



**SOCIETY FOR JUDGMENT  
AND DECISION MAKING**



**University of  
Zurich<sup>UZH</sup>**

# Modeling the influence of perceived situational uncertainty on everyday risky choices

Aaron Lob  
Olivia Fischer  
Renato Frey

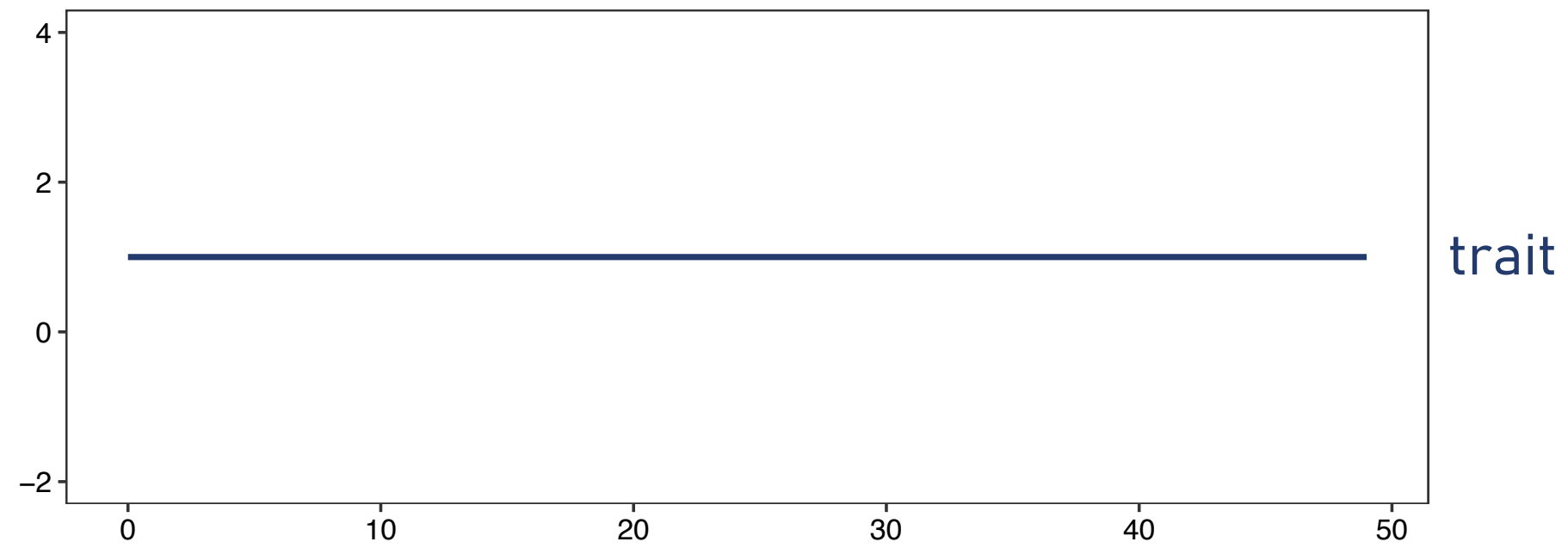
*Cognitive and Behavioral Decision Research, University of Zurich*  
<https://cbdr-lab.net>

**Society for Judgment and Decision Making – Annual Conference 2023**  
November 18, 2023, San Francisco

# Risky choices

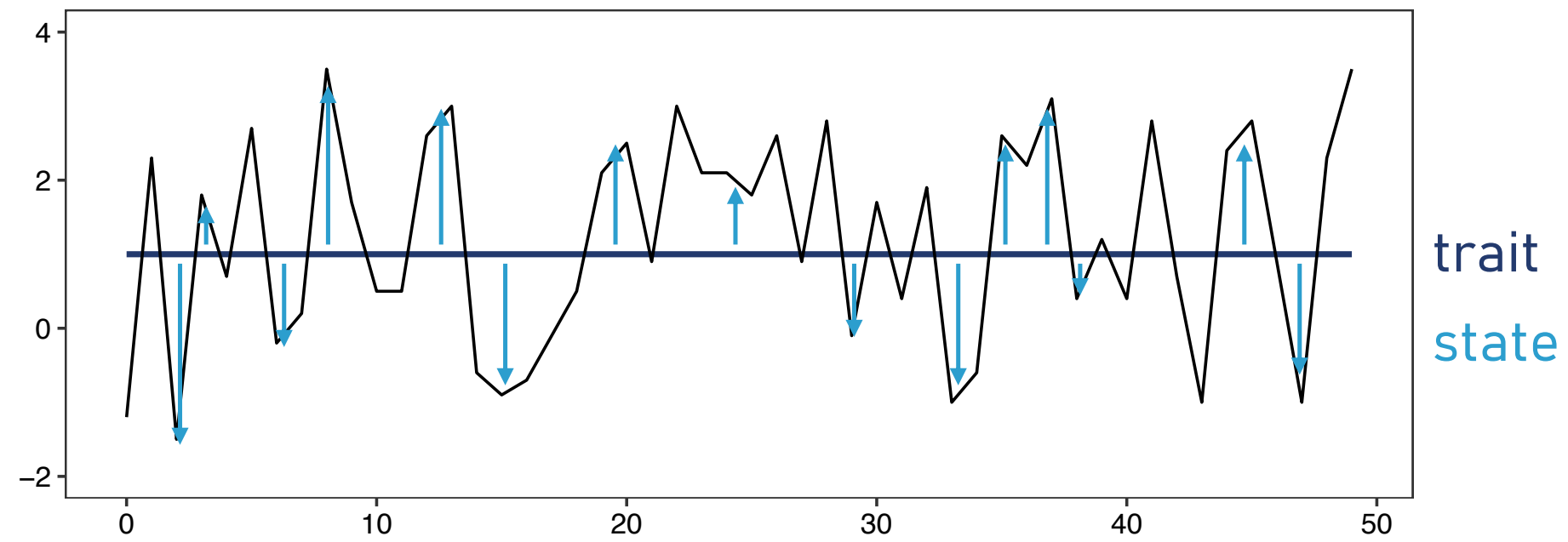
# Risk preference

(Frey et al., 2017; Schildberg-Hörisch, 2018; Weber & Milliman, 1997; Yechiam & Ert, 2011)

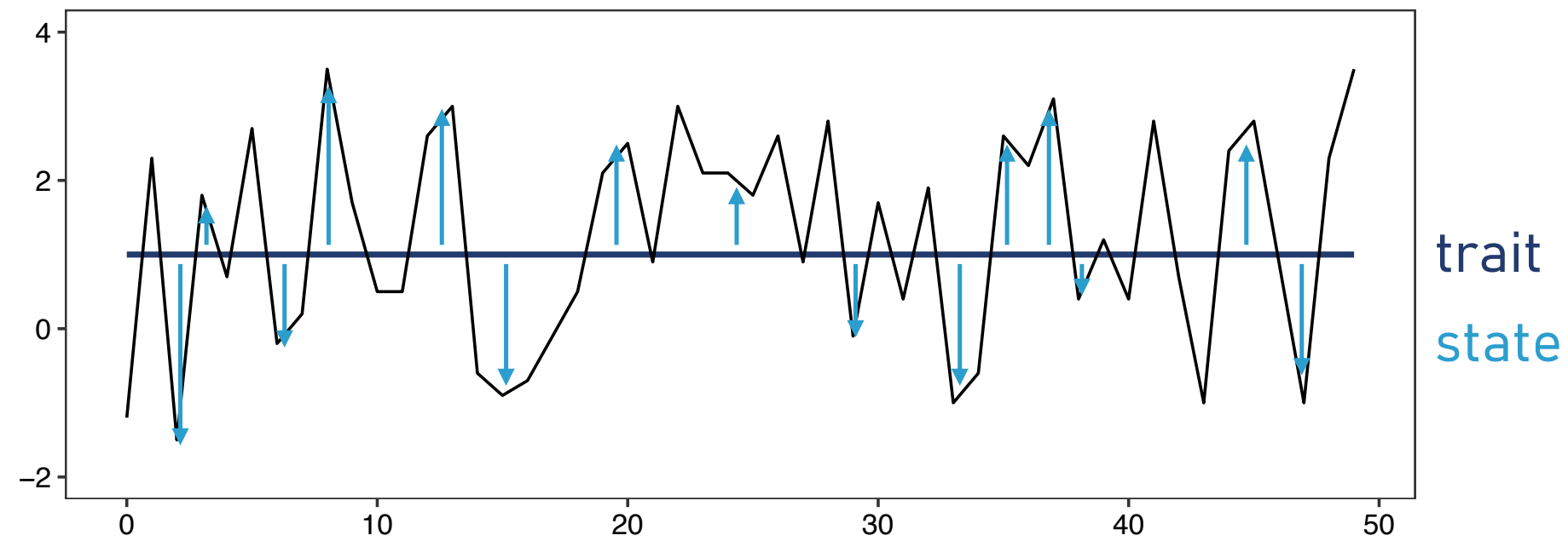


# Integrated trait-state model

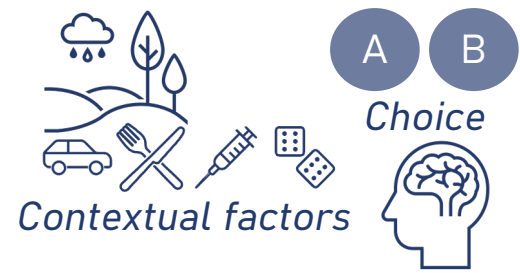
(Hamaker et al., 2007)



**RQ1:** To what extent is there **situational variability** in (everyday) risky choices?

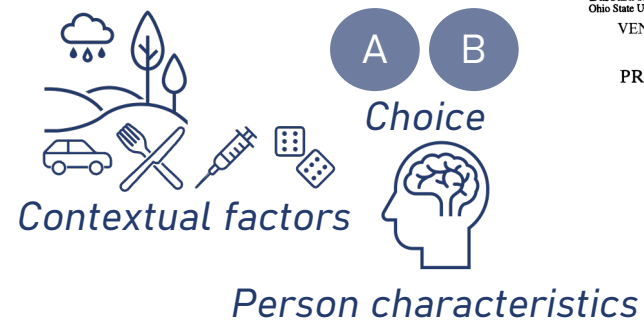


## Psychological processes



*Person characteristics*

## **Psychological processes**



# Psychological processes

Risk as Feelings  
 George F. Loewenstein, Carnegie Mellon University; Elke U. Weber, Columbia University

Emotion-Based Choice  
 Christopher K. Hsee, University of Chicago; Ned Welch, Carnegie Mellon University

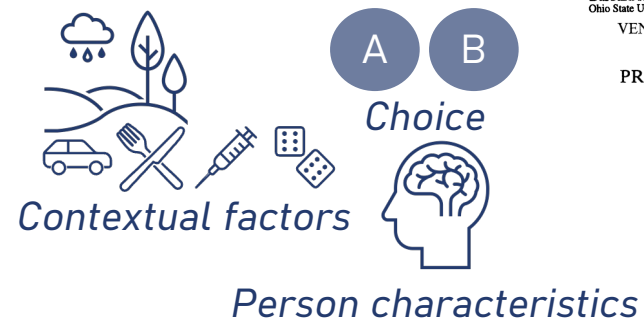
Venture Theory: A Model of Decision Weights\*  
 Barbara Mellers, Ohio State University; Alan Schwartz, University of Illinois at Chicago

Prospect Theory: An Analysis of Decision Under Risk  
 BY DANIEL KAHNEMAN AND AMOS TVERSKY<sup>1</sup>

**The Wisdom of Model Crowds**  
 Lishe An Ontology of Decision Models  
 Lisheng He, Wenjia Joyce Zhao, and Sudeep Bhatia, University of Pennsylvania







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# Psychological processes

Model	Category	Formulation	Psychological factors, mechanisms, or process	Weighting function (w)	Venture function (v)	Relative and Absolute Utility Functions
1	Certainty equivalence theory	Herdle (1977)	...	...	...	...
2	Utility-based subjective weighting	Kaplan (1976)	...	...	...	...
3	Prospect theory	Kahneman and Tversky (1979)	...	...	...	...
4	Loss theory of subjective weighting	Yaari (1987)	...	...	...	...
5	Loss theory of subjective weighting	Yaari (1987)	...	...	...	...
6	Prospect reference theory	Wagenaar (1984)	...	...	...	...
7	Reference theory	Hogarth and Einhorn (1995)	...	...	...	...
8	Comprehensive prospect theory	Tversky and Kahneman (1992)	...	...	...	...
9	Comprehensive prospect theory w/ L&E	Lichtenstein et al. (1982)	...	...	...	...
10	Reference bias theory	Bonini and Tversky (1996)	...	...	...	...
11	Risk affected multi-criteria weight	Przeworski (1997)	...	...	...	...
12	Comprehensive prospect theory w/ L&E	Przeworski (1998)	...	...	...	...
13	Comprehensive prospect theory w/ L&E	Genesio and Wu (1998)	...	...	...	...
14	Prospect theory w/ loss aversion	Wu et al. (2000)	...	...	...	...
15	Prospect of subjective weighting	Wagenaar (2006)	...	...	...	...
16	Loss aversion	McKersin (2010)	...	...	...	...
17	Loss aversion	Bonini et al. (2012)	...	...	...	...
18	Comprehensive prospect theory	Wu (2016)	...	...	...	...
19	Loss aversion	Loewenstein et al. (2015)	...	...	...	...
20	Loss aversion	Meiners et al. (2016)	...	...	...	...
21	Loss aversion	Loewenstein et al. (2016)	...	...	...	...



Perception of uncertainty  
 Aleatory vs. epistemic uncertainty

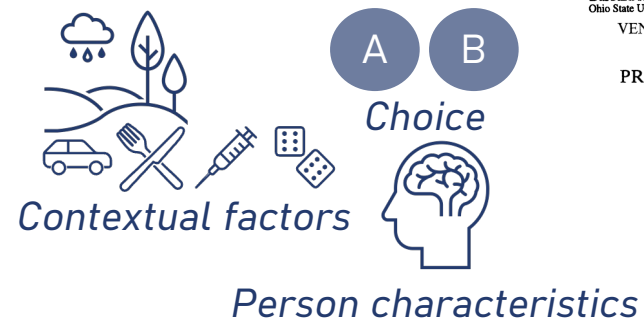












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VENTURE THEORY: A MODEL OF DECISION WEIGHTS\*

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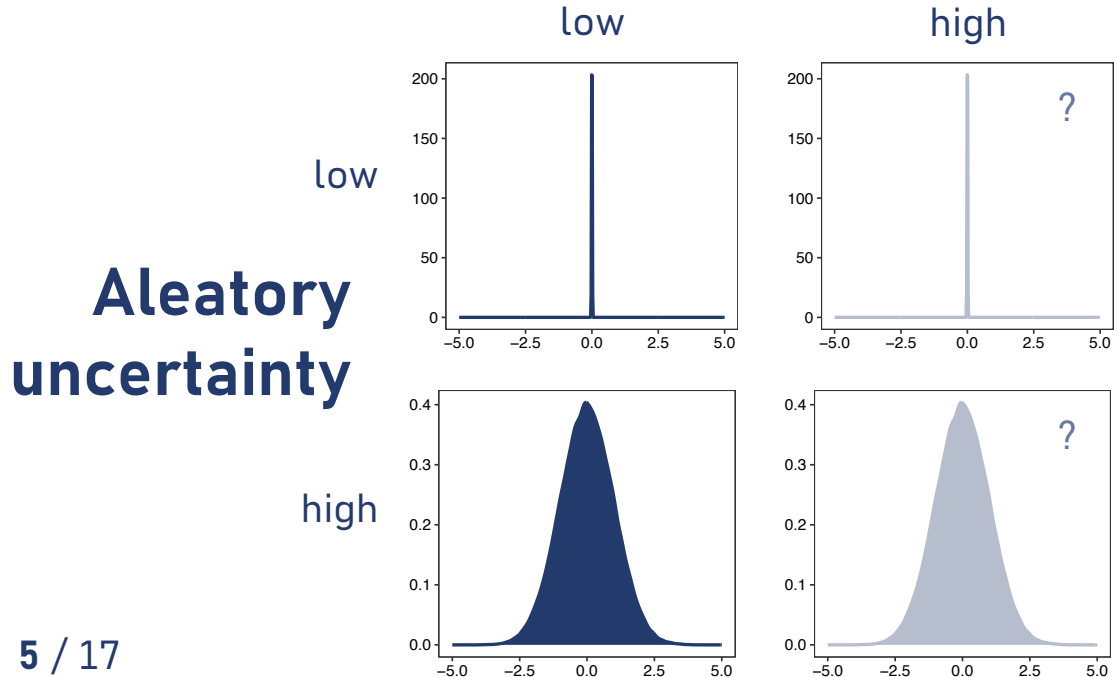
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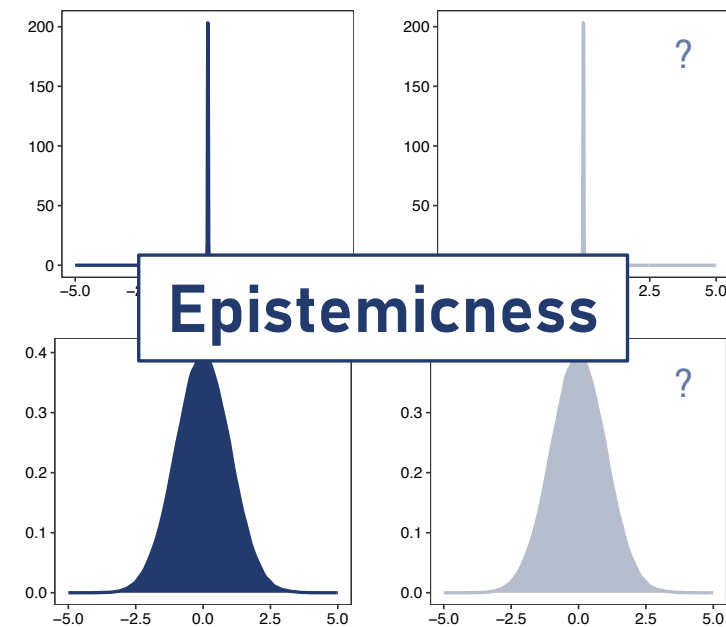
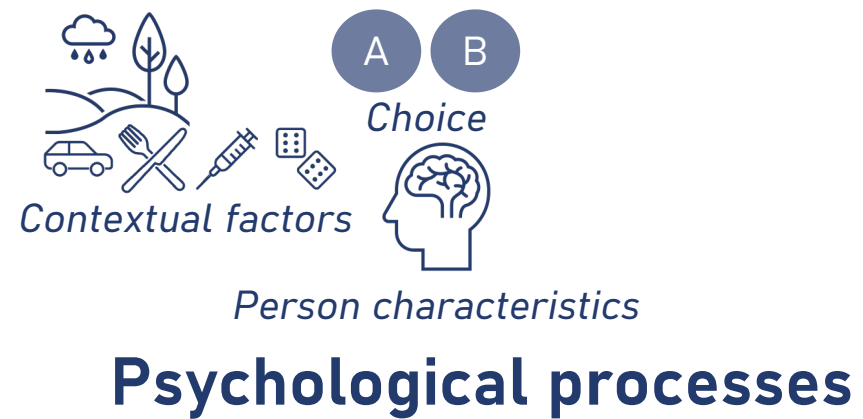
# Psychological processes

