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(Over-)Stylizing Experimental Findings and Theorizing with Sweeping Generality

Abstract:
Human decision making is a process guided by different and partly competing motivations that can each dominate behavior and lead to different effects depending on strength and circumstances. 'Over-stylizing' neglects such competing concerns and context-dependence, although it facilitates the emergence of elaborate general theories. We illustrate by examples from social dilemma experiments and inequality aversion theories that sweeping empirical claims should be avoided.

1. Introduction

Consider the following statements. (a) 'Even in one-shot prisoners' dilemma experiments there is a lot of cooperation.' (b) 'In repeated game experiments participants start out cooperating and defect only shortly before the end of the interaction.' (c) 'People engage in costly punishment without a future-directed preventive incentive.' These statements are ambiguous in themselves. On the one hand, they may be read as implicitly containing an existential quantifier. In this case, they would only claim that there exist game interactions in which they hold, thereby providing evidence against general statements as implied, e.g., by the traditional assumption of wealth maximizing behavior. On the other hand, the above statements may be regarded themselves as being general. Then the implicit quantifier would be a universal one.

Since beating to death poor *homo oeconomicus* another time is not exciting, interpreting statements (a)–(c) as 'there exist situations such that ...' should not stir up much interest. Yet, if a statement of this form is interpreted in terms of universal, rather than existential, quantification, it becomes much more interesting. We name statements, like (a)–(c), which are taken to apply 'universally' to a broad class of interactions *stylized facts*.

The upside of referring to stylized facts is that, based on them, new theoretical approaches to classes of similar problems can be and have been developed. Starting from statement (a), theories based on other-regarding concerns such as altruism (Bester and Güth 1998), inequ(al)ity aversion (Bolton 1991; Fehr and

Schmidt 1999; Bolton and Ockenfels 2000), and guilt aversion (Dufwenberg and Gneezy 2000; Charness and Dufwenberg 2006) have been proposed to explain cooperation in one-shot experiments. Taking (b) as a springboard and assuming some form of incomplete information, the concept of reputation equilibrium (Kreps, Milgrom, Roberts, and Wilson 1982) emerged and helped to account for cooperation and end-game effects in repeated games. Finally, in view of (c), a variant of reciprocity theory has been developed to justify costly punishment.[1]

On the down side, reliance on stylized facts has often led social theorists seriously astray. Along with the belief that abstractness of experiments would guarantee broad applicability of results, confidence in stylized facts has induced researchers to trust in mere speculations and daring generalizations. Notwithstanding its fruitful uses as a heuristic within the process of theory formation, stylizing should not be taken as a sound basis of justification and cannot serve as a substitute for serious testing of theories.[2]

In our subsequent discussion we intend to illustrate uses of 'stylizing' that we regard as abuses, and to which we therefore refer as *over*-stylizing. We first put stylizing in perspective of the complexities of human motivation by means of a prisoners' dilemma (henceforth PD) example (*section 2*). Next we turn to our main example of inequ(al)ity aversion introducing the basic concept and its trade-off interpretation (*section 3*). In the following two sections we discuss two specific problems: the lumpiness of equity concerns (*section 4*), and the ambiguity of equity standards (*section 5*). The final discussion in *section 6* states that inequ(al)ity aversion should be restricted to situations in which its more or less implicit prerequisites are granted.

2. Stylizing and the Complexity of Human Motivation

Consider a PD game with the payoff matrix depicted in Table 1.

	C_2	D_2
C_1	11, 11	0, 12
D_1	12, 0	10, 10

Table 1: PD game's payoff matrix

Assuming that the figures in the table are monetary payoffs, one can plausibly predict that there will hardly be any cooperation if this game is played repeatedly by the same two players ('partner design' in the experimental jargon). This contradicts the general claim that considerable cooperation is to be expected in

[1] Of course, many of the speculations are not entirely new. For example, theories of limited altruism, in particular among the so-called British Moralists (see Raphael 1969), theories of the central role of retributive emotions (see Mackie 1982, and references therein), or psychological equity theories (Walster, Walster and Berscheid 1978) have all been around for quite some time.

