

Mata, Rui; Richter, David; Josef, Anika K.; Frey, Renato; Hertwig, Ralph

## Research Report

# SOEP-IS 2014 - Individual and age differences in decisions from description and experience

SOEP Survey Papers, No. 1097

### Provided in Cooperation with:

German Institute for Economic Research (DIW Berlin)

*Suggested Citation:* Mata, Rui; Richter, David; Josef, Anika K.; Frey, Renato; Hertwig, Ralph (2022) : SOEP-IS 2014 - Individual and age differences in decisions from description and experience, SOEP Survey Papers, No. 1097, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:

<https://hdl.handle.net/10419/253402>

#### Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

#### Terms of use:

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



<https://creativecommons.org/licenses/by-sa/4.0/>

# 1097<sup>2022</sup>

**SOEP** Survey Papers  
Series H - SOEP-IS Modules

## SOEP-IS 2014 – Individual and Age Differences in Decisions from Description and Experience

Rui Mata, David Richter, Anika Josef, Renato Frey, Ralph Hertwig

Running since 1984, the German Socio-Economic Panel (SOEP) is a wide-ranging representative longitudinal study of private households, located at the German Institute for Economic Research, DIW Berlin.

The aim of the SOEP Survey Papers Series is to thoroughly document the survey's data collection and data processing.

The SOEP Survey Papers is comprised of the following series:

**Series A** – Survey Instruments (Erhebungsinstrumente)

**Series B** – Survey Reports (Methodenberichte)

**Series C** – Data Documentation (Datendokumentationen)

**Series D** – Variable Descriptions and Coding

**Series E** – SOEPmonitors

**Series F** – SOEP Newsletters

**Series G** – General Issues and Teaching Materials

**Series H** – SOEP-IS Modules

The SOEP Survey Papers are available at <http://www.diw.de/soepsurveyspapers>

#### **Editors:**

Dr. Jan Goebel, DIW Berlin

Prof. Dr. Stefan Liebig, DIW Berlin and Freie Universität Berlin

Prof. Dr. David Richter, DIW Berlin and Freie Universität Berlin

Prof. Dr. Carsten Schröder, DIW Berlin and Freie Universität Berlin

Prof. Dr. Jürgen Schupp, DIW Berlin and Freie Universität Berlin

Prof. Dr. Sabine Zinn, DIW Berlin and Humboldt Universität zu Berlin

Please cite this paper as follows:

Rui Mata, David Richter, Anika Josef, Renato Frey, Ralph Hertwig. 2022. SOEP-IS 2014 – Individual and Age Differences in Decisions from Description and Experience. SOEP Survey Papers 1097: Series H. Berlin: DIW/SOEP



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.  
© 2022 by SOEP

ISSN: 2193-5580 (online)

DIW Berlin  
German Socio-Economic Panel (SOEP)  
Mohrenstr. 58  
10117 Berlin  
Germany

[soeppapers@diw.de](mailto:soeppapers@diw.de)

# **SOEP-IS 2014 – Individual and Age Differences in Decisions from Description and Experience**

**Module Title in SOEP Documentation: Decisions from  
Description and Experience**

**Rui Mata, David Richter, Anika Josef, Renato Frey, Ralph Hertwig**

## SOEP-IS Proposal

### Individual and Age Differences in Decisions from Description and Experience

Rui Mata<sup>1</sup>, David Richter<sup>2</sup>, Anika Josef<sup>1</sup>, Renato Frey<sup>1</sup>, and Ralph Hertwig<sup>1</sup>

<sup>1</sup>Max Planck Institute for Human Development

<sup>2</sup>German Institute for Economic Research

#### Abstract

Empirical results suggest that individual and age-related differences in risk taking may be task dependent. Such results call into question the power of traditional measures of risk preferences, such as the choice between monetary gambles with described outcomes and probabilities, to fully and reliably capture risk behavior. The limitations of typical measures of risk taking have implications for research in different disciplines, including psychology, economics, and sociology that either aim to account for individual differences in behavior or control for such differences when trying to understand the role of tasks, groups, or institutions in producing economic and social outcomes. We propose to conduct a behavioral experiment using a within-subject design to assess the predictive power of different measures of risk taking behavior (decisions from description, decisions from experience) and to evaluate their relative power in predicting real-world outcomes. The proposed research extends the existing GSOEP database by providing behavioral assessment of individual differences that may be theoretically and practically relevant when explaining social inequalities resulting from employment, financial, and health decisions that are partly guided by individuals' risk tendencies.

