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Explorations of the effect of experience on preferences for a health-care service

Tzahi Neuman[a], Einat Neuman[b], Shoshana Neuman[c,d,e,*]

[a] Hadassah - Hebrew University Medical Center, Jerusalem, Israel
[b] Department of Economics, College of Management (academic track), Rishon Le'Tzion, Israel
[c] Department of Economics, Bar-Ilan University, 52900 Ramat-Gan, Israel
[d] CEPR, London, United Kingdom
[e] IZA, Bonn, Germany

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ABSTRACT

The standard assumption in economic theory is that preferences do not change as a result of experience with the commodity/service/event. Behavioral scientists have challenged this assumption, claiming that preferences constantly do change as experience is accumulated. This paper tests the effect of experience with a health-care service on preferences for maternity-ward attributes. In order to explore the effect of experience on preferences, the research sample was decomposed into three sub-samples: women pregnant with their first child (no experience); women after one delivery (single experience); and women after more than one delivery (multiple experiences). The preference patterns of the three sub-groups were estimated and compared. A Discrete Choice Experiment (DCE) was employed for establishing the relative importance of five attributes. Socio-economic background variables were also considered. The basic findings are that preferences change significantly as a result of experience with the health event; that the effect of experience is attribute-specific; that the extent of past experience (number of deliveries) is irrelevant; and that the effect of experience differs by socio-economic status.

1. Introduction

The standard assumption in economic theory is that preferences are given and stable (see discussion in the next section). In fact, any attempt to explain differences in economic outcomes using preference differences or changes in preferences, is considered unscientific. Stigler and Becker, right at the beginning of their influential 1977 article, "De Gustibus Non Est Disputandum", state:

> One does not argue over tastes for the same reason that one does not argue over the Rocky Mountains – both are there, will be there next year, too, and are the same to all men (page 76).

In the concluding section they summarize:

> We also claim, however, that no scientific behavior has been illuminated by assumptions of differences in tastes. Instead, they along with assumptions of unstable tastes have been a convenient crutch to lean on when the analysis has bogged down. They give the appearance of considered judgment, yet really have only been ad hoc arguments that disguise analytical failures (page 89).

The view that preferences are stable, implicitly assumes that economic agents have full information about all of the consumption bundles and their associated utilities; such that once a rational ordering of the preferences across these bundles is made, they thereafter remain unchanged. In reality, however, information about goods and services is incomplete. Consumers typically possess prior conceptions, often based on peers' experiences, regarding the value or utility associated with a wide range of goods and services. Over time, as the consumers themselves consume these goods and services, their preferences are updated – based on their own experience, and as greater experience is gathered about these commodities or commodity bundles, a reordering of preferences, may, in principle, occur.

The same process may be said to apply to the preference pattern of any given good or service. Under Lancaster's (1966) theory of value, a commodity or service can be decomposed into separable attributes (that is, characteristics or features), where each attribute has its partial utility. The standard assumption is that this set of partial utilities is constant. In a similar vein, based on experience, consumers might update the partial utilities and change the preference structure of the attributes.

This paper is presented as a contribution to the empirical-experimental literature that tests the validity of theoretical assumptions; it sets out to answer question as to: (i) whether the preference pattern is indeed constant, or whether an individual

* Corresponding author at: Department of Economics, Bar-Ilan University, 52900 Ramat-Gan, Israel. Tel.: +972 3 5318393; fax: +972 3 7384034.
E-mail address: neumans@mail.biu.ac.il (S. Neuman).

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updates and changes her preferences as she accumulates greater information, based on her personal experience, about the commodity or service. This issue was examined using data regarding the consumption of a health-care service, composed of a set of attributes; (ii) in addition, the paper examines the details of the preferences updating: whether there are *differential effects of experience on the various attributes* of the health-care service; (iii) it also investigates whether *additional experience* leads to increasingly greater changes in preferences, or whether the impact of experience on preference change soon reaches a plateau after the initial consumption of the service; (iv) finally, the paper examines the probable *differential effects of experience within diverse socio-economic groups*.

