Loss aversion or preference imprecision? What drives the WTA-WTP disparity? An experimental illustration*

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Abstract

We report results of an experiment decomposing the disparity between willingness-to-pay (WTA) and willingness-to-pay (WTP) into two leading motives: loss aversion and preference imprecision. Our experiment is based on a method developed in a related paper Lewandowski et al. (2026).

Keywords: willingness to accept, willingness to pay, uncertainty aversion, loss aversion, incomplete preferences, short sales

JEL classification: D81, D91, C91

1 Introduction

Lewandowski et al. (2026) presented a model that allows for a decomposition of the disparity between willingness-to-accept (WTA) and willingness-to-pay (WTP) into two mechanisms: loss aversion and preference imprecision. In this paper, we

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report the results of an experiment that elicits the relative strength of both these mechanisms.

The two mechanisms currently are the leading explanations of the WTA-WTP disparity. The prevalent behavioral explanation is based on loss aversion (Kahneman and Tversky, 1979; Marzilli Ericson and Fuster, 2014). It is based on the idea that *losing something hurts more than gaining the same thing pleases.*

Recently, Chapman et al. (2023) have found that the WTA-WTP gap is not correlated with loss aversion for risky prospects. This has revived interest in explanations based on preference imprecision/caution (Dubourg et al., 1994; Cubitt et al., 2015; Cerreia-Vioglio et al., 2024). These explanations are based on the idea that *if the good's value is uncertain, the decision maker becomes more inclined to buy low and sell high as a precaution.*

The approach of Lewandowski et al. (2026) allows for a decomposition of WTA-WTP gap into two parts: one due to preference imprecision and one due to loss aversion (defined as a residual). In the referenced study, the authors propose two WTA-WTP decompositions based on the boundary prices, and the two decompositions produce the lower and upper bound of preference imprecision. WTP is measured by a buying price. WTA is measured as a short-selling price.[1]

In this paper, we elicit the *no buying price* and the *no short-selling price* of a prospect. The no buying price is the minimum price such that the decision maker is sure that the status quo is no worse than buying the prospect at this price. The no short-selling price is the maximum price such that the decision maker is sure that the status quo is no worse than short-selling the prospect at this price. Buying and no buying prices (and analogously, short-selling and no short-selling prices) are

[1]Many papers define WTA as selling price instead of short-selling price. While the net position under selling and short-selling is the same, the two tasks differ in the initial endowment. When selling the prospect, the decision maker initially owns the prospect. When short-selling the prospect, the decision maker does not own the prospect and takes a short-position in the prospect. Under selling, you sell the lottery ticket issued by a third party. Under short-selling, you issue the lottery ticket to the buyer.

elicited using a modified multiple price list (MPL) procedure (see Cubitt et al. (2015), Agranov and Ortoleva, 2025, and Andersen et al. (2006)). In MPL, prices are listed in ascending order across rows, and for each price subjects choose among three options: *I certainly would buy (short-sell)*, *I am not sure*, and *I certainly would not buy (short-sell)*. The switching point away from the first option defines the buying (or short-selling) price, while the switching point away from the third option defines the no-buying (or no-short-selling) price.

The paper is organized as follows. Section 2 introduces theoretical results from Lewandowski et al. (2026) necessary for the decompositions we study. Section 3 describes the conduct of the experiment. Section 4 reports results. Section 5 presentes the discussion. Experimental instructions and screenshots are presented in Appendix A and B. The code and data can be found in the Open Science Framework repository: `https://osf.io/4uenj`.

2 Theory

S:Theory

Let S be a finite set of states. Its subsets are called events. Given a nonempty event A and real numbers x, y, a binary prospect $f = (x, y; A)$ is a real-valued mapping on S such that $f(s) = x$ if $s \in A$ and $f(s) = y$ if $s \in S \setminus A$. Let $\mathcal{F}$ denote the set of binary prospects. We denote by λ ($\in \mathbb{R}$) a constant prospect whose values are λ for all states. Prospect 0 represents the status quo. We assume preferences over binary prospects $\succcurlyeq$ satisfy assumptions **B0**–**B2** of Lewandowski et al. (2026) (preorder, monotonicity and continuity). $\succ, \sim, \bowtie$ denote, respectively, the asymmetric, symmetric and indecision part of $\succcurlyeq$. We say that events A and A^c are symmetric for $\succcurlyeq$ if, for all $x, y \in \mathbb{R}$, $(x, y; A) \succcurlyeq 0 \iff (x, y; A^c) \succcurlyeq 0$, and the same implication holds when $\succcurlyeq$ is replaced by $\preccurlyeq$. We say that a binary prospect $(x, y; A)$ is symmetric if the events A and A^c are symmetric.

For a binary prospect $f \in \mathcal{F}$, we define the following four price functionals:

$$\text{buying price} \quad B : \mathcal{F} \to \mathbb{R} \qquad B(f) = \max\{\theta \in \mathbb{R} : f - \theta \succcurlyeq 0\}, \tag{1}$$

$$\text{no buying price} \quad B_n : \mathcal{F} \to \mathbb{R} \qquad B_n(f) = \min\{\theta \in \mathbb{R} : 0 \succcurlyeq f - \theta\}, \tag{2}$$

$$\text{short-selling price} \quad B^* : \mathcal{F} \to \mathbb{R} \qquad B^*(f) = \min\{\theta \in \mathbb{R} : \theta - f \succcurlyeq 0\}, \tag{3}$$

$$\text{no short-selling price} \quad B_n^* : \mathcal{F} \to \mathbb{R} \qquad B_n^*(f) = \max\{\theta \in \mathbb{R} : 0 \succcurlyeq \theta - f\}. \tag{4}$$

We have the following definitions:

Definition 1 (UA)**.** $\succcurlyeq$ *is* ***uncertainty averse*** *if* $f \succcurlyeq 0$ *implies* $-f \not\succcurlyeq 0$ *for all* $f \in \mathcal{F} \setminus \{0\}$.

Theorem 1. $\succcurlyeq$ *is uncertainty averse if and only if* $B^*(f) - B(f) > 0$ *holds for every* $f \in \mathcal{F} \setminus \{0\}$. ∎

Thus, uncertainty aversion is equivalent to the WTA–WTP disparity. Our objective is to decompose this disparity into two components: the part attributable to preference imprecision, and a residual component capturing the portion of uncertainty aversion about which the decision maker is confident.

