The Measurement Properties of Electoral Contestation

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Introduction

We begin with a descriptive question: What types of actions do Americans deem acceptable when someone disagrees with the results of an election? Here we focus on levels of support for various actions such as protesting, criticizing election integrity, burning the American flag, ballot recounts, or challenging the outcome in the courts. Moreover, we are interested in understanding the underlying structure of contestation preferences. Is a construct like contestation multidimensional?

On one hand, we might expect that contestation behaviors reside on a single underlying dimension, anchored by a preference for contestation behaviors on one pole, and an opposition to these behaviors at the other pole. However, there are several reasons to expect more nuance, due primarily to different norms surrounding such behaviors. For instance, while recounting ballots and supporting legal means to contest an election are common and generally perceived-to-be acceptable behaviors, attending a march or burning the flag are seen as more active and potentially transgressive behaviors. Contestation behaviors may be effectively disaggregated into forms that pose a relatively high cost for individual citizens (i.e, require action) versus forms of contestation that are passive and impose a low cost for citizens. They can also be viewed as a continuum of behaviors that range from less to more normatively acceptable.

Measuring Support for Contestation Behaviors

We measure support for behaviors aimed at contesting election results with a question battery that captures some of the most prominent ways election results are contested. Respondents were asked,

"Many people are unhappy with the outcomes of elections. How much do you support or oppose each of the following behaviors when people are unhappy with the outcome of an election?"

- Attend a march or demonstration [, even if it might turn chaotic or dangerous]
- Publicly criticize the integrity or fairness of the election [on social media]
- Burn the American flag
- Support ballot recounts
- Contest the outcome in the courts

Respondents were asked to rate their support for each behavior on a 5-point scale, ranging from 1 (strongly support) to 5 (strongly oppose).

Recoding and Scaling

We rely on six data sets in this project. The **Western States Survey** conducted in both 2020 and 2024. The **Arizona Voter Project** election surveys, conducted in 2023 and 2024. And the 2022 Congressional

Election Study BYU module and the 2022 Congressional Election Study ASU module.