[2] Mayo 1996 and Rubinstein 2001 are useful discussions of the methodology of experimental science.

PD's that are played many periods. Likewise, the claim that even in one-shot PD's a considerable fraction of people cooperate is not generally true.

The validity of general hypotheses based on the above mentioned statements (a) and (b) seems to be constrained to very specific games. Hence, the intended realm of application of these general hypotheses needs to be restricted. In particular, one may suggest that cooperation in interactions having a PD-structure will, in all likelihood, occur only if mutual cooperation is much more profitable than mutual defection.

However, to avoid over-stylization, this plausible hypothesis, before being accepted, has to be tested in ways that render its validity across diverse contexts likely. One must carefully try to specify the conditions under which the hypothesis will hold and those under which it will not hold.[3]

In specifying these conditions, we must be aware of the complexity and multifactorial nature of human decision making (see Güth 2000, for an overall framework). Due to the different and partly competing motivations driving human choices, claiming that players in PD games will cooperate only when 'mutual cooperation is much more profitable than mutual defection' is in the last resort not sufficient. It is very likely, for instance, that efficiency-minded decision makers suppress all other concerns when the efficiency gains through mutual cooperation are large. Then the observations would simply reveal that efficiency concerns can become so important that they dominate all other motivations.

Overstating the generality of findings might have prevented the development of more adequate theories paying attention to the limited scope of some results. In the case of PD games, one would probably compare the efficiency gains from mutual cooperation (1 in the example of Table 1) with the risk of unilateral defection (11 in our example), and predict that efficiency concerns may become dominant not only when 'mutual cooperation is much more profitable than mutual defection', but also if the risk arising from the other's unilateral defection is small. Elaborate 'theories' would not boldly claim general applicability, but start out as qualitative ideas that must be elaborated in a piecemeal way via more and more refined empirical studies.

It is not by chance that theorists of human action ranging from Aristotle (in his *Topics*) to Homans (1967) have insisted (the former) or at least conceded (the latter) that, in view of the complexity of human cognitive and emotional processes, general hypotheses about human behavior have to adopt the very weak form of 'topoi' (in Aristotle 'pay attention to x!') or orientation hypotheses (in Homans 'x depends on y') without specifying how exactly the relevant relations operate and how things hang together. Of course, it would be better to have theories that apply in a broad, rather than narrow, class of contexts. But, it would be worse to entertain an illusion of knowledge without any warrant than not to have broad theories at all.

[3] Contrary to what most experimental economists seem to assume, the fact that hypotheses are typically generated using extremely 'stylized' situations, with a neutral frame, does not justify the claim of general validity.

On a very general level, it may be impossible to state much more than 'mankind is a species whose individual members can be emphatic as well as egocentric, competitive as well as cooperative, risk seeking as well as risk averse, inequ(al)ity seeking as well as inequ(al)ity averse, etc.'. We can say something about generally relevant dimensions of problem solving and generally relevant influences on its content. But can we generally say that one of the alternatives is of overwhelming relevance? Isolating one dimension and focusing on it on the basis of experimental evidence does not seem justifiable.

With respect to explaining human cooperation, this mode of operation typically neglects that there are situations where we are inclined to act pro-socially, and others where we tend to behave in the opposite way. And, if we display such variety in behavioral inclinations (as evolutionary arguments suggest), there are good reasons for situation-specific behavior. Let us address a specific example.

3. On Inequ(al)ity Aversion

3.1 Benchmarks

What is seen as 'fair' in allocation behavior has been extensively discussed in social psychology and led to the development of equity theory (Homans 1961; Walster and Walster 1975). To illustrate equity theory, consider a simple reward allocation game with allocator A and recipient R.[4] Suppose that their respective positive contributions c_A and c_R linearly generate a monetary reward or 'pie' p according to $p = \alpha(c_A + c_R)$ with $\alpha > 0$. Being aware of the individual contributions, allocator A must distribute p between the two parties by 'dictating' that A receives u_A, with $0 < u_A \leq p$, and R receives $u_R = p - u_A$. According to equity theory, the allocations of the pie should be proportional to contributions, i.e., allocator A should choose

$$\frac{u_A}{c_A} = \frac{u_R}{c_R}, \tag{1}$$

thereby acting as a good Aristotelian as described in book V. of the *Nicomachean Ethics* (for a standard philosophical account, see Frankena 1966). Since when the allocator distributes p the (costs of) contributions are sunk, this situation may be called 'a dictator experiment with a history'. Neglecting the history or letting the pie descend like manna from heaven (as normally done by experimental economists[5]), equity suggests that the monetary pie should be split equally, i.e., $u_A = u_R = p/2$.