Our framework is deliberately general and imposes no restrictions beyond those required to ensure the existence of the boundary prices defined in (1)–(4). As a consequence, identification of these two components is only partial. In more structured models, full identification is often achievable, as illustrated in (Lewandowski et al., 2026, Example 2).

However, our aim is to remain agnostic about the underlying model and to identify ranges for preference imprecision and for the "sure" component of the WTA–WTP disparity using only the elicited boundary prices. Accordingly, we present two decompositions: one that delivers an upper bound on preference imprecision, and another that delivers a lower bound.

2.1 Sure uncertainty aversion decomposition

The first decomposition, providing an upper bound on preference imprecision, relies on the following residual concept:

Definition 2 (Sure UA)**.** $\succcurlyeq$ *is* ***surely uncertainty averse*** *if* $0 \not\succ f$ *then* $0 \succ -f$ *for all* $f \in \mathcal{F} \setminus \{0\}$*.*

prop:UA2

Theorem 2. $\succcurlyeq$ *is surely uncertainty averse if and only if* $B^*(f) - B(f) > 0$ *and* $B_n^*(f) - B_n(f) \geq 0$ *for every* $f \in \mathcal{F} \setminus \{0\}$*.*

The decomposition is given by

Eq:decomposition

$$\text{decomp 1:} \quad \underbrace{B^*(f) - B(f)}_{\text{UA}} = \underbrace{B^*(f) - B_n^*(f)}_{\text{PI}_{-f}} + \underbrace{B_n^*(f) - B_n(f)}_{\text{sure UA}} + \underbrace{B_n(f) - B(f)}_{\text{PI}_f} \quad (5)$$

where:

$$\begin{aligned} \text{PI}_f &:= \{\theta \in (B(f), B^*(f)) : \ 0 \bowtie f - \theta\} \\ \text{PI}_{-f} &:= \{\theta \in (B(f), B^*(f)) : \ 0 \bowtie \theta - f\} \\ \text{sure UA} &:= \{\theta \in (B(f), B^*(f)) : \ 0 \succcurlyeq f - \theta \ \wedge \ 0 \succcurlyeq \theta - f\} \end{aligned}$$

2.2 Strong uncertainty aversion decomposition

The second decomposition, which delivers a lower bound on preference imprecision, is based on the following residual notion

Definition 3 (Strong UA)**.** $\succcurlyeq$ *is* ***strongly uncertainty averse*** *if* $f \succcurlyeq 0$ *implies* $0 \succ -f$ *for all* $f \in \mathcal{F} \setminus \{0\}$*.*

Theorem 3. $\succcurlyeq$ *is strongly uncertainty averse if and only if* $B^*(f) - B(f) > 0$*,* prop:UA3 $B^*(f) - B_n(f) \geq 0$ *and* $B_n^*(f) - B(f) \geq 0$ *for every* $f \in \mathcal{F} \setminus \{0\}$*.*

This leads to the following two decompositions:

$$\text{decomp 2a:} \qquad \underbrace{B^*(f) - B(f)}_{\text{UA}} = \underbrace{B^*(f) - B_n(f)}_{\text{strong UA}_f} + \underbrace{B_n(f) - B(f)}_{\text{PI}_f}. \tag{6}$$

Eq:decomposition2a

$$\text{decomp 2b:} \qquad = \underbrace{B^*(f) - B_n^*(f)}_{\text{PI}_{-f}} + \underbrace{B_n^*(f) - B(f)}_{\text{strong UA}_{-f}}. \tag{7}$$

Eq:decomposition2b

where

$$\text{strong UA}_f := \{\theta \in (B(f), B^*(f)) : \ 0 \succcurlyeq f - \theta\}$$
$$\text{strong UA}_{-f} := \{\theta \in (B(f), B^*(f)) : \ 0 \succcurlyeq \theta - f\}$$

3 Method

S:Experiment

3.1 Participants

Ninety-two undergraduate and master's students (ages 19–33) from the SGH Warsaw School of Economics, WSB Merito University, and the Higher School of Education in Sports participated in the study. Institutional approval to conduct the experiment was obtained from each participating institution. Participation was voluntary and unpaid.

The experiment was not incentivized. The rationale for this design choice, and the challenges associated with incentivizing this class of experiments, are discussed in the Discussion section. In total, 207 respondent–prospect observations were collected. After excluding incomplete responses (e.g., due to early survey termination), the final sample comprised 170 observations.

3.2 Design

3.2.1 Prospects

Each prospect involved drawing one ball at random from an urn containing 90 balls. Balls were either red or blue. Drawing a red ball yielded the higher payoff, whereas drawing a blue ball yielded the lower payoff. A prospect was defined by a pair $(source, payoffs)$.

The source of uncertainty took one of three forms:

- **Risk**: The urn contained 45 red balls and 45 blue balls.
- **Uncertainty**: The composition of the urn was unknown.
- **Partial uncertainty**: The urn contained 30 red balls, 30 blue balls, and 30 balls of unknown color.

The payoffs were one of two ordered pairs: 600–100 PLN or 400–300 PLN.

3.2.2 Tasks

For each prospect, participants completed three pricing tasks:

- **Buying**: *Ticket X entitles the owner to draw one ball from the urn. Several possible prices are presented, and participants indicate whether they would buy the ticket at each price.*
- **Selling**: *Ticket X entitles the owner to draw one ball from the urn. Participants are asked to imagine that they already own such a ticket and to indicate whether they would sell it at each presented price.*
- **Issuing (short-selling)**: *Ticket X entitles the owner to draw one ball from the urn. Participants may issue one such ticket to another (anonymous) person in exchange for a sure payment, while committing to pay the realized prize after the*

draw. Participants indicate whether they would issue the ticket at each presented price.

3.2.3 Assignment to Conditions

Participants were randomly assigned to one of three groups that differed in the prospects evaluated:

- **Group A**: (risk, 600–100) and (risk, 400–300),
- **Group B**: (uncertainty, 600–100) and (uncertainty, 400–300),
- **Group C**: (risk, 600–100), (partial uncertainty, 600–100), and (uncertainty, 600–100).

For each prospect, participants completed three multiple price lists (MPLs): one eliciting buying and no-buying prices, one eliciting selling and no-selling prices, and one eliciting issuing (short-selling) and no–short-selling prices. Consequently, participants in Groups A and B completed six tasks, whereas participants in Group C completed nine tasks.

