Dipartimento di Scienze Economiche
Università degli Studi di Firenze

Working Paper Series

"CHOOSER DEPENDANT" PREFERENCES, AND ATTITUDES de se

Vittorioemanuele Ferrante

Working Paper N. 09/2008
July 2008

Dipartimento di Scienze Economiche, Università degli Studi di Firenze
Via delle Pandette 9, 50127 Firenze, Italia
www.dse.unifi.it

"Chooser dependant" preferences, and attitudes *de se*[*]

Vittorioemanuele Ferrante[†]

July 15, 2008

Abstract

Sen's "chooser dependence" of preferences generates issues of indexicality which, we claim, can in fact be reduced to a specification of the content of preferences within a standard approach, by means of Lewis' theory of attitudes *de se*. While context sensitivity of preferences can be dealt with by the addition to the outcomes of choice of their relevant mereological contexts, indexical sensitivity requires the content of preferences to include (the nature of) the decision maker him/herself. The result is a naturalistic internalization of preferences, which become object of preference, belief, and action. *Keywords*: Preferences, utility, choice, attitudes, mereology, properties.

1 Introduction

The main purpose of this paper is to cast a bridge between Amartya Sen's celebrated theory of "chooser dependant" and "menu dependant" preferences (Sen 1997), and David Lewis' metaphysics of attitudes (Lewis 1979), including beliefs and preferences. Lewis' theory is well-known in the philosophical academy, but it is strangely neglected by decision theorists of diverse upbringing.[1]

[*]Thanks are due to Alessandro Balestrino, Antonio Gay, Ivan Moscati for useful comments. The usual disclaimer applies.

[†]Dpt. of Economic Sciences – University of Florence; manolo@unifi.it

[1]From the philosophical community, for example, Pettit (1991, 197 fn.) decides to overlook the issues contained in Lewis' approach. Sen himself seems to ignore altogether "the greatest systematic metaphysician since Leibniz" (obituary words of Mark Johnston, chairman of the philosophy department in Princeton), in his otherwise often very rich bibliographic reference lists. Lewis' work on attitudes is also barely mentioned in the ominous volume on *Preferences* (Fehige *et al.* 1998) by philosophers, and hardly at all in the *Handbook of Utility Theory* by economists and decision theorists (Barberà *et al.* 1998, 2004).

Sen argues that the standard decision theoretic binary relation over alternative outcomes, which interprets the preferences held by some decision maker i, say P_i, should be further qualified to specify the "identity of the chooser", as well as the "menu over which choice is being made", in order to define "comprehensive outcomes", which include "acts of choice" as well as "culmination outcomes" (Sen 1997), because preferential attitudes towards alternatives are (or, should be) sensitive to such additional elements. Therefore, for example, binary relation P_i^i is to be distinguished from binary relation P_i^j, the latter being the preference relation of decision maker i over alternatives, when the choice is made by subject j, and the former, when the chooser is i him/herself.

It can be counterargued that, however good reasons there may be for any refinements, a realistic approach to decision making should restrain any preferential attitude to vary with respect to its content only, and that the point raised should be resolved in some specification of such content, rather that in an indexation of the relation, which permits variations of preferences held by the same subject over the same contents: call this a Reduced to Content Theory of Preference (RCTP). We feel that the points made by Sen do raise an issue of indexation, but one which we suggest can be tackled under realistic canons, and solved while remaining within a RCTP. The approach we suggest is by no means new, and it is in fact Lewis' theory of attitudes *de se*.[2]

Sen's research programme is a well known criticism the Pareto-Samuelsonian identification of choice and preference (see, e.g., Sen 1993). It is more often construed as consisting of arguments towards a breach of validity in the axiomatics of "internal consistency" of choice, such as of well-known properties α and γ (Sen 1993, 500), rather than consisting in the conceptual issues we wish to emphasize here. The present paper does share Sen's implicit position against a formalistic methodology of much axiomatics in XX century economic theory — if that is what it is. Beyond this, we wish to suggest that committing oneself to an ontology of the objects of preference and choice (as we mean to do, by accepting Lewis philosophy), sets the ground for testing the validity of axiomatic restrictions, and, at the same time, eschews the question begging traps of redefining *ex post* the nature of the objects which happen to contradict the formal principles: such is the case, for example, when alternatives are further qualified by the choice set they belong to, in order to bypass a context dependence of choice over the same alternatives.

In fact, both defending, and attacking, the validity of axioms may suffer from mirror formal-

[2] Lewis' approach is itself not idiosyncratic: it consists in a realistic organization of lines of thought he credits to XX Century philosophers John Perry, Hector-Neri Castañeda, Peter Geach, Arthur Prior, and, naturally, W.V. Quine.

istic vices: if qualifying alternatives by their context of choice, in order to rescue the validity of axioms, begs the question, so does questioning the axioms which regiment the choice over the alternatives thus qualified, on the ground of *their* context of choice. In general, both verification, and falsification of formal principles require some kind of ontological precommitment, in order to avoid question begging faults.

2 Context, "position" and indexicality

Consider Sen's first example:

> You arrive at a garden party, and can readily identify the most confortable chair. You would be delighted if an imperious host were to assign you to that chair. However, if the matter is left to your own choice, you may refuse to rush to it. You select a "less preferred" chair. (Sen 1997, 747)

And the second example:

> You may prefer mangoes to apples, but refuse to pick the last mangoe from a fruit basket, and yet be very pleased if someone else were to "force" that last mangoe on you. (Sen 1997, 747)

Sen offers two distinct routes to treat the two cases: "chooser dependance", and "menu dependance" of preferences. In other words, preferences (should) depend on who does the choosing (e.g., selecting the chair), and also on the composition of the menu of alternatives among which to choose (e.g., the pieces of fruit remaining on the tray).