Model	Category	Formulation	Psychological factors, mechanisms, or process	Weighting function (w <sub>i</sub> )	Variance function (v <sub>i</sub> )	Relative and Absolute Utility Functions
1	Expected utility	Expected utility theory (EUT)	Expected utility theory (EUT)	$w_i = p_i$	$v_i = p_i$	Linear
2	Prospect theory	Prospect theory (PT)	Prospect theory (PT)	$w_i = p_i^\alpha$	$v_i = p_i^\beta$	S-shaped
3	Rank affected multi-criteria weight	Rank affected multi-criteria weight (RAMC)	Rank affected multi-criteria weight (RAMC)	$w_i = p_i^\alpha$	$v_i = p_i^\beta$	S-shaped
4	Rank affected multi-criteria weight	Rank affected multi-criteria weight (RAMC)	Rank affected multi-criteria weight (RAMC)	$w_i = p_i^\alpha$	$v_i = p_i^\beta$	S-shaped
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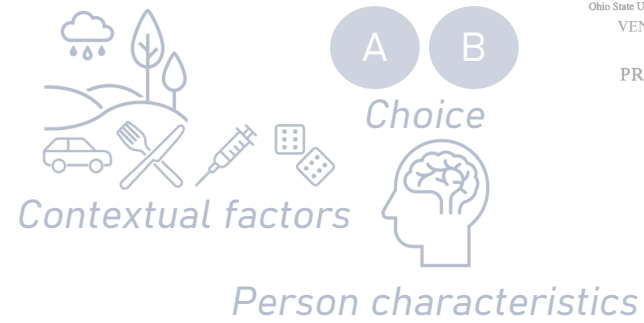
## Epistemic uncertainty



# RQ2: Is the **perception of epistemic uncertainty** related to a person's (everyday) risky choices?







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Emotion-Based Choice  
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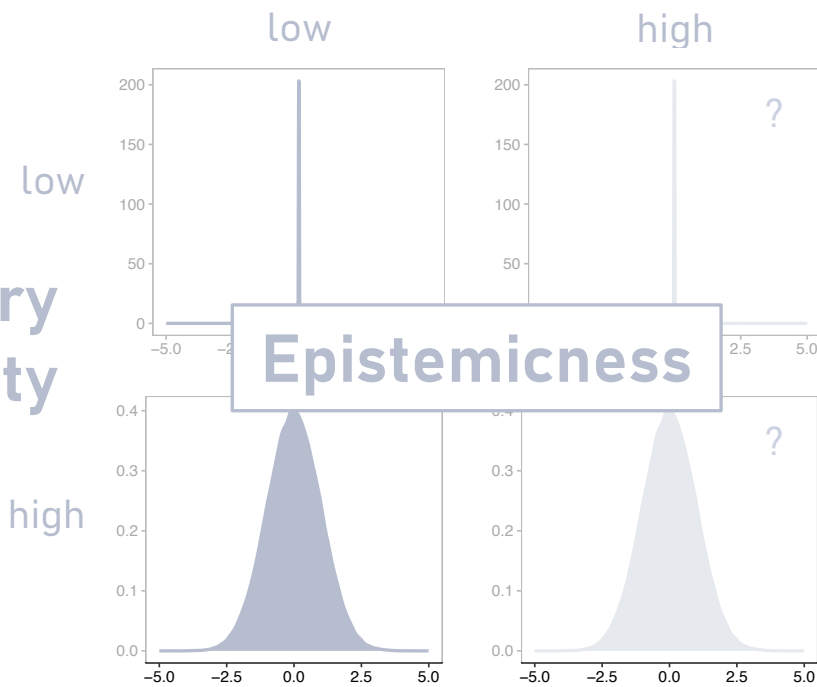
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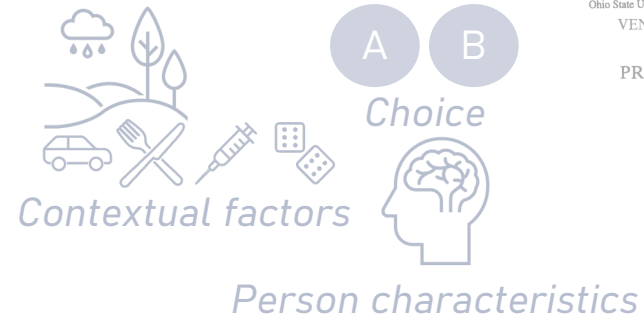
# Psychological processes

Model	Psychological factors, mechanisms, or processes	Weighting function (Tversky & Kahneman, 1979)	Value function (Tversky & Kahneman, 1992)	Reference and Attention (Kahneman, Knetsch, & Thaler, 1990)
Expected Utility Theory	Expected Utility	Yes	No	No
Prospect Theory	Prospect Theory	Yes	Yes	No
Choice Architecture	Choice Architecture	No	No	Yes
... (many more rows) ...	...	...	...	...

# Measurement

## Epistemic uncertainty





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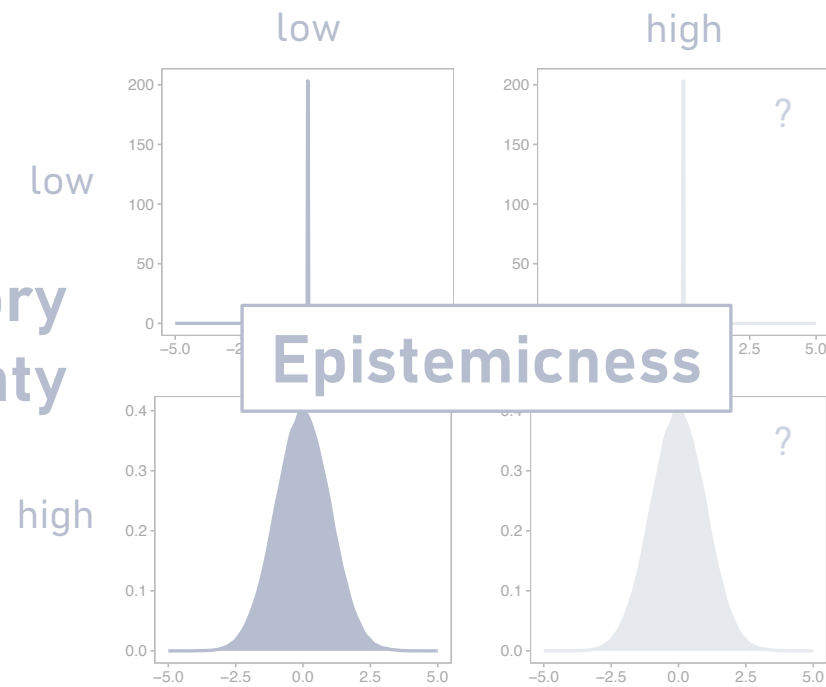
## Measurement

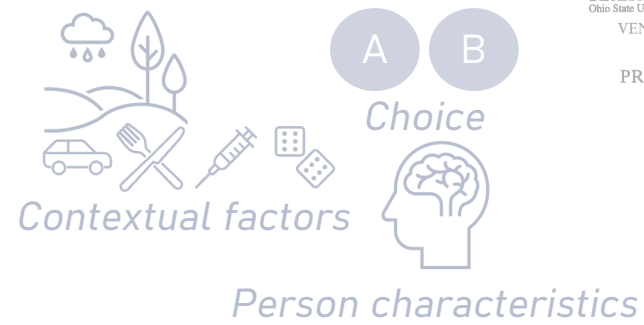
## Psychological processes

Category	Model	Year	Psychological factors, mechanisms, or process	Measure location or type	Relative and absolute criteria functions
Model	Cardinal expected utility theory	1927	Utility	Choice	Choice
	Cardinal expected utility theory with time discounting	1927	Utility, Time discounting	Choice	Choice
	Prospect theory	1979	Value, Loss aversion, Reference point, Probability weighting	Choice	Choice
	Cardinal prospect theory	1987	Utility, Loss aversion, Reference point, Probability weighting	Choice	Choice
	Prospect theory with loss aversion	1987	Value, Loss aversion, Reference point, Probability weighting	Choice	Choice
	Cardinal prospect theory with loss aversion	1987	Utility, Loss aversion, Reference point, Probability weighting	Choice	Choice
	Prospect theory with loss aversion and time discounting	1987	Value, Loss aversion, Reference point, Probability weighting, Time discounting	Choice	Choice
	Cardinal prospect theory with loss aversion and time discounting	1987	Utility, Loss aversion, Reference point, Probability weighting, Time discounting	Choice	Choice
	Prospect theory with loss aversion and time discounting and loss aversion	1987	Value, Loss aversion, Reference point, Probability weighting, Time discounting, Loss aversion	Choice	Choice
	Cardinal prospect theory with loss aversion and time discounting and loss aversion	1987	Utility, Loss aversion, Reference point, Probability weighting, Time discounting, Loss aversion	Choice	Choice
	Prospect theory with loss aversion and time discounting and loss aversion and loss aversion	1987	Value, Loss aversion, Reference point, Probability weighting, Time discounting, Loss aversion, Loss aversion	Choice	Choice
	Cardinal prospect theory with loss aversion and time discounting and loss aversion and loss aversion	1987	Utility, Loss aversion, Reference point, Probability weighting, Time discounting, Loss aversion, Loss aversion	Choice	Choice
	Prospect theory with loss aversion and time discounting and loss aversion and loss aversion and loss aversion	1987	Value, Loss aversion, Reference point, Probability weighting, Time discounting, Loss aversion, Loss aversion, Loss aversion	Choice	Choice
	Cardinal prospect theory with loss aversion and time discounting and loss aversion and loss aversion and loss aversion	1987	Utility, Loss aversion, Reference point, Probability weighting, Time discounting, Loss aversion, Loss aversion, Loss aversion	Choice	Choice
	Prospect theory with loss aversion and time discounting and loss aversion and loss aversion and loss aversion and loss aversion	1987	Value, Loss aversion, Reference point, Probability weighting, Time discounting, Loss aversion, Loss aversion, Loss aversion, Loss aversion	Choice	Choice

## Epistemic uncertainty

Aleatory uncertainty





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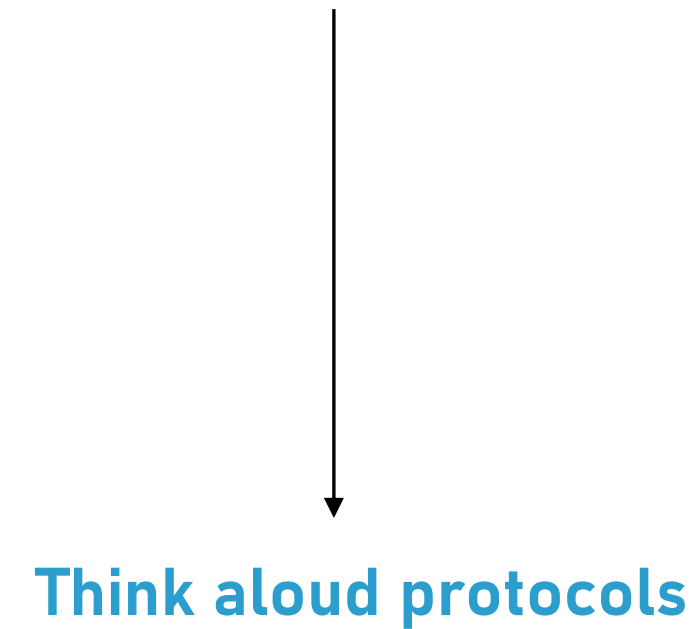
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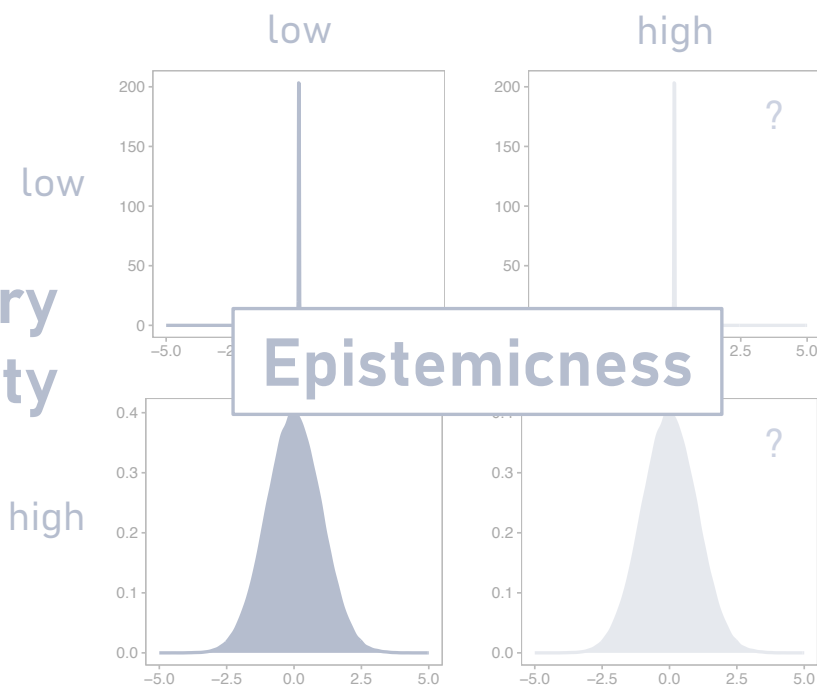


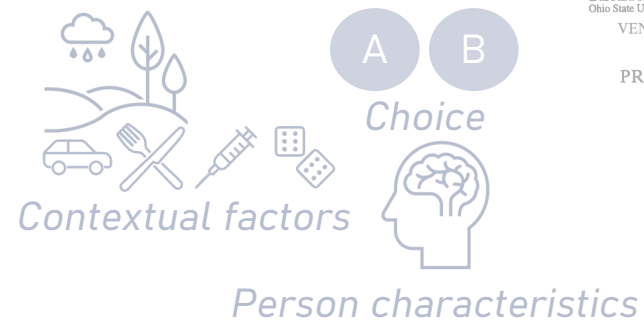
## Measurement



Category	Model	Psychological factors, mechanisms, or processes	Measure location or type	Relative and absolute criteria functions
Decision	Construal level theory (Trope & Liberman, 2010)	Construal level	Self-report	Relative
	Choice architecture (Thaler & Sunstein, 2008)	Choice architecture	Self-report	Relative
	Prospect theory (Kahneman, Tversky, & Amos, 1979)	Prospect theory	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
Process	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative
	Choice set effects (Tversky & Kahneman, 1981)	Choice set effects	Self-report	Relative

## Epistemic uncertainty





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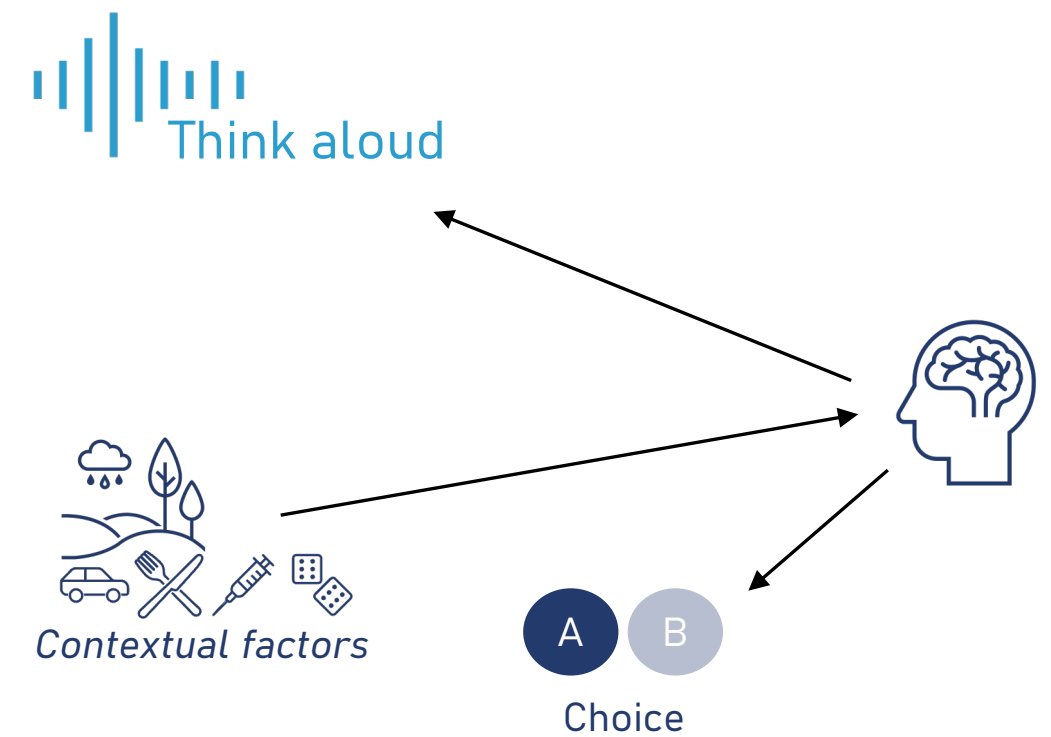
Prospect Theory: An Analysis of Decision Under Risk  
By DANIEL KAHNEMAN AND AMOS TVERSKY<sup>1</sup>