The order of prospects and the order of tasks within each prospect were randomized. Full instructions, MPL tables, and the comprehension quiz are provided in the Appendix. Data and analysis code are publicly available on the Open Science Framework (`https://osf.io/4uenj`).

3.3 Materials and Apparatus

The experiment was implemented using *oTree*, an open-source platform for conducting web-based interactive experiments. Registered participants received a link to the online study, and data were collected via the Heroku cloud infrastructure.

3.4 Procedure

Preferences were elicited using multiple price lists (MPLs). Each MPL presented a sequence of prices for a given prospect. For each price, participants selected one of three options: *"I certainly would buy"*, *"I am not sure"*, or *"I certainly would not buy"*.

A participant behaving consistently should accept the ticket at low prices and reject it at high prices, possibly expressing uncertainty at intermediate prices. The price at which a participant first switched from *"I certainly would buy"* to either of the other two options defined the upper bound of the buying-price range. The price at which the participant first switched to *"I certainly would not buy"* defined the lower bound of the no-buying-price range. Buying and no-buying prices were identified using the midpoint of these ranges; results were robust to alternative definitions using minimum or maximum values.[2]

Short-selling MPLs followed the same structure, except that the rational switching direction was reversed: issuing a ticket yields a sure payment upfront, so a rational participant should accept high prices and reject low prices.

Before completing the experimental tasks, participants received training on the MPL format and were required to correctly answer comprehension questions to ensure understanding of the task structure.

4 Results

S:Results

Figure 1 presents the decompositions for prospects with payoffs $(600, 100)$. The upper panel displays the sure UA decomposition; the lower panel shows the mean of the two strong UA decompositions, which were very similar.

We identify four groups of individuals (separated by dashed vertical lines): (1) A group for which the entire gap consists of sure/strong UA (positive or negative); (2) A group for which both components of the decomposition are strictly positive;

[2]The same procedure was applied to identify selling and short-selling prices.

(3) A group for which the entire gap is due to imprecision; (4) A group for which the sure/strong component is negative (uncertainty loving). In the fourth group, the overall UA gap may be positive or negative depending on whether positive imprecision outweighs negative sure/strong UA.

5 Discussion

S:Discussion

5.1 Correlation between WTA and WTP and between the WTA-WTP gap and loss aversion

Recently, Chapman et al. (2023) showed that WTA and WTP are not correlated and that the disparity between them is only weakly correlated with loss aversion. This challenges the view that loss aversion is the main explanation for the WTA–WTP disparity. We re-examine their findings using our dataset, our measure of WTA, and our measure of loss aversion. The left panel of Figure 2 shows the relation between WTA and WTP, and the right panel shows the relation between the WTA–WTP disparity and loss aversion. While we replicate their finding of no correlation between WTA and WTP, we document a positive correlation between the WTA–WTP gap (UA) and our measure of loss aversion (sure UA).

5.2 Incentive problems in experimental design

Incentive-compatible elicitation procedures are standard in experimental economics, typically implemented by (randomized) monetary payoffs based on elicited preferences. In applying our setting, however, two difficulties arise. First, it is unclear how to incentivize the elicitation of loss aversion. Our framework compares the prices of f and $-f$, and at least one of these prospects involves negative payoffs. For truthful revelation, participants must treat such losses as real possibilities, which conflicts with the usual requirement that participants should not lose money. Previous studies

Figure 1: Decomposition of UA (i.e., the WTA-WTP gap). Each vertical segment represents one individual. The upper panel presents decomposition 1. The bottom panel presents the mean of decomposition 2a and 2b. An absolute part of the UA attributed to preference imprecision is presented in orange (always positive), while the sure or strong part of the gap is presented in blue. Respondents are ordered by UA (black line), seperately within four groups (explained in main text). The upper panel is clipped at 600.