Actually, both examples seem to make both points, in a similar way. On the one hand, what counts is not only the objects of choice intrinsically, i.e., chairs and pieces of fruit, with respects to the enjoyment they give to the chooser who makes use of them, but also, in some sense, the consequences of any selection with respect to what objects remain available to other individuals in a specified community. There is only one "most confortable" chair, and taking possession of that collides with the welfare of the other guests; similarly, with the "last mangoe". On the other hand, there seems to be a difference between "taking", and "being given" the object of choice (be it the chair, or the mangoe), irrespectively of what remaining objects are left to the other guests.

To clarify, Sen makes it quite clear that the issue at stake is not any concern of decision maker's with the disconfort he causes to his own fellow guests, who end up being deprived of

something; rather, it is with his own disconfort at enjoying a privilege: the decision maker may well be happy with the full allocation of chairs, or pieces of fruit, among all the guests,[3] yet, for some reasons, feel unconfortable with his own position in this allocation. To anticipate, these reasons may be again two-folded: decision maker may be sorry for being the cause of the others' discomfort (even though he might accept this same discomfort if caused by his host, say); and he may be ashamed for having given himself the privilege.

Sen's own suggestion here is that what counts, in the decision maker's preferences, is not only the "culmination outcome" of the choice (i.e., enjoying the chair, the mangoe), but also the "act of choice" (the *way* a chooser obtains the outcome, and /or the "*subjectivity*" of the chooser), and that "comprehensive" outcomes should be considered instead, including both elements.

It is our purpose to clarify the meaning of this suggestion, and, in particular, what exactly it is that should be added to the "culmination outcome" to make it "comprehensive".

It may be argued that the notion of the "act of choice" is ambiguous, and we wish to disentangle two different construals of it. These correspond to an emphasis on the real process of obtaining (the chair, the mangoe) vs. what Sen calls the "position" of being a chooser (see also Sen 1982).

Consider the following assertions. These should be construed as considered preferentially by a decision maker whom we give the name of Amartya Sen (AS).

(a) AS **takes** the most confortable chair at the garden party

(a') AS **is given** the most confortable chair at the garden party

The meaning of the two assertions is obviously different: their natural interpretations intend to include a similar enjoyment of the chair by AS, along with the different real processes culminating in the same enjoyment. A different preferential attitude towards what is denoted by the assertions is then naturally explained by the fact that they describe different courses of events.

The construction of realistic interpretations of the two assertions in terms of possible worlds, and their parts, may be as follows, and run in similar lines with what was discarded by Sen, as discussed above, when considering the decision maker's concern over the lesser comfort of the other guests in enjoying the remaining chairs (or pieces of fruit) (cfr. fn. 3).

A possible concern of decision maker AS with the well-being of fellow party guests enjoying less confortable chairs, can be interpreted by means of a *spacial* extension of the content of

[3] "A common reaction to this type of chooser dependence is to think that the "problem" arises because of a mistaken attempt to define this person's preference in terms of the chair on which she herself gets to sit, and not over the full "vector" of chair allocations (involving others as well). But this is not the source of variability here." (Sen 1997, 747, fn.)

preferential attitude, to include and "mereologically" add, to the part of the party consisting of AS's enjoying the most confortable chair, those other distinct parts including the other guests being deprived of the best chair, and enjoying lesser ones. Similarly, a *temporal* extention can be considered, to specify whether AS's enjoyment was preceded by a process of "taking", rather than one of "being given", the crucial chair.

Notice that, in both cases, what seems to be of preferential interest in such spacial and temporal parts, is in their intrinsic nature. It is for this reason that, for example, AS's enjoyment of the most confortable chair, call it process x, a space-temporal part of the actual world, which extends in four dimensions with some continuity, can be considered to remain (intrinsically) indiscernible (or, even, identical[4]) whenever alternatively added to AS taking the chair, call it process y, or to AS being given the chair, call it process y'. The result is that the mereological sums $y \oplus x$, and $y' \oplus x$ define therefore parts of alternative worlds w and w', but with no fault in the identical denotation of the common sub-part x. Worlds w and w' may be candidate for mereological overlap in x, if one takes that overlapping of worlds is prohibited only if the intrinsic nature of the common part varies with the worlds (Yablo 1998). It is for this reason that preferential attitudes towards *the same* x may be refined by adjoining other parts to it, and yet retain the attitude towards $y \oplus x$ and $y' \oplus x$ to concern only the intrinsic nature of their parts x, y, and y' (rather than the relations among them).

Take now the following assertions, to be considered as above.

(b) **AS** takes the most confortable chair at the garden party

(b') **The 1998 Nobel prize winner in Economics** takes the most confortable chair at the garden party

AS's preferential attitudes towards (b) and (b') may differ, under common sense, though not in an obvious way: AS might favour (b'), and feel more uneasy towards (b). This assumption will constitute part of our guiding "empirical evidence".

First, one may wonder whether the assertions have the same meaning (beyond any natural language ambiguity), or not, under the same theory of meaning which was implicitly used in the examination of (a) and (a'), above: the meaning of such expressions may be the part of the (actual) world they denote (given the indicative mode of the actions), i.e., the processes of taking

[4]So-called Lebnitz Second Law, which prescribes identity of indiscernibles, whenever accepted, may be restricted to equality of intrinsic properties only, and exlude extrinsic properties from consideration. Otherwise, so-called "mere Cambridge changes" may affect identity: for example, if you become taller than me, I satisfy a changed description (i.e., some of my properties have changed), but mine is only a "mere Cambridge change" (Geach 1969).

possession of the chair, and enjoying it, in the assumed circumstances, by subject AS. Then, one may take the emphasized variation between (b) and (b') to consist in synonymic linguistic tokens which refer to the same individual. Given that **AS** *is* **the** (unique) **1998 Nobel prize winner in Economics**, the two linguistic expressions can only refer to the same individual, and this reveals a friction between the assumed theory of meaning, and our "empirical evidence", for different preferential attitudes towards the same object contradict RCPT. The consequence of this — under a realistic methodology — would be to shift the ontology of the content of preferential attitudes to ephemeral linguistic expressions, in a way which may be taken to be unacceptable.[5]