The paper examines these issues using data generated by a Discrete Choice Experiment (DCE). This is a stated-preferences technique for establishing the relative importance of different attributes in the provision of a good or a service. A DCE differs from other methodologies used to study preference patterns in its ability to disaggregate total utility, so that the contribution of each attribute to the total utility can be estimated. It thereby enables the examination of the differential effects of experience on the various attributes. It should be noted that while the DCE methodology has been used quite extensively to estimate preference patterns of health-care services, only two of the studies (San Miguel et al., 2002; Ryan and Ubach, 2003) looked at the effect of experience on preferences. Moreover, distinctions between the different attributes and between single versus multiple experiences have not been considered, and neither were differences between socio-economic sub-groups been detected.

Specifically, the paper examines the composite health service rendered during the delivery of babies at Israeli public hospitals. Israeli women were interviewed shortly after giving birth. The sample includes women with different levels of experience with child-birth, and was accordingly decomposed into three sub-groups: women pregnant with their first child (no experience); women who had recently given birth to their first child (single experience); and women who had gone through two or more deliveries. A large representative sample of 469 women was examined, leading to almost 4000 observations. The preference patterns of these sub-samples were estimated and compared.

As the DCE health-care literature is dominated by case studies that analyze UK and US data,[1] the present study, using Israeli data, extends the experimentation scope, thereby enriching the DCE literature in general, and the literature on the effect of experience on preferences in particular.

Our results indicate that (i) experience matters: the experience of a delivery leads to a significant updating of the preference pattern for attributes of a birth-giving health-care service; (ii) the effect of experience is attribute-specific: some attributes are further affected than others; (iii) it is the initial experience that matters, while additional experiences do not lead to further changes in preferences; and (iv) experience has different effects within various socio-economic sub-groups: the observed outcome of experience is a product of the interaction between experience and other intermediating factors, such as education and income.

The rest of the paper is structured as follows: The next section presents a background literature overview of the effect of experience on preferences; the Discrete Choice Experiment and the research sample are then described in Section 3; Section 4 presents the econometric model; Section 5 presents the findings; and Section 6 offers conclusions and a discussion.

2. Background – literature overview

The literature on the effect of experience on preferences (utilities) for attributes of a health-care service is relatively small.

2.1. Economic modeling

The economist's conventional view of individual choice and decision making is that individuals act in their best interest as they perceive it. This is the utility-maximization version of rationality (for an extensive review of rationality, including its variants and origins, see Blume and Easley, 2007). Under uncertainty, the individual is assumed to maximize his expected utility (EU) from the commodity/service/event subject to a stable, well-defined utility function.

The first characterization of EU preferences was provided by von Neumann and Morgenstern (1944). The von Neumann–Morgenstern expected utility theorem is one of the most fundamental results of the theory of individual decision making. It shows that a preference relation defined on a lottery space has an expected utility representation, provided that it is a complete and transitive binary relation that satisfies the standard independence and continuity axioms.

However, observations of choice behavior under controlled laboratory conditions provided mounting empirical evidence that agents do not have preferences consistent with completeness, transitivity and independence (e.g. Bradbury and Ross, 1990; Korhonen et al., 1990; Loomes et al., 1991). Despite the experimental evidence that denies the realism of the assumptions about preferences, economic theorists retained their use because of their normative value, claiming that those axioms are 'canons of rationality' (Anand, 1987; McClennen, 1989; Machina, 1991).

Two lines of research were used as a response.[2] (i) The first set out to demonstrate that intransitivity, incompleteness and absence of independence do not imply irrationality. For instance: Aumann (1962), Kim and Richter (1986), Anand (1987), Shiell et al. (2000a, 2000b), Ok (2002), and Dubra et al. (2004) address completeness and conclude "there is no reason why theories of positive or rational choice should insist on completeness" (Anand, 1987, p. 199). Mas-Collel (1974), Hughs (1980), Sugden (1985), Kim and Richter (1986), Anand (1987, 1993), and Fuchs-Seliger and Mayer (2003) attend to transitivity. Independence is addressed in Machina (1982) and Anand (1987). (ii) At the same time the normative value of these assumptions has also been disputed (e.g. Anand, 1987, 1993).