The electoralContestation package includes a number of helper functions to clean and recode these data. Downloading the package comes with the data electoral_contestation. Absent the CES modules, there are 9,403 observations.

```
rm(list = ls())
\#devtools::install\_github("crweber9874/electoralContestation")
library(electoralContestation)
library(dplyr)
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##
       filter, lag
## The following objects are masked from 'package:base':
##
##
       intersect, setdiff, setequal, union
library(lavaan)
## This is lavaan 0.6-19
## lavaan is FREE software! Please report any bugs.
electoral contestation <- electoral contestation %>%
  filter(survey %in% c("wss20", "wss24", "avpw1", "avpw2"))
head(electoral contestation)
## # A tibble: 6 x 29
##
     black white asian american_indian latino
                                                  age married college faminc state
     <dbl> <dbl> <dbl>
                                  <dbl>
                                          <dbl> <dbl>
                                                         <dbl>
                                                                 <dbl>
                                                                        <dbl> <chr>
##
## 1
         0
               1
                                       0
                                              0
                                                   61
                                                                     1
                                                                             0 4
                      0
                                                             1
## 2
         0
               1
                      0
                                       0
                                                   41
                                                             1
                                                                     1
                                                                             1 4
               0
                                                                             0 4
## 3
         0
                      0
                                       1
                                              0
                                                   25
                                                             0
                                                                     1
## 4
         0
               1
                      0
                                       0
                                              0
                                                   76
                                                             0
                                                                     1
                                                                             0 4
                                       0
## 5
         0
               1
                      0
                                              0
                                                   63
                                                             0
                                                                     0
                                                                             0 4
         0
               1
                      0
                                       0
                                              0
                                                   72
                                                                     0
                                                                             1 4
## 6
                                                             1
## # i 19 more variables: year <dbl>, survey <chr>, caseidID <dbl>,
## #
       caseidID22 <dbl>, attend_march <dbl>, burn_flag <dbl>, court <dbl>,
       recount <dbl>, criticize_election <dbl>, auth_1 <dbl>, auth_2 <dbl>,
## #
## #
       auth_3 <dbl>, auth_4 <dbl>, party3 <dbl>, christian <dbl>,
       post_experimental_condition <chr>, experimental_condition_post <chr>,
## #
       experimental_condition_pre <chr>, pre_post_election <dbl>
## #
```

```
ordinal_data = c("burn_flag", "court", "recount", "criticize_election", "attend_march")
model <- ' f1 =~ court + recount + criticize_election + attend_march</pre>
           court ~~ recount'
fit <- cfa(model, data = electoral_contestation,</pre>
           ordered = ordinal_data,
           )
# mod indices
summary(fit, fit.measures = TRUE)
## lavaan 0.6-19 ended normally after 20 iterations
##
##
     Estimator
                                                       DWLS
     Optimization method
##
                                                     NLMINB
##
     Number of model parameters
                                                         21
##
##
                                                       Used
                                                                  Total
##
     Number of observations
                                                       9397
                                                                    9403
##
## Model Test User Model:
                                                   Standard
##
                                                                 Scaled
     Test Statistic
                                                      4.064
##
                                                                  8.080
     Degrees of freedom
##
                                                          1
                                                                       1
     P-value (Chi-square)
                                                      0.044
                                                                  0.004
##
##
     Scaling correction factor
                                                                  0.503
                                                                  0.000
##
     Shift parameter
       simple second-order correction
##
##
## Model Test Baseline Model:
##
##
     Test statistic
                                                  10337.492
                                                               8732.950
##
     Degrees of freedom
                                                          6
                                                                       6
                                                      0.000
     P-value
                                                                  0.000
##
     Scaling correction factor
                                                                  1.184
##
##
## User Model versus Baseline Model:
##
     Comparative Fit Index (CFI)
                                                      1.000
                                                                  0.999
##
##
     Tucker-Lewis Index (TLI)
                                                      0.998
                                                                  0.995
##
##
     Robust Comparative Fit Index (CFI)
                                                                  0.999
```

```
0.992
##
     Robust Tucker-Lewis Index (TLI)
##
## Root Mean Square Error of Approximation:
##
##
    RMSEA
                                                    0.018
                                                                 0.027
##
     90 Percent confidence interval - lower
                                                    0.002
                                                                 0.012
     90 Percent confidence interval - upper
                                                    0.038
##
                                                                 0.046
##
    P-value H_0: RMSEA <= 0.050
                                                    0.998
                                                                 0.977
##
     P-value H_0: RMSEA >= 0.080
                                                    0.000
                                                                 0.000
##
##
    Robust RMSEA
                                                                 0.030
##
     90 Percent confidence interval - lower
                                                                 0.013
##
     90 Percent confidence interval - upper
                                                                 0.050
##
    P-value H_0: Robust RMSEA <= 0.050
                                                                 0.949
##
     P-value H_0: Robust RMSEA >= 0.080
                                                                 0.000
##
## Standardized Root Mean Square Residual:
##
                                                    0.006
##
     SRMR
                                                                 0.006
##
## Parameter Estimates:
##
##
    Parameterization
                                                    Delta
##
    Standard errors
                                               Robust.sem
##
     Information
                                                 Expected
     Information saturated (h1) model
                                             Unstructured
##
##
## Latent Variables:
                      Estimate Std.Err z-value P(>|z|)
##
##
    f1 =~
                         1.000
##
       court
##
                         0.782
       recount
                                  0.020 39.380
                                                    0.000
##
       criticize_lctn
                         1.322
                                  0.038
                                          34.689
                                                    0.000
       attend_march
                         0.932
                                  0.024
                                          38.792
                                                    0.000
##
##
## Covariances:
                      Estimate Std.Err z-value P(>|z|)
##
##
   .court ~~
##
      .recount
                         0.166
                                  0.010
                                         15.850
                                                    0.000
##
## Thresholds:
##
                      Estimate Std.Err z-value P(>|z|)
                        -0.999
                                  0.016 -64.161
##
                                                    0.000
       court | t1
```

```
##
       court | t2
                          -0.437
                                     0.013 -32.638
                                                         0.000
##
                                                         0.000
       court | t3
                           0.395
                                     0.013
                                              29.679
##
       court | t4
                                     0.017
                                              69.704
                                                         0.000
                           1.161
##
       recount | t1
                          -1.637
                                     0.022
                                            -75.486
                                                         0.000
       recount | t2
                                     0.016
                                            -68.939
                                                         0.000
##
                          -1.135
##
       recount | t3
                          -0.307
                                     0.013
                                            -23.369
                                                         0.000
##
       recount | t4
                           0.699
                                     0.014
                                              49.407
                                                         0.000
       critcz_lctn|t1
                                             -33.942
##
                          -0.456
                                     0.013
                                                         0.000
##
       critcz_lctn|t2
                           0.029
                                     0.013
                                               2.280
                                                         0.023
##
       critcz_lctn|t3
                           0.692
                                     0.014
                                              48.994
                                                         0.000
##
       critcz_lctn|t4
                           1.295
                                     0.018
                                              72.945
                                                         0.000
##
       attend_mrch|t1
                          -1.048
                                     0.016
                                             -66.017
                                                         0.000
##
       attend_mrch|t2
                          -0.545
                                     0.014
                                             -39.903
                                                         0.000
##
       attend_mrch|t3
                           0.234
                                     0.013
                                              17.943
                                                         0.000
##
       attend_mrch|t4
                           1.006
                                     0.016
                                              64.422
                                                         0.000
##
##
   Variances:
##
                        Estimate
                                   Std.Err z-value P(>|z|)
##
      .court
                           0.673
##
      .recount
                           0.800
##
      .criticize_lctn
                           0.428
##
      .attend_march
                           0.716
##
                           0.327
                                     0.012
                                              26.285
                                                         0.000
       f1
```

