



Measuring individual risk attitudes in the lab: Task or ask? An empirical comparison[☆]



Jan-Erik Lönnqvist^a, Markku Verkasalo^b, Gari Walkowitz^{c,h},
Philipp C. Wichardt^{d,e,f,g,*}

^a Swedish School of Social Science, University of Helsinki, Finland

^b Institute of Behavioural Sciences, University of Helsinki, Finland

^c Department of Management, Corporate Development and Business Ethics, University of Cologne, Germany

^d Kiel Institute for the World Economy, Germany

^e Department of Economics, University of Lund, Sweden

^f Department of Economics, University of Rostock, Germany

^g CESifo Munich, Germany

^h Laboratory for Experimental Economics, University of Bonn, Germany

ARTICLE INFO

Article history:

Received 1 August 2013

Received in revised form 30 June 2015

Accepted 6 August 2015

Available online 19 August 2015

JEL classification:

D81

C91

Z10

Keywords:

Risk attitudes

Trust

Personality

Lab experiments

ABSTRACT

This paper reports on an empirical comparison of two prominent measures of individual risk attitudes – the Holt and Laury (2002) lottery-choice task and the multi-item questionnaire advocated by Dohmen et al. (2011) – with respect to their within-subject stability over time (one year) and their correlation with actual risk-taking behavior in the lab – here the amount sent in a trust game (Berg et al., 1995). Our results suggest that the two risk attitude measures are at best only weakly correlated. Only the questionnaire measure shows high test–retest stability, while virtually no such stability is found in the lottery-choice task. In addition, only the questionnaire measure shows the expected correlations with a Big Five personality measure and is correlated with actual risk-taking behavior. With respect to behavior in the trust game, we find a high retest stability of transfers. This supports the conjecture that trusting behavior has a component which itself is a stable individual characteristic.

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1. Introduction

Risk-aversion has long since been a standard ingredient of economic theory (seminal works being Pratt, 1964; Arrow, 1965). Moreover, with the growing body of experimental studies in the social sciences in general and in economics in

[☆] We are grateful to Vincent Crawford, Thomas Dohmen, Armin Falk, Ernst Fehr, Holger Gerhardt, Glenn Harrison, Heike Hennig-Schmidt, Sven Hoepfner, Hakan Holm, Bernd Irlenbusch, Martin Kocher, Ulli Schmidt, Daniel Schunk, Avner Shaked, Jörn Tenhofen, Erik Wengström and Daniel Wiesen for helpful comments and discussions. Moreover, we would like to thank Julia Berndt, Andreas Born, Antti Hulusi and Rainer M. Rilke for helpful research assistance. Financial support of the Academy of Finland (127641), the Deutsche Forschungsgemeinschaft (PN74548) and the Arne Ryde Foundation is gratefully acknowledged.

* Corresponding author at: University of Rostock, Ulmenstr. 69, D-18057 Rostock, Germany. Tel.: +49 381 498 4486.
E-mail address: philipp.wichardt@uni-rostock.de (P.C. Wichardt).

particular (see [Falk and Heckman, 2009](#) for a discussion), individual risk attitudes have also been empirically linked to many behavioral patterns and economic outcomes.¹

Despite the empirical relevance of individual risk attitudes, there is, however, still an ongoing debate about their adequate elicitation (cf. [Harrison and Rutström, 2008](#)). Among other aspects – including specific procedural issues as well as the general question whether risk aversion is at all a plausible phenomenon to investigate employing the small stakes that are commonly offered in the lab (cf. [Rabin, 2000](#)) – the relevance of proper incentives has given rise to discussions: Should risk preferences be inferred from incentivized behavioral measures such as lottery-choice tasks (e.g., [Holt and Laury, 2002](#)) as is commonly done in economics? Or can they also be assessed using non-incentivized questionnaires based on so called Likert statements, in which subjects specify their level of agreement to a certain statement (see [Lauriola and Levin \(2001\)](#) for a historical review; see also [Dohmen et al. \(2011\)](#))?

Of course, lottery-choices are easier to translate into formal indices and, hence, are preferable when questions about structural parameters of utility functions are at issue (see, e.g., [Andersen et al., 2008](#)). Over the years, however, evidence has gathered indicating that these measures come with a considerable degree of noise, which may vary with the exact method of elicitation (e.g., [Isaac and James, 2000](#); [Berg et al., 2005](#); [Hey et al., 2009](#); [Dulleck et al., 2013](#)) and/or the subjects' cognitive ability (e.g., [Dave et al., 2010](#); [Andersson et al., 2013](#)).

