



PSIWORLD 2014

## Experimental methods in economics and psychology: A comparison

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### Abstract

This article compares the use of experiments as a research method in economics and psychology. We outline the most important differences between the two fields in terms of their use of experimental methods. The purpose of the article is two-fold. First, to provide an overview of areas where economic experiments differ from traditional psychological experiments. Second, to debate experimental economics in relation to experiments in other social sciences.

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Peer-review under responsibility of the Scientific Committee of PSIWORLD 2014.

*Keywords:* Experiments; economics; psychology; convergence; divergence

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### 1. Introduction

In 2002 the Nobel Prize in Economics was awarded to the psychologist Daniel Kahneman and the experimental economist Vernon Smith. This signaled that knowledge from psychological research and the use of experimental methods is accepted as ‘mainstream’ in the field of economics. Both experimental economics and experimental psychology are concerned with many of the same issues, e.g. negotiations, different types of decisions, choice situations, and social dilemmas. There are also similarities when it comes to methodological choices, e.g. careful planning and design of experimental and advanced techniques used in data analysis. But, there are also areas of divergence. This can be attributed to the fact that the two disciplines have different aims and interests. Not surprisingly, economists are concerned with economic theories while psychologists are concerned with psychological theories. This has implications for the choices which are made with respect to experimental designs, and the views on using incentives, deception, or how to recruit participants.

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This article compares the use of experiments as a research method in economics and psychology. We outline the most important differences between the two fields in terms of their use of experimental methods. The purpose of the article is two-fold. First, to provide an overview of areas where economic experiments differ from traditional psychological experiments. Second, to debate experimental economics in relation to experiments in other social sciences. It is the view of the authors that economists have been slow in terms of their take-up of insight and knowledge from other social sciences. Instead, economists have oriented themselves towards the natural sciences (McCloskey, 1985). Even though the cross-disciplinary researcher Herbert Simon won the Nobel Prize in Economics a long time ago, many years passed before his theories of bounded rationality and decision-making gained a strong foothold in mainstream economics.

Discussing convergence and divergence between economics and other social sciences can potentially create more possibilities for cross-disciplinary work. Traditionally, there has been little dialogue between economics and other social scientists. This may be because they do not speak the same ‘language’. As pointed out by Ariely and Norton (2007: 336) “(...) *at their core, economics and psychology share a common and overriding desire to understand human nature, but communication between the two is still in its infancy.*” The possibility for more cooperation is now higher, as experimental methods and certain psychological theories have become a legitimate part of mainstream economics.

This is not the first article which discusses and comments on aspects of experimental economics (Davis & Holt, 1993; Hey, 1991; Kagel & Roth, 1995) or differences between economists’ and psychologists’ use of experimental methods (Ariely & Norton, 2007; Friedman, 1994). Still, we argue that the article contributes by providing a short overview of the main points of convergence and divergence. We have attempted to draw on previous contributions and viewpoints from both disciplines. Due to space limitations, we are unable to give a complete picture. Therefore, in certain areas our article may not do justice to the literature. This is particularly challenging since these experimental economics is a research area which is in rapid development.

The article is structured as follows: First we briefly discuss the notion of validity in experimental methods, and the importance of internal and external validity. Then we discuss six aspects of economic experiments, in light of criticism from psychologists and others. The article ends with a discussion of areas of convergence and divergence.

## **2. Validity issues in experimental methods**

Experimental methods are known for scoring high on internal validity, which means that the researchers can be relatively certain that a demonstrated cause-and-effect relationship actually exists. In experimental economics internal validity is of utmost importance since economists aim to predict human behavior when faced with incentives. In general, economic theories are abstract and universal in nature, with the aim that they should be applicable across different situations and individuals. This makes contextual factors and the characteristics of the participants less important in economic experiments than in other types of experiments. In addition, economic theory is generally based on assumptions that actors are rational and capable of understanding the relationship between actions and payoffs. As a result, participants do not expect to be deceived. Any irrational behavior is interpreted as noise or biases. Instead, the experiments are repeated and market mechanisms are used to discipline behavior.

However, experimental methods are weak on external validity, meaning the extent to which the findings can be generalized to situations outside the setting where the experiment takes place. Experimental economists also make certain adjustments which they claim will alleviate the problems related to low external validity. For instance, there is strict control of context and incentives, and the use of disciplining market mechanisms and repetition. These are aspects of experimental methods which some argue enhance external validity (Loewenstein, 1999). However, many researchers in psychology will tend to disagree and claim that strict control of contextual factors reduces the external validity since it creates an artificial laboratory situation. Cognitive and learning psychologists will typically claim that real-life learning is situation-dependent. In the next part of the article these aspects are discussed in more depth.