## Background

What are the task and individual characteristics that determine risky choices? Can risk taking tendencies be captured reliably so as to predict real-world outcomes? In economics, risk is usually defined as the variance or probability of possible monetary outcomes. However, as Frank Knight (1921) has pointed out, one should distinguish between different types of „probability situations”. For example, according to Knight, a priori probabilities refer to situations in which the probability of an outcome is known or can easily be assigned via mathematical calculation. In turn, statistical probabilities refer to situations in which the probabilities must be gauged empirically through experience with similar outcomes. Recent work on the psychology of risky choice echoes this distinction between a priori and statistical probabilities by emphasizing the dramatic differences between *description*- and *experience*-based choices (see Hertwig & Erev, 2009, for an overview). Many studies in decision research have assessed risk preferences on the basis of people’s choices between gambles or lotteries in which full information about probabilities and outcomes is provided — decisions from description. In contrast, decisions from experience provide no explicit information about probabilities and individuals must rely on experience acquired through feedback. The evidence is mounting for the need to distinguish between the two types of decisions because of systematic differences in the results obtained with the two paradigms, including a reversal of the fourfold pattern of risk attitudes (see also Figure 1; for a review of empirical findings see Hertwig & Erev, 2009).

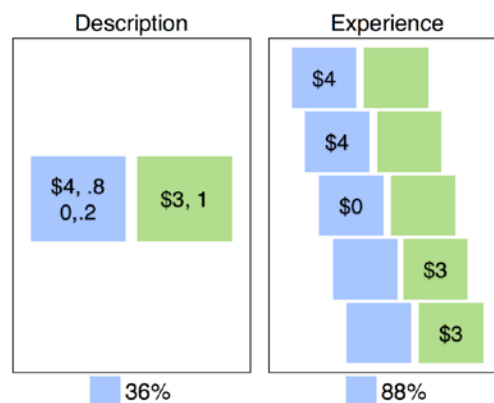


Figure 1. Depictions of decisions from description and experience paradigms and respective modal choice behavior. The choice task in the description paradigm consists of two monetary gambles with explicitly stated outcomes and probabilities. In the example above, the majority of participants shows risk aversion, with only 36% of participants choosing the higher variance option (cf. Hertwig, Barron, Weber, & Erev, 2004). In turn, the experience paradigm consists of an initial sampling stage (here represented by five fictitious draws) in which a person explores two payoff distributions without costs by clicking on one of the two buttons on the computer screen, followed by an outcome drawn from the respective distribution. After terminating sampling, the person sees a choice screen and is asked to select the button to draw once for real (not shown). In the sampling format, the majority of individuals show risk seeking choices with 88% choosing the higher variance option (Hertwig et al., 2004).

Another important component in determining risky choice are individuals' abilities and preferences that may change significantly across the life span. Economists and psychologists have theorized how life cycle variables, such as reproductive potential, cognitive capital, and wealth may impact risky choice (Dohmen, Falk, Huffman, Sunde, Schupp, & Wagner, 2011, Dohmen, Falk, Huffman, & Sunde, 2010; Mata, Josef, Samanez-Larkin, & Hertwig, 2011). In line with these ideas, *self-report measures* suggest reliable age-related reductions in risk-taking, albeit these seem to be moderated by domain (see Figure 2). In turn, the pattern concerning *behavioral measures* of risk taking is more heterogeneous as evidenced in a meta-analysis of behavioral measures of risk-taking, with age-differences being most evident in tasks involving time pressure or higher cognitive demands (see Figure 3).

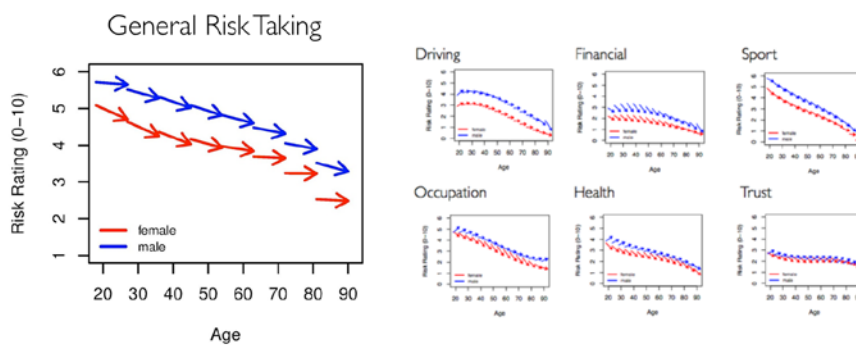


Figure 2. Age and sex differences in self-reported general and domain-specific risk taking estimated from the longitudinal data of over 40.000 individuals from GSOEP (Josef, Richter, Mata, Samanez-Larkin, Wagner, & Hertwig, 2013).

