

## Appendix A: List of Elites

Username	Secularist/Islamist	Democrat/Authoritarian	Democracy Score
slim404	Secularist	Democratic_Tunisia	2.00
oouups	Secularist	Democratic_Tunisia	1.57
nawaat	Secularist	Democratic_Tunisia	2.00
psycke	Secularist	Democratic_Tunisia	1.83
karim2k	Secularist	Democratic_Tunisia	1.76
riadheh	Secularist	Democratic_Tunisia	1.75
mira404	Secularist	Democratic_Tunisia	1.81
yassayari	Islamist	Anti-Democratic_Tunisia	1.35
sarah_bh	Secularist	Democratic_Tunisia	2.26
majdikhan	Secularist	Democratic_Tunisia	1.91
maramirou	Secularist	Anti-Democratic_Tunisia	0.52
marwen	Secularist	Democratic_Tunisia	1.50
benmhennilina	Secularist	Democratic_Tunisia	1.92
slimazzabi	Secularist	Anti-Democratic_Tunisia	1.27
jnayna	Secularist	Anti-Democratic_Tunisia	0.34
azyyoz	Secularist	Anti-Democratic_Tunisia	1.46
arabasta1	Secularist	Democratic_Tunisia	1.92
zinga_	Secularist	Anti-Democratic_Tunisia	0.40
c_moi	Secularist	Anti-Democratic_Tunisia	0.29
jasmintn	Secularist	Democratic_Tunisia	2.08
sans_url	Secularist	Democratic_Tunisia	1.74
indigo_light	Secularist	Anti-Democratic_Tunisia	1.45
takriz	Secularist	Anti-Democratic_Tunisia	0.49
sameh_b	Secularist	Democratic_Tunisia	1.93
nayzek	Secularist	Anti-Democratic_Tunisia	0.60

liliopatra	Secularist	Democratic_Tunisia	1.78
eyaturki	Secularist	Democratic_Tunisia	1.52
faiyla	Secularist	Democratic_Tunisia	1.49
zizoo	Secularist	Anti-Democratic_Tunisia	1.28
houeida	Secularist	Anti-Democratic_Tunisia	0.98
malekk	Secularist	Democratic_Tunisia	1.54
ahlemhc	Secularist	Democratic_Tunisia	1.99
tom_z	Secularist	Anti-Democratic_Tunisia	0.38
chiheb12	Secularist	Anti-Democratic_Tunisia	1.14
zeinebturki	Secularist	Democratic_Tunisia	1.75
khamousss	Islamist	Democratic_Tunisia	2.17
may_mouna	Secularist	Democratic_Tunisia	1.60
yamenbousrih	Secularist	Anti-Democratic_Tunisia	1.06
ifikra	Secularist	Anti-Democratic_Tunisia	1.25
blech_klem	Secularist	Anti-Democratic_Tunisia	0.59
emnachebaane	Secularist	Anti-Democratic_Tunisia	0.24
bidules	Secularist	Democratic_Tunisia	1.78
khalilbm	Secularist	Anti-Democratic_Tunisia	1.21
boukornineblog	Secularist	Democratic_Tunisia	2.08
out__rage	Secularist	Anti-Democratic_Tunisia	0.95
yhzami	Secularist	Anti-Democratic_Tunisia	0.77
viagramoniak	Secularist	Anti-Democratic_Tunisia	0.46
mounej	Secularist	Democratic_Tunisia	1.71
maroo_king	Secularist	Anti-Democratic_Tunisia	0.45
kiffegrave	Secularist	Anti-Democratic_Tunisia	1.04
albawsalatn	Secularist	Democratic_Tunisia	2.00
nizarus	Secularist	Anti-Democratic_Tunisia	1.16
r_ghannouchi	Islamist	Anti-Democratic_Tunisia	1.20