The Wisdom of Model Crowds  
Lishe (University of Pennsylvania)

An Ontology of Decision Models  
Lisheng He, Wenjia Joyce Zhao, and Sudeep Bhatia (University of Pennsylvania)



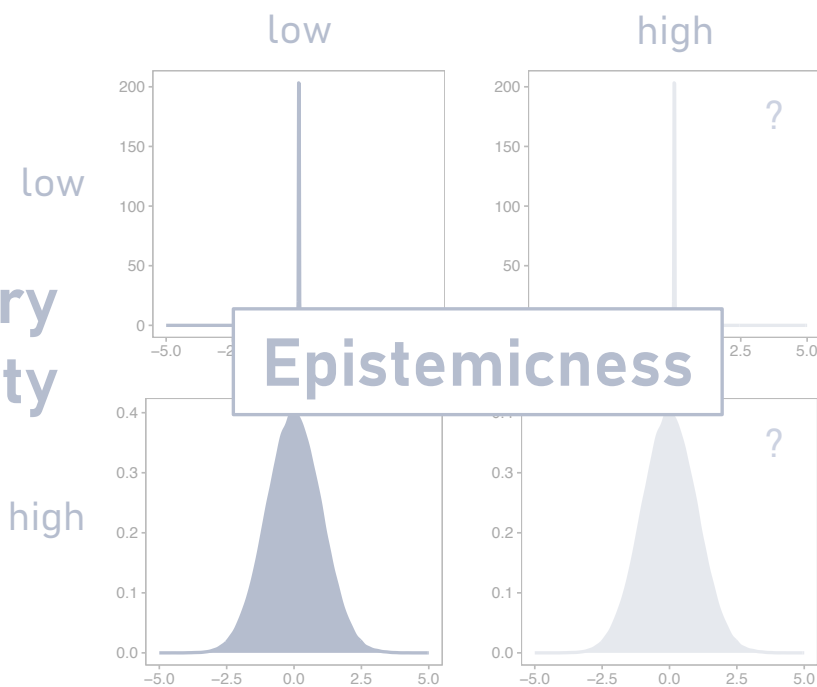
## Measurement

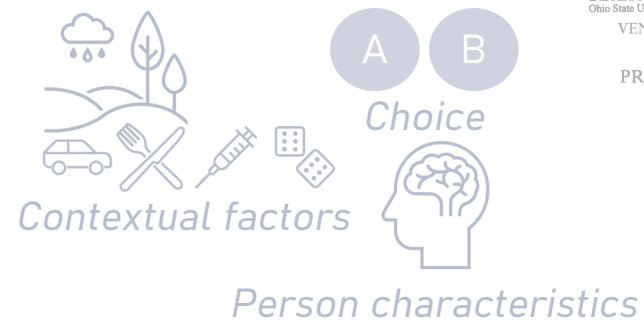


## Psychological processes

Model	Category	Year	Psychological factors, mechanisms, or process	Measure location or type	Relative and absolute criteria functions
1	Choice	1972	Expected utility theory	Choice	Choice
2	Choice	1972	Expected utility theory	Choice	Choice
3	Choice	1972	Expected utility theory	Choice	Choice
4	Choice	1972	Expected utility theory	Choice	Choice
5	Choice	1972	Expected utility theory	Choice	Choice
6	Choice	1972	Expected utility theory	Choice	Choice
7	Choice	1972	Expected utility theory	Choice	Choice
8	Choice	1972	Expected utility theory	Choice	Choice
9	Choice	1972	Expected utility theory	Choice	Choice
10	Choice	1972	Expected utility theory	Choice	Choice
11	Choice	1972	Expected utility theory	Choice	Choice
12	Choice	1972	Expected utility theory	Choice	Choice
13	Choice	1972	Expected utility theory	Choice	Choice
14	Choice	1972	Expected utility theory	Choice	Choice
15	Choice	1972	Expected utility theory	Choice	Choice
16	Choice	1972	Expected utility theory	Choice	Choice
17	Choice	1972	Expected utility theory	Choice	Choice
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19	Choice	1972	Expected utility theory	Choice	Choice
20	Choice	1972	Expected utility theory	Choice	Choice
21	Choice	1972	Expected utility theory	Choice	Choice
22	Choice	1972	Expected utility theory	Choice	Choice
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36	Choice	1972	Expected utility theory	Choice	Choice
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38	Choice	1972	Expected utility theory	Choice	Choice
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45	Choice	1972	Expected utility theory	Choice	Choice
46	Choice	1972	Expected utility theory	Choice	Choice
47	Choice	1972	Expected utility theory	Choice	Choice
48	Choice	1972	Expected utility theory	Choice	Choice
49	Choice	1972	Expected utility theory	Choice	Choice
50	Choice	1972	Expected utility theory	Choice	Choice

## Epistemic uncertainty





Risk as Feelings  
George F. Loewenstein, Carnegie Mellon University; Elke U. Weber, Columbia University

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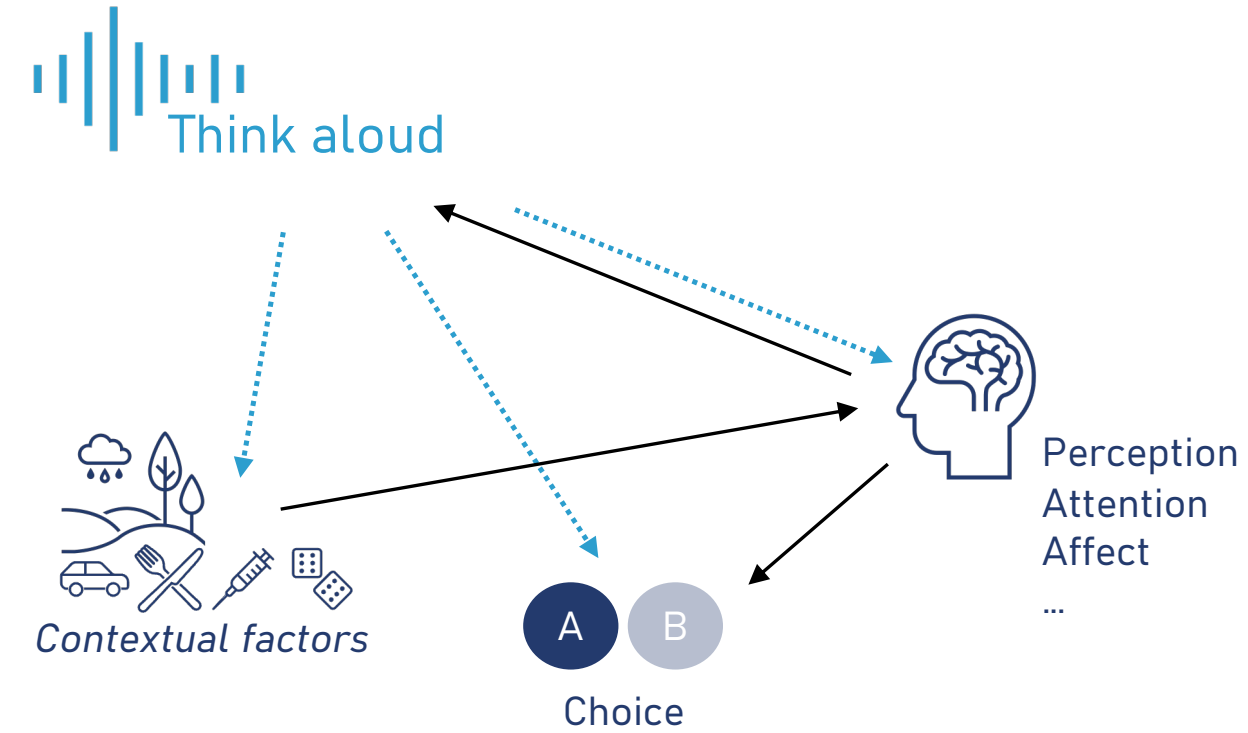
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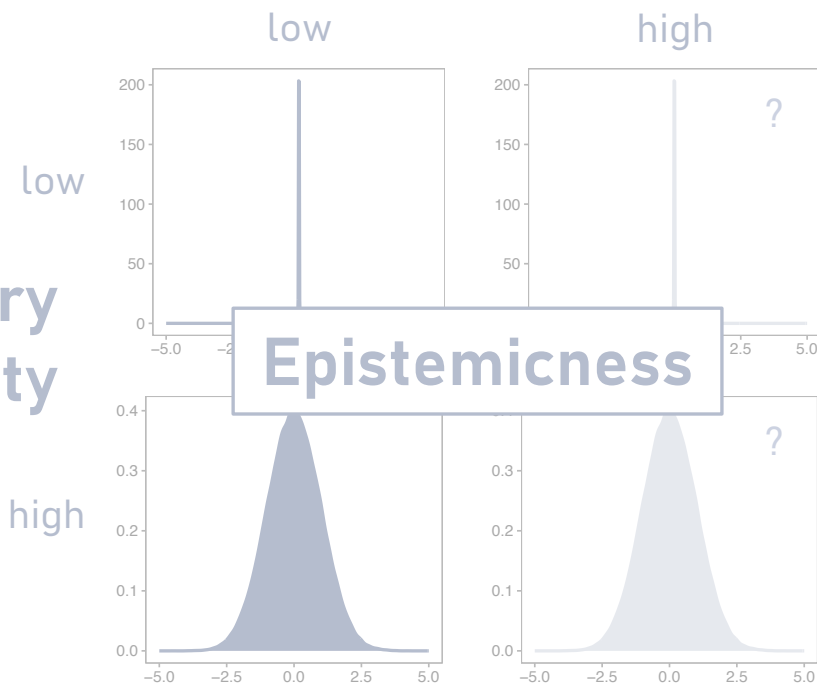
## Measurement

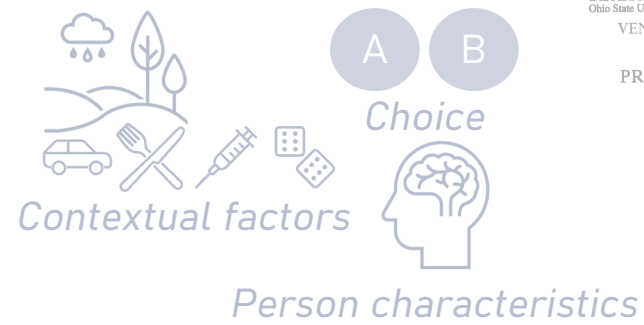
Model	Category	Year	Psychological factors, mechanisms, or process	Weighting function	Value function	Relative and absolute losses
1	Expected utility theory	1927	None	Linear	Linear	None
2	Expected utility theory	1951	None	Linear	Linear	None
3	Expected utility theory	1955	None	Linear	Linear	None
4	Expected utility theory	1957	None	Linear	Linear	None
5	Expected utility theory	1957	None	Linear	Linear	None
6	Expected utility theory	1957	None	Linear	Linear	None
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37	Expected utility theory	1957	None	Linear	Linear	None
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49	Expected utility theory	1957	None	Linear	Linear	None
50	Expected utility theory	1957	None	Linear	Linear	None



## Psychological processes

### Epistemic uncertainty





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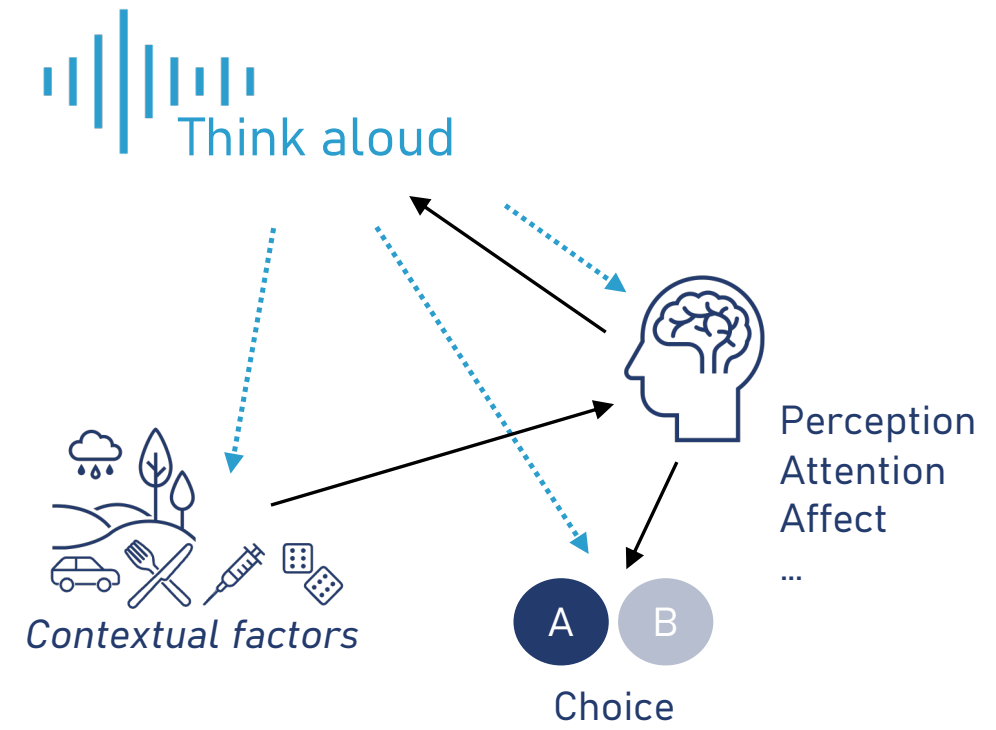
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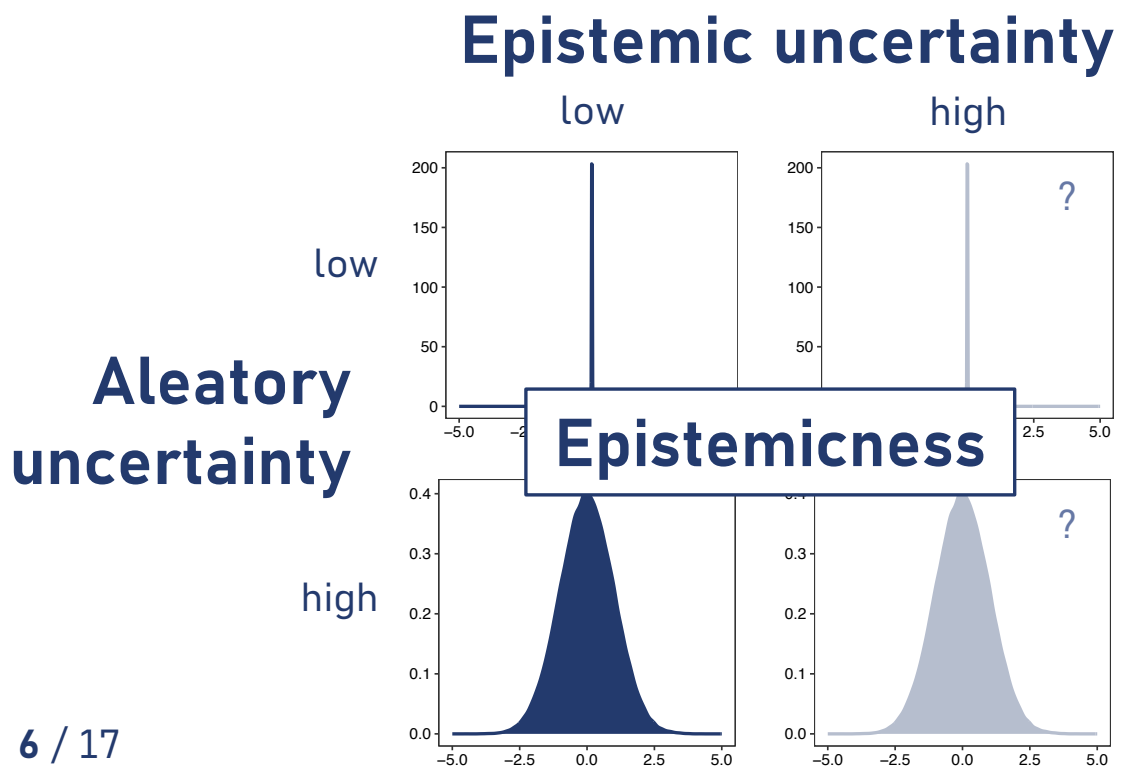
## Measurement

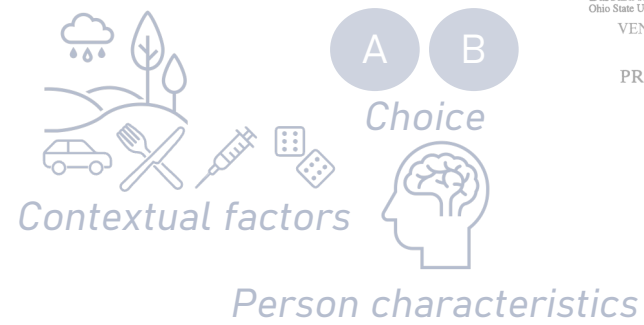
## Psychological processes

Model	Category	Year	Psychological factors, mechanisms, or processes
1	Choice	2007	Prospect Theory (Kahneman, Tversky, & Amos, 1979)
2	Choice	2007	Behavioral Decision Theory (Bardone et al., 2007)
3	Choice	2007	Bayesian Decision Theory (Gigerenzer & Hoffrage, 1997)
4	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
5	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
6	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
7	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
8	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
9	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
10	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
11	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
12	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
13	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
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15	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
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20	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
21	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
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23	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
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36	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
37	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
38	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
39	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
40	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
41	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
42	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
43	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
44	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
45	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
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47	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
48	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
49	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)
50	Choice	2007	Bayesian Inference (Gigerenzer & Hoffrage, 1997)



