Rough Draft

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Abstract

Tingley, McDermott, and Hatemi (2014) find that olfactory senses could explain assortative mating by ideology. My replication of this paper succeeded except for minor discrepancies which do not affect his conclusions. Through my extension, I further evaluate the three models Tingley, McDermtt, and Hatemi use by applying a bayesian framework instead of a regular linear model. I further use the sampled iterations created by `stan_lm` to graph density plots of the main coefficient being evaluated in the respective models. Through this framework, I confirm that Tingley's model illustrates little variability in their coefficients. The data and code used in this analysis replication is available on my github.[1]

Introduction

Have you ever wondered why dogs smell eachother upon meeting eachother? They use smell in deciding whether or not they like each other, and many more animals do this as well. Tingley, McDermott, and Hatemi take this knowledge to study whether smell affects who we like based on our political ideologies. According to Iyengar, Konitzer, and Tedin (2018), in 2015, there was a spousal [political] agreement level of 81.5%. There are numerous factors that can attribute to such a high percentage like this, but Tingley, McDermott, and Hatemi explore the connection to our sense of smell. In order to do so, they surveyed 146 participants asking them to rate the odor of anonymous targets who were either strong liberals or strong conservatives. With this data, they create three separate models. The models all regress the reported attractive rating on numerous variables. In the first model, they primarily focus on the coeficient explaining when the evaluator and the target shared ideologies. The second two models focus on the coefficient that measures the distance between ideology on a 7 point scale. This coeficient explains how a smaller or larger distance apart in ideology between the evaluator and target leads to different attractive ratings. The constant, or the intercept, in these models explain the predicted shift in attractiveness rating of the targets. Through these models, Tingley, McDermott, and Hatemi observe that their hypotheses hold true even though there were small reported coefficient values.

For my replication, I use R software[2] to translate Tingely's, McDermott's, and Hatemi's Stata code. Their code is available in the Harvard Dataverse here ("Replication Data for: Assortative Mating on Ideology Could Operate Through Olfactory Cues," n.d.). As mentioned, the data and code used in this replication is available on my github[3]. My replication of this paper was successful except for a few minor differences. I successfully recreated the first two models, but had troubles including target and evaluator fixed effects in the third model. Not including the fixed effects left my model three looking slightly different than the original model. I was also unable to successfully cluster my standard errors on a specific evaluator variable, leaving small discrepancies in the standard errors for the entire table. Regardless of these minor details, my overall replication was a success.

[1] ("Mike Silva Replication Project Github," n.d.)
[2] ("The R Project for Statistical Computing," n.d.)
[3] ("Mike Silva Replication Project Github," n.d.)

My extension of the paper focused on further solidifying the significance on Tingley's, McDermott's, and Hatemi's models. In order to do this, I applied a Bayesian framework to the linear models produced. This allowed me to use the sampled iterations that Bayesian models produce in order to evaluate the distributions of the main coefficients being explained. Interpreting these distributions gives a further understanding of the variability in these predicted values, which helps to explain the significance of the model. If there is little variability, then the model correctly explains the data and holds significance. Through my extension, I found that there was a very tight spread of all three main coefficients being evaluated, which proves that the models are significant.

Literature Review

Research on the connection between smell and attraction lead Tingley, McDermott, and Hatemi to their hypothesis on ideology pairings. The science behind our sense of smell differs from our other senses like hearing and seeing. Our olfactory bulb has connections with our emotional responses in the amygdala and our center of memory in the hippocampus[4]. Tingley, McDermott, and Hatemi explain how physically experienced predilections through the sense of smell shape an individual's opinion on cases such as abortion or homosexuality[5]. If the sense of smell can orient an individual's opinions on such topics, then there may be a connection to ideological simmilarities between one another as well. Previous literature on this topic have not involved politics in their research. Mandairon et al.(2009) find how our sense of smell triggers attraction and repulsion responses in our brain, which is a response that we share with mice[6]. Since the release of this paper, there have not been any papers focused on this topic as well.