### 3. Key aspects of the methodology used in economic experiments

We identify and discuss six aspects of economic experiments: Incentives, market mechanisms, repetition, recruitment of participants, context, and finally, deception. These aspects are discussed with reference to criticism from psychologists and behavioral economists.

Experimental economists use the notion of ‘induced valuation’, which means that the participants are compensated in relation to the theory which is tested and the choices they make (Smith, 1976). Experimental economists therefore use *incentives* because they view them as necessary to ensure the validity of the experiment and to achieve the goal of testing economic theory. The use of incentives will ensure that the participant will act ‘normally’. Therefore, the incentives have to be clearly defined so that the participants are able to calculate the costs and benefits of every choice, as predicted by standard economic theory (Edwards, 1961). An important question relates to the size of the incentives. It is also important to discuss the size of the amount in order to ensure the realism of the experiment. Are the participants paid enough in relation to their opportunity cost (e.g. part-time job) and the mental cost of participating (Smith & Walker, 1993)? It is also natural to judge whether the amount is large enough relative to the general cost-of-living in the country where the experiment is conducted, so that the participants view the incentives as real.

Psychologists are generally skeptical towards the use of economic incentives. Psychologists believe that in the real world costs and benefits are not as clearly defined. Using strong incentives can make the lab experiments less transferable to the real world. By not defining incentives, there is more variance in terms of participants’ behavior, something that psychologists view as a more correct picture of the real world (Ariely & Norton, 2007: 338).

This does not mean that incentives are never used in psychological experiments. But when used by psychologists, incentives are used in a different way. In psychological experiment the participants are usually given a fixed sum independent of their decisions. Psychologists typically argue that even though incentives are used, there are many other factors which influence participants (e.g. conformity, norms of appropriateness). This is neglected by economists. Economists typically offer participants anonymity to reduce such behavior. Still, much psychological and sociological research shows that even if guaranteed anonymity, people care about their reputation, self-concept and will conduct ‘impression management’ to varying degrees (Goffman, 1959; Schlenker, 1980). Anonymity can also induce demand characteristics (Intons-Peterson, 1983; Orne, 1962) as the participants expect a different type of behavior that would be the case if they were not anonymous. The results of experiments can also to a certain degree be due to a Hawthorne effect, but some economists argue that this effect was exaggerated in the original experiments (Levitt & List, 2009).

Economists make much use of *market mechanisms* in their experiments. Optimal behavior is rewarded while sub-optimal behavior is punished. These feedback mechanisms discipline irrational behavior. The effect is particularly strong when the game or negotiation situation is repeated several times. This can be criticized since there arguably are not that many real-time situations where a person gets a rapid and frequent feedback as in economic experiments. Loewenstein (1999) argues that such mechanisms are only existing in certain situations and for some types of work (e.g. currency traders). For most people, most types of economic choices are made in situations where feedback is not rapid enough to correct behavior.

In economic experiments *repetition* is used to a high degree. For example, a game or a negotiation situation is repeated several times. Over time, the behavior becomes more optimal. This is interesting in order to understand learning and how humans react to incentives and modify their behavior. However, it can be argued that the optimal behavior which is observed at the end of experiments after a number of repetitions is not representative for how the participant will act in other economic situations (Loewenstein, 1999). Loewenstein (1999) argues that even though humans learn when they are in a tightly controlled experimental situation, this does not mean that they learn in the same way outside of the lab. The type of learning which is observed in a structured experimental lab trial is not very representative of what is encountered in real life. Others will also argue that learning is situation-dependent. Psychologists specializing in learning and pedagogy will stress the importance of situated learning (Lave & Wenger, 1991). Research has shown that humans have difficulties in transferring knowledge (or optimal behavior) from one situation to another. Cognitive abilities, problem-solving and learning are to a large extent situation-dependent

(Hung, 2002). This brings our discussion to another important aspect of economic experiments, namely the role of the context in experiments.