## Linguistic markers of uncertainty perceptions (Ülkümen et al., 2016; Tannenbaum et al., 2017)





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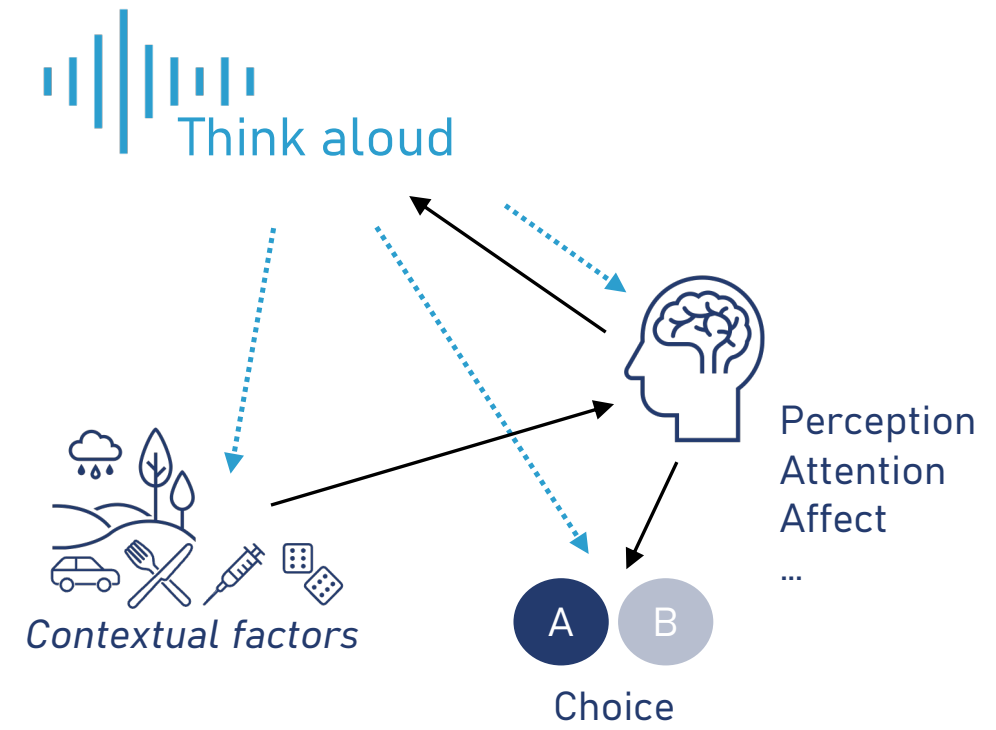
The Wisdom of Model Crowds  
Lishe (An Ontology of Decision Models)  
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## Measurement

## Psychological processes

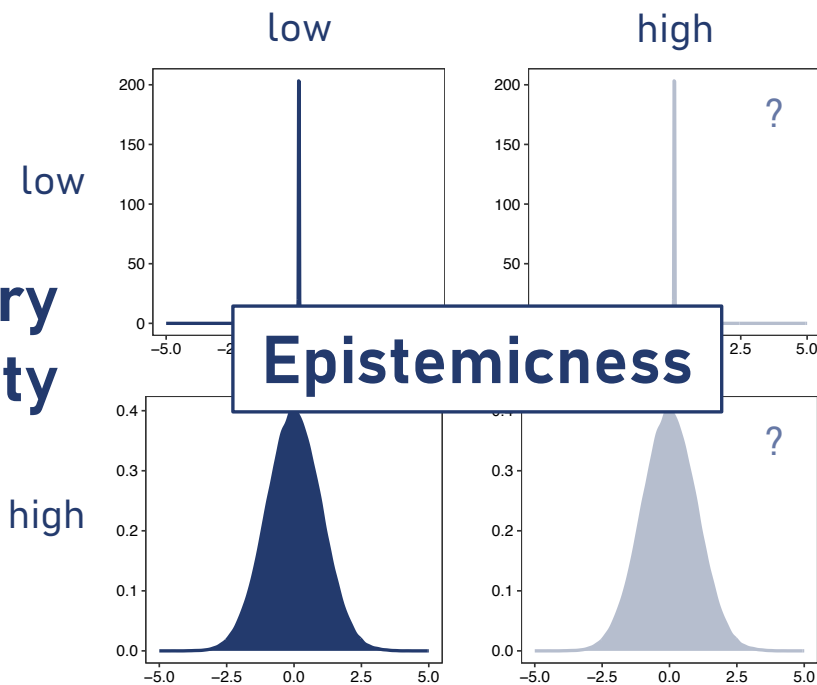
Model	Category	Year	Psychological factors, mechanisms, or processes	Weighting function	Value function	Reference and/or loss aversion
1	Expected utility theory	1927	None	Linear	Linear	None
2	Expected utility theory	1952	None	Linear	Linear	None
3	Expected utility theory	1955	None	Linear	Linear	None
4	Expected utility theory	1957	None	Linear	Linear	None
5	Expected utility theory	1957	None	Linear	Linear	None
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## Linguistic markers of uncertainty perceptions (Ülkümen et al., 2016; Tannenbaum et al., 2017)

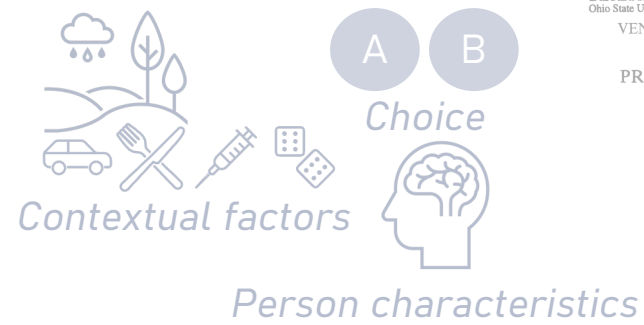
Likelihood statements: "It is likely that"

## Epistemic uncertainty



Aleatory uncertainty





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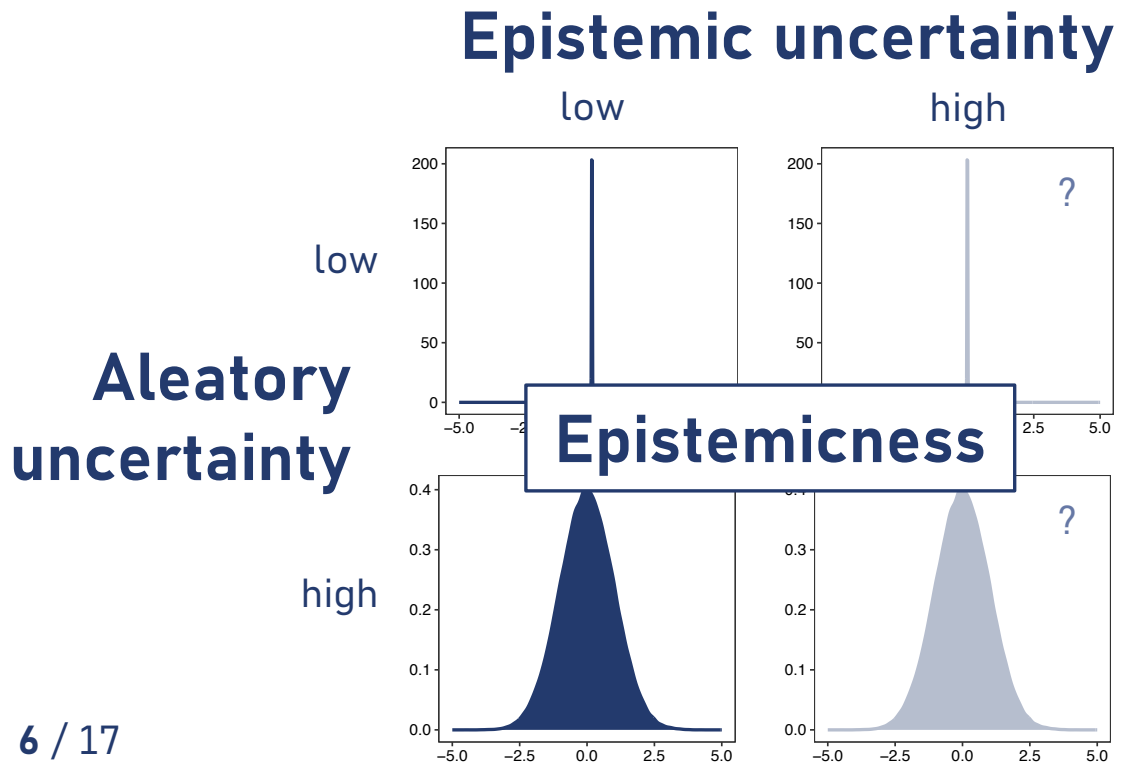
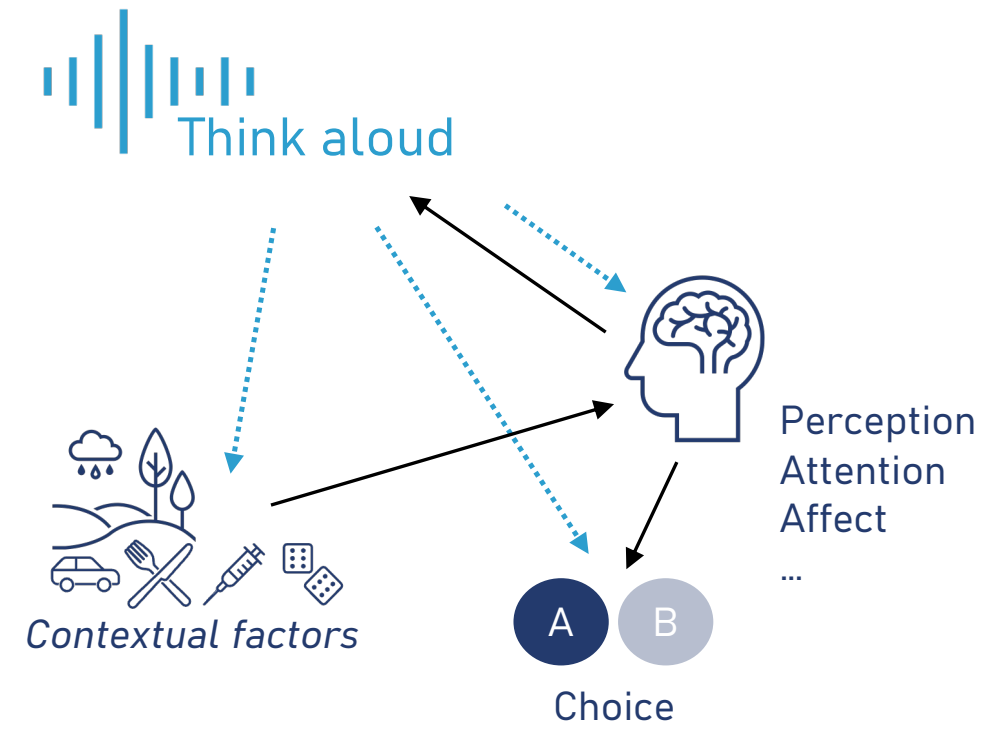
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## Measurement

## Psychological processes

Model	Category	Parameters
1	Prospect Theory	Value function, Probability weighting
2	Expected Utility Theory	Utility function
3	Bayesian Belief Networks	Conditional probability tables
4	Bayesian Networks	Conditional probability tables
5	Bayesian Belief Networks	Conditional probability tables
6	Bayesian Belief Networks	Conditional probability tables
7	Bayesian Belief Networks	Conditional probability tables
8	Bayesian Belief Networks	Conditional probability tables
9	Bayesian Belief Networks	Conditional probability tables
10	Bayesian Belief Networks	Conditional probability tables
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28	Bayesian Belief Networks	Conditional probability tables
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44	Bayesian Belief Networks	Conditional probability tables
45	Bayesian Belief Networks	Conditional probability tables
46	Bayesian Belief Networks	Conditional probability tables
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50	Bayesian Belief Networks	Conditional probability tables



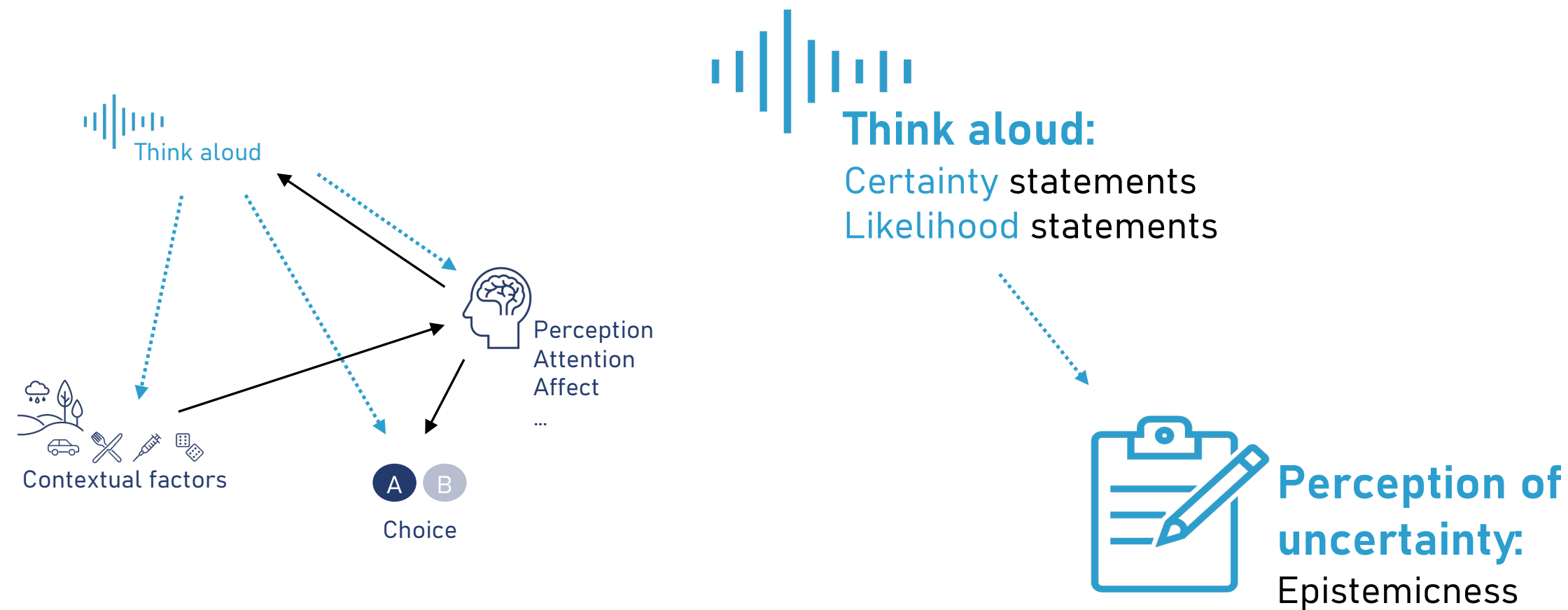
**Linguistic markers of uncertainty perceptions**  
(Ülkümen et al., 2016; Tannenbaum et al., 2017)

**Likelihood** statements:  
"It is likely that"

**Certainty** statements:  
"I am uncertain that"




# RQ3: Which **methods** can be used to investigate (everyday) risky choices?



# Procedure


# Procedure

## Onboarding

- $N=61$
- Risk preference   
(SOEP, Wagner et al., 2007)

# Procedure

## Onboarding

- $N=61$
- Risk preference   
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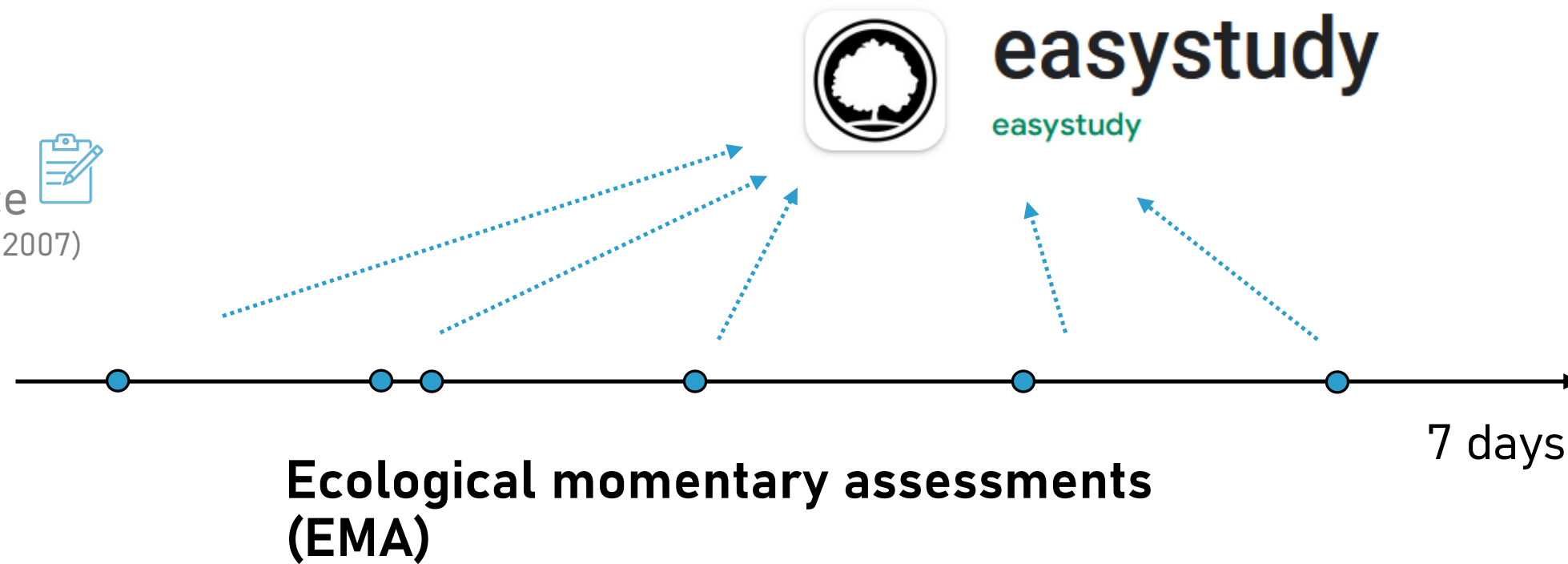
**Ecological momentary assessments  
(EMA)**

7 days

# Procedure

## Onboarding

- $N=61$
- Risk preference   
(SOEP, Wagner et al., 2007)



# Procedure

## Onboarding

- $N=61$
- Risk preference (SOEP, Wagner et al., 2007)



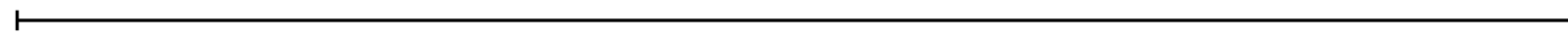
**easystudy**  
easystudy



7 days

Transcription using *Whisper*  
(Radford et al., 2019)