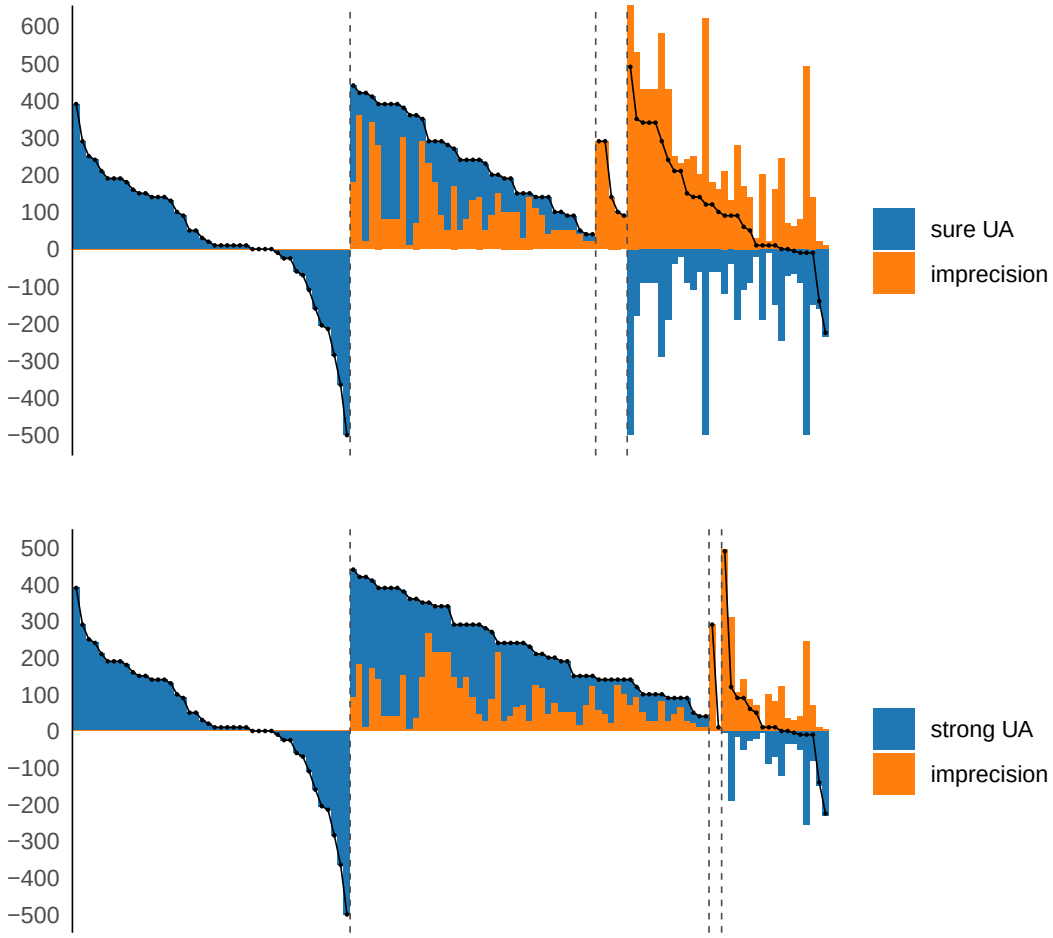
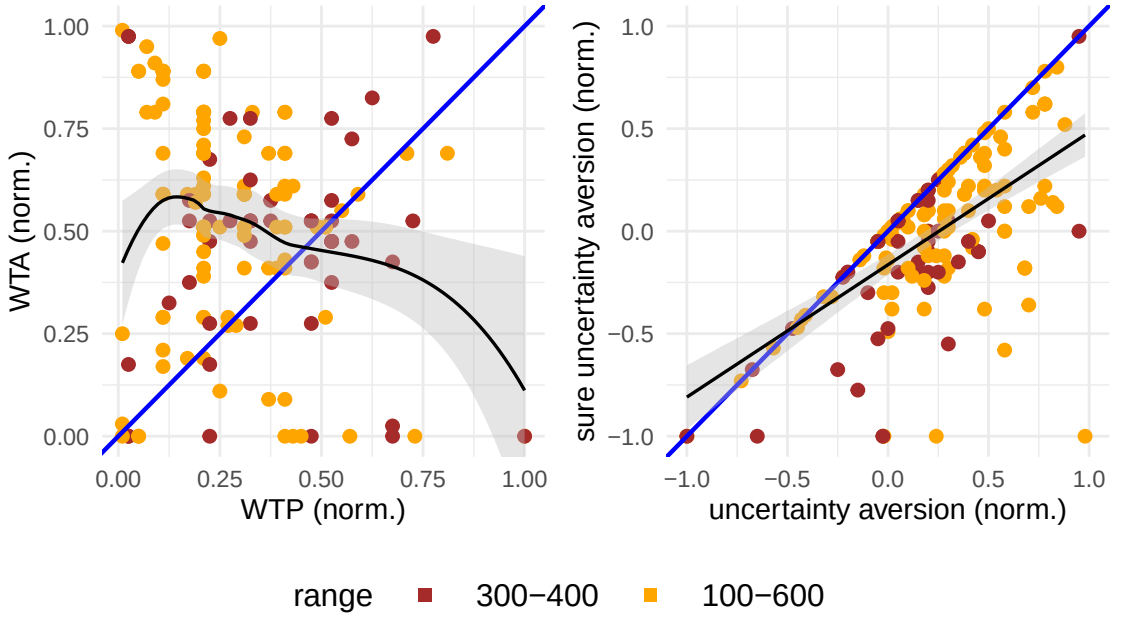


fig:absolutedecomp

Figure 2: Left panel: WTA vs. WTP (both normalized by subtracting minimal pay-off and dividing by pay-off range). LOESS regression line added. Right panel: uncertainty aversion vs. sure uncertainty aversion (both normalized by dividing by pay-off range). Regression line added. Both axes are clipped to $(-1, 1)$.

fig:disparity1



attempted to address this by introducing upfront payments (e.g., show-up fees) that are reduced if a "negative prize" is drawn (e.g., Schmidt and Traub, 2002; Abdellaoui et al., 2007). However, this approach is limited by the size of the show-up fee, especially when one wishes to study substantial losses. Second, it is unclear how to incentivize choices in regions of indecision or preference incompleteness. In particular, distinguishing "surely not buying" from "not buying out of caution" is challenging as no decision is elicited at this region. One possible solution is to delegate the decision in the imprecision region to an external DM with complete preferences; see Cettolin and Riedl (2019); Nielsen and Rigotti (2024) for recent discussions. Finally, the literature has begun to distinguish incompleteness from indifference regions, and some progress has been made (e.g., Agranov and Ortoleva, 2025).

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A Experimental instructions

S:Instructions

[Screen 1] Introduction We invite you to participate in a noncommercial research study: *Preference imprecision or loss aversion. What drives uncertainty aversion?*

In this study, you will be trading lottery tickets that pay out cash prizes depending on the color (blue or red) of a ball drawn from an urn. In each task, you will be asked to imagine you are in one of three possible different roles: 1) a buyer, 2) a seller, or 3) a bookmaker of a ticket. If you are a buyer, we will present you with multiple potential prices for a ticket and ask you if you would definitely buy a ticket at a given price or if you would definitely not buy a ticket or if you are not sure. In the roles of seller or bookmaker, it will be very similar, but instead of buying, we will ask you about selling or issuing a ticket.

In this survey:

- there are no right or wrong answers*
- your answers are fully anonymous
- you can quit at any time

* except for the comprehension test at the beginning and the risk literacy test at the end of the survey.

Estimated completion time is 12–15 minutes. By clicking NEXT you implicitly agree to terms and conditions stated HERE [see below].

Thank you for your participation!

Dr. Michał Lewandowski

Michal.lewandowski@sgh.waw.pl

On behalf of the scientific team

NEXT

[Screen 2] Comprehension quiz Of course, people's preferences are different. As a result, most survey questions do not have one right or wrong answer. However, some answers suggest that the question has been misunderstood (e.g. if a given person declares that they would pay 100 PLN for a single 50 PLN banknote). On this screen we want to make sure you fully understand the scenarios we are asking you to imagine. Therefore, we may point out some of your answers as potentially incorrect.

Imagine an urn containing only blue and red balls. One ball will be drawn randomly **TOMORROW** at noon. Ticket X entitles its owner to receive a cash prize, paid right after the draw, the amount of which depends on the color of the drawn ball: the red ball pays 600 zlotys and the blue ball pays 100 zlotys.

We will present you with three decision scenarios, each of which takes place **TODAY**.

Scenario 1: Buying ticket X

You do not have ticket X, but can buy one for a certain amount paid today.

Scenario 2: Selling ticket X

You already have one ticket X. You can sell it for a certain amount you will receive today. Please note that by selling the ticket you are waiving your right to receive one of the cash prizes paid to the ticket holder tomorrow.