Within DCE, the conventional approach to investigate rationality is to include tests of the axiom of non-satiation (dominance), i.e. more is preferred to less. Within DCEs satisfaction of this axiom has been explored by including a choice where one of the options has no worse levels for any of the attributes and better levels for at least one (a dominant option). Respondents who did not choose the superior (dominant) option were claimed to be irrational and were dropped from the sample (e.g. Johnson and Mathews, 2001; Ryan et al., 2001; San Miguel-Inza et al., 2008).[3] Other properties of DCE estimated preferences have also been explored, such as: complete-

[1] In a recent paper Ryan and Gerard (2003) identified 34 applications of DCE in health economics that have been published during 1990–2000. The main focus of those papers was the valuation of utilities of health-care programs. Other applied areas included health insurance planning, labor supply characteristics, time preference values, and valuation of generic health status domains. It appears that the UK was the predominant producer of DCEs (20 studies). Seven papers examined US data, followed by six with Australian data and a single paper that used Canadian figures. More recently a Spanish data set has been used to assess preferences for attributes of an innovative program for cervical cancer screening (Arana et al., 2006).

[2] Many of these articles were already published before Experimental Economics challenged the axioms of completeness, transitivity and independence.

[3] It was assumed that respondents who answered this choice 'irrationally' either misunderstood the questionnaire, or did not take it seriously (Ryan and Bate, 2001).

ness (e.g. San Miguel, 2000; Ryan and San Miguel, 2003); transitivity (e.g. San Miguel, 2000); continuity and symmetry (Ryan and Bate, 2001); and Sen's choice consistency properties (Sen, 1993) that were tested in San Miguel-Inza et al. (2008).

Several studies have challenged the stability assumption. Two main approaches have been used to empirically test its validity: parametric tests of structural stability of demand functions; and non-parametric tests of the axiom of stability (see San Miguel et al., 2002, for a literature survey of these two approaches).

In particular, accumulated experience with the commodity/service/event under discussion has *not* been considered a factor responsible for a change in preferences, which may lead, in turn, to a change in decision making and demand. A potential effect of past experience on consumption has been mentioned by von Weizsacker (1971) and Day (1986). They claimed that human behavior is governed by adaptive procedures and therefore, depends on past experience. However, they did not offer any systematic theory or empirical tests of this hypothesis.

Neo-classical economists have been reluctant to accept the idea that preferences are not stable and instead, they offer various explanations for the observation that preferences tend to change with experience or due to changes in conditions. For instance, Cox and Oaxaca (1982) claim that *conditional* preferences are stable (e.g. preferences for minimum wages *conditional* on the extent of unionization and on the importance of property income). Therefore, a change in conditions will result in a change in preferences, and this, without violating the assumption of stable *conditional* preferences.

2.2. Behavioral perspective: constructed preferences

In contrast to the classical economic theory of choice that assumes preferences (along with endowments and technologies) to be exogenous to the system and stable, there is a growing body of evidence supporting an alternative conception, that preferences are often *constructed* (Slovic, 1991; Payne et al., 1993). Experience might be an important factor in the process of the construction and shaping of preferences.[4] Rabin (1998) provides an extensive review of many of these articles.

Another line of research on the formation of preferences emphasized the role of interplay between the individual and the group. One popular approach has been to model the evolution and workings of pro-social norms of cooperation and trust. Bowles (1998) is a survey of this work. Others have turned to biological metaphors, claiming that population dynamics of rules and preferences (in games or markets) determine outcomes, and consequently the composition of the next round of the population's decision rules and preference orders (e.g. Guth and Kliemt, 1998; Bergstrom, 2002; Blume and Easley, 1992, 2006).

2.3. Effect of the respondent's experience with illness on the valuation of health states[5]

Studies addressing the question of stability of the patients' valuation of health, i.e., *whether experience with illness influences the valuation of health*, were conducted along two lines: (i) by comparing health valuations of different groups of respondents: patients currently experiencing a certain health state, people with past experience of that health state, close relatives of patients, health-care professionals, and samples of the general public; and (ii) by observing the same patients during different stages of their illness.

The definition of the state of health was one-dimensional. Values of health states have been estimated on the basis of stated-preferences survey data, using different techniques and instruments. They include: Time-Trade-Off (TTO, e.g. Buxton and Ashby, 1988; Tsevat et al., 1993)[6]; Willingness to Pay methodologies (WTP, e.g. Ryan et al., 1997; Donaldson et al., 1998); Standard Gamble (SG, e.g. Base et al., 1994); The EuroCol rating instrument (e.g. EuroCol, 1990; Brooks, 1996); Magnitude estimation (e.g. Rosser and Kind, 1978); Quality Adjusted Life Years (QALY, e.g. Nord, 1992); and Paired Comparisons (e.g. Kind, 2005).