On the other hand, one can distinguish between the ontological status of the reference of the emphasized different subject terms in the assertions. In (b), **AS** denotes (is the name of) an *individual*; in (b'), **the 1998 Nobel prize winner in Economics** is naturally interpreted as a description, i.e., it denotes the *property* of some individual: it is whoever enjoys the property of having excelled in the eyes of the members of the Royal Swedish Academy of Sciences whom, one might presume under common sense, AS wishes to favour, *whether that is AS (himself) or not.* In other words, (b') itself refers to a *proposition*, and it is true at all and only the possible worlds where whoever has the property of having been awarded the Nobel prize, also has the property of taking the most confortable chair. Instead, (b) refers to the property possessed by individual **AS** in some possible world when he enjoys the most confortable chair. It is for this reason that one may define the (preferential) attitude towards (b') as *de dicto*, and the attitude towards (b) as *de re*, by means of a distinction which is traditional in logic and analytical philosophy.[6]

This may be the reason why the meaning of the two assertions can be different; and this justifies possibly different preferential attitudes towards them, within a RCTP approach.

Following Lewis, we will consider properties as the argument of preferential attitudes. This will involve considering the boolean structure of properties, to include the properties which uniquely and exhaustively describe the alternatives, *vis–à–vis* a more common treatment of

[5] In terms of a formal language, it would imply that the objects of a preferential attitude should be the elements of the sintax, rather than the elements of the semantic of the language. In the example, one would discriminate preferentially between so called well formed formulas which are sintactically different, but in fact equivalent, in that they are interpreted by the same concrete element of the semantic.

[6] Preferences *de dicto* concerning worlds such that AS is part of them, are a way to interpret preferences held from behind the veil of ignorance characterizing AS's own "original position" (Harsanyi 1953, Rawls 1971): AS may prefer the world to be such and such, independently of his own particular part he plays, or "position" he takes, in the world. This may be one way of treating the evaluation of one's own vs. other peoples' lifes with an "extended sympathy" approach, yet allowing for idiosyncratic preferences (crf. Broome 1998). But this is the subject for another paper.

properties as tools for an analysis of alternatives in a "multi-criterion" style, by stressing the difference between the properties of an alternative, and the parts of an alternative; also, there will result a theoretical gap between preference and choice, given the ontological distance between their respective objects. Lewis' approach includes reducing attitudes towards propositions, such as (the reference of) (b'), as special cases of attitudes towards properties, such as (the reference of) (b), given that propositions are construed analytically as properties of a particular sort.

Consider now the following expressions, as asserted by decision maker AS:

(c) **I** take the most confortable chair at the garden party

(b) **AS** takes the most confortable chair at the garden party[7]

The self-referential (c) is a special case of an assertion *de re* which takes the label of *de se*. In the case of epistemic attitudes, for example, it amounts to a self ascription of properties, rather than their ascription to an individual through a name; i.e.: I know (or, believe) that **I** do..., rather than: I know (or, believe) that **such and such an individual** does....

The point here is, again, whether or not (b) and (c) are exact substitutes as contents of preference, under common sense psychology, *vis-à-vis* whether or not they have the same meaning, i.e., whether **I** and **AS** denote equally. If the meaning is the same, yet common sense (therefore, AS's) preferential attitudes towards them differ (possibly, favouring (b) over (c)), then obviously RCTP fails. So, let us check this possibility.

The meanings of these statements are obviously the same only if they are asserted by ES, because the denotation of the pronoun depends on the utterer. There remains the if part of the sameness of meaning.

If **AS** denotes an individual, so does **I**: but is it always the same individual? Lewis has an example against this, in the context of epistemic attitudes: I may watch myself in the mirror, and ascribe properties to the individual I am watching, yet be unaware, for some reason, that that individual is *me* (Lewis 1979, 156). It is because of this, that an epistemic attitude towards myself may not be *de se*, but only *de re*: like with any other individual, the ascription of properties to that *res* (who is me, but I do not know this) requires a "acquaintance" with it

[7] A point on notation. The bold face was used to emphasize the variation between (a) and (a'), for example; but it comes handy now to make a different distinction, as follows. "AS" denotes our *subject*, i.e., the decision maker; "**AS**" denotes (part of) the *object* of AS's preferences (be it an individual, or his properties). It is for this reason that we often prefer to talk about the *content*, rather than the object, of preference, (which may be more common) in order to leave room for the possibility that such content be, in fact, a subject (or his properties). This convention will be followed only loosely as from sect. 4.

which, in this case, is provided by the relation of watching. We will consider later what other relations should intervene for preferential attitudes *de re*.

It is obviously sufficient to the case of preferential (as much as epistemic) difference in attitudes, that the individual denoted by **AS** not be the same as the individual denoted by **I**.

Again, an individual is a part of a possible world. Following Lewis (1976), this part is the individual's entire life, including all its "time slices". Given that Lewis' possible worlds do not overlap, an individual has "counterparts" in other words (where **AS** may not have been awarded the Nobel prize, for example), and counterparts live more and less similar lives (Lewis 1968). In a world w where **AS** and **I** take the most confortable chair at the garden party, the two individuals differ only if some of their (other) parts differ in some world w' (and w' may, or may not, be different than w). But however this may be, certainly the individual denoted by **I** cannot be different than utterer decision maker AS, whose moral sentiments we are exploring.

The question is whether this different identity is also necessary. If it is not, then a feeling that common sense preferential attitudes (should) differ, might imply that indexicality issues are irreducible to content, and possibly that, in some sense, it is in fact the way that decision maker AS "separates" **AS** from **I** himself that makes a difference. Therefore, necessity is crucial for RCTP: on the other hand, the different identity seems to be implied by the very suggestion of a "separation".

Next, we introduce what we suggest may capture Sen's point on the "positionality" of preferences. Consider preferentially (b') versus (c); here, we suggest that AS will no doubt favour (b'): this "common sense evidence" is offered as an illustration of Sen's point over "chooser dependance" of preferences. Notice that this, possibly sharper, preferential attitude is in some contrast with the greater uncertainty in the previous comparisons, i.e., between (b') and (b) on the one hand, and between (b) and (c) on the other: it may look as if some kind of transitivity requirement of preferential incomparability fails to hold. We wish to suggest that this is due to some vagueness in the reference of subject term **AS** in the pivot statement (b): crucially, it might depend on whether or not individual **AS**'s life is taken to include the prestigious award mentioned in (b'), *vis-à-vis* what other aspects **AS** does not share with the individual reference of the subject term **I** in (c).