Paper Review

Tingley, McDermott, and Hatemi create this theoretical piece to explore the many ways that lead to ideological pairings in couples in the United States. Besides religion, human relationships coincide on social and political attitudes more than any other trait. This is not because of increased time spent with one another, rather it happens before the pair even knows eachother. Many animals use their sense of smell to base their opinions on others. Have you ever seen two dogs interact for the first time and immediately sniff eachother? The basis that smell triggers emotional responses creates Tingley, McDermott, and Hatemi's work. They hypothesize that people with the same ideology are more likely to give high ratings of attractiveness to eachother. In order to do this, they have 21 participants wear pads on their armpits for a specific amount of time. These participants are instructed to follow strict living guidelines to ensure there was control in the experiment. After the alotted time, the participants turn in their armpit pads, which are locked away in freezers. The 119 evaluators then come in, and rate the attractiveness of odor for each pad. Through this experiment, the evaluators are unaware of the political ideology of the person who's armpit pad they are rating. In one model, binary versions of ideology are created by grouping all respondents who rated themselves as 4 or higher on the ideology scale as Conservative and the rest as Liberal. The other two models take the negative absolute value between the evaluator and the target to show how larger and smaller gaps in ideology effect the attractiveness ratings. Through these results, Tingley, McDermott, and Hatemi find that evaluators gave higher attractiveness ratings to targets with the same or close to same ideology of themselves, which successfully proved their hypothesis. Through the discussion, it is noted that olfactory mechanisms are not the only way nor the most dominant way in which ideologically similar couples come about. Instead, this paper suggests that olfactory mechanisms are one of the many ways that humans find compatable spouses.

[4]McDermott, Tingley, and Hatemi (2014)
[5]McDermott, Tingley, and Hatemi (2014)
[6]Mandairon et al. (2009)

Replication

Appendix

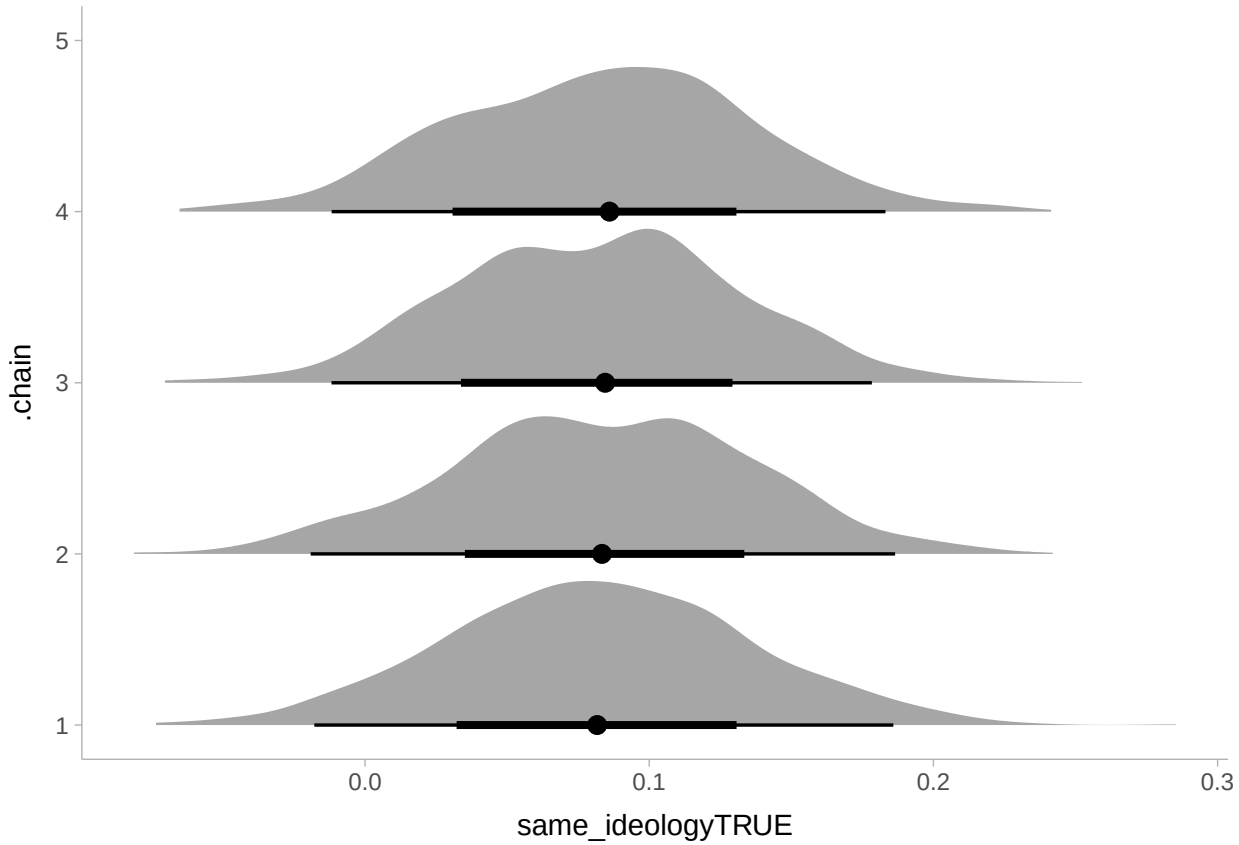
Table 1: Odor Attraction as a Function of Ideological Similarity