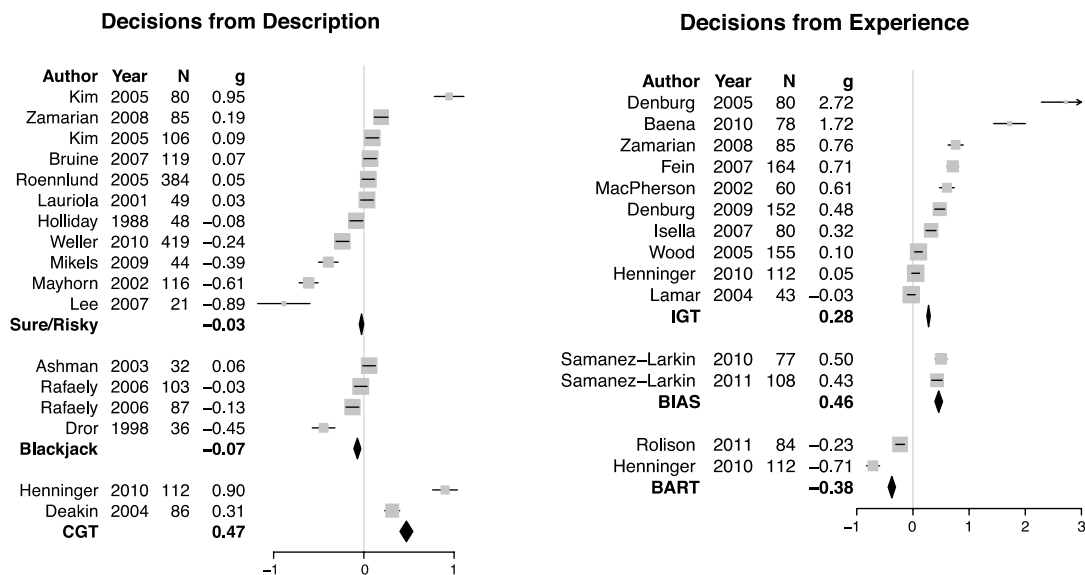


Figure 3. Meta-analysis of age differences in risky choice based on 29 studies comparing younger and older adults ( $N = 4093$ ). Positive effect sizes represent more risk-seeking behavior of older relative to younger adults (Mata et al., 2011). Age differences were found in tasks involving time pressure (CGT) or learning demands (IGT, BIAS, BART; cf. Mata et al., for task details).

## Goals and Implications

The overview above suggests that there are task and individual characteristics that are likely to play a role in determining individual differences in risk taking. Moreover, past findings suggest that individual differences in risk measures have significant correlations with important social and economic outcomes (Dohmen et al., 2011). Nevertheless, one implication of the dramatic differences between different choice paradigms (see Figure 1) and patterns of age differences between self-reported and actual behavior (see Figures 2 and 3), is that there may be fundamental differences in the power of description and experience measures of risk taking to predict behavior in real-world situations. **We propose to conduct a behavioral study examining individual differences in risk taking in both decisions from description and experience** (see Figure 1). To our knowledge, only one behavioral study involving described monetary gambles was conducted in the GSOEP (N = 450; Dohmen et al., 2011). However, this study did not examine different task formats and thus cannot answer the issue of whether description or experience paradigms capture different aspects of individual and age-related differences in risk taking or have differential power to predict real-world outcomes. Our proposal aims to fill this gap in order to clarify the role of task and individual characteristics in risky choice. The measures have the potential to have broad impact on the use of GSOEP data by economists, sociologists, and psychologists because measures of risk tendencies are relevant to many statistical controls when considering financial-, health-, education-, and work-related choices.

## Proposed Experimental Design

*Design.* We propose a within-subject design in which individuals are asked to choose between monetary gambles in two blocks of trials, one involving decisions from description, and another, decisions from experience, with the presentation order being counterbalanced across participants. Participants will be asked to perform 4 choices within each block. Set size will be manipulated to test for information overload effects because previous work suggests that more cognitively demanding tasks lead to significant individual and age differences in risk taking (two vs. four options; cf. Frey, Mata, & Hertwig, 2013; Hills Noguchi, & Gibbert, 2013; Mata et al., 2011). In sum, the design will be 2 (format: description vs. experience) x 2 (set size: two vs. four options).