The fit is good. With just these items, I don't find much of a multidimensional structure. I actually don't find much evidence of a two factor model for the surveys other than the 2020 Western; there also seems to be a bit of a problem with the burning flag item, as it doesn't seem all that related to the other items.

```
electoral_contestation %>%
  select("burn_flag", "court", "criticize_election", "attend_march", "recount") %>%
  # deal with NA
  na.omit() %>%
  cor()
```

```
##
                        burn_flag
                                      court criticize_election attend_march
                       1.00000000 0.1664893
## burn_flag
                                                     0.03776088
                                                                    0.2404490
                       0.16648928 1.0000000
## court
                                                     0.38231136
                                                                    0.2582262
## criticize_election 0.03776088 0.3823114
                                                     1.0000000
                                                                    0.3477097
## attend_march
                       0.24044899 0.2582262
                                                     0.34770971
                                                                    1.0000000
## recount
                       0.12712382 0.3583892
                                                     0.27691073
                                                                    0.2110060
##
                         recount
## burn_flag
                       0.1271238
## court
                       0.3583892
## criticize_election 0.2769107
```

```
## attend_march 0.2110060
## recount 1.0000000
```

Testing for measurement invariance across party categories.

```
# Configural Invariance: This assumes total variation of parameters across groups
fit_configural <- cfa(model, data = electoral_contestation, ordered = ordinal_data, group = "party3")
## Warning: lavaan->lav_data_full():
      group variable 'party3' contains missing values
##
# Scalar Invariance: This assumes equal factor loadings and intercepts across groups
fit_scalar2 <- cfa(model, data = electoral_contestation, ordered = ordinal_data, group = "party3", group
## Warning: lavaan->lav_data_full():
      group variable 'party3' contains missing values
##
# summary(fit_scalar, fit.measures = TRUE)
# Compare models
anova(fit_configural, fit_scalar2)
##
## Scaled Chi-Squared Difference Test (method = "satorra.2000")
##
## lavaan->lavTestLRT():
      lavaan NOTE: The "Chisq" column contains standard test statistics, not the
##
     robust test that should be reported per model. A robust difference test is
##
##
      a function of two standard (not robust) statistics.
                  Df AIC BIC
                               Chisq Chisq diff Df diff Pr(>Chisq)
## fit_configural 3
                               22.695
## fit_scalar2
                  33
                             1993.588
                                          1491.5
                                                      30 < 2.2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
```

There fairly substantial differences in comparing the fully variant model to the one that is equal across partisan groups. There seems to be measurement variance. Here is the fully varying model – though note that without some common items it's not really possible to compare estimates

```
summary(fit_configural, fit.measures = TRUE)

## lavaan 0.6-19 ended normally after 57 iterations
##

## Estimator DWLS

## Optimization method NLMINB
```