Economists and psychologist differ greatly when it comes to the importance of *context* in experiments. Experimental economists have the context-free experiment as an ideal, and try to construct neutral experimental contexts because their aim to develop theory which is universally applicable. Therefore, the theory cannot be tested in a particular context. In addition, the context creates noise and variance in the data material. The context may also create demand characteristics and biases. Psychologists typically argue that creating a context-free lab setting is artificial. This criticism is known as the ‘artificiality criticism’ (Stanovich, 2007). This view is shared by many psychologists. Cognitive psychologists argue that cognition and problem-solving to a large extent is situation-dependent. In contrast with economists, psychologists will manipulate the context. For example, they may fill the lab with smoke or use other ‘tricks’. Psychologist may also use so-called ‘priming’ of the sub-consciousness to manipulate participants. Research has shown that such subliminal priming can affect the choice of for instance brands (Karremans, Stroebe, & Claus, 2006).

Economic theories are general and aim to be applicable to different types of *participants*. Economists try to create simple theories which explain and predict behavior of a large number of people in different situations. At the same time, it is usually tolerated that the assumptions underlying the theories are imperfect as long as they have predictive power. In contrast, psychologists and other behavioral scientists aim to create more complex theories, which may only explain behavior in a certain group or in a certain context. As a result, economists have a tendency to place less emphasis on the characteristics and make-up of the participant group (e.g. demographics). That being said, it should be mentioned that even some experimental economics have started to take into consideration individual and cultural variations.

Another area of divergence is related to how participants are recruited. Economists typically recruit paid volunteers, while psychologists, particularly in the US, have relied extensively on undergraduate psychology majors. There are many researchers who have criticized the widespread use of American college students in psychological experiments. For example, it is pointed out this group is very homogeneous and that these students already are familiar with some of the theories which are tested. In addition, these students are young and may not have fully developed their identities and attitudes. This criticism is referred to as ‘the college sophomore problem’ (Stanovich, 2007). The same type of criticism can possibly be leveled at economic experiments where business and economics majors are often used as participants.

*Deception* of participants is taboo among experimental economists (Bonetti, 1998). Economists tend to argue that it is unnecessary to deceive participants because they are aiming at creating an experimental situation where the context is abstracted away. Hiding the purpose of the experiment has little value for economists since they believe this will reduce the participants’ ability to make informed choices. In addition, deception can have other costs since participants can become suspicious and see it as a breach of trust (A. Ortmann & Hertwig, 2002). Psychologists, on the other hand, actively use deception in their experiments and believe it is an acceptable practice (Andreas Ortmann & Hertwig, 1997). Researchers use cover stories and helpers among the participants to ensure that the participants behave as would do outside of the laboratory. From the history of psychology there are many examples of experiments where deception has been used to extreme lengths, e.g. Milgrom’s and Zimbarbo’s famous experiments (Mandler, 2007).

#### 4. Discussion and conclusion

One of the main points of the article has been to show that the methodological choices made by economists and psychologists are a product of the disciplines’ unique approaches to understanding human nature and behavior. The article has shown that even though economists and psychology share an interest in understanding and explaining human nature and behavior, there are substantial differences between the two disciplines which makes it hard to bridge and unite them. Nevertheless, the potential value of cross-disciplinary work should be high, which means that researchers should try to work together. In addition, the increased recognition that other social sciences get within the field of economics signals that a dialogue is possible.

Both experimental economics and experimental psychology should reflect more on own methodological positions when it comes to for instance the use of incentives and deception of participants (Ariely & Norton, 2007). Instead of

making for instance deception a moral or ethical question, economists could instead discuss how deception could contribute to understand human behavior. In the same way, psychologists could start using incentives and market mechanisms in their experiments. This could help alleviate concerns about whether participants are taking the experiments seriously, and also open up the possibility of actors behaving in line with what is predicted by the rational actor-model proposed in mainstream economic theory.

In the article we have shown that economists and psychologist differ greatly when it comes to several aspects of their use of experimental methods. These fundamental methodological differences could make dialogue more difficult. For psychologists it may be difficult to communicate their findings to economics if incentives have not been used, or if they have only used a fixed amount of compensation independent of the choices made by the participants. Hence, if psychologists hope to influence economists it is important to control for the use of incentives. This is particularly important when presenting results which fly in the face of standard economic theory. If incentives are not used, it may be too easy for economists to argue that the results are not credible due to non-use of incentives. Another example is the use of deception. Among economists there are strong norms that participants should not be deceived. Hence, it could be difficult for psychologists to publish such research in economic journals.

Despite the differences there should be many possibilities for more cross-disciplinary research. Particularly experimental economists should have much to gain from a dialogue with researchers from other disciplines such as psychology, which has a much longer history of using experiments (cf. Mandler, 2007). Experimental economics, despite having been around for 50-60 years, still has many unexplored areas, and there is reason to believe experimental methods can continue to shed light on many areas of economic life.

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