As a result of the above described problems, questionnaire measures of risk attitudes have witnessed a growing popularity in recent years (e.g., [Dohmen and Falk, 2011](#); [Dohmen et al., 2008, 2010](#)). While inherently difficult to translate into numerical parameters and potentially not reflecting an individual's true attitude toward risk, they still have their virtues as predictors of behavior. This is particularly true for the analysis of behavior in laboratory experiments, where relative assessments of risk attitudes are often more important than absolute ones. And, of course, questionnaire measures are both cheaper to use and arguably easier to respond to without further instructions. This notwithstanding, the correlation between experimental and questionnaire/survey measures tends to be weaker than what could have been expected (see, e.g., [Anderson and Mellor, 2009](#)) – thereby also raising questions about the stability of the preferences thus expressed.

In the present study, we take up the question about the adequate elicitation of risk attitudes in connection with economic lab experiments and investigate the relative performance of a lottery-choice measure introduced by [Holt and Laury \(2002\)](#) and a questionnaire measure advocated by [Dohmen et al. \(2011\)](#) with regard to their construct validity (being correlated with a construct that has been found to be associated with risk-taking behavior, namely personality), and their test–retest stability over time (one year) and their ability to predict actual behavior in a domain that is typically related to risk.² In doing so, we operationalize risk-taking behavior in the lab via a standard trust (investment) game ([Berg et al., 1995](#)) taking the amount transferred by first movers as a measure related to subjects' willingness to take risks. Although the question whether the investment decision in trust games eventually measures risk or trust (or both) is contentious – with some studies emphasizing the role of risk (e.g., [Snijders and Keren, 1998](#); [Ben-Ner and Putterman, 2001](#); [Schechter, 2007](#)) and others rather questioning it (e.g., [Eckel and Wilson, 2004](#); or [Bohnet and Zeckhauser, 2004](#)) or arguing directly in favor of trust (e.g., [Houser et al., 2010](#)) – it appeared to us as an intuitive item to analyze. In fact, the popular view that giving money to strangers is risky (also expressed, e.g., in [Kosfeld et al. \(2005\)](#)) intuitively suggests that doing so should be correlated with risk attitudes.³ In conjunction with the mixed evidence on this correlation, it thus seemed appealing to try and scrutinize whether the type of risk measure applied may be crucial in this context.

Moreover, reporting retest results for both measures of risk attitudes and individual trusting behavior can contribute to the discussion on the stability of risk and trust preferences, both of which are often assumed to be persistent across different settings and time. Yet, empirical evidence with regard to stability is not conclusive and seems to crucially depend on the context and method of elicitation (see e.g., [Dave et al., 2010](#); [Deck et al., 2013](#), for comparing different methods of risk attitudes elicitation; see [Chuang and Schechter, 2015](#), for an excellent review on the test–retest stability of risk elicitation measures). Studying individual responses, both across different risk-associated tasks and across time, we are able to observe how the responses to the distinct tasks are related.

The study was conducted as follows: Before going into the laboratory, we gathered data on the subjects' Big Five personality traits, which subsume a huge variety of personality attributes and provide a concise summary of stable individual differences in personality ([Digman, 1990](#)). This was done in order to analyze the connection between risk attitudes and

¹ In this regard, important work has been done, for example, by [Binswanger \(1980\)](#), [Binswanger and Sillers \(1983\)](#) and [Tanaka et al. \(2010\)](#), on the relation between risk attitudes and household income; [Cox et al. \(1985\)](#), [Cox et al. \(1988\)](#) and [Goeree et al. \(2002\)](#), on the link between risk attitudes and bidding heterogeneity in different types of auctions; [Goeree et al. \(2002\)](#), on explanation of deviations from Nash-equilibrium in a generalized matching pennies game; [Schechter \(2007\)](#) and [Houser et al. \(2010\)](#), on the predictive power of risk attitudes in trust game experiments; [Guiso and Paiella \(2004\)](#), [Bellemare and Shearer \(2010\)](#) and [Dohmen and Falk \(2011\)](#), on individual self-selection into different types of payment schemes; [Jacobson and Petrie \(2009\)](#), on risk aversion related to individual saving behavior and taking out informal loan; [Castillo et al. \(2010\)](#), on selection into occupations and financial decisions; [Deck et al. \(2013\)](#), on the relation of domain-specific risk attitudes and variation in behavior across different tasks; [Barham et al. \(2014\)](#), on the adoption of new farming technologies. And these are but some of the many examples that have been discussed in the literature (see [Harrison and Rutström, 2008](#), for further examples).

² Note that biases in the measurement – as might result from the fact that one of the two measures is incentivized while the other is not – are not problematic for our purposes as we intend to ascertain whether the two (well established) measures are suitable as a tool to relate observed behavior in economic (lab) experiments to individual risk attitudes but do not draw any inferences about the shape of individual utility functions. For an interesting discussion of hypothetical biases in the elicitation of risk attitudes and a review of the respective literature, see [Harrison \(2006\)](#).

³ For an instructive general discussion of the different facets of trust see, e.g., [Ben-Ner and Halldorsson \(2010\)](#).

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