## ##	Number of model parameters	63	
##	Number of charmetians non group.	Used	Total
##	Number of observations per group:	3435	3439
##	1	4216	4217
##	2	1431	1432
##	2	1431	1432
	Model Test User Model:		
##	Model lest osel Model.	Standard	Scaled
##	Test Statistic	22.695	44.597
##	Degrees of freedom	3	3
##	P-value (Chi-square)	0.000	0.000
##	Scaling correction factor	0.000	0.509
##	Shift parameter		0.016
##	simple second-order correction		0.010
##	Test statistic for each group:		
##	3	6.187	6.187
##	1	34.721	34.721
##	2	3.689	3.689
##			
##	Model Test Baseline Model:		
шш			
##			
##	Test statistic	11572.116	9600.426
	Test statistic Degrees of freedom	11572.116 18	9600.426 18
##			
## ##	Degrees of freedom	18	18
## ## ##	Degrees of freedom P-value	18	18 0.000
## ## ## ##	Degrees of freedom P-value	18	18 0.000
## ## ## ##	Degrees of freedom P-value Scaling correction factor	18	18 0.000
## ## ## ##	Degrees of freedom P-value Scaling correction factor	18	18 0.000
## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model:	18 0.000	18 0.000 1.206
## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI)	18 0.000 0.998	18 0.000 1.206
## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI)	18 0.000 0.998	18 0.000 1.206
## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI)	18 0.000 0.998	18 0.000 1.206 0.996 0.974
## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI)	18 0.000 0.998	18 0.000 1.206 0.996 0.974 0.993
## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI)	18 0.000 0.998	18 0.000 1.206 0.996 0.974 0.993
## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation:	18 0.000 0.998 0.990	18 0.000 1.206 0.996 0.974 0.993 0.957
## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA	18 0.000 0.998 0.990	18 0.000 1.206 0.996 0.974 0.993 0.957
## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower	18 0.000 0.998 0.990 0.047 0.030	18 0.000 1.206 0.996 0.974 0.993 0.957
## ## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower 90 Percent confidence interval - upper	18 0.000 0.998 0.990 0.047 0.030 0.065	18 0.000 1.206 0.996 0.974 0.993 0.957 0.068 0.051 0.086
## ## ## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower 90 Percent confidence interval - upper P-value H_0: RMSEA <= 0.050	18 0.000 0.998 0.990 0.047 0.030 0.065 0.584	18 0.000 1.206 0.996 0.974 0.993 0.957 0.068 0.051 0.086 0.041
## ## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower 90 Percent confidence interval - upper	18 0.000 0.998 0.990 0.047 0.030 0.065	18 0.000 1.206 0.996 0.974 0.993 0.957 0.068 0.051 0.086

```
Robust RMSEA
                                                                0.071
##
##
    90 Percent confidence interval - lower
                                                                0.053
##
    90 Percent confidence interval - upper
                                                                0.091
    P-value H_0: Robust RMSEA <= 0.050
                                                                0.031
##
     P-value H_0: Robust RMSEA >= 0.080
                                                                0.245
##
##
## Standardized Root Mean Square Residual:
##
##
     SRMR
                                                    0.014
                                                                0.014
##
## Parameter Estimates:
##
     Parameterization
                                                    Delta
##
    Standard errors
                                               Robust.sem
##
    Information
                                                 Expected
##
     Information saturated (h1) model
                                             Unstructured
##
##
## Group 1 [3]:
##
## Latent Variables:
##
                     Estimate Std.Err z-value P(>|z|)
    f1 =~
##
##
      court
                        1.000
                        0.760
##
      recount
                                  0.026
                                          29.191
                                                    0.000
##
      criticize_lctn
                        1.204
                                  0.036
                                         33.835
                                                    0.000
##
       attend_march
                         0.979
                                  0.028
                                          35.292
                                                    0.000
##
## Covariances:
                     Estimate Std.Err z-value P(>|z|)
##
   .court ~~
##
##
                        0.154
                                  0.015 10.202
                                                    0.000
      .recount
##
## Thresholds:
##
                     Estimate Std.Err z-value P(>|z|)
                       -1.134
                                 0.027 -41.663
                                                    0.000
##
      court | t1
##
                       -0.605 0.023 -26.462
                                                    0.000
      court|t2
                        0.191 0.022 8.849
##
      court|t3
                                                    0.000
                                 0.026 38.402
##
      court|t4
                        0.983
                                                    0.000
##
                       -1.755
                                 0.039 -45.082
                                                    0.000
      recount | t1
##
      recount | t2
                       -1.318
                                 0.030 -44.351
                                                    0.000
##
      recount | t3
                        -0.536
                                  0.023 -23.767
                                                    0.000
##
      recount | t4
                        0.456
                                  0.022 20.546
                                                    0.000
```

```
critcz_lctn|t1
##
                        -0.367
                                   0.022 -16.731
                                                     0.000
##
       critcz_lctn|t2
                        -0.079
                                   0.021
                                           -3.702
                                                     0.000
##
       critcz_lctn|t3
                         0.462
                                   0.022
                                           20.782
                                                     0.000
       critcz_lctn|t4
                                   0.027
                                           41.560
                                                     0.000
##
                         1.129
##
       attend_mrch|t1
                        -0.782
                                   0.024 -32.653
                                                     0.000
##
       attend_mrch|t2
                        -0.265
                                   0.022 -12.218
                                                     0.000
       attend mrch|t3
##
                         0.478
                                   0.022
                                           21.454
                                                     0.000
##
       attend_mrch|t4
                                   0.029
                                           43.630
                                                     0.000
                         1.258
##
## Variances:
##
                      Estimate Std.Err z-value P(>|z|)
##
      .court
                         0.566
##
      .recount
                         0.749
##
      .criticize_lctn
                         0.370
##
      .attend_march
                         0.584
##
       f1
                         0.434
                                   0.018
                                           24.165
                                                     0.000
##
##
## Group 2 [1]:
##
## Latent Variables:
##
                      Estimate Std.Err z-value P(>|z|)
##
     f1 =~
##
       court
                         1.000
##
       recount
                         0.830
                                   0.036
                                           22.900
                                                     0.000
                                   0.060
                                                     0.000
##
       criticize_lctn
                         1.125
                                           18.830
##
                         0.987
                                   0.050
                                           19.657
                                                     0.000