*Sample.* We propose to use the longitudinal portion of the SOEP-IS comprising about 1500 participants. Using the longitudinal portion of the SOEP-IS will allow us to link the behavioral measures collected in the proposed behavioral experiment to previous and future measures of self-reported risk taking (see Figure 2). In addition, it paves the way to assessing the longitudinal changes in risk taking as assessed with behavioral measures.

*Feasibility.* Our experience in previous studies suggests that, due to sampling requirements, decisions from experience take considerably longer than decisions from description and that older individuals tend to take longer relative to younger adults (Hertwig et al., 2004; Frey et al., submitted). For example, Frey et al. conducted a comparison between younger and older adults' decisions from experience using computerized portable devices involving multiple sessions of 4 decisions between two prospects. Both younger and older adults took about 4 minutes to complete such a set of 4 problems (Time in minutes: 20 to 30 year-olds, M = 3.4, SD = 2.4, Median = 2.5 minutes;



65 to 80 year-olds,  $M = 3.9$ ,  $SD = 3.0$ , Median = 2.8). A conservative time estimate suggests that a set of 8 problems can be conducted on average under 8 minutes.

*Budget.* Participants will be provided with choice-contingent payment: One of the four decisions from description and from experience, respectively, will be randomly selected for the payment. The overall expected value for each participant is 6.2 EUR and can range from 0 to 64 EUR. The total costs of approximately 10.000 EUR (6.2 EUR x 1500 = 9300 EUR) will be covered by the Center for Adaptive Rationality, Max Planck Institute for Human Development (Director: Prof. Dr. Ralph Hertwig).

*Data Analysis.* We will conduct mixed-effects logistic regressions to assess the role of task characteristics (experience vs. description, set size) and individual characteristics (e.g., sex, age, education, wealth) on choices. In addition, we will conduct correlations to link individual differences in behavioral assessments of risk, self-reported measures of risk taking, and real-world outcomes (cf. Dohmen et al., 2011).

Table 1. Proposed Decision Problems

	Option 1	Option 2	Option 3	Option 4
Problem 1	4, .8 vs. 0, .2 EV = 3.2	3, 1 EV = 3		
Problem 2	16, .2 vs. 0, .8 EV = 3.2	8, .4 vs. 0, .6 EV = 3.2	4, .8 vs. 0, .2 EV = 3.2	3, 1 EV = 3
Problem 3	32, .1 vs. 0, .9 EV = 3.2	3, 1 EV = 3		
Problem 4	32, .1 vs. 0, .9 EV = 3.2	16, .2 vs. 0, .8 EV = 3.2	8, .4 vs. 0, .6 EV = 3.2	3, 1 EV = 3

Note. Values are in EUR, followed by their probabilities. EV = Expected Value.

## References

- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual Risk Attitudes: Measurement, Determinants and Behavioral Consequences. *Journal of the European Economic Association*, 9(3), 522-550.
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., (2010). Are risk aversion and impatience related to cognitive ability? *The American Economic Review*, 120(54), 256-271.
- Frey, R., Mata, R., & Hertwig, R. (2013). No age differences in decisions from experience. Manuscript submitted for publication.
- Hertwig, R., Barron, G., Weber, E. U., & Erev, I. (2004). Decisions from experience and the effect of rare events in risky choice. *Psychological Science*, 15, 534-539.
- Hertwig, R., & Erev, I. (2009). The description-experience gap in risky choice. *Trends in Cognitive Sciences*, 13, 517-523.
- Hills, T. T., Noguchi, T., & Gibbert, M. (2013) Information overload or search-amplified risk? Set size and order effects on decisions from experience. *Psychonomic Bulletin and Review*, 20,1023–1031
- Josef, A. K., Richter, D., Mata, R., Samanez-Larkin, G. R., Wagner, G. G., & Hertwig, R. (2013). Manuscript under preparation.
- Knight, F.H. 1921. *Risk, Uncertainty and Profits*. University of Chicago Press. Chicago.
- Mata, R., Josef, A., Samanez-Larkin, G., & Hertwig, R. (2011). Age differences in risky choice: A meta-analysis. *Annals of the New York Academy of Sciences*, 1235, 18-29.
- Mata, R., & Hertwig, R. (2011). How to model age-related motivational reorientations in risky choice: A Comment on Depping and Freund. *Human Development*, 54, 368-375.
- Tversky, A. & Kahneman, D. (1992). Advances in prospect theory: cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, 5, 297–323.