Scenario 3: Issuing ticket X

In this scenario, you act as a bank. You can issue one ticket X to another person in exchange for a certain amount paid today. Please note that by doing this you are committing to pay the ticket prize determined in the draw tomorrow.

What is the minimum payout in zlotys you will receive tomorrow if you issue one ticket X?

What is the maximum payout in zlotys you will receive tomorrow if you issue one ticket X?

If X is offered for free, would you take it?

∘ Yes ∘ No ∘ I'm not sure

If you had one ticket X, would you sell it for free?

∘ Yes ∘ No ∘ I'm not sure

Would you issue one ticket X to another person for free?

∘ Yes ∘ No ∘ I'm not sure

NEXT

The subsequent screens present a series of pricing tasks, each structured as follows:

1. a description of the prospect,
2. a description of the task,
3. the MPL table,
4. a confirmation and refinement stage.

See the design subsection **??** and example screens in Appendix B.

[Screen after the MPL tables] Tell us something about yourself.

What is your age?

What is your gender?

∘ Male

∘ Female

∘ Prefer not to say

What is your education field?

∘ Formal sciences

◦ Social sciences: business, economics, finance

◦ Social sciences: psychology, sociology

◦ Social sciences: other

◦ Natural sciences

◦ Other

NEXT

[Screens with risk literacy test] We adopted the adaptive Berlin numeracy test format taken from Schwartz, L. M., Woloshin, S., Black, W. C., & Welch, H. G. (1997), *The role of numeracy in understanding the benefit of screening mammography. Annals of Internal Medicine, 127(11).*

Instructions: Thank you for staying with us up to this point. The last 2 or 3 questions of the survey will check how you understand risk situations. Do not use a calculator, but feel free to use scratch paper for notes. *[See Figure 1 for adaptive test structure: it presents the next questions depending on whether the previous question has been answered correctly and assigns people to one of four groups.]*

Q1. Out of 1,000 people in a small town, 500 are members of a choir. Out of these 500 members in the choir, 100 are men. Out of the 500 inhabitants that are not in the choir, 300 are men. What is the probability that a randomly drawn man is a member of the choir? Please indicate the probability in percent.

%

Q2a. Imagine we are throwing a five-sided die 50 times. On average, out of these 50 throws, how many times would this five-sided die show an odd number (1, 3, or 5)?

out of 50 throws

Q2b. Imagine we are throwing a loaded die (6 sides). The probability that the die shows a 6 is twice as high as the probability of each of the other numbers. On average,

out of these 70 throws, how many times would the die show the number 6?
out of 70 throws

Q3. In a forest, 20% of mushrooms are red, 50% brown, and 30% white. A red mushroom is poisonous with a probability of 20%. A mushroom that is not red is poisonous with a probability of 5%. What is the probability that a poisonous mushroom in the forest is red?

Algorithm 1: Adaptive assignment of participants to groups based on responses

Input: Answers to questions Q1, Q2a, Q2b, Q3

Output: Assigned Group (I, II, III, IV)

```
Ask Q1;
if Q1 is incorrect then
    Ask Q2a;
    if Q2a is incorrect then
        Assign participant to Group I;
    end
    else
        Assign participant to Group II;
    end
end
else
    Ask Q2b;
    if Q2b is correct then
        Assign participant to Group IV;
    end
    else
        Ask Q3;
        if Q3 is correct then
            Assign participant to Group IV;
        end
        else
            Assign participant to Group III;
        end
    end
end
```

[Farewell screen] Thank you for participating in this survey!

We value your time and want to assure you that the time and effort you put into answering the questions in this survey will not be wasted.

If you would like to be informed about survey results and how they are used to support our scientific claims, please indicate that you wish to receive project updates.