Be that as it may, preferences *de se* concern one's own welfare (my own enjoyment of the chair), while the content of preferences *de re* is other individuals' (the other guests enjoy lesser chairs, and AS may, or may not care for this). Naturally, my own concern over other people's welfare is still a moral sentiment of mine, and will, in the end, involve my own welfare indirectly: As we will see, Lewis's theory reduces preferences *de re* to preferences *de se* in a way which

mirrors this last common tenet in the theory of utility.[8]

3 A Lewis' style framework

David Lewis' suggestion that the content of all attitudes should be abstract properties, sets the treatment of preferences *au par* with beliefs and knowledge[9]. Indeed, bayesian decision theory in all fields of application treat the content of epistemic attitudes to be sets of alternatives, i.e., properties in Lewis' metaphysics (Lewis 1979, 135). To the contrary, it is the Pareto-Samuelsonian approach in economics which identifies preferences and choices, and therefore requires that the content of the former should be concrete alternatives.

As was already suggested, a theory of preferential attitudes based on properties is sometimes erroneously considered just an analytical approach towards alternatives:[10] if one follows this line of thought, properties are construed as the *parts* of the content of preference. In fact, this is not in line with a realistic, so-called extensional, approach to parthood: the parts of a pen are its cap, ink,... and not its being expensive, broken...

A realistic theory of parthood is an extensional mereology of space-temporally extended possible worlds (Simon 1987, Lewis 1998). The garden party, similarly, is a four-dimensional thing, a part of a possible world, with four-dimentional parts in its turn: **AS** enjoying his chair, the host showing it to him, the other guests cheering the arrival of the eminent Nobel prize winner (or, being scornful of his arrogant pose). A possible world has parts: the entire garden party, and its parts, are parts of a possible world, this being the actual one, i.e., from the point of view of **AS**, say, as having possession of the chair.[11] The parts of a possible world in an extensional mereology can be formalized as elements of a quasi-boolean algebra (i.e., a boolean algebra with no zero element[12]), with operations of sum, product, or "overlap", and

[8] Lewis discusses Perry's account of attitudes (Lewis 1979, 150–2): this differs in the fact that, instead of Lewis' self-ascription of properties to **me** (respectively, preference for one's own properties), Perry considers, in a sense, ascription of properties to **ES** (preference for **ES**'s properties) made by me. Lewis criticizes Perry's theory on account of semplicity; we have suggested that **I** and **ES** may not denote equally.

[9] That the content of preferential attitudes is the properties of the alternatives is also the tenet of Pettit (1991).

[10] A well-known ancestor of the analytic approaches to (no longer atomic) alternatives in the theory of economic demand, is Lancaster theory of the "characteristics"of economic goods (1971): whether these should be construed as properties, or otherwise parts of the alternatives is an issue we skip here.

[11] It is well known that Lewis denies that any world in particular may be *the* actual one, due to the lack of a "God's" point of view: any world is the actual one, from the point of view of its "inhabitants" (Lewis 1986). This implies that any possible world has the same ontological dignity to existence as any other, which is at the basis of Lewis' celebrated modal "extreme realism". Other approaches grant existence only to only one world (the actual one), and confine *possibilia* to non existence (Stalnaker 1976, 2001).

[12] As in Lewis (1998). This is not uncontroversial: Martin (1965) accepts a "null individual" as the zero element

difference. For example, the overlap between the whole garden party, and **AS**'s entire life, is **AS**'s enjoynment of the chair at the party; the difference between the garden party and **AS** enjoying his chair, will be the latter's local mereological context (and the source of AS's pride, or shame).

Let w, w'... be Lewis' possible worlds. Let x be an extensional part of world w, so that it can be written that $x \sqsubseteq w$, or $x \sqsubset w$, if x is a proper part of w, i.e., if $x \neq w$. The world w is an improper part of itself, $w \sqsubseteq w$. If x and y are parts of w, then their mereological sum $x \oplus y$ is also a part of w. The sum is always defined, whether of not its terms are parts of the same world: if $x \sqsubseteq w$, and $x' \sqsubseteq w'$, then $x \oplus x' \sqsubseteq w \oplus w'$. The product $x \otimes y$ is defined only if parts x and y overlap, i.e., only if they share a common (sub)part: parts which do not overlap may be called alternative, for nothing can be both. Summing up over all worlds define the universe W. The difference x/y is defined only if part x and y are not identical, and is a proper part of x if x and y overlap, in an extentionally obvious way. A part of a world may be an individual at an instant, or a temporally extended *tranche de vie* of an individual.

A *set* of parts, $\{x, y, ...\}$ is called a property. Sets of parts should carefully be kept distiguished from the mereological summation of such parts.[13] For example, $\{x\} \neq x$; here, if x is an individual, then $\{x\}$ is the property which uniquely and exhaustively specifies the nature of x (the intersection of all sets containing the element x), and it corresponds logically to the conjunction of all the properties possessed by the individual. Properties may be within a world, or across worlds, depending on whether their elements coexist (i.e., they are parts of the same world), or not. Again, two properties which not not intersect may be called alternative, for nothing can have both.

A special case of a property is a set of worlds, $\{w, w', ...\}$: call this a proposition. An event is a property which is an object of epistemic, or "optative" attitude of some subject.

3.1 An example: to be lost in one's own world

Let us illustrate epistemic attitudes over properties by considering an example by Perry (1977), which is elaborated on by Lewis (1979). An "omniscient" scholar is lost in the Stanford library; the library collects an awesome amount of books, whose content refers exhaustively to all the propositions which are true, including all the details of the biography of the scholar, and he has read all the books in the library. The scholar has, therefore, perfect information concerning his

of the algebra.

