157e+00  1.302008e+00  0.1929
```

Model with NP3 as reference

```
## Call:
## polr(formula = SR ~ H + NP + RS + AGR + TA + DWH + DS, data = lm_DF,
##     Hess = TRUE)
##
## Coefficients:
##          Value Std. Error    t value
## H     0.260178  1.522e-01  1.710e+00
## NP1   1.860320  4.786e-01  3.887e+00
## NP2   0.760716  4.938e-01  1.541e+00
## RS2  -0.620899  3.034e-01 -2.047e+00
## AGR   0.158698  9.273e-02  1.711e+00
## TA   -0.004804  1.556e-02 -3.088e-01
## DWH2 17.150085  9.167e-06  1.871e+06
## DWH3  1.220101  1.331e+00  9.164e-01
## DWH4  0.879191  1.289e+00  6.821e-01
## DWH5  0.379519  1.278e+00  2.969e-01
## DS2  -0.967761  5.839e-01 -1.657e+00
## DS3  -1.290287  5.567e-01 -2.318e+00
##
## Intercepts:
##     Value        Std. Error   t value
## 1|2       2.9875       1.7629       1.6946
## 2|3       4.1117       1.7739       2.3180
##
## Residual Deviance: 350.4739
## AIC: 378.4739
```

```
##             Value   Std. Error       t value p value
## H     0.260177685 1.521951e-01  1.709501e+00  0.0874
## NP1   1.860319950 4.786184e-01  3.886854e+00  0.0001
## NP2   0.760716468 4.937792e-01  1.540600e+00  0.1234
## RS2  -0.620899387 3.033589e-01 -2.046748e+00  0.0407
## AGR   0.158697854 9.273301e-02  1.711341e+00  0.0870
## TA   -0.004803576 1.555662e-02 -3.087802e-01  0.7575
## DWH2 17.150085326 9.167122e-06  1.870825e+06  0.0000
## DWH3  1.220100992 1.331469e+00  9.163573e-01  0.3595
## DWH4  0.879190542 1.289034e+00  6.820539e-01  0.4952
## DWH5  0.379519166 1.278323e+00  2.968883e-01  0.7666
## DS2  -0.967760528 5.839109e-01 -1.657377e+00  0.0974
## DS3  -1.290286904 5.567348e-01 -2.317597e+00  0.0205
## 1|2   2.987517683 1.762948e+00  1.694615e+00  0.0901
## 2|3   4.111730045 1.773857e+00  2.317960e+00  0.0205
```

Model with all variables NP1, DWH5 and DS1 as reference

```
## Call:
## polr(formula = SR ~ H + AGR + NP + DWH + DS, data = lm_DF, Hess = TRUE)
##
## Coefficients:
##        Value Std. Error    t value
## H     0.3013  1.539e-01  1.957e+00
## AGR   0.1594  9.078e-02  1.756e+00
## NP3  -1.7753  4.708e-01 -3.771e+00
## NP2  -1.0634  3.274e-01 -3.248e+00
## DWH1 -0.3835  1.230e+00 -3.119e-01
## DWH2 16.3081  2.548e-07  6.400e+07
## DWH3  0.8764  5.178e-01  1.692e+00
## DWH4  0.4887  3.525e-01  1.386e+00
## DS2  -0.9257  5.746e-01 -1.611e+00
## DS3  -1.3050  5.505e-01 -2.370e+00
##
## Intercepts:
##     Value         Std. Error    t value
## 1|2        1.4729        0.9972        1.4770
## 2|3        2.5755        1.0088        2.5531
##
## Residual Deviance: 354.8303
## AIC: 378.8303
```

```
##           Value   Std. Error       t value p value
## H     0.3013098 1.539331e-01  1.957407e+00  0.0503
## AGR   0.1594192 9.077640e-02  1.756174e+00  0.0791
## NP3  -1.7752742 4.707763e-01 -3.770951e+00  0.0002
## NP2  -1.0633624 3.273782e-01 -3.248116e+00  0.0012
## DWH1 -0.3835385 1.229646e+00 -3.119096e-01  0.7551
## DWH2 16.3081446 2.548254e-07  6.399732e+07  0.0000
## DWH3  0.8763704 5.178451e-01  1.692341e+00  0.0906
## DWH4  0.4887109 3.525219e-01  1.386328e+00  0.1656
## DS2  -0.9257109 5.746044e-01 -1.611040e+00  0.1072
## DS3  -1.3049554 5.505178e-01 -2.370415e+00  0.0178
## 1|2   1.4728956 9.972273e-01  1.476991e+00  0.1397
## 2|3   2.5754897 1.008766e+00  2.553110e+00  0.0107
```

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

```
## Call:
## polr(formula = SR ~ H + AGR + NP + DWH + DS, data = lm_DF, Hess = TRUE)
##
## Coefficients:
##        Value Std. Error    t value
## H     0.3013  1.539e-01  1.957e+00
## AGR   0.1594  9.078e-02  1.756e+00
## NP1   1.7753  4.708e-01  3.771e+00
## NP2   0.7119  4.879e-01  1.459e+00
## DWH5  0.3836  1.230e+00  3.120e-01
## DWH2 16.8222  8.406e-06  2.001e+06
## DWH3  1.2600  1.288e+00  9.783e-01
## DWH4  0.8723  1.240e+00  7.033e-01
## DS2  -0.9257  5.746e-01 -1.611e+00
## DS3  -1.3050  5.505e-01 -2.370e+00
##
## Intercepts:
##     Value        Std. Error   t value
## 1|2       3.6317       1.5106       2.4042
## 2|3       4.7343       1.5257       3.1031
##
## Residual Deviance: 354.8303
## AIC: 378.8303
```

```
##           Value   Std. Error       t value p value
## H     0.3013086 1.539328e-01  1.957403e+00  0.0503
## AGR   0.1594178 9.077636e-02  1.756160e+00  0.0791
## NP1   1.7752781 4.707762e-01  3.770960e+00  0.0002
## NP2   0.7119130 4.878627e-01  1.459249e+00  0.1445
## DWH5  0.3836065 1.229661e+00  3.119611e-01  0.7551
## DWH2 16.8221986 8.406042e-06  2.001203e+06  0.0000
## DWH3  1.2599675 1.287860e+00  9.783417e-01  0.3279
## DWH4  0.8723123 1.240343e+00  7.032834e-01  0.4819
## DS2  -0.9257205 5.746043e-01 -1.611057e+00  0.1072
## DS3  -1.3049688 5.505178e-01 -2.370439e+00  0.0178
## 1|2   3.6317486 1.510597e+00  2.404181e+00  0.0162
## 2|3   4.7343437 1.525660e+00  3.103145e+00  0.0019
```