**Ecological momentary assessments (EMA)**

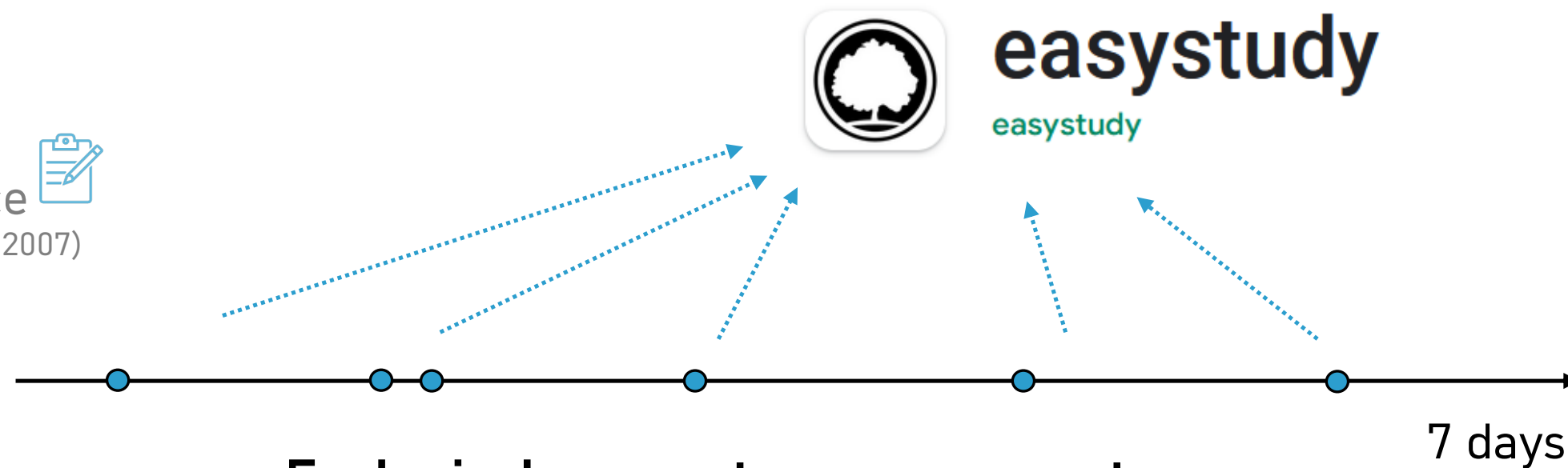


Independent variables

# Procedure

## Onboarding

- $N=61$
- Risk preference   
(SOEP, Wagner et al., 2007)




**Ecological momentary assessments  
(EMA)**

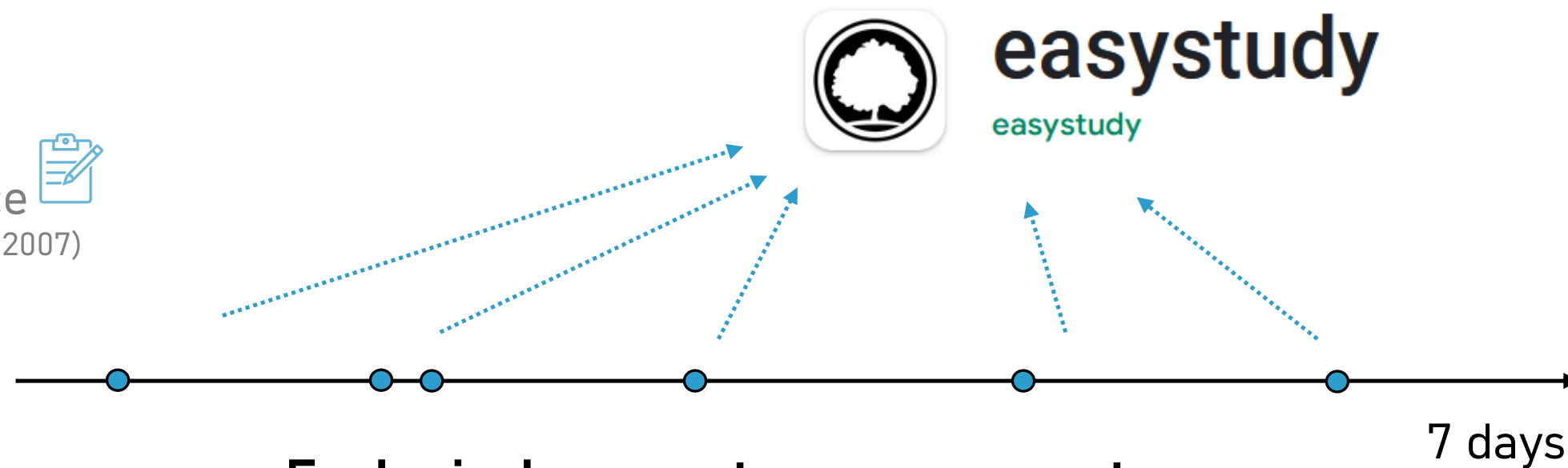


Independent variables

# Procedure

## Onboarding

- $N=61$
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(SOEP, Wagner et al., 2007)



## Ecological momentary assessments (EMA)



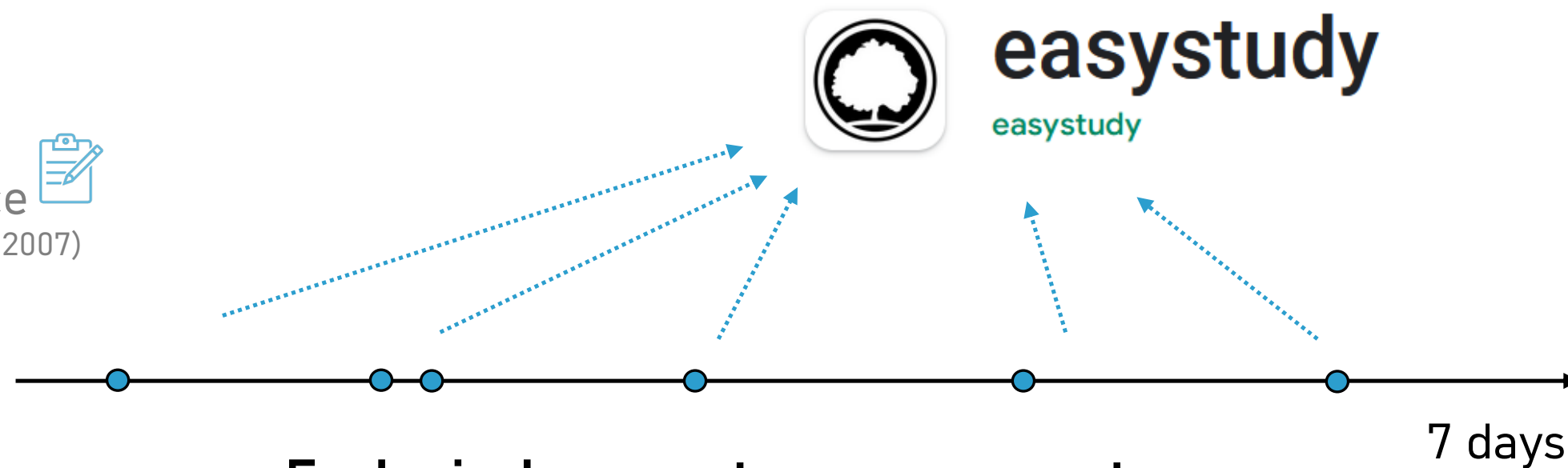
Independent variables



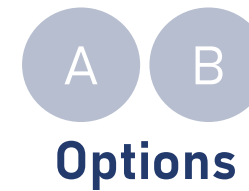
# Procedure

## Onboarding

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## Ecological momentary assessments (EMA)

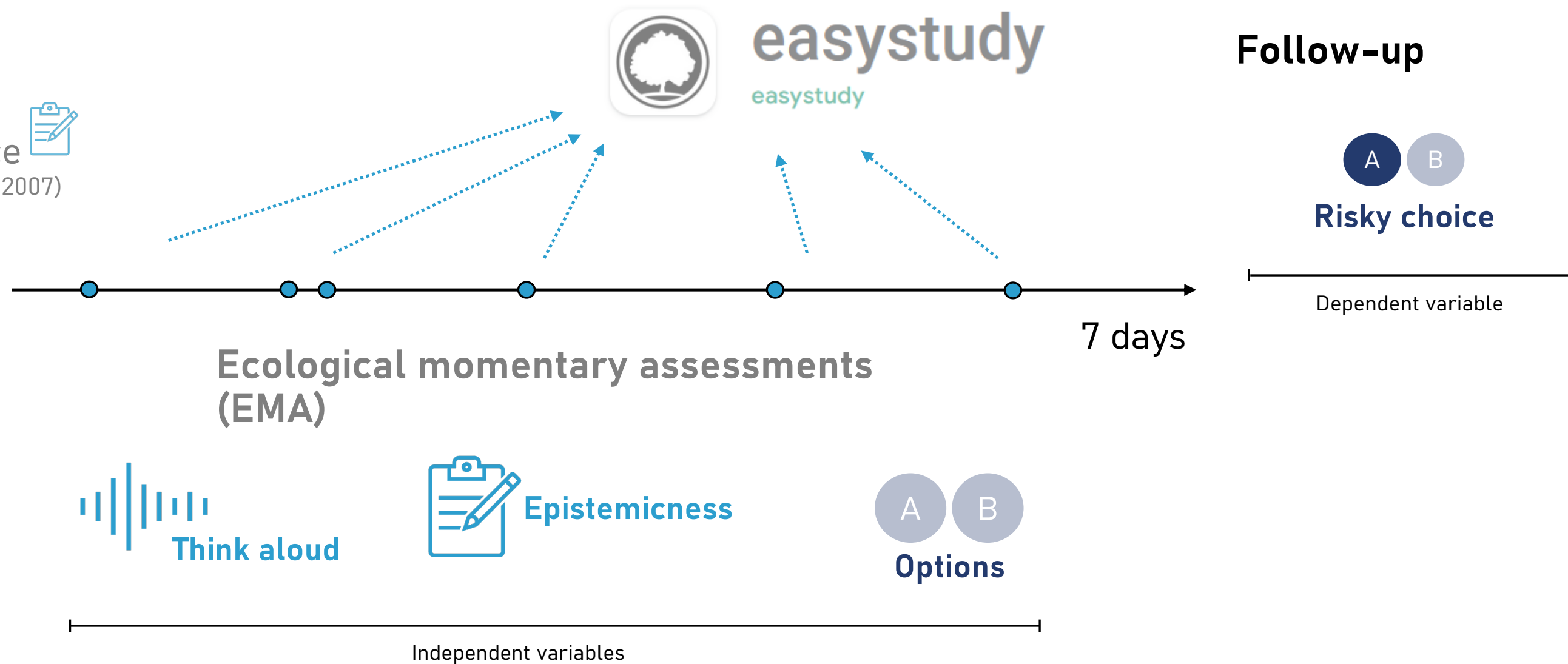


Independent variables

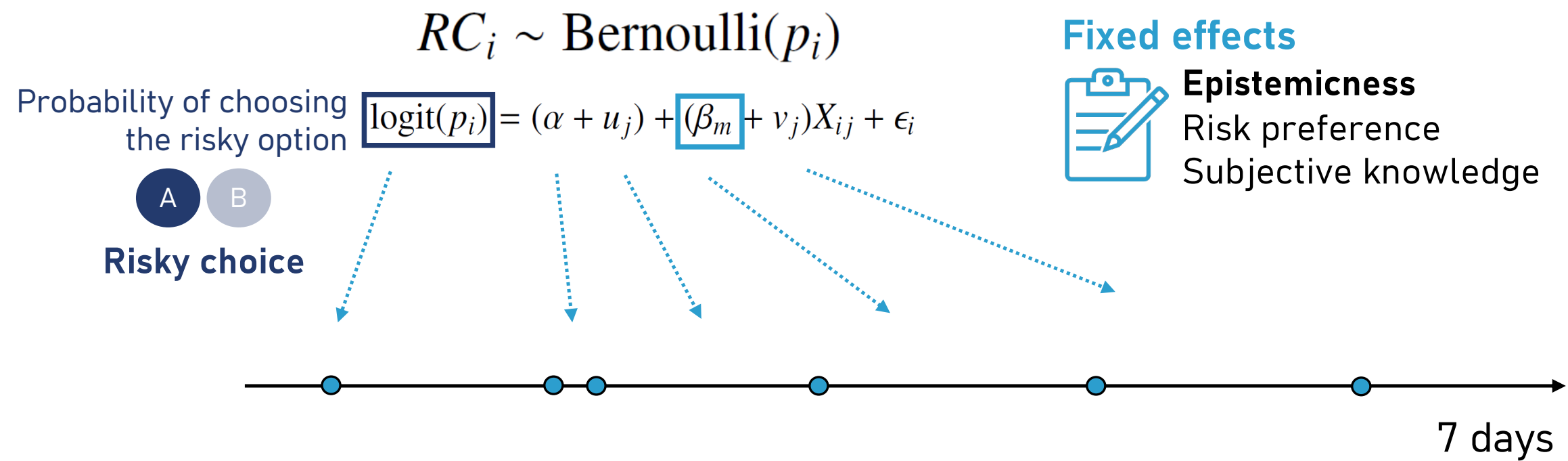
# Procedure

## Onboarding

- $N=61$
- Risk preference (SOEP, Wagner et al., 2007)