       attend_march
##
## Covariances:
##
                      Estimate Std.Err z-value P(>|z|)
##
    .court ~~
##
                         0.104
                                   0.018
                                            5.793
                                                     0.000
      .recount
##
## Thresholds:
##
                      Estimate Std.Err z-value P(>|z|)
##
       court | t1
                        -0.857
                                   0.022 - 38.754
                                                     0.000
                        -0.245
                                   0.020 -12.553
##
       court | t2
                                                     0.000
##
       court|t3
                         0.524
                                   0.020 25.824
                                                     0.000
##
       court | t4
                         1.314
                                   0.027
                                           49.087
                                                     0.000
                        -1.571
##
       recount | t1
                                   0.031 -50.638
                                                     0.000
##
       recount | t2
                        -1.018
                                   0.023 -43.460
                                                     0.000
##
       recount | t3
                         -0.243
                                   0.020 - 12.430
                                                     0.000
##
                                   0.022
                                           39.090
                                                     0.000
       recount | t4
                         0.867
```

```
critcz_lctn|t1
##
                        -0.511
                                   0.020 -25.250
                                                      0.000
##
       critcz_lctn|t2
                         0.153
                                   0.019
                                            7.881
                                                      0.000
##
       critcz_lctn|t3
                         0.844
                                   0.022
                                           38.332
                                                      0.000
       critcz_lctn|t4
                                                      0.000
##
                         1.447
                                   0.029
                                           50.268
##
       attend_mrch|t1
                        -1.311
                                   0.027 -49.053
                                                      0.000
##
       attend_mrch|t2
                        -0.777
                                   0.022 -35.992
                                                      0.000
       attend mrch|t3
##
                        -0.054
                                   0.019
                                           -2.772
                                                      0.006
##
       attend_mrch|t4
                                   0.022
                                           36.567
                                                      0.000
                         0.793
##
## Variances:
##
                      Estimate Std.Err z-value P(>|z|)
##
      .court
                          0.692
##
      .recount
                          0.788
##
      .criticize_lctn
                          0.611
##
      .attend_march
                          0.700
##
       f1
                          0.308
                                   0.022
                                           14.216
                                                      0.000
##
##
## Group 3 [2]:
##
## Latent Variables:
##
                      Estimate Std.Err z-value P(>|z|)
##
     f1 =~
##
       court
                          1.000
##
       recount
                          0.861
                                   0.051
                                           16.741
                                                      0.000
                                                      0.000
##
       criticize_lctn
                          1.373
                                   0.091
                                           15.110
##
                                   0.064
                                           17.057
                                                      0.000
       attend_march
                          1.092
##
## Covariances:
##
                      Estimate Std.Err z-value P(>|z|)
##
    .court ~~
##
                         0.144
                                   0.024
                                            5.990
                                                      0.000
      .recount
##
## Thresholds:
##
                      Estimate Std.Err z-value P(>|z|)
                        -1.100
##
       court | t1
                                   0.042 - 26.474
                                                      0.000
##
       court | t2
                        -0.564
                                   0.035 -16.047
                                                      0.000
##
       court|t3
                         0.450
                                   0.034
                                          13.088
                                                      0.000
##
       court | t4
                         1.153
                                   0.043
                                           27.116
                                                      0.000
                        -1.590
##
       recount | t1
                                   0.054 - 29.499
                                                      0.000
##
       recount | t2
                                   0.042 -26.638
                                                      0.000
                        -1.113
##
       recount | t3
                         -0.143
                                   0.033
                                           -4.307
                                                      0.000
##
                                   0.037
                                           21.213
                                                      0.000
       recount | t4
                          0.788
```

```
##
      critcz_lctn|t2 -0.013
                                0.033 -0.396
                                                  0.692
##
      critcz_lctn|t3
                      0.781 0.037 21.065
                                                  0.000
      0.000
##
      attend mrch|t1 -1.060
                               0.041 -25.927
                                                  0.000
##
##
      attend_mrch|t2 -0.576
                                0.035 -16.356
                                                  0.000
      attend mrch|t3
##
                      0.440
                                0.034 12.827
                                                  0.000
      attend_mrch|t4
                                0.042 26.474
                                                  0.000
##
                      1.100
##
## Variances:
##
                     Estimate Std.Err z-value P(>|z|)
##
      .court
                        0.703
##
      .recount
                        0.780
##
      .criticize_lctn
                        0.440
##
      .attend march
                        0.646
##
      f1
                        0.297
                                0.028 10.490
                                                  0.000
electoral_contestation$survey <- as.character(electoral_contestation$survey)</pre>
# one hot encode survey
electoral_contestation <- electoral_contestation %>%
  mutate(wss20 = as.numeric(survey == "wss20"),
        wss24 = as.numeric(survey == "wss24"),
        avpw1 = as.numeric(survey == "avpw1"),
        avpw2 = as.numeric(survey == "avpw2"))
model <- ' f1 =~ court + recount + criticize_election + attend_march + burn_flag
          court ~~ recount
          f1 ~ wss20 + wss24 + avpw1'
fit_modified <- sem(model, data = electoral_contestation,</pre>
          ordered = ordinal data,
          group = "party3"
## Warning: lavaan->lav_data_full():
##
     group variable 'party3' contains missing values
summary(fit_modified, fit.measures = TRUE)
## lavaan 0.6-19 ended normally after 68 iterations
##
##
    Estimator
                                                   DWLS
                                                 NLMINB
##
    Optimization method
```