Yours sincerely,

Michal Lewandowski

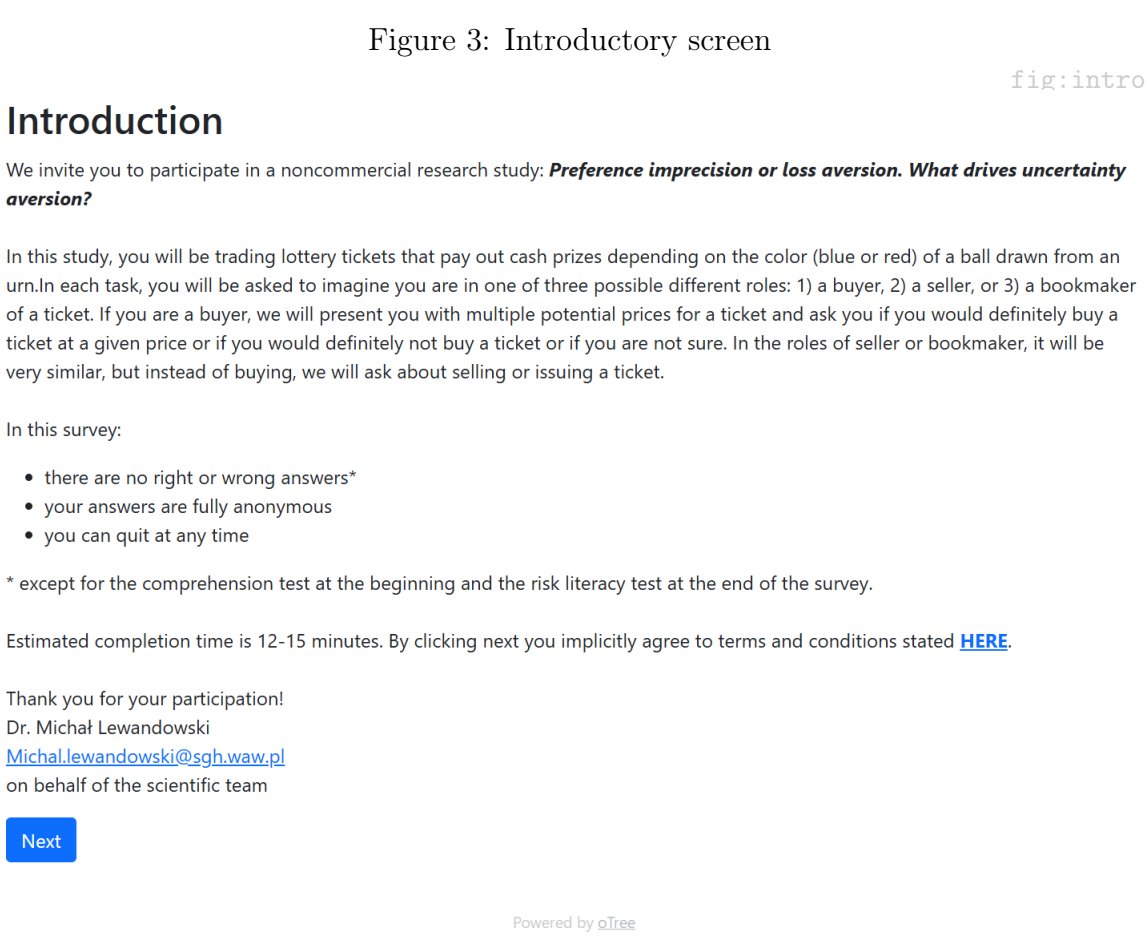
On behalf of the whole academic team

B Screenshots

S:Screenshots

Figure 3: Introductory screen

fig:intro



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Next

Powered by oTree

Figure 4: Comprehension quiz

fig:compr

Instructions and questions

Comprehension Quiz

Of course, people's preferences are different. As a result, most survey questions do not have one right or wrong answer. However, some answers suggest that the question has been misunderstood (e.g. if a given person declares that they would pay 100 PLN for a single 50 PLN banknote). On this screen we want to make sure you fully understand the scenarios we are asking you to imagine. Therefore, we may point out some of your answers as potentially incorrect.

Imagine an urn containing only blue and red balls. One ball will be **drawn randomly TOMORROW** at noon. **Ticket X** entitles its owner to receive a cash prize, paid right after the draw, the amount of which depends on the color of the drawn ball: the red ball pays **600 zlotys** and the blue ball pays **100 zlotys**.

We will present you with three decision scenarios, each of which takes place **TODAY**.
Scenario 1: Buying ticket X
You do not have ticket X, but you can buy one for a certain amount paid today.

Scenario 2: Selling ticket X
You already have one ticket X. You can sell it for a certain amount which you will receive today. Please note that by selling the ticket you are waiving your right to receive one of the cash prizes paid to the ticket holder tomorrow.

Scenario 3: Issuing ticket X
In this scenario, you act as a bank. You can issue one ticket X to another person in exchange for a certain amount paid today. Please note that by doing this you are committing to pay the ticket holder the prize determined in the draw tomorrow.

What is the minimum payout in zlotys you will receive tomorrow if you have one ticket X?

What is the maximum payout in zlotys you will have to pay tomorrow if you issue one ticket X?

If X is offered for free, would you take it?
- Yes
- No
- I'm not sure

If you had one ticket X, would you sell it for free?
- Yes
- No
- I'm not sure

Would you issue one ticket X to another person for free?
- Yes
- No
- I'm not sure

Next

Reassessment

fig:compr-reassess

Comprehension Quiz

You replied that **you didn't want ticket X for free**. This way you lose a certain profit: 600 zlotys if a red ball is drawn or 100 zlotys if a blue ball is drawn.

Please consider the same question again.

- ○ I am changing my answer and want ticket X for free.
- ○ I still don't want this ticket for free.

You replied that **you would sell ticket X for free**. This way you lose a certain profit: 600 zlotys if a red ball is drawn or 100 zlotys if a blue ball is drawn.

Please consider the same question again.

- ○ I'm changing my answer and would not sell ticket X for free.
- ○ I still want to sell ticket X for free.

You replied that **you were not sure if you wanted to issue ticket X for free**. Note that by issuing the ticket for free you lose money for sure: 600 zlotys if a red ball is drawn or 100 zlotys if a blue ball is drawn.

Please consider the same question again.

- ○ I don't want to issue ticket Y for free.
- ○ I want to issue ticket Y for free.

Next

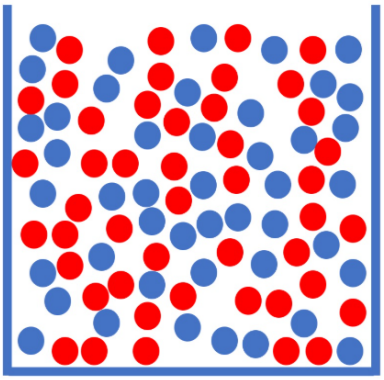
Figure 5: Buying a prospect with source = risk and payoffs = 600–100

fig:buy-risk-600

Description of the prospect and task

Buying a ticket *600-100*

Imagine an urn containing 90 colored balls **half of which are blue and half are red**.



Ticket *600-100* entitles the owner to draw one ball from the urn. The payout depends on the color of the drawn ball:
The blue ball pays 600 PLN,
The red ball pays 100 PLN.

On the next screen we will present you with several possible **prices** and you have to answer **if you would BUY the ticket at that price.**

Next

MPL table before selection is made

Buying a ticket *600-100*

Reminder: ticket *600-100* pays **600 PLN if a blue ball is drawn** and **100 PLN if a red ball is drawn** from an Urn containing 90 colored balls **half of which are blue and half are red**.

If the price was...	...I certainly would buy	...I am not sure	...I certainly would not buy
100 PLN	○	○	○
110 PLN	○	○	○
120 PLN	○	○	○
130 PLN	○	○	○
140 PLN	○	○	○
150 PLN	○	○	○
160 PLN	○	○	○
170 PLN	○	○	○
180 PLN	○	○	○
190 PLN	○	○	○
200 PLN	○	○	○
210 PLN	○	○	○
220 PLN	○	○	○
230 PLN	○	○	○
240 PLN	○	○	○
250 PLN	○	○	○
260 PLN	○	○	○
270 PLN	○	○	○
280 PLN	○	○	○
290 PLN	○	○	○
300 PLN	○	○	○
310 PLN	○	○	○
320 PLN	○	○	○
330 PLN	○	○	○
340 PLN	○	○	○
350 PLN	○	○	○
360 PLN	○	○	○
370 PLN	○	○	○
380 PLN	○	○	○
390 PLN	○	○	○
400 PLN	○	○	○
410 PLN	○	○	○
420 PLN	○	○	○
430 PLN	○	○	○
440 PLN	○	○	○
450 PLN	○	○	○
460 PLN	○	○	○
470 PLN	○	○	○
480 PLN	○	○	○
490 PLN	○	○	○
500 PLN	○	○	○
510 PLN	○	○	○
520 PLN	○	○	○
530 PLN	○	○	○
540 PLN	○	○	○
550 PLN	○	○	○
560 PLN	○	○	○
570 PLN	○	○	○
580 PLN	○	○	○
590 PLN	○	○	○
600 PLN	○	○	○

Confirm

Please note that once you press the Confirm button, you will **not** be able to go back and change your answer.