[13] In social sciences, this is standardly not the case: a committee, or a board is usually defined to be the set of its members, and formal preferences over sets are used to treat choices over such groups (see, e.g., Barberà *et al.* 2004b).

actual world: in terms of propositions, his information set is a singleton, whose only element is his own world. But he is lost: he knows that such and such a scholar is in aisle five, floor six of the main building (he knows all true propositions), but he does not know that's *him*, because he cannot ascribe that property to himself. For all he knows, he may have the (alternative) properties of some other individual, whom he knows to be somewhere else, in some other library: in terms of properties, i.e., of sets of *parts* of worlds, his information is not perfect.

Unlike strategic game forms[14], extensive game forms seem to be suitable for a comparison of descriptive elements of game theory with a metaphysic of possible worlds. In an extensive form, an outcome may be defined as a complete chain of subsequent actions by the players, and it may be seen to be the equivalent of a possible world, where the parts of the latter may be equated to the actions in the chain. Take, for example, the event denoted by the statement: "I am at a motorway exit", made by the absent-minded driver of the one player well-known game (Piccione-Rubinstein 1997): the driver cannot recall whether or not some particular motorway exit is behind, or ahead of him, both in space and in time.

This event is a set of two coexisting parts of the driver's life which are subjectively indiscernible to the asserter: one part is his own individual *tranche de vie* denoted by the expression "the absent-minded driver at the first exit", and the other is his *tranche de vie* consisting in his being at the second exit. Notice that the (coexisting) elements of the event are strictly alternative because they do not overlap (they are temporally non-extended, perhaps). But in a broader sense, they would be "alternative", albeit only from the point of view of "I", even if they did overlap (over some time extension, say) so long as the mental "I" is defined to be a part of their sum, but mereologically larger than their overlap. Then, one could not "place" "I" within each of both parts. In fact, the driver is lost, not just in his own world, but also strictly in himself.

Perry's scholar is lost in space, as much as the absent-minded driver is lost in space-time: due to the fact that the scholar is not (presumably) lost in time, his alternatives are not different *tranches de vie* of his own, as is the case for the absent-minded driver, in the standard version. The scholar's uncertainty, instead, concerns two simultaneous time slices of necessarily different individuals. Therefore, an issue of personal identity separates the two examples, which make, otherwise, the same point.

In fact, game forms of imperfect information may be conceived, where indiscernibility of nodes in one information set includes *who* are the players at the different nodes (the same

[14] "States" in so-called Bayesian games specify strategy profiles and beliefs over profiles (and beliefs over beliefs...) of players. But if strategies include both factual and counterfactual actions, they cannot be parts of the same possible world.

constraints on capacity to act, which are the consequence of information sets, would therefore operate on the same nodes for many different players). Standardly, this uncertainty is modelled instead by including uncertainty over final pay-offs in so-called games with incomplete information, and our different individuals turn out to be the same individual with different pay-offs: this *ex ante* modelling technique may be contrasted with an empirically "internal" definition of players who may believe it possible (and/or prefer) to be (to have the properties of) different individuals than what they are.

Be that as it may, one can combine the issue of alternatives parts of the same world with uncertainty over the players themselves. We offer the case of a two players extensive game, with the same tree structure and information set as the absent-minded driver game form, as depicted in fig. 1: call this the "absent-minded lorry drivers" game. Here, one and the same information set, in a non-standard way, joins nodes of two different players. The drivers take turns at the same lorry: player 1 is at the first junction, player 2, at the second. An inn can accommodate both after the first exit, but driver 1's home is after the second exit, while driver 2's is at the end of the motoway. Each driver is uncertain about himself, i.e., about his own turn (and exit), and about the location of his own home; each driver has only two strategies, *in* and *out*, i.e., the actions available to him, whatever the node he believes he may be at.

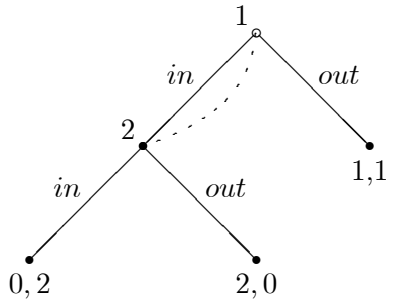

Figure 1: Two lorry drivers

Assume it to be common knowledge that being at each junction (i.e., being himself, or the other driver), is equiprobable. Then the normal form game is as in fig. 2 (the pay-offs associated with the players' strategy profiles in the cells of the bi-matrix, are calculated as expected values of the pay-offs associated with the end nodes of the original extensive game).

	out_2	in_2
out_1	$1;1$	$\frac{1}{2};1\frac{1}{2}$
in_1	$1\frac{1}{2};\frac{1}{2}$	$1;1$

Figure 2:

This symmetric strategic game has a unique Nash equilibrium in strictly dominant stategies, namely (in_1, in_2), whose final outcome is that driver 2 goes home, and driver 1 does not.

If one swaps the drivers' homes, i.e., the pay-offs at the two bottom nodes of the extensive form in fig. 1, then the strategic game becomes as in fig. 3; the unique Nash equilibrium (out_1, out_2) is again in strictly dominant strategies, and the drivers end up at the inn.

	out_2	in_2
out_1	$1;1$	$1\frac{1}{2};\frac{1}{2}$
in_1	$\frac{1}{2};1\frac{1}{2}$	$1;1$

Figure 3:

3.2 Intrinsicity and mereological context

Properties can be intrinsic, or extrinsic (Weatherson 2006). Intrinsic properties of a part x do not depend on what other parts there may, or may not be in the mereological context of x; extrinsic properties, do. Being round, being male are intrinsic, under a common view; being single, being preferable, or prefering, are extrinsic. Extrinsic properties derive from relations that x entertains with other parts of its mereological context. One may take that if an extrinsic property p of x derive from some relation x entertains with part y, then property p of $x \oplus y$ is intrinsic: if x is near y, then this property is part of the shape of $x \oplus y$, and shape is typically intrinsic. Therefore, $x \notin p$, but $x \oplus y \in p$. Conversely, if q is intrinsic of x, then $x \in p$, but possibly $x \oplus y \notin p$: take being round of a sphere x; if y is a cube, then $x \oplus y$ is not round. The class of properties whose all and only elements contain x will take the name of the *nature* of x.