critcz_lctn|t1

-0.483

0.035 - 13.974

0.000

##

## ##	Number of model parameters	87	
##	Number of observations per group:	Used	Total
##	3	3435	3439
##	1	4216	4217
##	2	1430	1432
##			
##	Model Test User Model:		
##		Standard	Scaled
##	Test Statistic	650.290	672.427
##	Degrees of freedom	48	48
##	P-value (Chi-square)	0.000	0.000
##	Scaling correction factor		0.989
##	Shift parameter		14.758
##	simple second-order correction		
##	Test statistic for each group:		
##	3	421.406	421.406
##	1	163.405	163.405
##	2	87.616	87.616
##			
##	Model Test Baseline Model:		
##			
##	Test statistic	12675.889	10259.234
## ##	Degrees of freedom	30	30
## ## ##	Degrees of freedom P-value		30
## ## ## ##	Degrees of freedom	30	30
## ## ## ##	Degrees of freedom P-value Scaling correction factor	30	30
## ## ## ## ##	Degrees of freedom P-value	30	30
## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model:	30	30 0.000 1.236
## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI)	30 0.000 0.952	30 0.000 1.236
## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model:	30	30 0.000 1.236
## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI)	30 0.000 0.952	30 0.000 1.236 0.939 0.962
## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI)	30 0.000 0.952	30 0.000 1.236 0.939 0.962
## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI)	30 0.000 0.952	30 0.000 1.236 0.939 0.962
## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI)	30 0.000 0.952	30 0.000 1.236 0.939 0.962
## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI)	30 0.000 0.952	30 0.000 1.236 0.939 0.962
## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI)	30 0.000 0.952 0.970	30 0.000 1.236 0.939 0.962 NA
## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation:	30 0.000 0.952	30 0.000 1.236 0.939 0.962
## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower	30 0.000 0.952 0.970	30 0.000 1.236 0.939 0.962 NA NA
## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower 90 Percent confidence interval - upper	30 0.000 0.952 0.970 0.064 0.060	30 0.000 1.236 0.939 0.962 NA NA
## ## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower	30 0.000 0.952 0.970 0.064 0.060 0.069	30 0.000 1.236 0.939 0.962 NA NA 0.066 0.061 0.070
## ## ## ## ## ## ## ## ## ## ##	Degrees of freedom P-value Scaling correction factor User Model versus Baseline Model: Comparative Fit Index (CFI) Tucker-Lewis Index (TLI) Robust Comparative Fit Index (CFI) Robust Tucker-Lewis Index (TLI) Root Mean Square Error of Approximation: RMSEA 90 Percent confidence interval - lower 90 Percent confidence interval - upper P-value H_0: RMSEA <= 0.050	30 0.000 0.952 0.970 0.064 0.060 0.069 0.000	30 0.000 1.236 0.939 0.962 NA NA 0.066 0.061 0.070 0.000

```
Robust RMSEA
##
                                                                    NA
##
    90 Percent confidence interval - lower
                                                                    NA
    90 Percent confidence interval - upper
##
                                                                    NA
    P-value H_0: Robust RMSEA <= 0.050
##
                                                                    NA
     P-value H_0: Robust RMSEA >= 0.080
                                                                    NA
##
##
## Standardized Root Mean Square Residual:
##
##
     SRMR
                                                    0.030
                                                                 0.030
##
## Parameter Estimates:
##
     Parameterization
                                                    Delta
##
    Standard errors
                                               Robust.sem
##
     Information
                                                 Expected
##
     Information saturated (h1) model
                                             Unstructured
##
##
## Group 1 [3]:
##
## Latent Variables:
                      Estimate Std.Err z-value P(>|z|)
##
    f1 =~
##
##
       court
                         1.000
       recount
                         0.714
##
                                  0.027
                                          26.956
                                                    0.000
##
       criticize_lctn
                         1.415 0.045
                                          31.426
                                                    0.000
##
       {\tt attend\_march}
                         0.941 0.028
                                          33.992
                                                    0.000
##
       burn_flag
                         0.627
                                  0.034
                                          18.447
                                                    0.000
##
## Regressions:
##
                      Estimate Std.Err z-value P(>|z|)
    f1 ~
##
##
       wss20
                        -1.031
                                  0.048 -21.386
                                                    0.000
       wss24
                        -0.352
##
                                  0.043 -8.261
                                                    0.000
                         0.055
                                  0.051
                                           1.084
##
       avpw1
                                                    0.278
##
## Covariances:
##
                      Estimate Std.Err z-value P(>|z|)
##
    .court ~~
                         0.195
##
                                  0.014 13.713
                                                    0.000
      .recount
##
## Thresholds:
##
                      Estimate Std.Err z-value P(>|z|)
```

```
0.000
##
       court | t1
                         -1.503
                                   0.054 - 27.586
##
       court|t2
                         -0.969
                                   0.054 -18.101
                                                      0.000
##
       court|t3
                         -0.147
                                   0.054
                                            -2.744
                                                      0.006
##
       court | t4
                          0.678
                                   0.055
                                           12.305
                                                      0.000
##
       recount | t1
                         -2.359
                                   0.066 -35.800
                                                      0.000
##
       recount | t2
                         -1.922
                                   0.063 -30.482
                                                      0.000
                                   0.062 -18.170
##
       recount | t3
                         -1.122
                                                      0.000
##
       recount | t4
                         -0.084
                                   0.059
                                           -1.424
                                                      0.154
##
       critcz_lctn|t1
                         -1.260
                                   0.059
                                          -21.224
                                                      0.000
##
       critcz_lctn|t2
                         -0.821
                                   0.057
                                          -14.322
                                                      0.000
##
       critcz_lctn|t3
                         -0.103
                                   0.057
                                           -1.800
                                                      0.072
##
       critcz_lctn|t4
                          0.674
                                   0.059