nahdhatunisie	Islamist	Anti-Democratic_Tunisia	1.16
yusraghkh	Islamist	Democratic_Tunisia	1.54
ziedladhari	Islamist	Anti-Democratic_Tunisia	1.13
alaa	Secularist	Anti-Democratic_Egypt	-2.45
waelabbas	Secularist	Democratic_Egypt	2.00
ghonim	Secularist	Democratic_Egypt	-0.11
nawaranegm	Secularist	Anti-Democratic_Egypt	-3.03
sandmonkey	Secularist	Anti-Democratic_Egypt	-1.29
elbaradei	Secularist	Democratic_Egypt	-0.74
zeinobia	Secularist	Anti-Democratic_Egypt	-1.65
3arabawy	Secularist	Anti-Democratic_Egypt	-1.15
amrmsalama	Secularist	Democratic_Egypt	-1.02
monasosh	Secularist	Anti-Democratic_Egypt	-2.36
kalimakhus	Secularist	Anti-Democratic_Egypt	-2.26
drbasemyoussef	Secularist	Anti-Democratic_Egypt	-1.07
gamaleid	Secularist	Anti-Democratic_Egypt	-2.40
salmaeldaly	Secularist	Democratic_Egypt	-1.03
yosrifouda	Secularist	Democratic_Egypt	-0.12
wael	Secularist	Anti-Democratic_Egypt	-1.63
monaeltahawy	Secularist	Democratic_Egypt	-0.60
alyaagad	Secularist	Anti-Democratic_Egypt	-1.72
galalamer	Secularist	Anti-Democratic_Egypt	-1.30
amrwaked	Secularist	Anti-Democratic_Egypt	-1.18
mand0z	Secularist	Democratic_Egypt	-0.12
adel_salib	Secularist	Anti-Democratic_Egypt	-1.07
hazem_azim	Secularist	Anti-Democratic_Egypt	-2.75
ahmadesseily	Secularist	Anti-Democratic_Egypt	-1.91
zeinabsamir	Secularist	Democratic_Egypt	-0.90

lilianwagdy	Secularist	Anti-Democratic_Egypt	-1.45
5orm	Secularist	Anti-Democratic_Egypt	-1.14
sarahcarr	Secularist	Democratic_Egypt	-0.82
gsquare86	Secularist	Democratic_Egypt	-0.78
minazekri	Secularist	Democratic_Egypt	-1.01
ahmednaguib	Secularist	Democratic_Egypt	0.01
gemyhood	Secularist	Anti-Democratic_Egypt	-1.45
shokeir	Secularist	Anti-Democratic_Egypt	-1.49
heshoz	Secularist	Anti-Democratic_Egypt	-1.97
mennagamal	Islamist	Democratic_Egypt	1.15
theboghdady	Secularist	Democratic_Egypt	0.03
seksek	Secularist	Anti-Democratic_Egypt	-1.53
sarahngb	Secularist	Democratic_Egypt	-0.26
thebigpharaoh	Secularist	Anti-Democratic_Egypt	-2.09
lastoadri	Secularist	Democratic_Egypt	-0.59
rashapress	Secularist	Anti-Democratic_Egypt	-1.94
minanaguib90	Secularist	Democratic_Egypt	-0.44
ahmad_khalil	Secularist	Anti-Democratic_Egypt	-2.18
naguibsawiris	Secularist	Anti-Democratic_Egypt	-2.00
mazloun	Secularist	Democratic_Egypt	0.52
nabilelhalfawy	Secularist	Anti-Democratic_Egypt	-1.77
alnagar80	Secularist	Anti-Democratic_Egypt	-1.60
theadly	Secularist	Democratic_Egypt	0.72
thesherio	Secularist	Democratic_Egypt	-0.24
kalnaga	Secularist	Democratic_Egypt	0.02
dr_heba_raouf	Islamist	Democratic_Egypt	-0.32
moftasa	Secularist	Democratic_Egypt	-0.93
ahmdalish	Secularist	Anti-Democratic_Egypt	-1.98

theonlywarman	Secularist	Democratic_Egypt	0.50
pakinamamer	Secularist	Democratic_Egypt	0.01
zelaky	Secularist	Anti-Democratic_Egypt	-2.32
embee	Secularist	Democratic_Egypt	0.05
ahmada2	Secularist	Anti-Democratic_Egypt	-1.10
ramiii	Secularist	Democratic_Egypt	-0.08
mar3e	Secularist	Anti-Democratic_Egypt	-1.61
alaaaswany	Secularist	Anti-Democratic_Egypt	-2.00
alienzero	Secularist	Anti-Democratic_Egypt	-1.20
salmasaid	Secularist	Anti-Democratic_Egypt	-1.35
i3atef	Secularist	Anti-Democratic_Egypt	-1.77
loainagati	Secularist	Anti-Democratic_Egypt	-1.14
memam8	Secularist	Anti-Democratic_Egypt	-1.74
ayaabdullah	Secularist	Democratic_Egypt	-1.00
bassem_sabry	Secularist	Anti-Democratic_Egypt	-1.37
bothainakamel1	Secularist	Anti-Democratic_Egypt	-1.77
tarekshalaby	Secularist	Democratic_Egypt	-0.22
m3adel	Secularist	Democratic_Egypt	-0.19
amrrodriguez	Secularist	Anti-Democratic_Egypt	-1.28
malek	Secularist	Anti-Democratic_Egypt	-1.68
etharkamal	Secularist	Democratic_Egypt	0.12
ssirgany	Secularist	Democratic_Egypt	-0.34
__safi__	Secularist	Democratic_Egypt	0.02
hfakhry	Secularist	Democratic_Egypt	-0.75
hamzanamira	Islamist	Democratic_Egypt	0.56
asmaamahfouz	Secularist	Anti-Democratic_Egypt	-1.20
egyptocracy	Secularist	Democratic_Egypt	-0.48
nasry	Secularist	Anti-Democratic_Egypt	-1.25