The crop yield of an allotment of land does not depend, by and large, on whether or not neighbouring allottments are also cultivated, but only on the intrisic productivity of the land; contrariwise, the functionality of a component of an engine is not intrinsic, but it depends on its connection with the other parts. Arrow-Debreu commodities, among other things, are specified under extrinsic properties, like space-temporal location: the convenience of a home depends on its proximity to a workplace.

Some extrinsic properties are due to the *lack* of things in the mereological context. Take a lonely tree standing in a clearing: its extrinsic property is due to the absence of nearby trees, even though it does require the clearing. Assume, in fact, that a possible world is made of just the three, but with no clearing, and anything else beyond: is the tree lonely? Arguably, not. The example may look arcane, but the formal point is not. Similarly, sum up the tree, the clearing, and everything else in its own world, to have the entire world. Is this lonely? Again, possibly not, even though there is nothing else in the world, for there is no "place" either, to look into for any other content.

The distinction between intrinsic and extrinsic properties corresponds to different issues raised because of the mereological context, which are of relevance for the content of preference, in a subtle way. Take the shame **I** may feel in taking the best chair: this may be due to the scornful looks **I** may receive while doing so, by the other guests (i.e., **my** mereological context): one may take that the shame depends on the looks, and this defines a relation between one thing and the other. Yet, feeling ashamed is an intrinsic property of **mine**, and being scornful is an intrinsic property of the other guests: the causal relation between the two things does not *per se* means extrinsicness (though, being caused by, *is* an extrinsic property), even if the causal relation is necessary (there may not be any world, where **I** feel ashamed without receiving

scornful looks).

For example, if, again, x is the process of enjoying the chair, and y, y' are the processes of taking, and being given the chair, respectively, and if the alternative possibilites are the mereological sums $x \oplus y$, and $x \oplus y'$, then implicitely the (intrinsic) nature of x does not causally depend on y, y' (and we assumed above that it did, in fact), else x could not be denoted equally (intrinsically). This does not exclude that x as part of $x \oplus y$, has different extrinsic properties than x as part of $x \oplus y'$, and it obviously has: such is the gist of the doctrine of overlapping worlds, where the overlapping parts must be intrinsically equal to satisfy identity under the widely accepted First Law of Leibitz.[15] Lewis' doctrine of disjoint worlds, on the other hand, extends indiscernibility of identicals to extrinsic properties as well: x as part of $x \oplus y$ is not identical to x as part of $x \oplus y'$, if y, y' are parts of different worlds, even though they are intrinsically alike, and using the same denotation "x" is a mistake.

It was discussed in sec. 2 that "menu dependence" in preferences (depriving other choosers of the best alternative, i.e., the last mangoe) can be treated under a strict RCTP by mereological summation of the time extended process of **ES** enjoying the piece of fruit, with the space-temporally contiguous processes of the other guests enjoying the remaining pieces of fruit (or the remaining chairs). The intrinsic properties of such parts will take care of a real interpretation of the well-being which the guests derive from such consumption. Other relevant intrinsic considerations remain: it may make a difference to the sentiments towards **ES** of a third guest, who is left with an apple, whether one, or two mangoes, were on the tray when ES made his choice. Such a difference may not concern to the third guest's process of consumption, but it is intrinsic to the third guest's overall well-being, and it is caused by a different part of the party (**ES**'s enjoyment): the intrinsic properties of both parts (**ES**'s, and the third guest's enjoyments) remain under preferential scrutiny by ES.

Conversely, ES may be concerned with the fact that the third guest enjoys a *lesser* piece of fruit, this being an extrinsic property of the third guest process of consumption (in a sense, being better or worse does not change the utility of the apple): hence, the extrinsic property under scrutiny now is the (intrinsic) property defined as the set which includes as a member the mereological sum of **ES**'s with the third guest's consumptions.

Yet, all this is not a matter of "position", or of indexicality in preferences. Beyond the detailed specification of intrinsic, and extrinsic properties of the alternative courses of actions, there remains the self-referential aspect in the wishing of such properties: it is not only a matter of "**ES** taking the most confortable chair at the garden party"$\oplus$"the other guests taking the

[15] As is well known, this stipulates that two identical things are indistiguishable in their properties.

other chairs", with all the intrinsic, and extrinsic properties of the parts of the sum, and of the sum itself (given that the properties of the parts may, or may not, carry over to the sum, and viceversa), it is also the circumstance that I (and $\mathbf{I}$) am part of all this.

4 Preferring oneself, and others

The metaphysics of possible worlds is an essentially descriptive doctrine which aims at a comprehensive generality. In contrast with the descriptive aspects of some simple decision theory, whatever corresponds in the metaphysics to the decision maker, player, agent, ect., of the decision theory, that will be a part of whatever includes the objects of decision, namely possible worlds.

That the subject should be part of the object is not entirely new to decision theory in general, and especially in game theory: the introduction of notions and techiques of epistemic logic in the 80's and 90's gave analytical status to the standard informal game theoretical requirements of self-reference of interactive decision making, whereby, for example, beliefs over other players' (and one's own) beliefs are strategically crucial.[16] In addition to this, a thorough metaphysical approach may introduce two novelties: self-referencial preferences, and a mereological analysis of their content.

The first novelty may not be of game theoretical concern: preferences over preferences are not of strategic interest as much as beliefs over beliefs are. More likely, it is of concern in a theory of preferences. The fact that I prefer mangoes to apples is a property of mine, and not of any piece of fruit (unlike "utility", perhaps); if the object of preferences were fruit, then that property of mine would not be of any interest. But Sen's concern is, as we suggested, over the fact that I take the mangoe, and that is something which confers properties to me. Thus, if the content of my preferences are to be the properties I have, then also are my own preferences, which are properties of mine.