It is beyond the scope of this paper to review the extensive existing literature.[7] A few examples will be mentioned for each line of research: (i) de-Wit et al. (2000) reviewed 35 different publications that reported 38 studies, which used nine different research designs and compared various rater groups, in an attempt to answer the question of whether experience with illness influences the valuation of health. The results were inconclusive: 27 of the 38 studies concluded that patients' values are different from other groups' values. Eleven studies found no differences in values between rater groups. The studies reporting differences in valuation found that in general, patients gave higher values than other groups. Past experience of illness, on the other hand, appears to have a negligible effect on valuations (Dolan, 1996); (ii) many of the studies which used longitudinal patient data, aiming to detect changes in valuations in response to changes in health conditions, used time-trade-off instruments. The results were indecisive in this set of papers as well. It seems that more studies concluded that utilities from different health conditions did not change when there was a change in the patient's actual status of health. For example, Llewellyn-Thomas et al. (1984, 1993) examined patients undergoing radiation therapy for laryngeal cancer. In one study they found that patients assigned similar time-trade-off values to voice quality over the course of treatment, despite deterioration in their actual voice quality. In another study of 66 patients, it was found that evaluations of future short-term health states did not change when they actually entered these stages. O'Connor et al. (1987) found that utility patterns of cancer patients undergoing chemotherapy remained stable, despite significant side effects of treatment. Similarly, a study of dialysis patients receiving erythropoietin found no change in time-trade-off scores, despite improvements in measures of fatigue, depression and physical functional status (Canadian Erythropoietin Study Group, 1990). Consistent with the results of the above reported studies are also the results of a longitudinal study by Tsevat et al. (1993), which examined time-trade-off values in a cohort of survivors of myocardial infraction. Over a time interval of 8.4 months utilities remained stable despite changes in cardiac functional status and symptoms.

2.4. Effect of experience on preferences for various attributes of a health-care service

All the studies reported above referred to a change in the valuation of a one-dimensional clinical health state, and examined potential changes in valuation that resulted from experience with illness. More recently it has been acknowledged that patients have defined preferences, not only for the health outcome but also for

[4] Economists might refer to it as habit formation (e.g. Pollak, 1976; Constantinides, 1990). However this 'habit formation' is essentially equivalent to convergent stable long run demands.

[5] Giving birth is not considered as an illness. However it involves medical procedures and health-care services that are similar to those provided during an illness.

[6] The TTO instrument is intensively used in health evaluation studies. It estimates the trade-off between years of survival (quantity) and quality of life, asking sick patients questions such as: "Which would you prefer: living 10 years in your current state of health or 1 year in excellent health?" If the patient preferred 10 years of current health, the period of excellent health was progressively lengthened until an indifference point was found.

[7] Many of the studies were conducted by medical doctors.

the *attributes of the process of a health-care service*. Accordingly, the statistical technique of DCE was employed for the estimation of the relative importance attached to different characteristics of the *process* of health-care (for the theoretical foundations and statistical techniques of designing DCEs and analyzing DCE data, see for instance: Ben-Akiva and Lerman, 1985; Louviere et al., 2000; Ryan and Amaya-Amaya, 2005). Two recent studies used DCEs to examine the effect of experience on preferences for attributes of health-care events. The first study, by San Miguel et al. (2002), examined preferences for out-of-hours care by general practitioners; and the second study, by Ryan and Ubach (2003), studied preferences for a new service of repeat prescription. In the two studies, the preferences of in-experienced versus experienced patients were compared.[8] The results, however, were not conclusive.

In the first study (San Miguel et al., 2002) two identical questionnaires were given, 2 months apart, to parents who took their sick children to a health-care facility. In order to test the effect of experience on preferences, the sample was split into two sub-samples: parents who experienced a visit to a facility between the two experiments and parents who had not had this additional experience. Two preference patterns were estimated for each sub-sample, based on each of the two experiments. The results were mixed (depending on the type of test, whether it was a non-parametric or parametric test) and contrary to what had been expected. The unexpected results may have stemmed from the problematic definition of the 'experience' core variable. Most importantly, experience before the first experiment was totally ignored, and only experience between the two experiments was recorded. A better identification of the experience variable and a finer definition may have lead to different results.

In the second study by Ryan and Ubach (2003), a DCE was used to test the effect of previous experience on preferences for a new system of issuing repeat prescriptions. Preferences for the new system had been estimated separately for two groups of patients: 33 patients who had no previous experience with the new system and 33 individuals with prior experience. It was found that the preference patterns of the two groups were significantly different, indicating that experience affects preferences.