Proportional or equal sharing characterizes resource allocations if fairness is the only or, at least, the dominating concern (as perhaps in 'gift splitting'). However, in many situations, people are not motivated solely by fairness, but have other concerns, chief among them being their own material well-being. In such situations, they may trade off fairness against a personal material advantage.

[4] For early reward allocation studies, see Mikula 1973 and Shapiro 1975.

[5] For exceptions, see Königstein 2000, or Gantner, Güth and Königstein 2001.

In the attempt of 'explaining' data from a large set of laboratory observations, some recent models (Fehr and Schmidt 1999; Bolton and Ockenfels 2000) have been able to incorporate such trade-off considerations into the utility function. Inequality aversion theories measure deviations from fairness via the distance from the *equal* share, and assume that individuals weigh these deviations against the gains of deviating. These theories presuppose that equity coincides with equality, thereby disregarding that, whenever c_A/c_R differs from 1, equality allocations contradict the ideal proportional sharing of equity theory—as expressed by condition (1).[6]

In the next section, we shall formulate the former analysis in somewhat more general terms so as to capture the principal features of the experimentalists' equ(al)ity theory.

3.2 A General Formulation

Let N=1, ..., n with $n \geq 2$ denote the set of individuals who have to allocate some rewards among themselves. Assuming that individual i's monetary success can be measured by u_i (for all i in N), and denoting the vector of individual monetary discrepancies $\left(\max\{0,u_j-u_k\},\max\{0,u_k-u_j\}\right)_{\substack{j,k\in N\\ j\neq k}}$ by δ, the basic idea of inequality aversion can be characterized by an overall individual evaluation function of the form

$$U_i(\cdot) = f(u_i,\delta), \tag{2}$$

which depends positively on u_i and negatively on δ.[7]

According to (2), given u_i, the situation that i considers as the best is the one of equality in success where δ is the 0-vector. In other words, i enjoys best his own success u_i when

$$u_j = u_k \text{ for all } j,k \in N, j \neq k. \tag{3}$$

Equity theory provides the hitherto most convincing answer to the query why this may in fact be assumed. In any interactive situation in which classes of normatively equivalent results can be formed and individual contributions cannot be clearly ranked, the personal contribution standard (Güth 1988; 1994) can be expressed via

$$c_j = c_k \text{ for all } j,k \in N, j \neq k. \tag{4}$$

If personal standard (4) is used, then equity theory predicts that people should allocate rewards so as to satisfy condition (3).

Equal share of the pie is often observed in ultimatum experiments without entitlement in which the pie descends like manna from heaven. However, the tenet does not apply generally: many proposers are found to offer between one third and one half of the pie to the responder (see Camerer 2003 for a recent

[6] For a recent criticism to this approach see Bergh 2008.

[7] One can specify U_i in various ways. For instance, in the limit, one may assume that preferences are lexicographic, allowing for no trade-off between u_i and alternative values of δ, but factoring in the latter if $u_i = u_i'$.

survey). Hence, while some participants in the role of the proposer shy away from greedy offers and propose the equal split instantaneously, others try to find out how far they can decrease the offer without causing own remorse or annoying the responder. This kind of trade-off analyses are the basis of inequality aversion theories, which formally capture how more success for oneself can compensate remorse for taking advantage of inequality.

4. Lumpiness of Equ(al)ity Concerns

Although the basic formulation (2) of inequ(al)ity aversion needs not be continuous, economists (following an established practice of the field) have assumed continuous relationships when specifying the trade-off between own success u_i and the inequality measures contained in δ. This implies that for any small gain in success u_i, one is willing to sacrifice condition (3) for some small inequality.