On the other hand, granting that the subjects are part of the content of preferences imply that *others'* preferences can also be under scrutiny, as is the case when one prefers that others do not prefer reading *Lady Chatterley's lover*, to take an obvious example (whether one prefers that others do read *Lady Chatterley's lover*, or not).

Suitably axiomatized metapreferences are often interpreted as comparisons of the "differences" between "utility levels" which are established by the "first order" preferences: in other words, if p is preferred to q, and p' is preferred to q', and the first preference is (second level)

[16] Recent surveys on so-called "epistemic" game theory are in four distinct entries of the *New Palgrave Dictionary of Economics* (2008), by A. Brandenburger, A. Heifetz, and M. Siniscalchi.

preferred to the second preference, then this is often taken to mean that the "gain in utility" which is obtained by leaving q for p, is greater than the gain in utility which is obtained by leaving q' for p' (see, for example, Fishburn 1970). A different approach to metapreferences regard these as moral values: if I prefer preferring p to q, than preferring p' to q', that may mean that I regard the first preference as morally superior (Moore 1903, Lewis 1989). The distinction is obviously independent of the validity of the axiomatization on metapreferences which may allow for a numerical representation of first order preferences of a "cardinal" kind (i.e., unique up to unit of measure, and origin). On the other hand, the distinction vanishes whenever morality is identified with personal well-being. At the other extreme, morality may be seen to require "disinterested" comparisons, such as those made over propositions, i.e., independently of the subject's own position in the world.

The second novelty is mereology. Again, consider epistemic game theory. In a so-called Bayesian game, a player i's qualitative beliefs "at a state of the world s" are usually defined by an "accessibility" (or Kripke) relation between s and the elements of a set of states P. Then, i's beliefs comprehend proposition P (if we equate states and possible worlds), and all supersets of P, by monotonicity; therefore, s itself is an element of a set K_iP, whose elements are all the states at which player i believes P. The set K_iP is also a proposition, and it is i's belief in P. But if player i is just a part of the "state", i.e., a part of his possible world, then the domain of i's accessibility relation is no longer on the possible worlds, but on parts of worlds. Therefore, i's belief itself is no longer a proposition, but a property, i.e., a set of parts of possible worlds. Now, the question is: which parts? Parts of i, evidently, i.e., those at which i believes P, if and when he does so.

Again, Lewis' theory sets all attitudes *au par*. Therefore, whatever questions are put over beliefs, count for preferences as well. The mangoe is part of the "state" (world) at which I prefer mangoes; now, does the mangoe "prefer" my eating apples? No, because not every part of a world has such properties as attitudes, but only those parts which possess attitudinal mental images, and whom we identify as subjects.

More in general, once preferences are properties of parts of possible worlds, they become object of belief and of action, rather than just their premisses. Given than a particular preference structure may not be essential to a subject of decision, the latter may be defined on an independent empirical basis, and be allowed to have "state dependent" preference structures. Rational decision making may be founded on a criterion of consistency of actions with beliefs and preferences, rather than on a criterion of adequacy of the former to the latter.

4.1 *De re* reduces to *de se*; but *de se* is a special *de re*.

Given that it is *my* preferences that are under scrutiny, and not other subjects', preferences over properties which others have, matter because they concern me, and not them: this is the issue of preferences *de re*. We consider this issue by paraphrasing Lewis's point on belief *de re*, and emphasize (with sans serifs) what we alter in the original quotation in order to fit our case[17] (also, we consider an attitude of desire, rather than one of preference, to mantain the one-arity):

> "To wish property taking the best chair to individual some party guest [...] — to desire *de re* that the guest has the best chair — is to wish enjoying the best chair to the guest under some suitable description of the guest. It remains to ask what makes a description 'suitable'." (Lewis 1979, 153)

Granted that the content of a description is a property, and that some properties are relations, here are some suggestions for "suitable descriptions": the 1998 Nobel prize winner in economics; the guest who is looking at me scornfully; the guest who is identical to myself. Lewis' suggestions for the case of epistemic attitudes are in fact that the suitable description should either "capture the essence of the guest, or [be] a relation of acquaintance that I bear to the guest" (155), such as being identical to oneself (157), and such that of looking (156), respectively.

A property is essential to an individual, if the individual possesses the property in every world where it exists; in other words, loosing an essential property changes the individuality. Possibly, being the 1998 Nobel prize winner in economics is essential to no individual in the party: how is it, then, that I approve to (some guest contingently being) the 1998 Nobel prize winner in economics enjoy the chair? Probably, because of my witnessing that, *if my preference is de re*, even though, because of the ambiguity of a natural language, one cannot distinguish easily between this, and the *de dicto* assertion (b') in sect. 2:[18] the ambiguity stems from the possibility that the contingent description ("the 1998 Nobel prize winner in economics") can be used as a name of an individual, rather than as a property, as was taken to be in the examination of (b') above.

In other words, if being the unique 1998 Nobel prize winner in economics were (uniquely[19]) essential to AS, say, any guest in the party should no longer need to wittness AS enjoy the

[17] Lewis 1976 general treatment of attitudes is in fact almost exclusively elaborated and exemplified for belief and knowledge. It is therefore necessary to fill some gaps to treat optative attitudes as well, along similar lines.

[18] It is possibly because of this ambiguity that, in a postscript, Lewis admits of the possibility that his account can be mistakenly seen as a reduction of attitudes *de re* to attitudes *de dicto* (Lewis 1979, 156).

[19] That is, if no other person can be the Nobel prize winner, whether essentially, or not. Otherwise, the property is not one-to-one with the essence of AS.

best chair, in order to approve of that. This imply a restriction on preferences: if being the unique 1998 Nobel prize winner in economics is essential to AS, the guest should mantain the same optative attitudes towards the set of possible worlds were the 1998 Nobel prize winner in economics takes the best chair (i.e., the proposition to the extent of which the 1998 Nobel prize winner in economics takes the best chair), and the set of parts of those worlds (a property, *strictu sensu*) which consist in AS enjoying the best chair (which is equal to the set of parts of all worlds consisting of whoever is the 1998 Nobel prize winner in economics enjoying the best chair, because, in the assumption, there is no world where AS is not the 1998 Nobel prize winner in economics, and viceversa). In other words, preferences *de dicto*, and preferences *de re* can be identified for attitudes, in the case of identification under essential descriptions.