The study presented in this paper aims at contributing to this line of research and unpacking, with greater detail, the impact of experience on preferences for attributes of a health-care event. Preferences for attributes of medical care at maternity-wards (where women stay during labor, intra-partum care and post-natal care) are compared across three groups of respondents: women in pre-natal classes (shortly before their first delivery), women after the first delivery, and those after more than one delivery.

3. Methods

The statistical tool used to elicit preferences and detect the effect experience had on them, was a Discrete Choice Experiment,[9] which was conducted in maternity-wards in three large public hospitals[10] located in the Greater Tel-Aviv area, in Israel. Women who had given birth[11] were approached by interviewers and requested to fill out a questionnaire.[12] In the questionnaire, a DCE was used to present individuals with a series of hypothetical scenario pairs of maternity-ward care. Each of the pair's scenarios depicted different levels for a number of maternity-ward care attributes (for example, 3 beds in a room as opposed to 2 beds in a room). One scenario (A) was kept constant while the other (B) was changed in each pair. For each pair, the subjects were asked to choose which they preferred. It was assumed that subjects would choose the alternative that provides the higher level of utility.

The attributes, their levels and the wording of the questionnaire, were determined during three preliminary stages: (i) an in-depth face-to-face interviews with 10 women who had recently given birth; (ii) a pilot study involving 48 women; and (iii) an extensive literature survey, which examined the topics of hospital choice for delivery and maternity care, and preferences for attributes of maternity care and natal care. The various studies referred to different attributes of medical care. Some of them are: Christensen-Szalanski (1984), McGuirk and Porell (1984), Rahtz and Moore (1988), Bronstein and Morrisey (1991), Phibbs et al. (1993), Brown and Lumley (1994), Wilcock et al. (1997), Janssen et al. (2000), and Sadler et al. (2001). Since the late 1990s, DCEs have been used to elicit preferences for maternity care, e.g. Ryan and Hughes (1997), Hundley et al. (2001), and Hundley and Ryan (2004). Three recent studies (that also used DCEs) compared preference patterns of different groups: Longworth et al. (2001) contrasted the relative values attached to characteristics, associated with the process of maternity care during the intra-partum stage, for women who had chosen to give birth at home, as compared to women who gave birth at the hospital. The five characteristics that were considered are: continuity of contact with the same medical staff; location of delivery; availability of pain relievers; who is the decision maker; and probability of transfer during labor if a problem develops. Arana et al. (2006) examined preferences for an innovative program for cervical cancer screening among respondents of two groups: one was composed of expert medical practitioners, and the second included young undergraduate students of social science. The following attributes were considered: time interval between tests; probability of a false-positive result; probability of dying from cervical cancer; waiting time for test results; and cost of the test. The preference patterns of the two groups were

[8] It should be noted that the health economics literature includes several more papers that seem to refer to the effect of experience on preferences. However, they relate to different definitions of experience. In Porter and Macintyre (1984), Salkeld et al. (2000), and Hundley and Ryan (2004) 'experience' is defined as the 'status-quo' – 'what patients already know' – and refers to the *level* of attribute/s that they are familiar with. It is claimed that they prefer what they know best. For instance, Hundley and Ryan (2004) who compared preferences of women for intra-partum care at different areas in the UK, found that women in areas where continuity of care was a realistic option appeared to value this aspect of care more highly. This issue is also related to the broader topic of 'reference-dependent preferences': preferences are dependent of a reference point that could be the 'status-quo' or the 'endowment' of the good/service/attribute. See Rabin (1998) for a review of the literature on the 'endowment effect' and 'status-quo bias'. See also Neuman and Neuman (2008) and Neuman (2009) for 'reference-dependent preferences'. Arana et al. (2006) compared valuations of medical (professionally experienced) doctors with valuations of patients, regarding attributes of an innovative program for cervical cancer screening. They refer to 'experience' as the medical professional training and experience of the evaluator.

[9] DCEs were first introduced in Mathematical Psychology (Luce and Tukey, 1964; Green et al., 1972) and then adopted by economists for use in the fields of transportation (e.g., Wardman, 1988), environment (e.g. Swallow et al., 1992; Opaluch et al., 1993), marketing (e.g. Cattin and Wittink, 1982 who survey the marketing literature), and recently in health (e.g. Bryan et al., 1998; Ryan et al., 1998a, 1998b; Vick and Scott, 1998; Salkeld et al., 2000; San Miguel et al., 2002; Scott, 2002). The term Conjoint analysis (CA) is sometimes used for the DCE statistical tool.