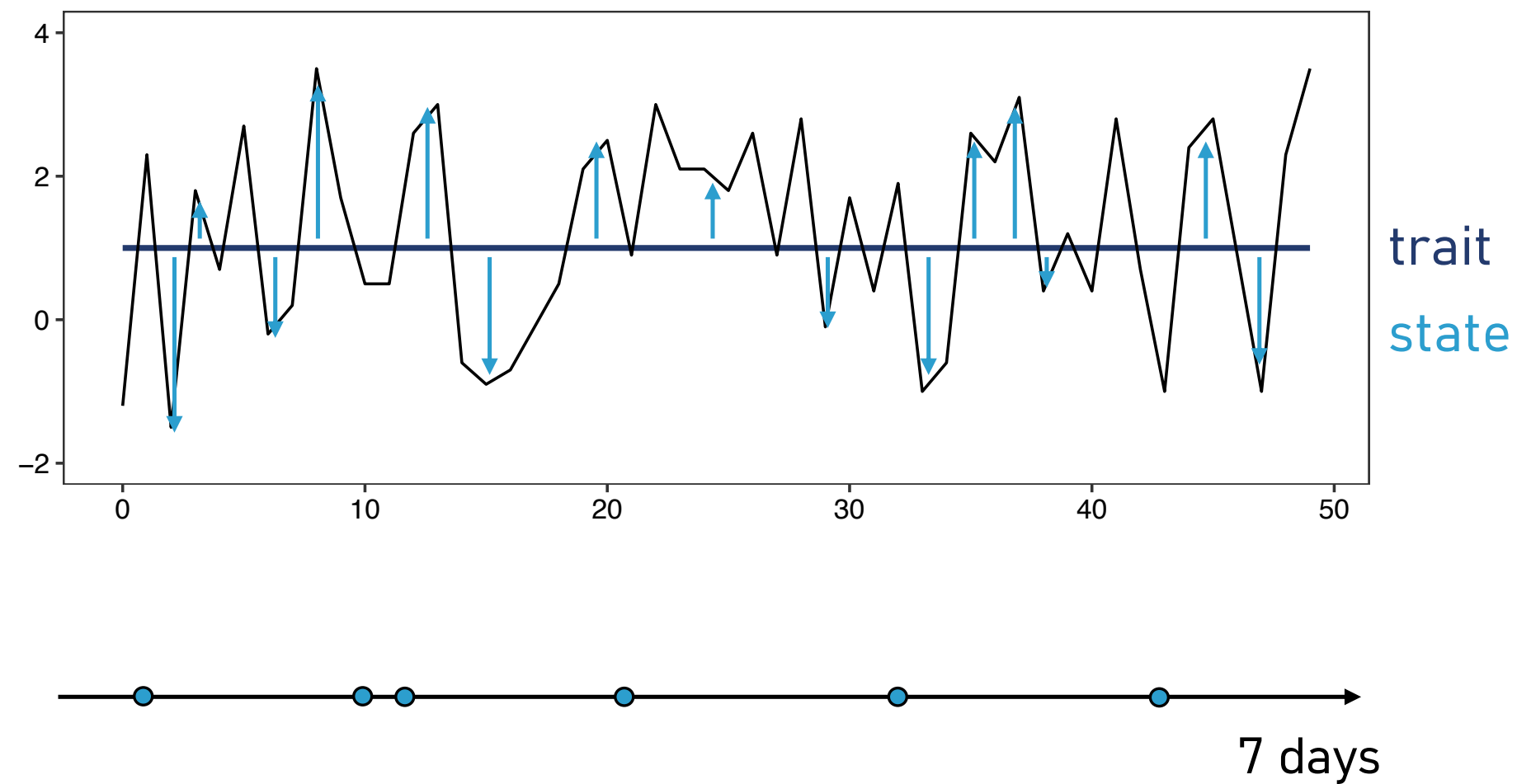


# Modeling risky choices

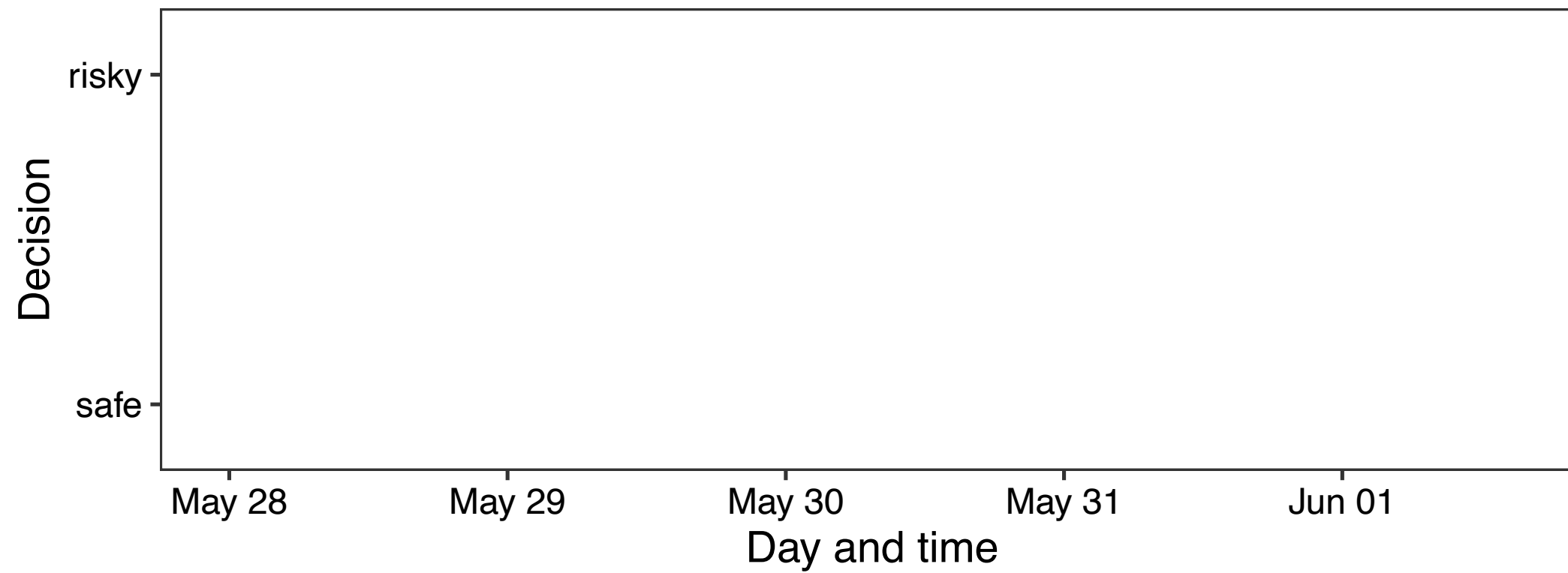


# Results

**RQ1:** To what extent is there **situational variability** in (everyday) risky choices?

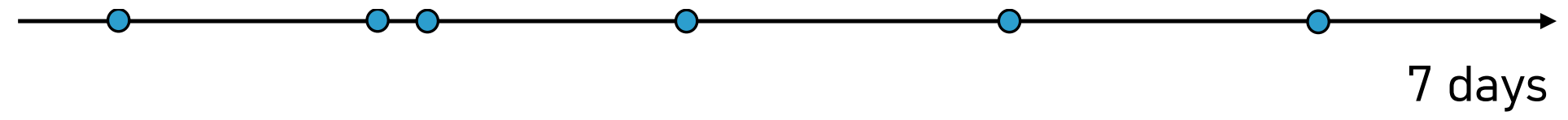
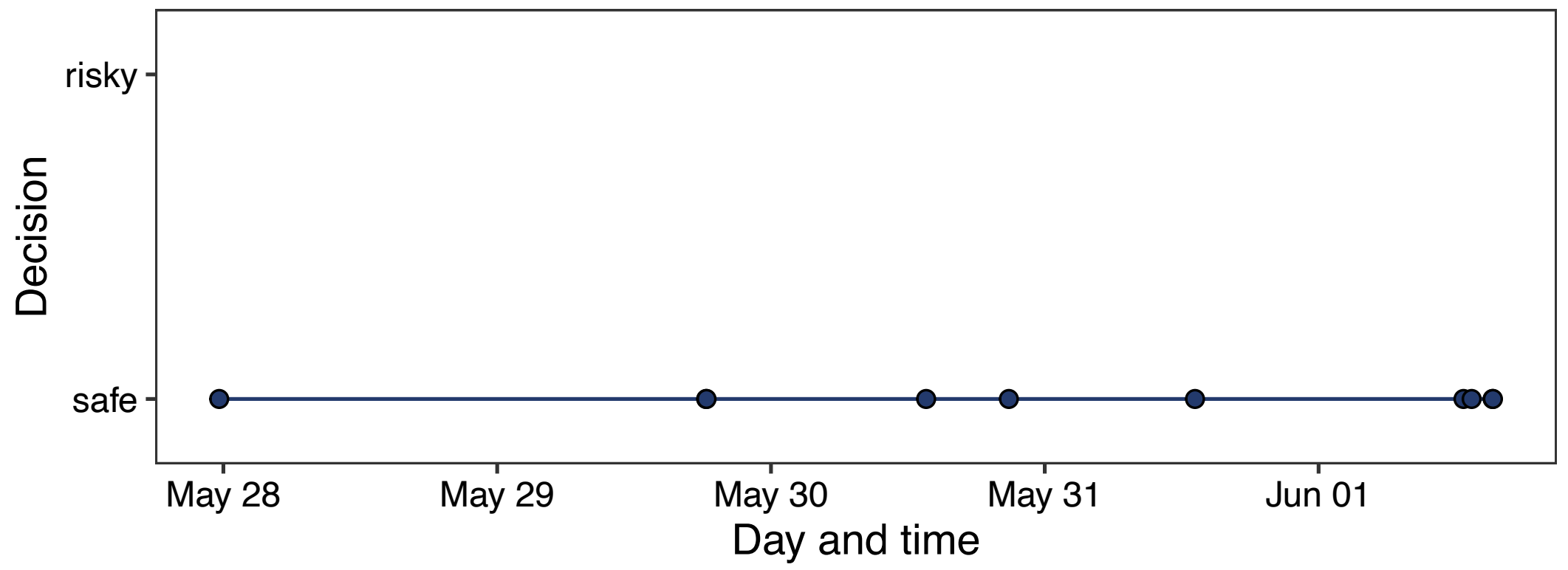


# Situational variability

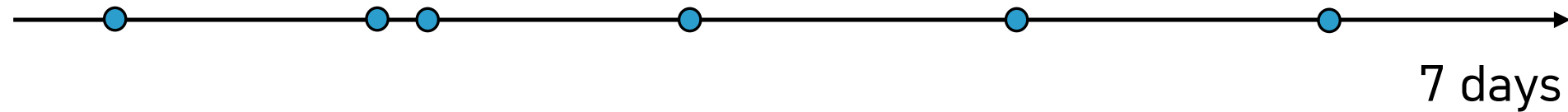
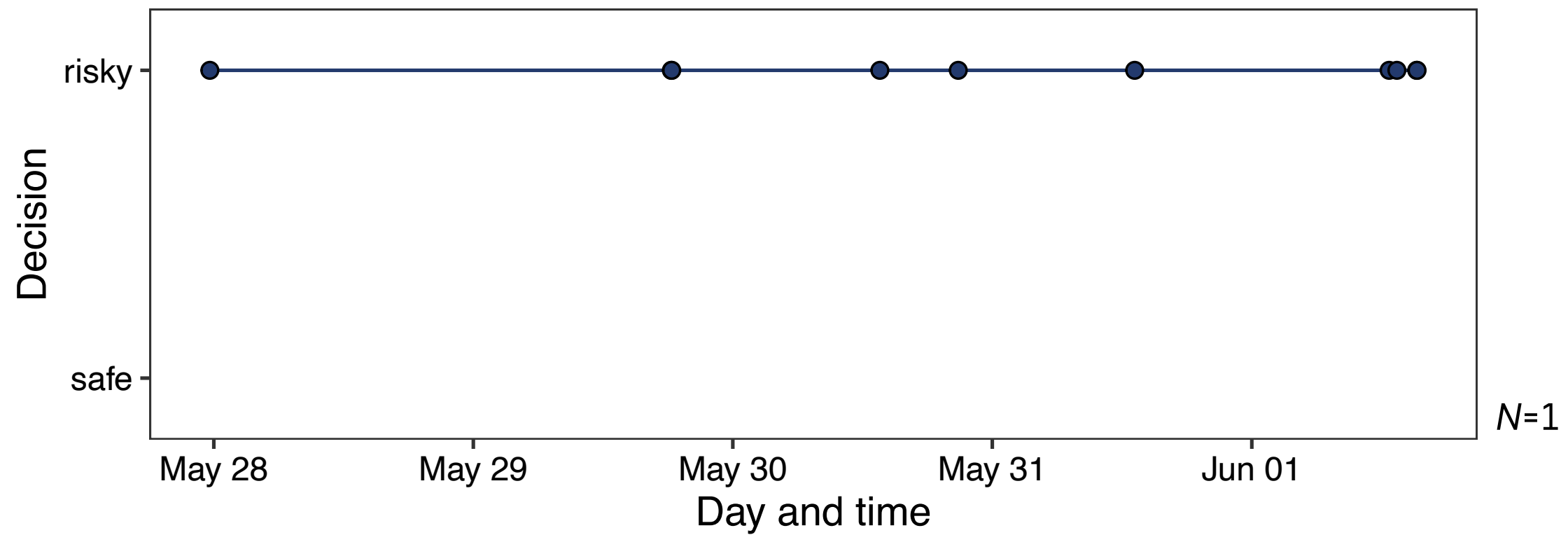


7 days

# Situational variability

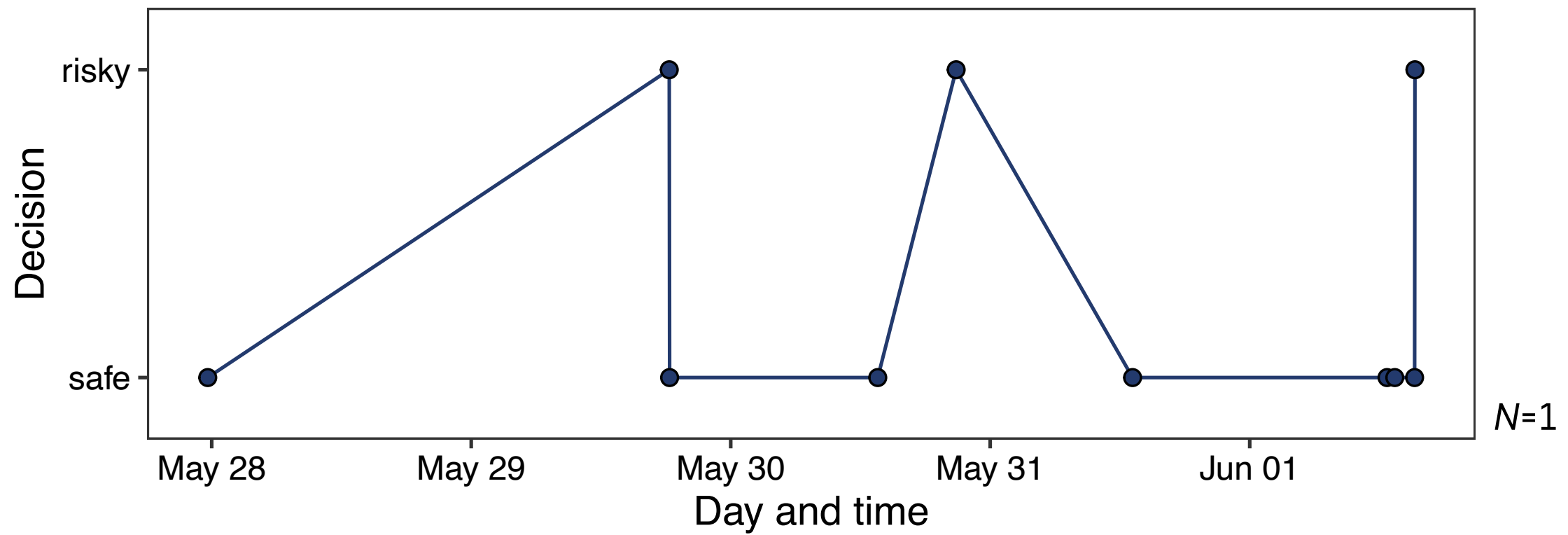


# Situational variability

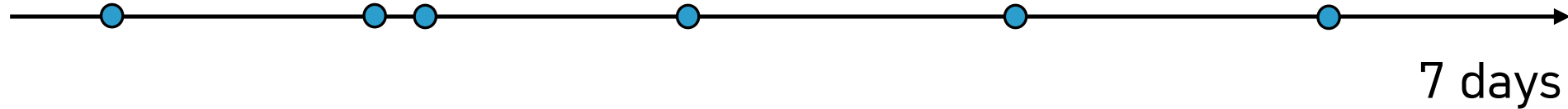




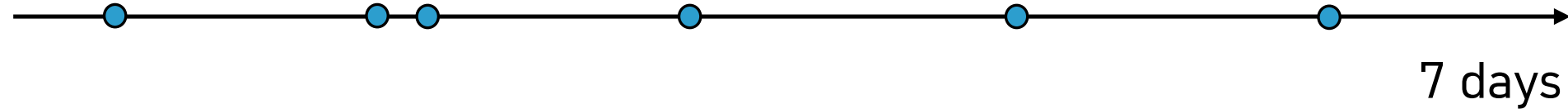
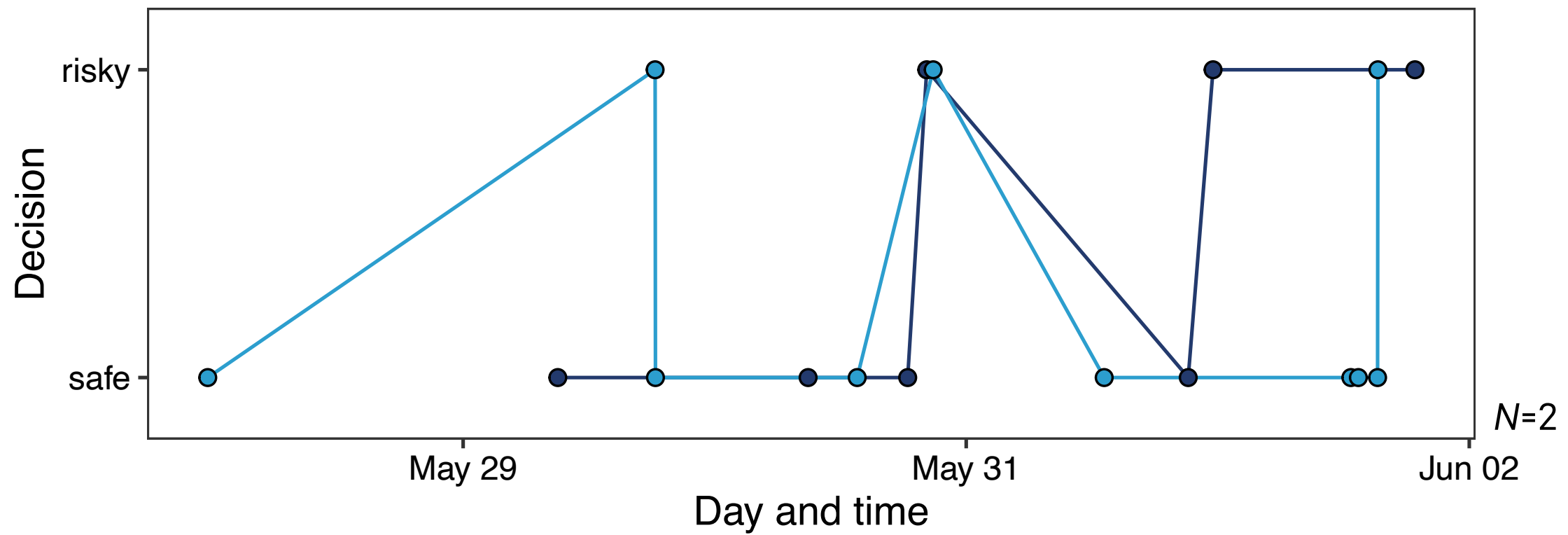
# Situational variability



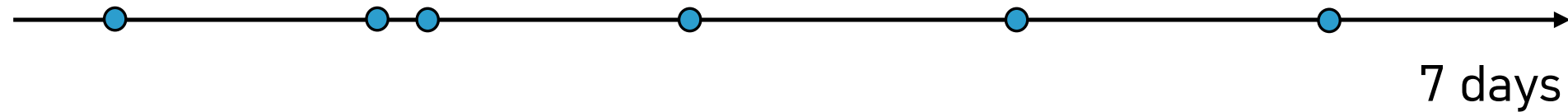
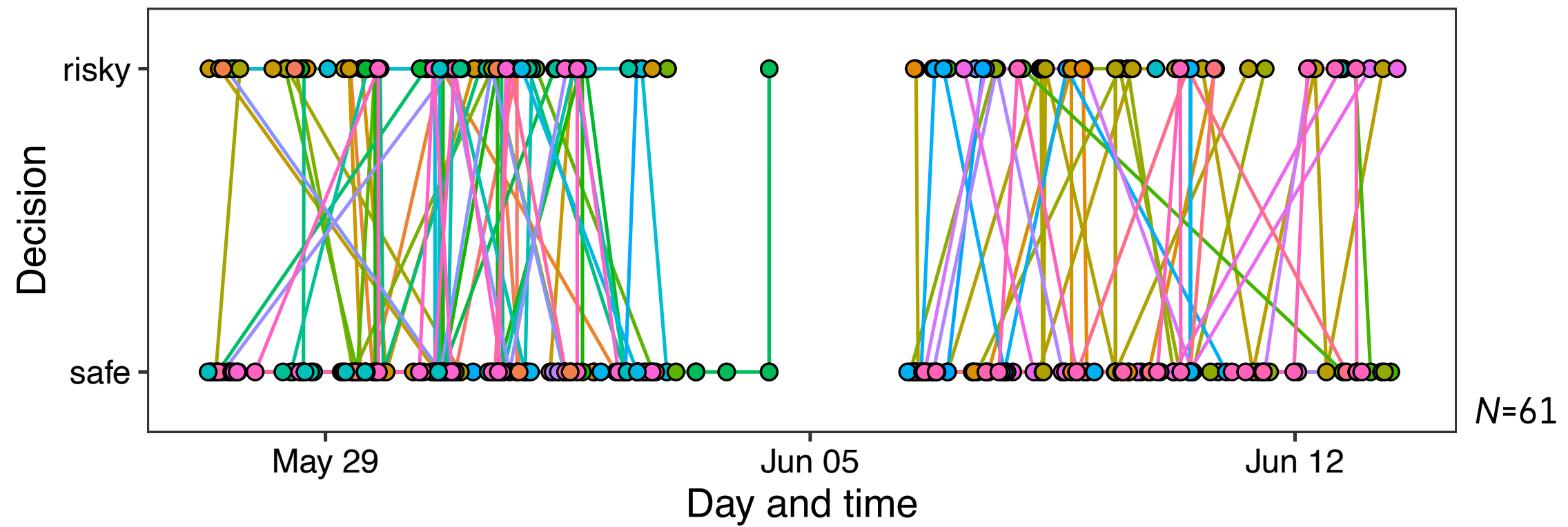
N=1