mohamedwaked	Secularist	Anti-Democratic_Egypt	-1.90
themiinz	Secularist	Anti-Democratic_Egypt	-1.21
muhammadmorsi	Islamist	Democratic_Egypt	0.90
ikhwanweb	Islamist	Democratic_Egypt	0.76
mushaweh	Islamist	Democratic_Egypt	1.21
azzaelgarf	Islamist	Democratic_Egypt	1.12
alnourpartyeg	Islamist	Democratic_Egypt	1.20
yonosmakhyoun	Islamist	Democratic_Egypt	1.21
naderbakkar	Islamist	Democratic_Egypt	0.18
gelhaddad	Islamist	Democratic_Egypt	0.59
alqaradawy	Islamist	Democratic_Egypt	1.11

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## Appendix B: Full Explication of Item-Response Theory-Vector Autoregression (IRT-VAR)

To construct the latent inter-group distance time series, we employ as our base specification the standard 2-PL IRT model that can be used to estimate the canonical ideal point model (Clinton, Jackman, and Rivers 2004). Formally, we use this model to predict the mean of the retweet counts  $Y_{c,g,t,j}$ :

$$Y_{c,g,t,j} \sim \text{Pois}(\delta_j \alpha_{c,g,t} - \beta_j) \quad (1)$$

In this model,  $\alpha_{c,g,t}$  represent the latent ideal points of all the elites in each ideological group-country combination at each time point  $t$ , while  $\delta_j$  represents how strongly ideological citizen  $j$ 's retweet pattern is and  $\beta_j$  is a citizen-specific intercept. We know from Clinton, Jackman, and Rivers (2004) that we can interpret this model as citizens choosing to retweet an elite if and only if that elite's ideal point in a latent space is closer to the citizen's ideal point in the latent space than the ideal point of any other elite.

In order to estimate this model, we situate equation 1 in a Bayesian framework in which we define  $\theta$  as the full set of parameters we can estimate in (1), and we want to know the most likely values of  $\theta$  conditional on the observed data  $Y_{c,g,t,j}$ :

$$p(\theta|Y_{c,g,t,j}) \propto p(\theta)p(Y_{c,g,t,j}|\theta) \quad (2)$$

Using this standard form of Bayesian inference, equation 1 becomes the likelihood  $p(Y_{c,g,t,j}|\theta)$ , and we can then look at endogenous relationships between ideal point parameters via the priors of these parameters,  $p(\theta)$ . In particular, building on Martin and Quinn (2002) and Kropko (2013), we can model the vector auto-regression between the ideological groups  $g$  via priors on the ideal points  $\alpha_{c,g,t}$ :

$$\alpha_{c,g,t} \sim N(\gamma_{c,g} + \beta_{c,g,I}\alpha_{c,g,t-1} + \beta_{c,g,E}\alpha_{c',g,t-1} + \beta_{g,c,x}X, \sigma_{c,g}) \quad (3)$$

Equation 3 shows how any one elite group  $\alpha_{c,g,t}$ 's latent score in time  $t$  is a function of its prior time period latent score,  $\beta_{c,g,I}\alpha_{c,g,t-1}$ , and the latent score of the same group  $g$  but opposite country  $c'$  in the previous time period,  $\beta_{c,g,E}\alpha_{c',g,t-1}$ . As can be seen relative to equation ??, equation 3 substitutes the observed time series  $y_t$  and  $y'_t$  with the latent ideal scores  $\alpha_{c,g,t}$ , but otherwise has the same parameters  $\beta_{c,g,I}$  and  $\beta_{c,g,E}$ . In other words, we use the IRT model to construct the time series by estimating the latent positions of the elite actors, but we are also able to directly estimate parameters of interest even with this measurement uncertainty. Because these priors are multiplied with the likelihood  $p(Y_{c,g,t,j}|\theta)$ , we can then estimate a full joint density of both the IRT model and the vector autoregression between latent ideological positions so that uncertainty in both models is appropriately captured.

There are two other notable features of equation 3. First, we include exogenous regressor  $\beta_{g,c,x}X$ .  $\beta_{g,c,x}X$  represents a binary vector that equals 0 before a polarizing event occurs, and 1 afterward, so that we can directly measure the effect of polarizing events on the ideal points  $\alpha_{c,g,t}$ . To achieve identification, we constrain one of the intercepts  $\gamma_{c,g}$  for one group in each dimension

to be equal to +1 and -1 (see (Bafumi et al. 2005) for a full discussion of ideal point identification). In addition, we fix one of the variance parameters  $\sigma_{c,g}$  to .1 to identify the scale of the ideal points because the addition of the over-time variation adds another dimension of potential multi-modality in the model’s joint posterior distribution.

