QUESTIONS by ML 270619

Red: Justin

Purple: marjaana

3. Many variables are missing: trauma, family, culture, presence of atheist, level of education and study topic. We have to report correlations for all variables whether they were low or high. These are needed not only by the journal but also because I am not able to write or think about the discussion without more exact information.

Indeed, those were variables that we said before weren’t interesting.

When we skyped, I made this list for variables that we decided to delete: “Inquisitive encourage, apologetic information, freethought information, general religious interest, family influence (because there is the other family variable), friend influence and presence of atheists”. We have not discussed deleting trauma, family, culture, level of education or study topic. Presence of atheist we decided to delete, yes, but because it was included in your previous results, I tried to integrate this variable in the last version of the Introduction and the figure.

In the later correlation all variables were included. So, I’ll need to know definitively if we want correlations with these variables, or regressions with all of these variables (see comment below).

## Regression

We also utilized regression to understand the positive and negative effects of different variables on god beliefs and supernatural beliefs.

In order to better understand the key variables of our model, we can trim down to just the most important variables from the literature. This regression results are found below.

4. Why not from the correlations? It would be extremely difficult to justify this by ‘the literature’ and it is a normal way to exclude variables that do not correlate with the dependent variable.

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Beta (standardized) | t | p |
| INTELLIGENCE | -0.0039 | -199.49 | <.01 |
| TRAD\_SELF\_CONT | 0.0039 | 115.22 | <.01 |
| INTUITIVE\_THINKING\_STYLE | 0.0019 | 79.30 | <.01 |
| COGNITIVE\_REFLECTION | -0.0039 | -194.13 | <.01 |
| NEED\_FOR\_COGNITION | -0.0039 | -199.77 | <.01 |
| Fact\_resistance | 0.016 | 421.99 | <.01 |
| Cognitive\_inhibition | 0.00034 | 1.80 | .07 |
| Ontological\_confusion | 0.99 | 5243.04 | <.01 |

General model statistics: *RSE* = 2.05, *df* = 19991, *r2* = 1, *f* = .000000032(8,19991), *p* < .01.

If it is by correlations or regression, it is largely up to you guys I think. As you know though, there are different assumptions about the two methods, and their interpretation. As we are aiming to suggest a relationship between all of the variables and god belief (although they might not be equal, they are not necessarily independent), as opposed to just any one variable at a time independently, it makes the most theoretical sense to also present a regression.

Ok, we can do this according to the literature, but then factual knowledge should be included. If you read the Introduction, or look at the Figure, you notice that it can’t be left out. (Overall, I think that most, if not all our misunderstandings between you Justin and I would be reduced if you read the Introduction and told me which issues we can / do address and which we don’t + which text should be deleted or changed).

Factual knowledge was not included because there was no correlation discerned (see full correlation table I included before). I think that at this point we do have our wires crossed. So, what I will need is a list of exactly what regressions and correlations you are looking for.

The variables that we have data for are as follows (just for information: variables in all caps are parameters, all others are not):

"PRESENCE\_OF\_A"

"FIRST\_TRAUMA"

"FREQ\_OF\_TRAUMA"

"INTELLIGENCE"

"INIT\_COG\_INHIBITION"

"COG\_INHIB\_DEPLETION"

"INIT\_RELIGIOUS\_INFO"

"FAMILY\_RELIGIOUS\_IMPORTANCE"

"INIT\_FACT\_INFO"

"EVENT\_INTENSITY"

"START\_UG\_AGE"

"START\_PG\_AGE"

"END\_UG\_AGE"

"STUDYTOPIC"

"TRADITION\_SELF\_CONT"

"INTUITIVE\_THINKING\_STYLE"

"COGNITIVE\_REFLECTION"

"NEED\_FOR\_COGNITION"

"ENV\_RELIGIOUS\_IMPORTANCE"

"fact\_resistance"

"cognitive\_inhibition"

"factual\_information"

"ontological\_confusion"

"analytical\_thinking\_style"

"godBelief"

“supernaturalBelief”

5. The results are not sensible. Ontological confusions cannot explain everything (they can’t have a beta which is 250 times higher than the beta of the other variables)

When it comes to these betas, remember, this is just for our simulated data, not for a psychological experiment, so we don’t need these betas to align perfectly for our purposes. Instead, we should focus on directionality. We can always weight ontological confusions in a later publication to match more reliable betas from the literature. At this point though, it makes the most sense for us to focus on the directionality of these relationships and later we can revise it for relative weighting, but I think we can argue that this is beyond the scope of our current publication. So we should ask ourselves if it is the directionality of the results that are not sensible or just the beta for ontological confusion?

But we already know all directionalities (based on earlier studies). What we do not know is the order of importance of the predictors, and this is would be of crucial importance. If we only get directionalities, what is the new information this study adds?

Ouch, I don’t understand the difference between the correlations or betas in a psychological experiment and in the simulation. I noticed that there was a correlation of 1.00 between god belief and ontological confusions, for example. That would of course be impossible in an empirical study because they are totally different things. This is probably related to the directionality issue as well. But I really don’t know how to write the Discussion if we just replicate what everybody already knows (= the mere directionalities in the correlational and regression analyses).