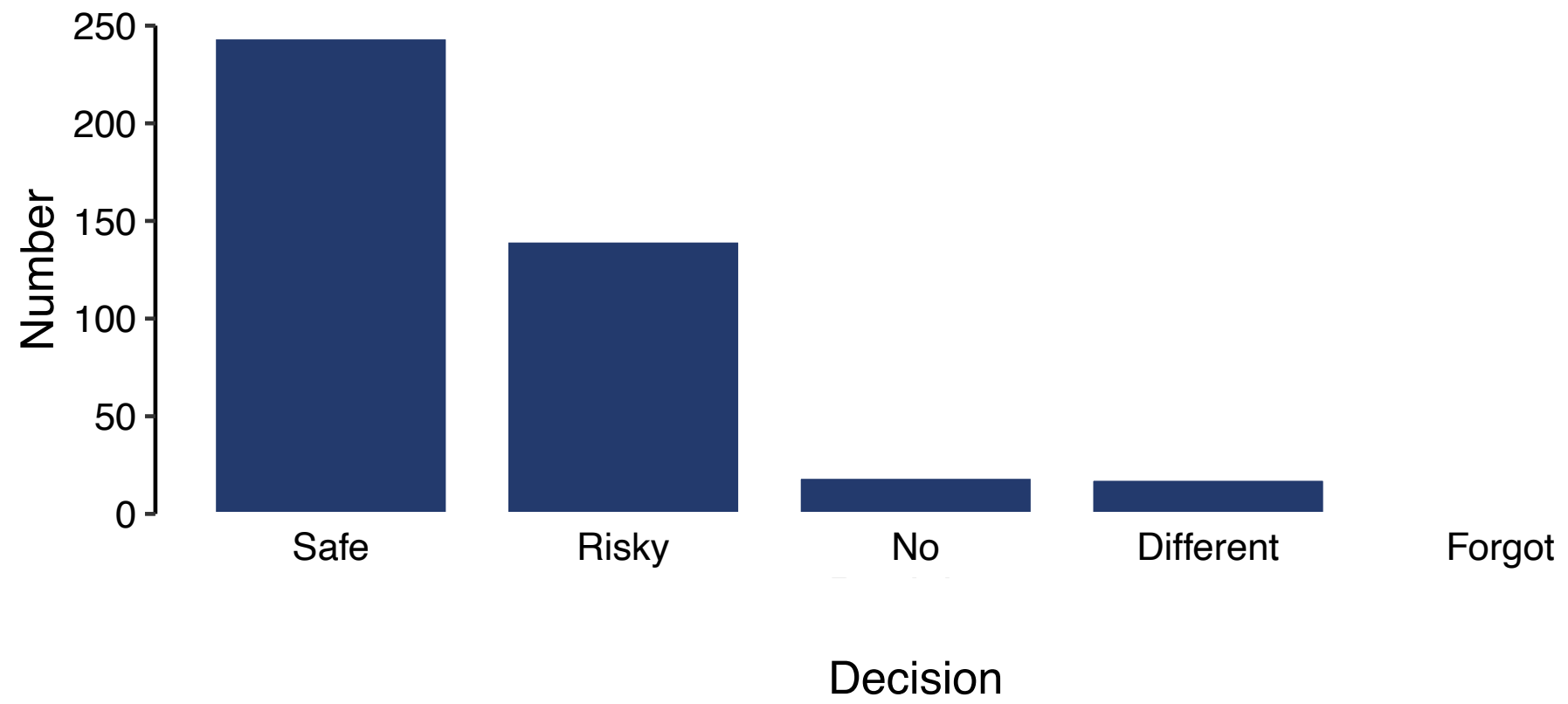
# Situational variability



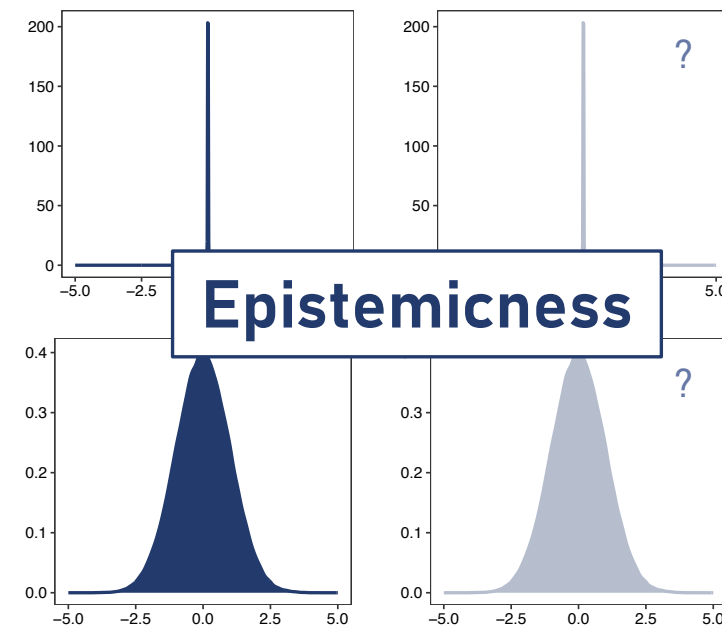
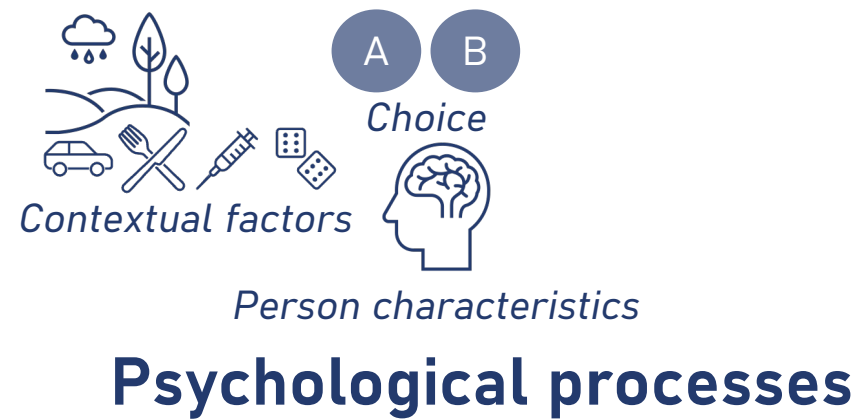
# Situational variability



# Decisions

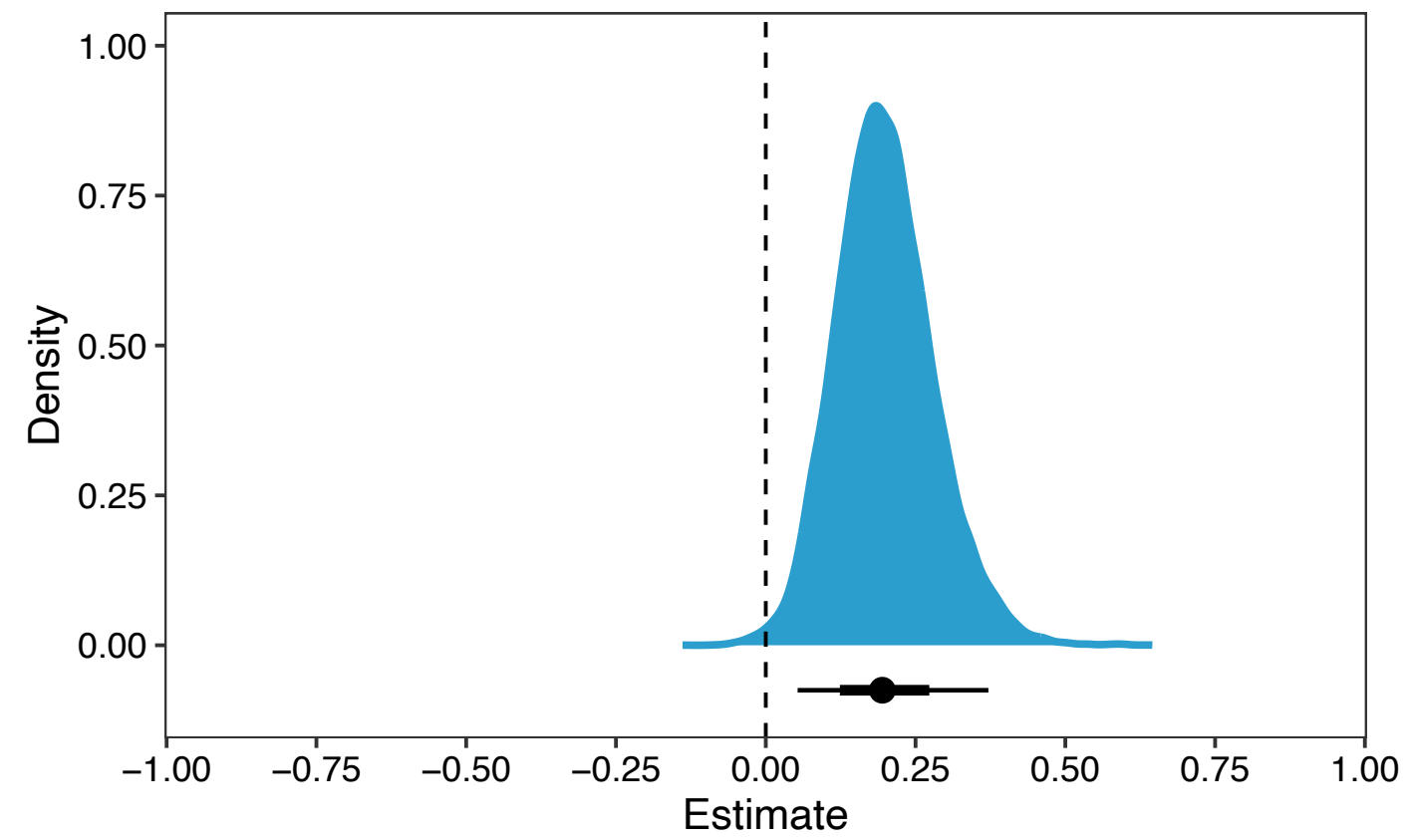


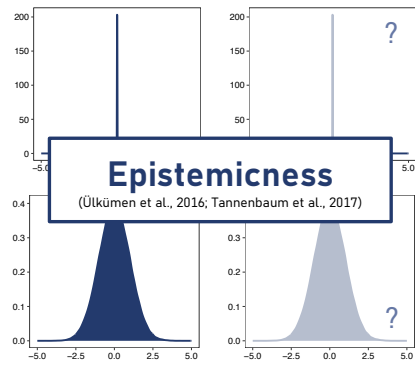
# RQ2: Is the **perception of epistemic uncertainty** related to a person's (everyday) risky choices?



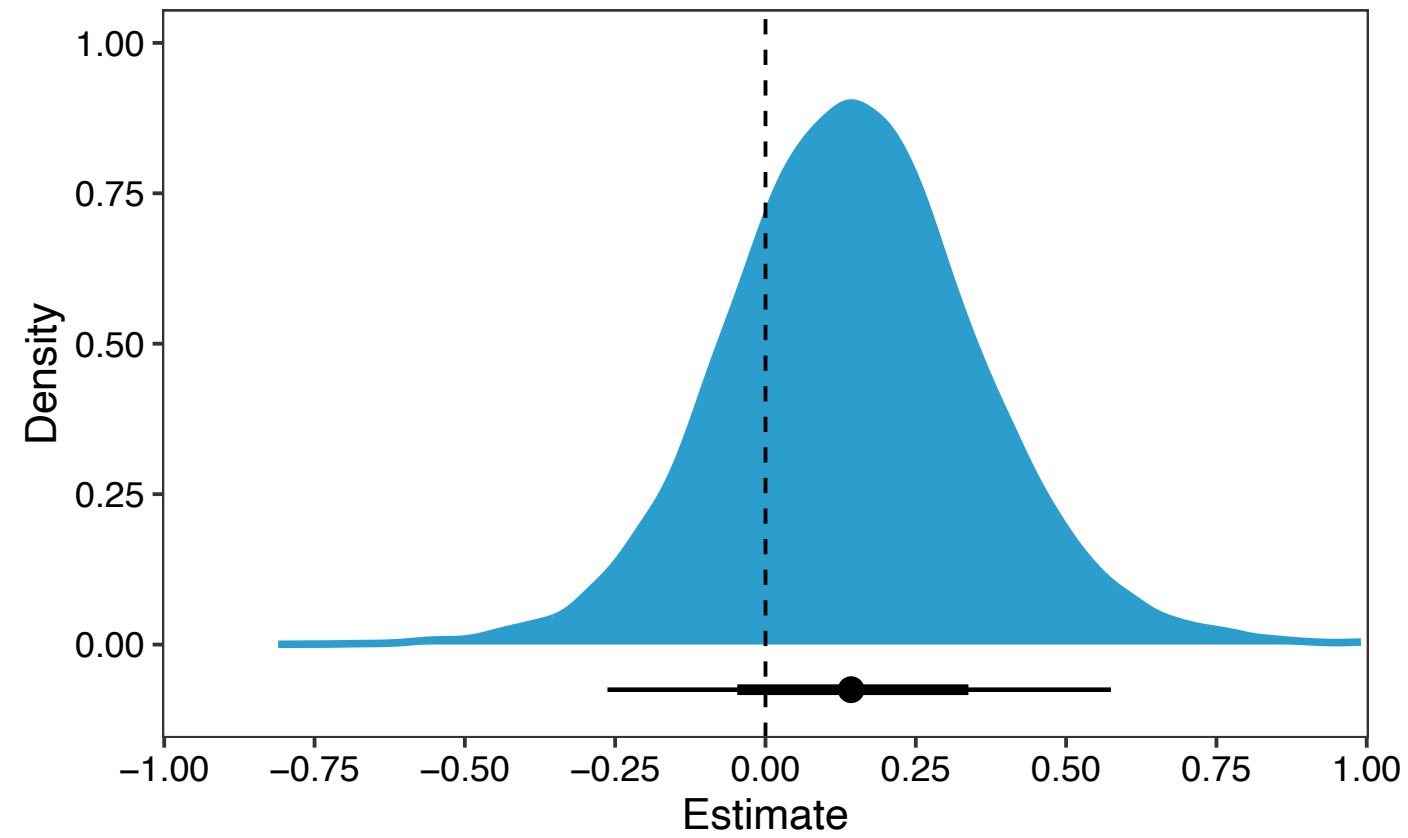
# Modeling situational factors

Fixed effects				
Parameter	Estimate [95% HDI]	Odds ratio [95% HDI]	Hypothesis	$BF_*$
Intercept	-0.69 [-1.10, -0.31]	0.50 [0.33, 0.73]	-	-
Risk preference (RP)	0.20 [0.05, 0.37]	1.22 [1.05, 1.45]	$\beta > 0$	$BF_{10} = 5.05$



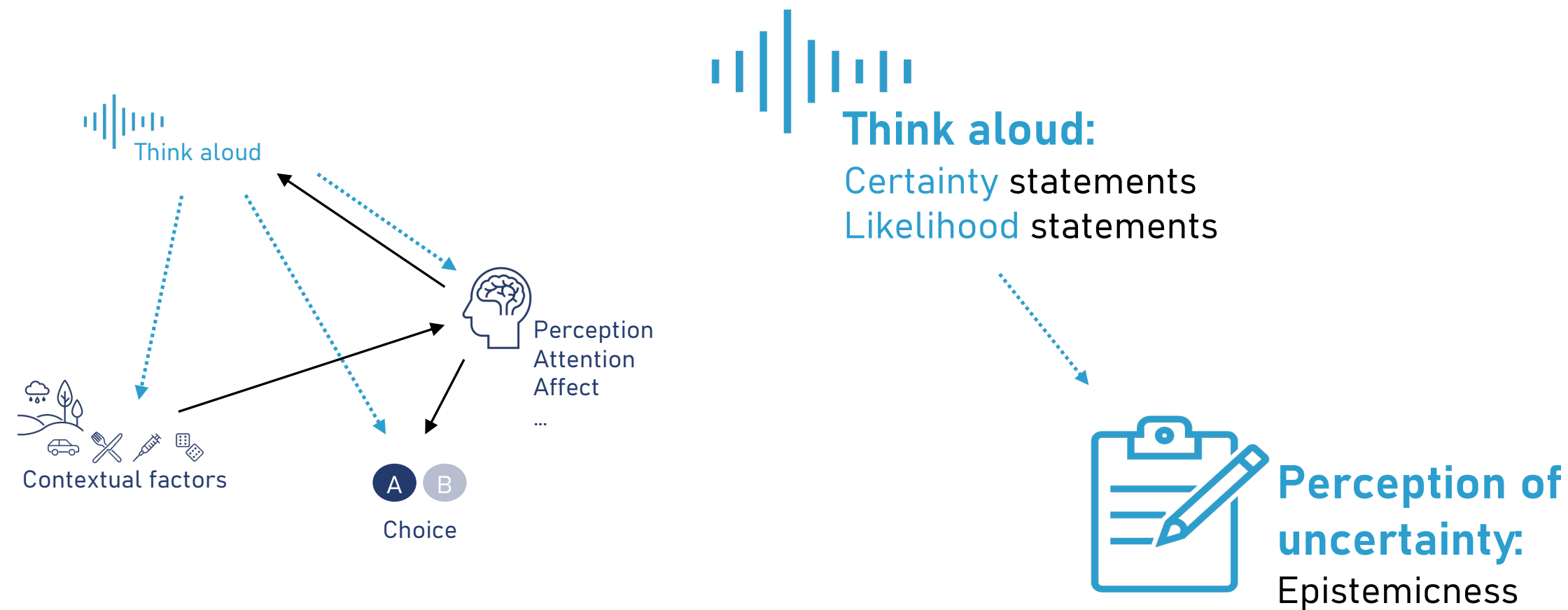


Fixed effects				
Parameter	Estimate [95% HDI]	Odds ratio [95% HDI]	Hypothesis	$BF_*$
Intercept	-0.69 [-1.10, -0.31]	0.50 [0.33, 0.73]	-	-
Risk preference (RP)	0.20 [0.05, 0.37]	1.22 [1.05, 1.45]	$\beta > 0$	$BF_{10} = 5.05$
Epistemicness (E)	0.14 [-0.27, 0.58]	1.15 [0.76, 1.78]	$\beta < 0$	$BF_{01} = 8.13$

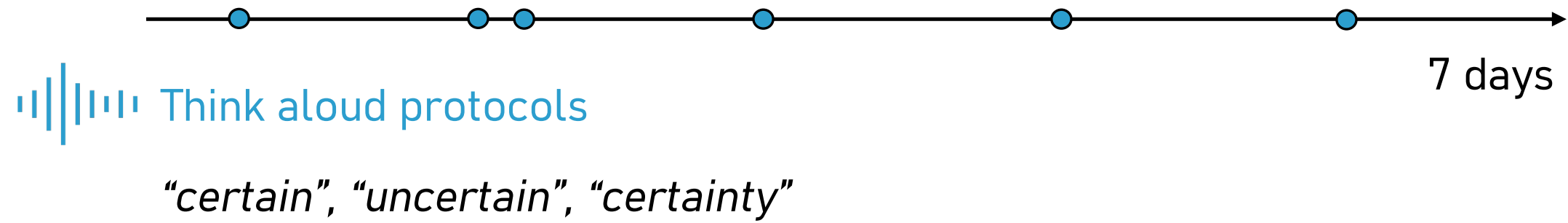




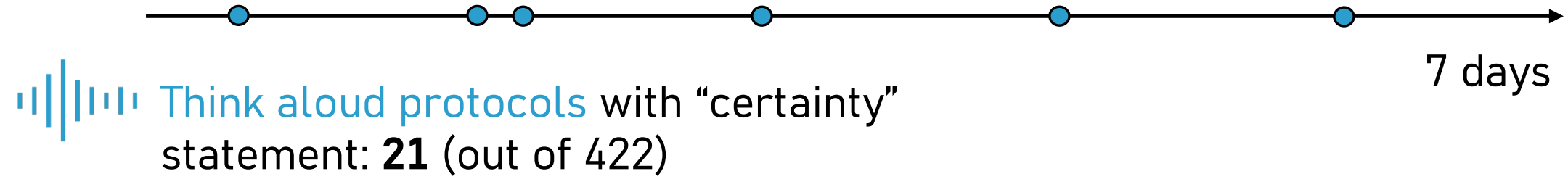
# RQ3: Which **methods** can be used to investigate (everyday) risky choices?