                                           11.496
                                                      0.000
##
       attend_mrch|t1
                         -1.170
                                   0.055
                                          -21.218
                                                      0.000
##
       attend_mrch|t2
                        -0.621
                                   0.054
                                          -11.572
                                                      0.000
##
       attend_mrch|t3
                          0.167
                                   0.054
                                             3.119
                                                      0.002
##
       attend_mrch|t4
                          0.979
                                   0.056
                                            17.391
                                                      0.000
##
       burn_flag|t1
                         -0.587
                                   0.131
                                            -4.496
                                                      0.000
##
       burn_flag|t2
                          0.369
                                   0.126
                                             2.921
                                                      0.003
##
       burn_flag|t3
                          1.077
                                   0.128
                                             8.431
                                                      0.000
                                            13.292
                                                      0.000
##
       burn_flag|t4
                          1.738
                                   0.131
##
## Variances:
##
                       Estimate Std.Err z-value P(>|z|)
##
      .court
                          0.638
##
      .recount
                          0.815
##
      .criticize_lctn
                          0.274
##
      .attend_march
                          0.679
##
      .burn_flag
                          0.857
##
      .f1
                          0.362
                                   0.016
                                            23.239
                                                      0.000
##
##
## Group 2 [1]:
##
## Latent Variables:
##
                       Estimate Std.Err z-value P(>|z|)
##
     f1 = ~
                          1.000
##
       court
##
       recount
                          0.840
                                   0.034
                                            24.999
                                                      0.000
##
       criticize_lctn
                          1.074
                                   0.045
                                            23.957
                                                      0.000
##
       attend_march
                          1.104
                                   0.045
                                            24.567
                                                      0.000
##
                          0.991
                                   0.041
                                            24.109
                                                      0.000
       burn_flag
##
## Regressions:
```

```
##
                      Estimate Std.Err z-value P(>|z|)
##
     f1 ~
##
       wss20
                          0.012
                                   0.046
                                            0.269
                                                      0.788
       wss24
                         -0.157
                                   0.046
##
                                           -3.421
                                                      0.001
##
       avpw1
                         -0.081
                                   0.056
                                           -1.451
                                                      0.147
##
## Covariances:
##
                      Estimate Std.Err z-value P(>|z|)
##
    .court ~~
##
      .recount
                          0.121
                                   0.015
                                            8.011
                                                      0.000
##
## Thresholds:
##
                      Estimate Std.Err z-value P(>|z|)
##
       court|t1
                         -0.984
                                   0.068 -14.447
                                                      0.000
##
       court | t2
                         -0.371
                                   0.066
                                           -5.618
                                                      0.000
##
       court|t3
                          0.400
                                   0.066
                                            6.063
                                                      0.000
##
       court|t4
                          1.190
                                   0.070
                                           17.027
                                                      0.000
##
       recount | t1
                         -1.519
                                   0.060 -25.228
                                                      0.000
##
       recount | t2
                         -0.958
                                   0.059
                                          -16.170
                                                      0.000
##
                                   0.059
                                           -2.942
       recount | t3
                         -0.173
                                                      0.003
##
       recount | t4
                         0.946
                                   0.061
                                           15.615
                                                      0.000
                                   0.088
##
       critcz_lctn|t1
                         -0.739
                                           -8.367
                                                      0.000
##
       critcz_lctn|t2
                         -0.069
                                   0.085
                                           -0.816
                                                      0.415
##
       critcz_lctn|t3
                         0.619
                                   0.086
                                            7.218
                                                      0.000
       critcz_lctn|t4
##
                         1.219
                                   0.090
                                           13.598
                                                      0.000
##
                        -1.383
                                   0.060
                                          -22.992
                                                      0.000
       attend_mrch|t1
##
       attend_mrch|t2
                         -0.848
                                   0.058
                                          -14.578
                                                      0.000
                                           -2.154
##
       attend_mrch|t3
                         -0.125
                                   0.058
                                                      0.031
##
       attend_mrch|t4
                         0.722
                                   0.059
                                           12.226
                                                      0.000
       burn_flag|t1
##
                         -0.631
                                   0.079
                                           -7.970