This is possible in later studies. It is beyond the scope of the current paper. In simulated data, we are looking at theoretical proposals. In empirical data we’re looking at what is, rather than what we propose ought to be. In effect, our data is like collecting a lifetime of data on 20,000 people with a perfectly random sample. So when we look at the analytical results of our data, we should keep this in mind; in comparison, empirical data from a psychological experiment will get one data point on only 3 or 4 of these variables (at best we could get a few time steps on a handful of these variables). The fact that we have replicated what everyone already knows is actually extremely valuable and demonstrates the validity of the model. While other studies have shown some of these relationships, from what was said in Lesbos, having all of these variables simultaneously presented in a single model, calculated continuously over time, is valuable in itself as well. So, I worry now that if we aren’t able to suggest that we’ve helped the literature that we should abandon the issue entirely.

# Optimization

\* For Tommy only

# Calibration



8. These results are scary strange. For example, traditional values and intuitive style ‘explain’ both the conversion from religious to atheist and from atheist to religious etc. I hope that the explanations for this table Justin promised to write clear things up.

For now, let’s set this aside since its not going in this publication.

Yes, this is going to the publication. (Please Justin read the Introduction, even superficially). It is the Optimization part which goes to the other publication, as stated above (“For Tommy only”).

I’m aware of the introduction, but I thought from our skype that these would be left out. If we want to keep them in we have to first understand that there is no “significance testing” here, it is a multi-dimensional parameter search and no single parameter can be taken out of the context of all other parameters simultaneously. In this sense, all of the variables that are inputs in the model “explain” each of the settings. There is no relative weighting or strength, nor is there significance for any one variable. Rather, the question for the analysis is better put as “are you 95% certain that this set of variables is the best to replicate the pattern you’re looking for?” when the computer is sure the answer is yes, it stops. These are those sets of variables.

**9. PLEASE JUSTIN, tell us the reason why ontological confusions are not included! I know that this is one of the hundred times asked questions, but the response that ontological confusion is a parameter is just not enough**. I repeat myself: “. So please, I would really appreciate it if I could get some … text sections about these issues intended to be included in the manuscript (keeping in mind the intelligence researcher R. Sternberg’s tip to get articles published: ”Write for a somewhat broader and technically less skilled audience than you expect to read the article”).”

Again, we should set this aside. As we’ve mentioned before, it comes down to the fact that ontological confusion is effectively an output in our model, not an input. So we can’t manipulate an output in an optimization experiment. We can only set inputs and see which one gets closest to our desired output. We can’t currently optimize for multiple outputs at once, so we only chose god beliefs to be our target for the optimization.

No, this cannot be set aside, because this is the most important topic in this article. And I’m sorry but it does not help that the word ‘parameter’ is replaced with the word ‘output’, because in my mindset the output is and should be “Always atheist”, “always strong atheists” etc. So I repeat: please, just write one sentence about the results in the above table so that the sentence includes the words ‘ontological confusions’ = a sentence which could be included in the manuscript, not a sentence for me.

Ontological confusions cannot be included in the optimization or calibration analysis. You cannot test an IV as a DV in your analysis, and what you’re effectively asking is for an analytical procedure that can only look at how to match a longitudinal dependent variable based on a set of independent variables, you want me to tell you what the answer is in regards to a mediating variable. It simply cannot be done in this manner. As such, I again think we should strongly consider cutting all calibration and optimization experiments out of the paper.

10. And also in general, the variables included in this analysis should either be exactly the same as in the correlation table, or the exclusion of some variables should be clearly justified.

As these are limited to only the set of parameters that we can input into the model, it wouldn’t make sense that they are all exactly the same as some of our correlations are mechanisms and outputs. In any case, we should leave the optimizations aside for now as discussed in our last skype.

But I am asking about the table in the Calibration chapter, not in the Optimization chapter. In my mind, the correlations and regressions tell about how the variables predict God belief and how they interact, and the Calibration tells how the same variables behave when one turns from atheist to religious and vice versa. But this is a serious misunderstanding, isn’t it? Anyway, this is how the Introduction has been written.

It is indeed a misunderstanding, I think. I don’t think that we need to set up the introduction for the calibrations even if they are ultimately included. We can put them forward as additional model exploration.

12. What about the flows? They were included in the early version, and they caused me great headache when writing the Introduction. Is there a similar flow table coming up?

We can include the visualization of the flows if we want. That can always be inserted as a figure.

Oh, I am happy if it can be left out. In the first version there was both the table and a figure. Do you mean that both of them could be excluded from the manuscript? That would change the Introduction a lot, because justifying all flows in the Introduction was really difficult and some of the related text may not be fully defensible. As I wrote to you, the purple text in the Introduction is about the (old) flows.

In the model description we will include links to the actual model itself and its code. We will also include a list of variables as a table. I think that is easier than the visual presentation of the flows themselves, which can be found by opening the model (which is going to be as simple as a doubleclick when its hosted in the could).