MPL table after selection is made

Buying a ticket *600-100*

Reminder: ticket *600-100* pays **600 PLN if a blue ball is drawn** and **100 PLN if a red ball is drawn** from an Urn containing 90 colored balls **half of which are blue and half are red**.

If the price was...	...I certainly would buy	...I am not sure	...I certainly would not buy
100 PLN	◉	○	○
110 PLN	◉	○	○
120 PLN	◉	○	○
130 PLN	◉	○	○
140 PLN	◉	○	○
150 PLN	◉	○	○
160 PLN	◉	○	○
170 PLN	◉	○	○
180 PLN	◉	○	○
190 PLN	◉	○	○
200 PLN	◉	○	○
210 PLN	◉	○	○
220 PLN	◉	○	○
230 PLN	◉	○	○
240 PLN	◉	○	○
250 PLN	○	◉	○
260 PLN	○	◉	○
270 PLN	○	◉	○
280 PLN	○	◉	○
290 PLN	○	◉	○
300 PLN	○	◉	○
310 PLN	○	◉	○
320 PLN	○	◉	○
330 PLN	○	◉	○
340 PLN	○	◉	○
350 PLN	○	◉	○
360 PLN	○	◉	○
370 PLN	○	◉	○
380 PLN	○	◉	○
390 PLN	○	◉	○
400 PLN	○	◉	○
410 PLN	○	◉	○
420 PLN	○	◉	○
430 PLN	○	◉	○
440 PLN	○	◉	○
450 PLN	○	◉	○
460 PLN	○	◉	○
470 PLN	○	◉	○
480 PLN	○	◉	○
490 PLN	○	◉	○
500 PLN	○	◉	○
510 PLN	○	◉	○
520 PLN	○	◉	○
530 PLN	○	◉	○
540 PLN	○	◉	○
550 PLN	○	◉	○
560 PLN	○	◉	○
570 PLN	○	○	◉
580 PLN	○	○	◉
590 PLN	○	○	◉
600 PLN	○	○	◉

Confirm

Please note that once you press the Confirm button, you will **not** be able to go back and change your answer.

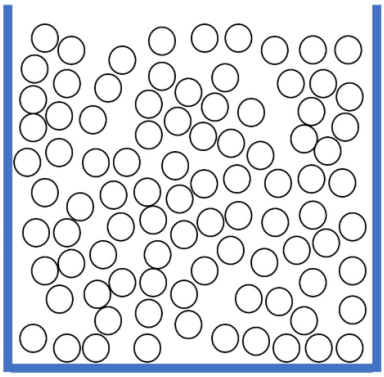
Figure 4: Selling a prospect with source = uncertainty and payoffs = 400–300

fig:selling-uncertainty-400

Description of the prospect and task

Selling a ticket *400-300*

Imagine an urn containing 90 blue or red balls of unknown proportions.



Ticket *400-300* entitles the owner to draw one ball from the urn. The payout depends on the color of the drawn ball:
The blue ball pays 400 PLN,
The red ball pays 300 PLN.

Imagine you hold one such ticket. On the next screen we will present you with several possible **prices** and you have to answer if **you would SELL this ticket at that price.**

Next

MPL table before selection is made

Selling a ticket *400-300*

Reminder: ticket *400-300* pays **400 PLN if a blue ball is drawn** and **300 PLN if a red ball is drawn** from an Urn containing 90 colored balls each of which is either blue or red, but **the number of balls of each color is unknown**.

If the price was...	...I certainly would sell	...I am not sure	...I certainly would not sell
300 PLN	○	○	○
305 PLN	○	○	○
310 PLN	○	○	○
315 PLN	○	○	○
320 PLN	○	○	○
325 PLN	○	○	○
330 PLN	○	○	○
335 PLN	○	○	○
340 PLN	○	○	○
345 PLN	○	○	○
350 PLN	○	○	○
355 PLN	○	○	○
360 PLN	○	○	○
365 PLN	○	○	○
370 PLN	○	○	○
375 PLN	○	○	○
380 PLN	○	○	○
385 PLN	○	○	○
390 PLN	○	○	○
395 PLN	○	○	○
400 PLN	○	○	○

Confirm

Please note that once you press the Confirm button, you will **not** be able to go back and change your answer.

MPL table after selection is made

Selling a ticket *400-300*

Reminder: ticket *400-300* pays **400 PLN if a blue ball is drawn** and **300 PLN if a red ball is drawn** from an Urn containing 90 colored balls each of which is either blue or red, but **the number of balls of each color is unknown**.

If the price was...	...I certainly would sell	...I am not sure	...I certainly would not sell
300 PLN	○	○	◉
305 PLN	○	○	◉
310 PLN	○	○	◉
315 PLN	○	○	◉
320 PLN	○	○	◉
325 PLN	○	○	◉
330 PLN	○	○	◉
335 PLN	○	○	◉
340 PLN	○	○	◉
345 PLN	○	◉	○
350 PLN	○	◉	○
355 PLN	○	◉	○
360 PLN	○	◉	○
365 PLN	○	◉	○
370 PLN	◉	○	○
375 PLN	◉	○	○
380 PLN	◉	○	○
385 PLN	◉	○	○
390 PLN	◉	○	○
395 PLN	◉	○	○
400 PLN	◉	○	○

Confirm

Please note that once you press the Confirm button, you will **not** be able to go back and change your answer.

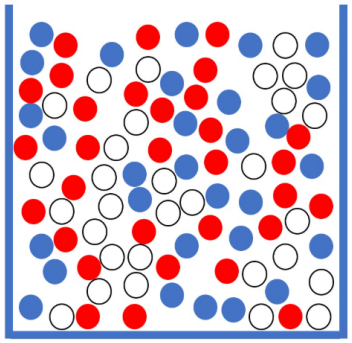
Figure 3: Issuing (short-selling) a prospect with source = partial and payoffs = 600–100

fig:issuing-partial-600

Description of the prospect and task

Issuing a ticket *AMBIGUITY*

Imagine an urn containing 90 colored balls, each of which is either blue or red. You know that **30 of these balls are blue, 30 red, and 30 of an unknown color (blue or red)**.