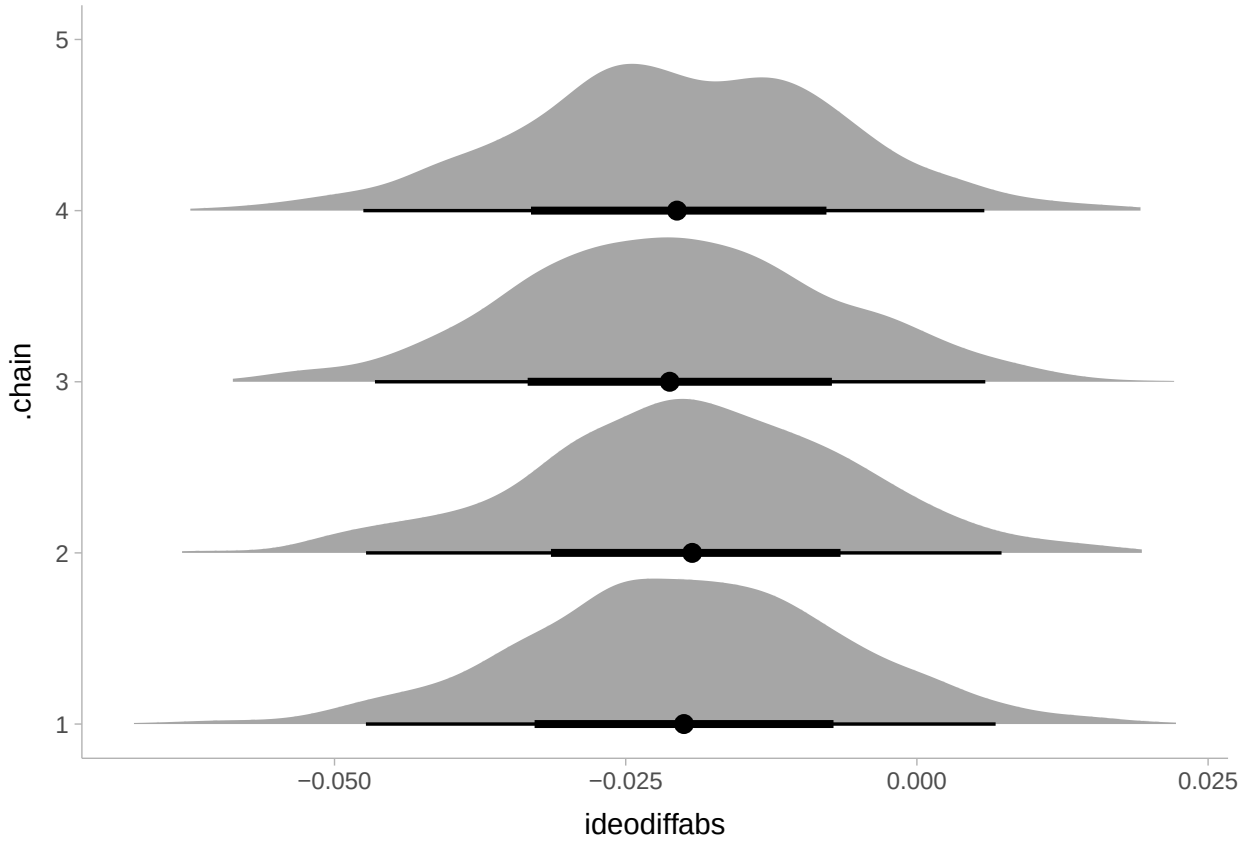
	Model 1	**Model 2**	**Model 3**
Same Ideology	0.0853		
	(0.0522)		
- Abs Ideology Diff.		−0.0206	0.0008
		(0.0142)	(0.0163)
Same Sex	−0.1436***	−0.1430***	−0.1877***
	(0.0507)	(0.0508)	(0.0618)
Conservative Eval.	−0.0056		
	(0.0540)		
Conservative Target	0.0196		
	(0.0522)		
Ideology of Eval.		−0.0009	
		(0.0136)	
Ideology of Target		0.0056	
		(0.0121)	
Male Evaluator	−0.00003	0.0004	
	(0.0523)	(0.0522)	
Male Target	−0.0174	−0.0141	
	(0.0526)	(0.0533)	
Avg. Target Attract	0.9990***	1.0012***	
	(0.0404)	(0.0406)	
Avg. Eval. Attract	0.9988***	0.9988***	
	(0.0463)	(0.0463)	
Constant	−3.5759***	−3.5058***	3.7053***
	(0.2254)	(0.2267)	(0.0580)
N	2195	2195	2195