It is clearly convenient to rely on continuity and differentiability when exploring the implications of inequ(al)ity aversion analytically. From a methodological point of view, this convenience may justify the assumption of a continuous trade-off relationship even though it implies some distortion of the facts. But note that in the case at hand, this distortion seems to go beyond a mere idealization that smoothes functional representations. It seems mistaken in a more basic sense.

The experiment by Güth, Huck and Müller (2001) has shown that any intentional (and thus avoidable) deviation from equ(al)ity brings in a kind of qualitative change. This means that an intentional deviation from (3) can be compensated only by a considerable increase in u_i if one wants to keep $U_i(\cdot)$ constant. Following Khalil (2004), we refer to this as the *lumpiness of inequ(al)ity aversion*. This lumpiness casts some doubt on the continuity of the trade-off relationship between one's own success and inequ(al)ity measures.

5. Ambiguity of Equity Standards

Unlike implicitly assumed by theories of inequ(al)ity aversion, equity theory does not offer unique benchmarks. Most importantly, condition (3) is just *one* equity standard, namely the personal one where individual contributions are either equal or cannot be ranked. In reward allocation experiments with costly contributions, if c_A/c_R differs significantly from 1, allocators tend to behave in accordance with equity standard (1), thereby violating equality standard (3).[8]

Fairness is also ambiguous in ultimatum experiments where only the proposers know the size of the pie. In particular, when p can be either small ($\underline{p}$) or large ($\overline{p}$), with $0 < \underline{p} < \overline{p}$, most proposers with $p = \overline{p}$ want to appear fair by offer-

[8] Deviations from proportional sharing are observed either when (1) favors the allocator or when the costs of contributions are minor.

ing $\underline{p}/2$ instead of $\overline{p}/2$ (Güth and Huck 1997). What is regarded as fair depends, therefore, on the parties' information.

The ambiguity of fairness standards has been known for a long time among equity theorists. In economics, Selten (1978) has early on discussed the problem and recommended to restrict equity theory to situations where the fairness standards are unique. This uniqueness requirement being rather restrictive, Güth (1988; 1994) has suggested that equity theory is applicable even when several fairness standards are suitable insofar as they can be ranked according to some adequacy criterion. For instance, in the ultimatum experiments with private information, it could be argued that only fair sharing of the small pie is controllable. Thus, most responders will punish revealed unfairness (i.e., offers that are unfair in view of $p = \underline{p}$) and grant the benefit of the doubt otherwise (for a similar result in a stochastic trust game see Güth, Kliemt, Levati and von Wangenheim 2007).

In light of these observations, inequality aversion theories should be limited to situations in which the personal fairness standard (3)—based on equality in allocations—is either the most obvious or at least the most likely accepted equity benchmark.

6. Discussion

Recent theories of inequ(al)ity aversion like Fehr and Schmidt (1999) and Bolton and Ockenfels (2000) have received quite some attention in the literature and inspired many applications. They are often used to account for empirical findings that are not in line with the traditional *homo oeconomicus* model of economic theory. Although these theories fare well in many contexts, in others they do not. For instance, they do not seem to have much appeal in settings where inequ(al)ity concerns are not smooth or the equity standard is ambiguous.

In reward allocation situations where the perceived contributions of the parties are different, equality in allocations contradicts the ideal proportional sharing of equity theory and, thus, it may not be what people perceive as 'fair'. Only if the pie to be distributed descends like manna from heaven or the contributions cannot be ranked, equality can be one of several equity standards, namely the personal one.

Moreover, even when equal sharing is the predominant concern, there are other important prerequisites for theories of inequ(al)ity aversion to hold such as common observability of the pie. Many experimental studies (e.g., Güth, Huck and Ockenfels 1996; Güth and Huck 1997; Güth et al. 2007) seem to indicate that what people perceive as fair hinges on the parties' information. A recent contribution (Bicchieri and Chavez, forthcoming) shows that perceptions of fairness depend also upon normative expectations (i.e., upon one's beliefs about what she ought to do in a situation).