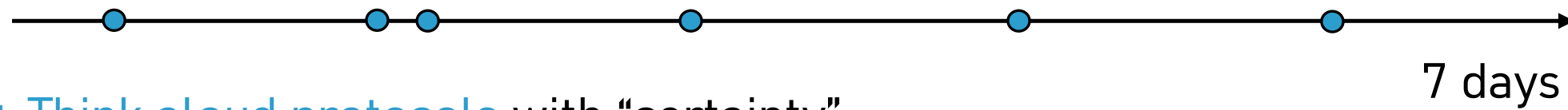
# Linguistic markers



# Linguistic markers

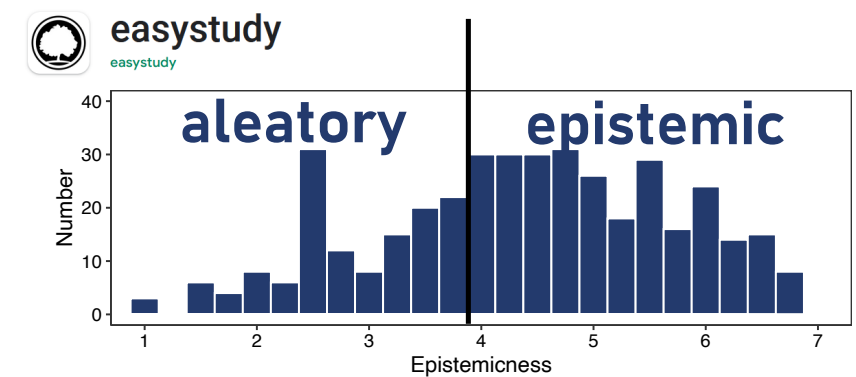


# Linguistic markers

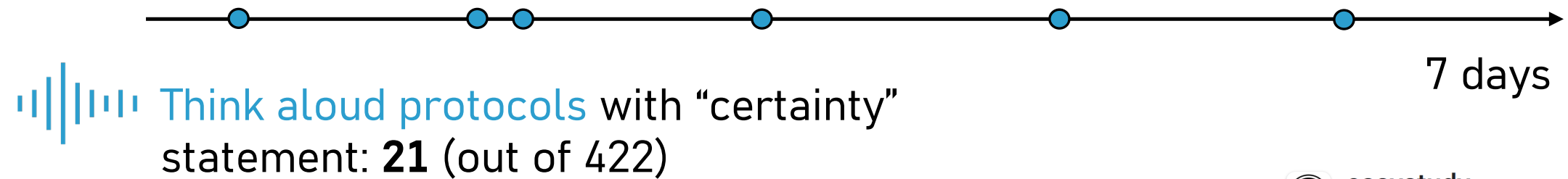


Think aloud protocols with “certainty” statement: **21** (out of 422)

**N situations mostly epistemic = 287**

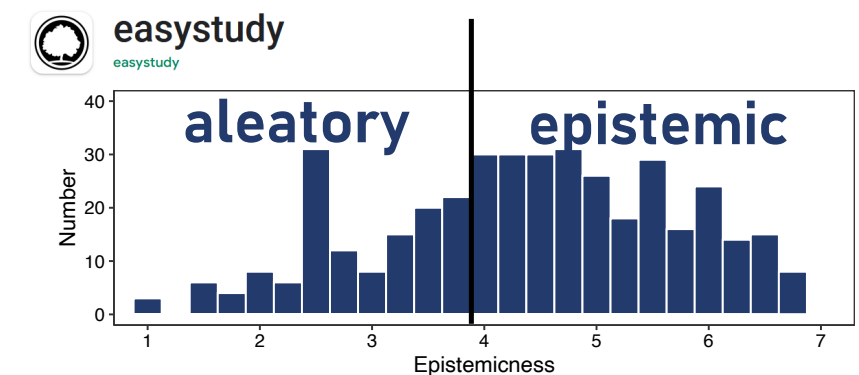


# Linguistic markers



**N situations mostly epistemic = 287**

**N epistemic situations described with "certainty" statement = 16**



# Linguistic markers

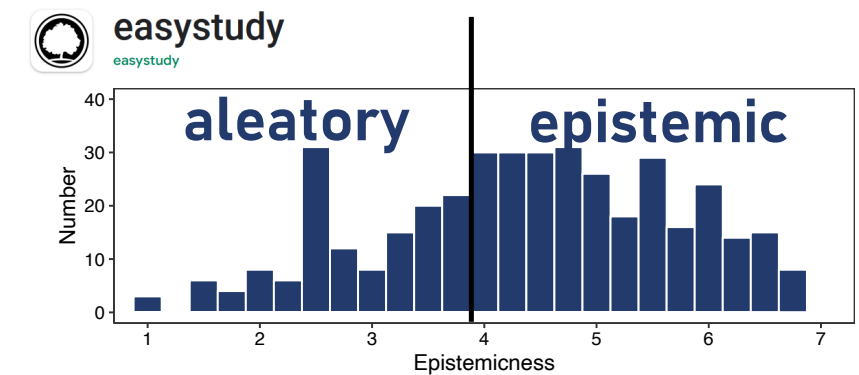


Think aloud protocols with “certainty” statement: **21** (out of 422)

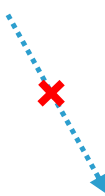
N situations mostly epistemic = **287**

N epistemic situations described with “certainty” statement = **16**

$$\frac{16}{287} = 0.056$$



Think aloud:  
Certainty statements  
Likelihood statements

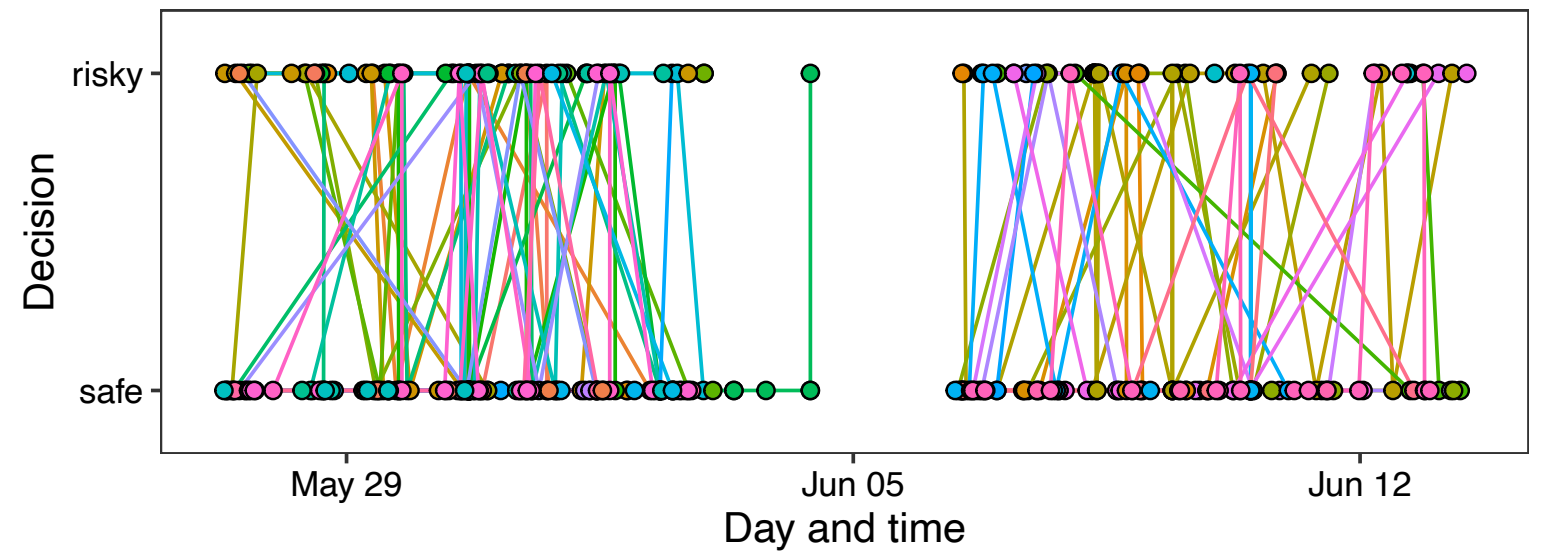


Perception of uncertainty:  
Epistemicity

**What did we learn?**

# What did we learn?

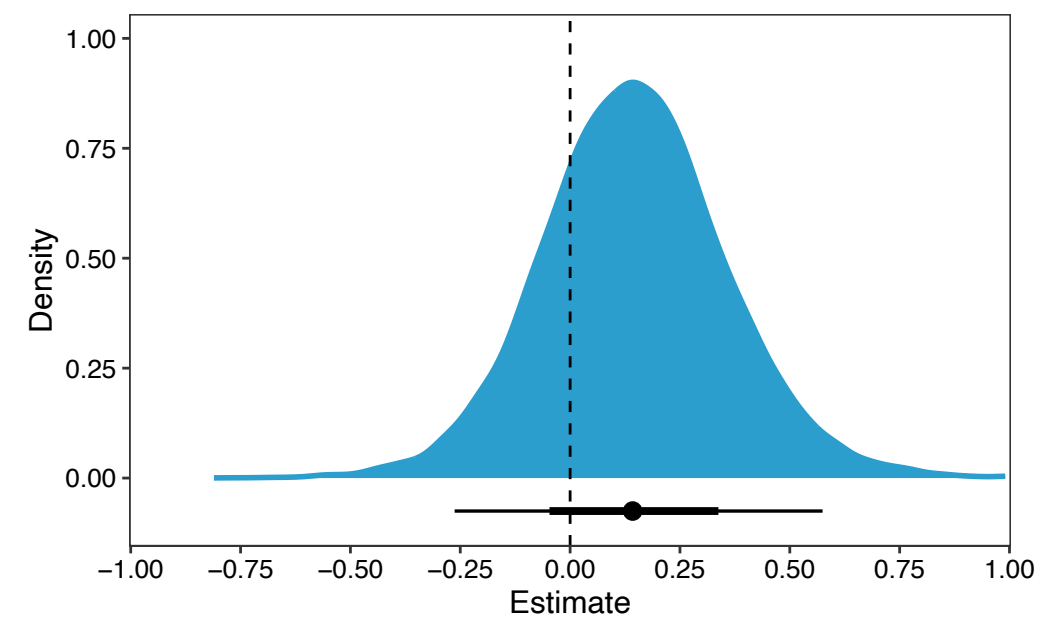
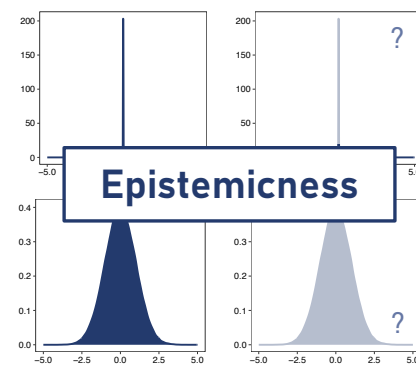
- **Situational variability**





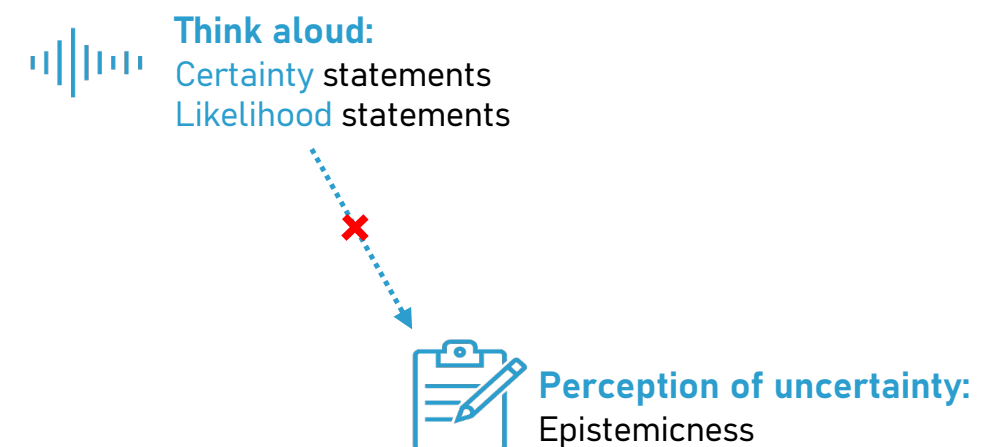
## What did we learn?

- **Situational variability**
- **Perceived epistemic uncertainty is unrelated to risky choices**



## What did we learn?

- **Situational variability**
- **Perceived epistemic uncertainty** is unrelated to risky choices
- No evidence for **linguistic markers** of perceived epistemic/aleatory uncertainty



# Modeling the influence of perceived situational uncertainty on everyday risky choices

Aaron Lob, Olivia Fischer, & Renato Frey



**Cognitive and Behavioral Decision  
Research, University of Zurich**

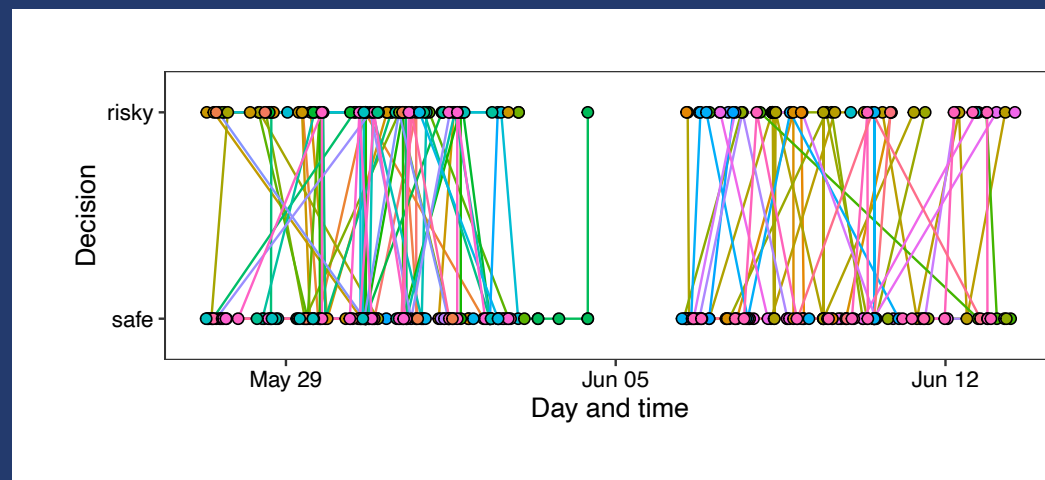


Renato Frey

Olivia Fischer

Aaron Lob

Code	Category	Model	Formalization	Psychological factor, mechanism, or process
1	✓	✓	✓	✓
2	✓	✓	✓	✓
3	✓	✓	✓	✓
4	✓	✓	✓	✓
5	✓	✓	✓	✓
6	✓	✓	✓	✓
7	✓	✓	✓	✓
8	✓	✓	✓	✓
9	✓	✓	✓	✓
10	✓	✓	✓	✓
11	✓	✓	✓	✓
12	✓	✓	✓	✓
13	✓	✓	✓	✓
14	✓	✓	✓	✓
15	✓	✓	✓	✓
16	✓	✓	✓	✓
17	✓	✓	✓	✓
18	✓	✓	✓	✓
19	✓	✓	✓	✓
20	✓	✓	✓	✓
21	✓	✓	✓	✓
22	✓	✓	✓	✓
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97	✓	✓	✓	✓
98	✓	✓	✓	✓
99	✓	✓	✓	✓
100	✓	✓	✓	✓



**Society for Judgment and Decision Making – Annual Conference 2023**  
November 18, 2023, San Francisco

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<https://cldr-lab.net/lob>

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