                                                      0.000
##
       burn_flag|t2
                         0.006
                                   0.076
                                            0.076
                                                      0.940
##
       burn_flag|t3
                          0.803
                                   0.077
                                           10.474
                                                      0.000
##
       burn_flag|t4
                          1.412
                                   0.079
                                           17.921
                                                      0.000
##
## Variances:
##
                      Estimate Std.Err z-value P(>|z|)
##
                          0.704
      .court
##
                          0.792
      .recount
##
      .criticize_lctn
                          0.659
##
      .attend_march
                          0.640
##
      .burn_flag
                          0.710
##
      .f1
                          0.296
                                   0.018
                                           16.781
                                                      0.000
##
```

```
##
## Group 3 [2]:
##
## Latent Variables:
##
                      Estimate Std.Err z-value P(>|z|)
##
     f1 =~
                          1.000
##
       court
##
       recount
                          0.850
                                   0.051
                                            16.614
                                                      0.000
##
       criticize_lctn
                         1.283
                                   0.076
                                            16.855
                                                      0.000
##
       attend_march
                          1.139
                                   0.065
                                            17.570
                                                      0.000
##
       burn_flag
                          0.777
                                   0.058
                                            13.492
                                                      0.000
##
## Regressions:
##
                      Estimate Std.Err z-value P(>|z|)
##
     f1 ~
##
       wss20
                         -0.530
                                   0.076
                                           -6.937
                                                      0.000
##
       wss24
                         -0.324
                                   0.075
                                           -4.314
                                                      0.000
##
       avpw1
                         -0.233
                                   0.088
                                            -2.648
                                                      0.008
##
## Covariances:
##
                      Estimate Std.Err z-value P(>|z|)
##
    .court ~~
##
                          0.140
                                   0.023
                                            6.210
                                                      0.000
      .recount
##
## Thresholds:
##
                      Estimate Std.Err z-value P(>|z|)
##
       court | t1
                         -1.519
                                   0.106 -14.290
                                                      0.000
##
       court|t2
                         -0.979
                                   0.103
                                           -9.551
                                                      0.000
##
       court | t3
                         0.046
                                   0.103
                                            0.443
                                                      0.658
##
       court | t4
                          0.762
                                   0.105
                                            7.227
                                                      0.000
##
       recount | t1
                         -2.015
                                   0.102 -19.802
                                                      0.000
##
       recount | t2
                         -1.542
                                   0.098 -15.789
                                                      0.000
##
       recount | t3
                         -0.568
                                   0.098
                                           -5.781
                                                      0.000
##
       recount | t4
                         0.372
                                   0.098
                                            3.790
                                                      0.000
##
       critcz_lctn|t1
                         -1.020
                                   0.109
                                           -9.372
                                                      0.000
##
       critcz_lctn|t2
                         -0.497
                                   0.105
                                           -4.731
                                                      0.000
       critcz_lctn|t3
##
                         0.355
                                   0.105
                                            3.382
                                                      0.001
##
       critcz_lctn|t4
                         0.889
                                   0.107
                                            8.305
                                                      0.000
##
       attend_mrch|t1
                        -1.456
                                   0.103 -14.102
                                                      0.000
##
       attend_mrch|t2
                         -0.967
                                   0.101
                                           -9.587
                                                      0.000
##
       attend_mrch|t3
                         0.061
                                   0.101
                                            0.606
                                                      0.545
##
       attend_mrch|t4
                          0.729
                                   0.104
                                            7.031
                                                      0.000
##
                                            -3.921
                                                      0.000
       burn_flag|t1
                         -0.617
                                   0.157
```

```
burn_flag|t2
                          0.004
##
                                   0.151
                                             0.023
                                                      0.981
##
       burn_flag|t3
                          0.981
                                   0.152
                                             6.456
                                                      0.000
##
       burn_flag|t4
                          1.565
                                   0.156
                                            10.033
                                                      0.000
##
## Variances:
##
                       Estimate Std.Err z-value P(>|z|)
                          0.701
##
      .court
      .recount
                          0.784
##
                          0.507
##
      . \verb|criticize_lctn| \\
      . \verb|attend_march||
##
                          0.611
##
      .burn_flag
                          0.819
##
      .f1
                          0.299
                                   0.027 11.025
                                                      0.000
```