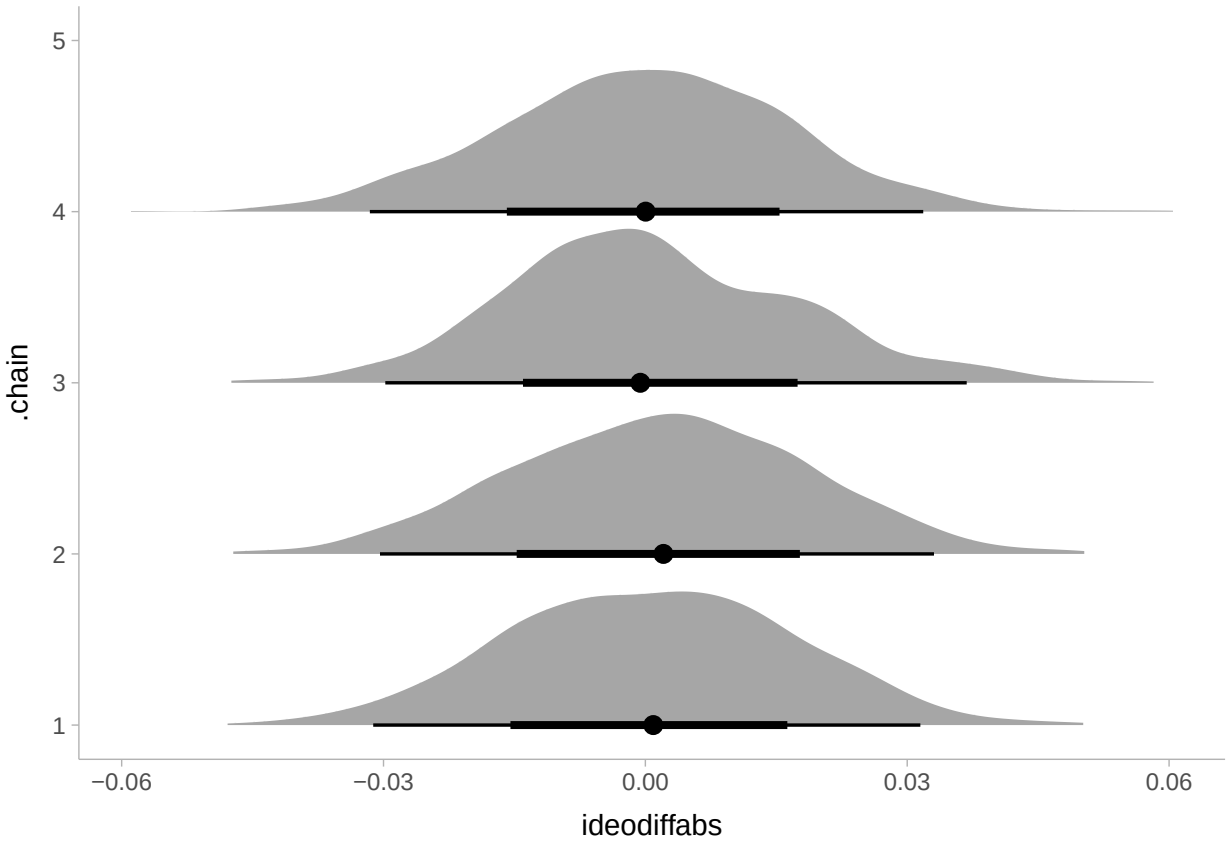
***p < .01; **p < .05; *p < .1

Extension

Pictured below are individual graphs for each focused parameter in Tingley's three models. These graphs illustrate the distribution of those variables sampled from the model using `stan_lm`.


.chain
5
4
3
2
1
0.0
0.1
0.2
0.3
same_ideologyTRUE


.chain
5
4
3
2
1
−0.050
−0.025
0.000
0.025
ideodiffabs



Through this graph, we can see how well the data explains the outcome we are looking at in our model, which is the measure of attractiveness of the subjects. The dark blue line illustrates the actual outcomes of the model. As you can see, there is a lot of fluctuation between each value. This is because the observers only graded on a whole number scale. The peaks in each hump represent each value- there are 7 peaks that coordinate to each of the 'attractive' values. The faded blue line refers to the posterior iterations ran using pp_check that predicts outcomes using the information in our model.

Through this graph we can confidently say that our model significantly explains the data. In most cases the predicted values align closesly with the outcome variables, emphasizing how the model is representative of the data. In a the cases of attractive values 1, 4, and 5, the predicted values underestimated compared to the actual values. This may be because there is less data for those values, so the prediction is less accurate. Regardless, this graph confirms the accuracy and significance of the model created by Tingley et al.

Selected Bibliography + References:

Iyengar, Shanto, Tobias Konitzer, and Kent Tedin. 2018. "The Home as a Political Fortress: Family Agreement in an Era of Polarization." *The Journal of Politics* 80 (4): 1326–38.

Mandairon, Nathalie, Johan Poncelet, Moustafa Bensafi, and Anne Didier. 2009. "Humans and Mice Express Similar Olfactory Preferences." *PloS One* 4 (1).

McDermott, Rose, Dustin Tingley, and Peter K. Hatemi. 2014. "Assortative Mating on Ideology Could Operate Through Olfactory Cues." *American Journal of Political Science* 58 (4): 997–1005. https://doi.org/10.1111/ajps.12133.

"Mike Silva Replication Project Github." n.d. https://github.com/mikesilva23/replication_1006.

"Replication Data for: Assortative Mating on Ideology Could Operate Through Olfactory Cues." n.d.

"The R Project for Statistical Computing." n.d.