Pre-analysis plan:
Additional Sessions for "Anchoring and Subjective Belief Distributions"

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1) Purpose and Motivation

In May 2023, we conducted an online experiment to study how the anchoring effect affects estimations of subjective belief distributions (SBDs). This experiment showed that (1) the classical anchoring effect on means was smaller when we elicited full SBDs rather than means and (2) presenting participants with an anchor moved probability mass towards the anchor, reducing its variance and increasing (decreasing) the skewness for low (high) anchors respectively. The pre-registration and pre-analysis plan for this experiment are available at: https://www.socialscienceregistry.org/trials/11396.

The present experiment replicates the design of the original experiment with a different elicitation procedure for the SBDs. The purpose of this is to investigate how the results from our original experiment are affected by the specific way the elicitation procedure was implemented. In what follows, we will present a brief overview of the design of the new experiment, alongside a pre-analysis plan and power calculation.

2) Design

2.1) Overview of Original Experiment

In our original experiment, we asked participants to estimate historical hotel prices in Rome, using either a point estimate (the mean) or a subjective belief distribution (SBD). Prior to either belief elicitation, subjects were given either a low (134) or a high anchor (546; irrelevant pieces of information). We also included a control group, whose beliefs were elicited using a distribution but received no anchor, to serve as a baseline for a belief distribution in the absence of anchoring. The design and results of our original experiment can be found in our working paper, which is uploaded as part of the pre-registration page.

2.2) Overview of New Experiment

Our new experiment follows the design of our old experiment closely, with two main exceptions.

First, we replace the SBD elicitation task (the click-and-drag tool of Crosetto and de Haan, 2023) with the Number Input elicitation similar to that used in the New York Fed's Survey of Consumer Expectation (Armantier et al, 2016). Replicating our results using this task allows us to speak more directly to other research using this method. Second, to save time, we removed a second anchoring task as well as several other measures we previously collected on e.g., financial literacy. Instead, we will only elicit some basic demographics at the end of the experiment.

3) Analysis

3.1) *Main Analysis*

Within our new experiment, we will test the exact same set of three primary hypotheses that we tested in our original experiment, using the same statistical tests except with one small extension (indicated *in cursive*). These are the following:

H1 (anchoring): The mean price elicited with a low anchor is lower than that elicited with a high anchor.

We test this hypothesis using a one-sided two-sample t-test comparing the mean in the high-anchor treatment to the mean in the low-anchor treatment. We do this separately for both the SBD and mean elicitation tasks. We then run an OLS regression of the mean price on a dummy for the high anchor treatment while controlling for Age, Gender, and Education. For this regression and all other regressions we will use robust standard errors unless otherwise specified. This analysis is identical to the analysis reported in our paper and original pre-analysis plan.

H2 (treatment comparison): The anchoring effect is smaller when the mean price is elicited using SBD than when it is elicited as a point estimate.

We test Hypothesis 2 using a one-sided difference-in-difference test, that is, an OLS regression of the mean price on a dummy for the two high-anchor treatments, a dummy for the two SBD treatments, and their interaction (the main variable of interest). We also run a second regression controlling for Age, Gender, and Education.

H3A (variance): A low anchor does not change the coefficient of variation of the elicited SBD relative to the control treatment.
H3B (variance): A high anchor does not change the coefficient of variation of the elicited SBD relative to the control treatment.

We will test this hypothesis using two two-sided two-sample t-tests and then run two OLS regressions for subjects receiving the relevant treatment (either high anchor, or low anchor. with the no-anchor treatment as the control group) with a dummy for the relevant treatments (HD or LD) and controlling for Age, Gender, and Education. In both cases, we will look at the coefficient of variation as the object of interest. *We will also separately look at the standard deviation as well (this was not part of the pre-analysis plan for our original experiment).*

3.2) *Secondary Analysis*

As in our original pre-analysis plan, we also intend to look at the **skewness** of the elicited SBD. We will use two two-sample two-sided t-tests to test whether the skewness in the respective anchor treatments differs from the skewness in the control treatment. We will also run an OLS regression for subjects with the skewness coefficient as the dependent variable and with the dummy variables for the high and low anchor treatments while controlling for Age, Gender, and Education.

Finally, we will also compare the results of our new experiment to our original experiment. For this purpose, we will interact the relevant coefficients with an experiment dummy and test whether this interaction is significant.

4) Data collection and sample size

We use the exact same data collection strategy as in our original experiments, using American subjects over the age of 18. We also aim for the same sample size as in our previous experiment (150 participants in each of our five treatments). These sample sizes give us a power greater than 0.99 for hypothesis 1 and greater than 0.80 for both hypothesis 2 if we assume that the means (sds) are 180 (100) and 300 (160) for the low-anchor and high-anchor means treatments respectively, and half that size for the SBD treatments. Since we found larger effects in our original study, our actual power may be larger even for hypothesis 2.

References

Armantier, O., Topa, G., van der Klaauw, W., & Zafar, B. (2016). An overview of the survey of consumer expectations. *Federal Reserve Bank of New York Staff Reports*, No. 800.

Crosetto, P., & de Haan, T. (2023). Comparing input interfaces to elicit belief distributions. *Judgement and Decision Making*, 18, e27.