In fact, Lewis' relations of acquaintance seem best suited for epistemic attitudes only: it is only because I am looking at a stranger that I come to believe that he is taller than me. As for preferential (and other optative) attitudes, a relation of *use*, or of transitive *living*, may appear to be more appropriate: it is because I live my host showing me to the best chair that I prefer he has that property (rather than, say, the property of being shocked by my rudeness).

Now, beliefs *de se* are a special case of beliefs *de re* with no need for a relation of acquaintance, given that the relation of identity to oneself is necessary (157), hence essential[20]: I believe that **I** am the 1998 Nobel prize winner in Economics (if I do believe it), simply because it cannot be that **I** is not (therefore, it is essential to **me** that **I** is) *me*. The same will be for preferences *de se*: it is not that I make use of, or live, **myself**, it is that **I** is *me*.

On the other hand, beliefs (and preferences) *de re* depend inevitably, for Lewis, on attitudes *de se*, and on their irreducibly psicological self-referential nature. Ascribing property: "being the 1998 Nobel prize winner in Economics" to some party guest, requires self-ascribing the property of being acquainted with the party guest; similarly, wishing the property: "enjoying the best chair" to some party guest, requires self-wishing the property of wittnessing the party guest on the best chair.

4.2 Individuals and worlds

AS is part of a world w; but some of his properties are not essential to him. Therefore, there are worlds w' where AS exists (i.e., he is part of w'), and where he possesses different properties. According to Lewis, AS in w is but a counterpart of AS in w', call it AS$'$. Be that as it may, it is obviously useful to mantain personality through different worlds: let $\{w\}_{AS}$ be the set of

[20] If a property is necessary, then all individuals have it always; therefore, AS has it in all worlds; therefore, AS has it in all the worlds where he exists, i.e., it is essential to him.

worlds our subject is part of. The set $\mathcal{AS} = \{AS \mid AS \sqsubseteq w \mid w \in \{w\}_{AS}\}$, which can be defined on the ground of an ontological precommitment with respect to $\{w\}_{AS}$, is the intersection of all properties which are essential to AS. This sets a dividing lines with respect to worlds $w \notin \{w\}_{AS}$, and with respect to properties $p \notin \mathcal{AS}$.

If P is a proposition whose elements are only worlds which AS is not part of (if $w \in P$, then $w \notin \{w\}_{AS}$), then AS's preferential attitude towards P is perfectly "disinterested", both in the sense that it does not affect him, and in the sense that he (and anyone else, be it part of the world, or not) can do nothing about it (if AS has no part in w, then obviously he does not act in w either, and whatever others may do, has no consequence for AS). Whatever attitude AS may have towards P, it is not because AS may "live" P: one might maintain that AS has no reason for holding attitudes towards P at all.

On the other hand, AS will be "impartial" towards the worlds he does live in, if his attitudes are independent of the part he plays, or position he holds, in such worlds: such is the case when AS favours that the 1998 Nobel prize winner takes the best chair at the garden party, independently of who in the party he his. Thus, AS will be impartial towards propositions Q whose elements are all in $\{w\}_{AS}$. As a special case, AS is impartial with respect to propositions Q when this is the intersection of all his essential properties, i.e., when $Q = \{w\}_{AS}$. Again, if p is essential, $p \supseteq \mathcal{AS}$, then AS is (weakly) interested, for it may well affect AS' well-being, but he (and anyone else) cannot do anything about it.

It is only when a property is not essential to an individual that he may wish to have, or not to have it. If p is a property which is (strictly) smaller than $\mathcal{AS}$ (i.e., $p \subsetneq \mathcal{AS}$), then AS is (strictly) "interested" in p, for he can have p as much as he can not have it

On the other hand, it is only when a property is not essential to an individual that it may include parts of the same world, so that the relative attitude cannot be *de dicto*, and must be *de se*. Conversely, a property which is not essential may have elements which are all not coexisting (each element is a part of a different world)

Clearly, interest and partiality do not classify all preferences exhaustively, for some, more or less "gerrymandered" propositions include both worlds in $\{w\}_{AS}$ and not in $\{w\}_{AS}$, and some general properties include both worlds and parts of worlds strictly. Also, a natural extension to the notion of personality makes it a less than a crisp criterion: the person I am at (or before) birth may be the same as that after seventy years' time, more or less: rather, it may be only similar.

5 Further issues, and conclusions

The scope of this paper was on fundamental issues concerning optative attitudes. It is too obvious that the approach leaves many open questions.

Optative attitudes used in economics and in decision theories usually come in the form of binary relations over alternatives. One may, first of all, notice that the objects in a binary preference need not be alternative: I may prefer my morning coffee to my evening beer; yet, I can have both. This is how it should be, since the subject will normally possess more than one property (i.e., will belong to more than one set of parts of the worlds), and it would be probably an unduly restriction not to allow for preferences between these.

Secondly, a naive question concerns the arity of such optative attitude, *vis-à-vis* different interpretations of the difference between the standard notion of preference and the notion of utility in economics and decision theory. It is well known that the binarity of the attitude is well suited for receiving restrictions which guarantee various kinds of ordinal and cardinal numerical representability (see, e.g., Fishburn 1970): does this mimic a quantitative interpretations of a unary optative attitude, or of an intrinsic property of the possible alternatives, such as is, possibly, implicit in a XIX Century notion of utility? Alternatively, the binarity may also interprets *change*: it is because subject i wishes to cease (having property) p, for (having property) q (wherein p and q are now necessarily alternative), that one says that i prefers q to p.

These, and other issues remain beyond the scope of the paper. What was suggested here, is essentially a conceptual framework which may be a basis for analytical treatment. The main feature of the suggestion is that "it invokes only such entities and distinctions as we need to believe in anyway" (Lewis 1989, 68): it is on the basis of this independent ground that formal principles may be tested.

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