Ticket *AMBIGUITY* entitles the owner to draw one ball from the urn. The payout depends on the color of the drawn ball:
The blue ball pays 600 PLN,
The red ball pays 100 PLN.

Suppose you can **issue one such ticket** to another (anonymous) person. In a sense **you will be acting like a bank** to this person: you will have to pay out (with your own money) the cash reward to the owner of ticket *AMBIGUITY* (of course the result of the draw remains unknown for now).

The other person must pay you to get the ticket. On the next screen we will present you with **several** possible prices and you have to answer **if you would ISSUE this ticket at that price**.

Next

MPL table before selection is made

Issuing a ticket *AMBIGUITY*

Reminder: ticket *AMBIGUITY* pays **600 PLN if a blue ball is drawn** and **100 PLN if a red ball is drawn** from an Urn containing 90 colored balls each of which is either blue or red. You know that **30 of these balls are blue, 30 red, and 30 of an unknown color** (blue or red).

If the price was...	...I certainly would issue the ticket	...I am not sure	...I certainly would not issue the ticket
100 PLN	○	○	○
110 PLN	○	○	○
120 PLN	○	○	○
130 PLN	○	○	○
140 PLN	○	○	○
150 PLN	○	○	○
160 PLN	○	○	○
170 PLN	○	○	○
180 PLN	○	○	○
190 PLN	○	○	○
200 PLN	○	○	○
210 PLN	○	○	○
220 PLN	○	○	○
230 PLN	○	○	○
240 PLN	○	○	○
250 PLN	○	○	○
260 PLN	○	○	○
270 PLN	○	○	○
280 PLN	○	○	○
290 PLN	○	○	○
300 PLN	○	○	○
310 PLN	○	○	○
320 PLN	○	○	○
330 PLN	○	○	○
340 PLN	○	○	○
350 PLN	○	○	○
360 PLN	○	○	○
370 PLN	○	○	○
380 PLN	○	○	○
390 PLN	○	○	○
400 PLN	○	○	○
410 PLN	○	○	○
420 PLN	○	○	○
430 PLN	○	○	○
440 PLN	○	○	○
450 PLN	○	○	○
460 PLN	○	○	○
470 PLN	○	○	○
480 PLN	○	○	○
490 PLN	○	○	○
500 PLN	○	○	○
510 PLN	○	○	○
520 PLN	○	○	○
530 PLN	○	○	○
540 PLN	○	○	○
550 PLN	○	○	○
560 PLN	○	○	○
570 PLN	○	○	○
580 PLN	○	○	○
590 PLN	○	○	○
600 PLN	○	○	○

Confirm

MPL table after selection is made

Issuing a ticket *AMBIGUITY*

Reminder: ticket *AMBIGUITY* pays **600 PLN if a blue ball is drawn** and **100 PLN if a red ball is drawn** from an Urn containing 90 colored balls each of which is either blue or red. You know that **30 of these balls are blue, 30 red, and 30 of an unknown color** (blue or red).

If the price was...	...I certainly would issue the ticket	...I am not sure	...I certainly would not issue the ticket
100 PLN	○	○	◉
110 PLN	○	○	◉
120 PLN	○	○	◉
130 PLN	○	○	◉
140 PLN	○	○	◉
150 PLN	○	○	◉
160 PLN	○	○	◉
170 PLN	○	○	◉
180 PLN	○	○	◉
190 PLN	○	○	◉
200 PLN	○	○	◉
210 PLN	○	○	◉
220 PLN	○	◉	○
230 PLN	○	◉	○
240 PLN	○	◉	○
250 PLN	○	◉	○
260 PLN	○	◉	○
270 PLN	○	◉	○
280 PLN	○	◉	○
290 PLN	◉	○	○
300 PLN	◉	○	○
310 PLN	◉	○	○
320 PLN	◉	○	○
330 PLN	◉	○	○
340 PLN	◉	○	○
350 PLN	◉	○	○
360 PLN	◉	○	○
370 PLN	◉	○	○
380 PLN	◉	○	○
390 PLN	◉	○	○
400 PLN	◉	○	○
410 PLN	◉	○	○
420 PLN	◉	○	○
430 PLN	◉	○	○
440 PLN	◉	○	○
450 PLN	◉	○	○
460 PLN	◉	○	○
470 PLN	◉	○	○
480 PLN	◉	○	○
490 PLN	◉	○	○
500 PLN	◉	○	○
510 PLN	◉	○	○
520 PLN	◉	○	○
530 PLN	◉	○	○
540 PLN	◉	○	○
550 PLN	◉	○	○
560 PLN	◉	○	○
570 PLN	◉	○	○
580 PLN	◉	○	○
590 PLN	◉	○	○
600 PLN	◉	○	○

Confirm

Figure 2: Risk literacy test

fig:risk-literacy

First question

Risk literacy test

Thank you for staying with us up to this point. The last 2 or 3 questions of the survey will check how you understand risk situations. Do not use a calculator but feel free to use the scratch paper for notes.

Out of 1,000 people in a small town 500 are members of a choir. Out of these 500 members in the choir 100 are men. Out of the 500 inhabitants that are not in the choir 300 are men. What is the probability that a randomly drawn man is a member of the choir? Please indicate the probability in percent.

[ ] %

Next

Second question

Question 2

Imagine we are throwing a five-sided die 50 times. On average, out of these 50 throws how many times would this five-sided die show an odd number (1, 3 or 5)?

[ ] out of 50 throws

Next

Feedback

Risk literacy test: feedback

Question 1: Out of 1,000 people in a small town 500 are members of a choir. Out of these 500 members in the choir 100 are men. Out of the 500 inhabitants that are not in the choir 300 are men. What is the probability that a randomly drawn man is a member of the choir? Please indicate the probability in percent.

Your answer: 1
Correct answer: 25

Question 2: Imagine we are throwing a five-sided die 50 times. On average, out of these 50 throws how many times would this five-sided die show an odd number (1, 3 or 5)?

Your answer: 1
Correct answer: 30

If you want to know how you fared against other people, go to http://www.riskliteracy.org/ and look for the results in the publications section.

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Figure 1: Metrics screen

fig:metrics