At this point, we have defined the IRT-VAR model that allows us to make time-series inferences on the over-time changes in the elite ideal points  $\alpha_{c,g,t}$ . However, this model is only defined over the retweet counts in which we have observed a citizen  $j$  retweet one of the elites in a specific time period  $t$ . As mentioned in the previous section, we expand our observed data to include all the times that each citizen  $j$  *does not* retweet an elite in each time period, or  $Y_{c,g,j,t} = 0$ . If we simply include those zeroes in our likelihood  $L(Y_{c,g,j,t}|\theta)$  as additional data, we will be making the very strong assumption that each citizen  $j$  looked at every tweet from every elite in time period  $t$  and decided whether or not to retweet each tweet. In fact, that assumption may not hold for any of the citizens in our data except for unusually thorough citizens who want to have all influential Twitter users in their feed. As a result, we are concerned about a form of selection bias in which citizens are only exposed to tweets from those elites who are ideologically proximate to them, either because 1) Twitter’s recommendation algorithm suggests that they follow elites who are ideologically proximate or 2) the citizen prefers to have a network is full of ideological allies or 3) both of these factors in interaction.

For these reasons, we need a separate likelihood for the case when  $Y_{c,g,j,t} = 0$ . To do so, we incorporate the missing-data mechanism employed by Kubinec (2017), in which a hurdle model is used to account for missing data in an ideal point model when missingness is plausibly a function of the value of a person’s ideal points. Given that this missingness pattern is very likely present in our data for the reasons previously described, we define a new likelihood  $L(Y_{c,g,t,j} = 0|\lambda)$  conditional on a different set of parameters  $\lambda$ :

$$L(Y_{c,g,j,t} = 0|\lambda) = \prod_{C=1}^c \prod_{G=1}^g \prod_{J=1}^j \prod_{T=1}^t \text{logit}^{-1}(\delta_{Aj} \alpha_{c,g,t} - \eta_{Aj}) \quad (4)$$

What should be noted about this model is that we now have a Bernoulli-distributed random vari-



able  $Y_{c,j,t} \in \{0, 1\}$ , and so we predict this probability using a logit link function of the parameters in  $\lambda$ . These parameters represent a separate IRT equation with the same elite ideal points  $\alpha_{c,g,t}$  but separate discrimination parameters for the citizens  $\delta_{Aj}$ . These separate set of citizen parameters represent a citizen's latent willingness to look at tweets from across ideological spectrum that is independent of that citizen's own individual ideal point, or what could be thought of as that citizen's desire to be informed of tweets from across the ideological spectrum. We include citizen intercepts  $\eta_{Aj}$  that represent missingness that is ignorable, which will occur if  $\delta_{Aj} = 0$  and the probability of a citizen seeing a tweet is equal to that citizen's average number of tweets per group for the sample period. Ignorable missingness can occur if, for example, a citizen does not see tweets because they are working or on vacation. Importantly, in either case, the elite ideal points  $\alpha_{c,g,t}$  that are our focus of inference will adjust to the uncertainty in this first-stage selection model. Our revised Bayesian model can then be written as follows in terms of the joint distribution of  $Y_{c,j,t} = 0$ ,  $Y_{c,j,t} \neq 0$ ,  $\lambda$  and  $\theta$ :

$$p(\theta, \lambda | Y_{c,j,t} \neq 0, Y_{c,j,t} = 0) \propto p(\theta)p(\lambda). \quad (5)$$

$$[L(Y_{c,j,t} = 0 | \lambda) + (1 - L(Y_{c,j,t} = 0 | \lambda))L(Y_{c,j,t} \neq 0 | \theta)] \quad (6)$$

To finish our model specification, we include here our prior distributions for all other parameters in the model:

$$\eta_{Aj} \sim N(0, 3) \tag{7}$$

$$\delta_j \sim N(0, 3) \tag{8}$$

$$\delta_{Aj} \sim N(0, 3) \tag{9}$$

$$\gamma_{cg} \sim N(0, 3) \tag{10}$$

$$\beta_{c,g,x} \sim N(0, 5) \tag{11}$$

$$\beta_{c,g,I} \sim N(0, 1) \tag{12}$$

$$\beta_{c,g,E} \sim N(0, 1) \tag{13}$$

$$\sigma_{c,g} \sim E(1) \tag{14}$$

$$\tag{15}$$

What is important to note about the prior distributions is that because the outcome is on the exponential scale. As such, the  $N(0, 3)$  and  $N(0, 5)$  represent weak priors, while the  $\beta_{c,g,I}$  and  $\beta_{c,g,E}$  parameters receive stronger unit Normal priors in order to bias the model towards stationarity (although we do not impose a hard constraint).

## References

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