Notwithstanding their ability to organize data from a wide variety of laboratory games, inequ(al)ity aversion theories cannot be regarded as explanatory

theories in the conventional sense. They received a very warm welcome in the economics community precisely because they are in line with the 'do and do nots of the trade' (see Lakatos 1978). Indeed, economists not only adhere to consequentialism, in normative economics they are also explanatory consequentialists: they explain human behavior exclusively in terms of the consequences that the actors bring about by their actions.

Although modern decision and game theory allows to differentiate between identical end states that are reached by a different path using different means (see, for instance, Broome 1991, chap. 1), a consequentialist would explain actions by considering the properties of the end states only. If the best state is simply the one yielding the highest monetary payoff—as assumed by the traditional approach, then rational choices can be accounted for by an evaluation function that merely ranks the end states. Inequality aversion theories 'refine' preferences by inserting distributional concerns into the utility function, but still allow economists to abstract from the ways in which the distributional effects are brought about. Teleological explanations of actions can be based on evaluations that do not take into account the path to the results to be evaluated. By this means, the explanations become more powerful in that they generalize over all actions that lead to the same consequences.

It seems that being outcome oriented has contributed very much to the success of recent behavioral theories of the Fehr-Schmidt and Bolton-Ockenfels type. The ample empirical evidence suggesting that behavior is not merely motivated by egoistic motives represented a threat to traditional economic modeling. The outcome-based models, which redefine consequences (or the argument of the utility functions) by assuming that individuals care about equ(al)ity, allowed economists to neutralize this threat with minor repairs in the analytical framework. From this perspective, the success of outcome-based models reveals a more fundamental methodological problem of empirical, as opposed to "eductive" (Binmore 1987; 2008), game theory: to acquire any generality the utility functions must represent end-state oriented preferences.

Although end-state orientation and over-stylizing are different concepts, over-stylizing contributes to sustain the illusion that explanations of human behavior based on expected consequences are possible. Special cases—like situations of gift splitting—seem to corroborate the hypothesis that utility functions incorporating fairness concerns have the power to organize observations well. These special cases would be representative of a more general class of situations *if only consequences mattered*.

The typical theorist seems to be anxious to disregard this latter condition and to over-stylize her hypothesis. Yet, one must not assume *a priori* that utilities depend only on the material structure of the consequences. The identification of the preferences associated with each consequence may require, for instance, an examination of what might have happened or of the means used to reach a specific end state. Going back to the initial examples, this means that we can claim that 'there exist cases in which distributional effects seem to prevail'. However, the path leading to decisions (e.g., the external gift path) is part of the conditions

that generate them. Ignoring path-dependency and making general claims for a broad class of proposer-responder interactions amount to over-stylizing.

Although we focused on inequ(al)ity aversion theories to illustrate the concept of over-stylizing, we intended this to be just an example. The PD game illustrated in Section 2 may serve as a warning that even the seemingly most simple strategic interaction can be more complicated than one might imagine from its matrix representation. Convoluted cognitive processes may be involved even in games as simple as a two-by-two PD. Human decision making is complicated not necessarily because decisions are complicated, but because the brain that makes them is.

Context- and path-dependency will therefore always matter if human actors and human perceptions are involved. We do not claim that each case is completely different. Analogies exist and may be generalized. However, experimental economists, just like lawyers, should generalize from 'precedents' in a case by case manner and resist the temptation to act as if a covering law with 'general punch' would be always present. Often, all one can say is that a paradigm case had certain results in a specific experiment. Such a statement is much better than not performing the experiment at all and abstains from formulating general hypotheses ranging over classes of games. It hands the task of a slight generalization over to those who will use that experimental evidence to deal with a yet unknown case.

Experimentalists should not let statistics range over heterogeneous experiments unless they have a good reason for doing so—such as the test of a particular hypothesis. The observation that statistics organize well some data may be interesting and useful for formulating further testable hypotheses. If these hypotheses survive the subsequent tests, then there may be ground for a more general theory. Mere inductive generalization from data will practically always result in over-stylizing.

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