[10] Israel has a public health-care system. A negligible number of women give birth in private hospitals or at home.

[11] The advantage of a stated-preference technique, such as a DCE, is that the experiment can legitimately elicit the preferences of any group of individuals, not only patients, provided that the experiment is well designed and gives the respondent sufficient information about the commodity being valued and all the relevant information necessary for making well-informed rational choices. However, in our case that examines the effect of experience with the health event, it is more natural to include women who are either close to the event or shortly after. This also guarantees that the interviewed women have all the relevant information.

[12] It is recognized in the literature that interviews are the most effective and appropriate means for conducting DCEs, even though they are rarely used, due to their high costs. Postal questionnaires are regularly used instead (Ryan and Gerard, 2003).

Table 1
Attributes, levels and coding.

Ward attributes (independent variables)	Ward A (constant)	Coding	Ward B (all alternatives)	Coding	Difference (B – A) (value of independent variable)
Number of beds in room	3 beds	3	3 beds	3	0
			2 beds	2	−1
			Private room	1	−2
Attitude of staff towards patients	Reasonable	0	Reasonable	0	0
			Very good	1	+1
Professionalism of staff	Very good	1	Good	0	−1
			Very good	1	0
Information transferred from staff to patients	Extensive	1	Basic	0	−1
			Extensive	1	0
Travel time to hospital	45 min	2	45 min	2	0
			30 min	1	−1
			15 min	0	−2

Note: For regression analysis, each of the independent variables that relate to the attributes of 'attitude', 'professionalism' and 'information' has been defined by one dummy variable that takes the value of 1 for the better level of the difference, and 0 for the lower one. The 'number of beds' was defined by two dummy variables: '2 beds versus 3 beds' and 'private room versus 3 beds'. 'Travel time to hospital' included the two dummy variables of': '30 min versus 45 min' and '15 min versus 45 min'.

not significantly different. Neuman and Neuman (2009) compared preferences for maternity-ward care between a group of women who gave birth, and a group of medical care-givers who treated them. The same attributes used in the present study were also used there. Significant differences between the two preference patterns were found, leading to the conclusion that care-givers are not perfect agents of the patients.

We also followed the suggestions mentioned in the DCE literature, that attributes and levels should be realistic, sensible to respondents, and capable of being traded off.

The following attributes (and levels) were identified: (a) number of beds in hospital room (three beds; two beds; or a private room), (b) attitude of staff toward the patient (reasonable; very good), (c) medical staff's professionalism (good; very good), (d) information transfer from staff to patient (basic; extensive), and (e) travel time from residence to hospital (45, 30, or 15 min).

Table 1 presents the attributes, their levels and coding, the attributes of the constant hospital A, the attributes of the various alternatives of hospital B, and the levels of the difference (B – A) for each of the alternatives.

The levels of the first attribute – number of beds in hospital room – relate to the current facilities in most Israeli maternity-wards, where a standard room has two or three hospitalization beds. There are only a few private rooms, and some hospitals have also rooms with more than three beds.

The three qualitative attributes – attitude of staff, professionalism of staff, and transfer of information – have two similar levels each. The levels are similar but not identical – the gap between 'reasonable' and 'very good' is larger than between 'good' and 'very good'. This is because hospitals are believed to be more diverse in terms of attitude of staff, than in terms of professionalism. Hospitals are also believed to be diverse in terms of information transfer, and therefore, the two assigned levels are 'basic' and 'extensive'. The pilot survey and interviews indicated that uniformity simplifies the task of choosing between scenarios, and that respondents are fully aware of the gap between the two levels assigned to each of the attributes.

Travel time received the levels of 15, 30 and 45 min to reflect the fact that the actual travel time is relatively short, due to the central location of a number of hospitals (the average *actual* travel time of the respondents from their residence to the maternity-ward was 19 min, with minor differences between the three hospitals: 23, 20 and 16 min to each of the hospitals, respectively). A gap of 15 min between two successive levels seems, therefore, reasonable.

A full factorial design, using all of the possible attribute combinations, gives rise to 72 scenarios ($2^3 \times 3^2 = 72$; 2 attributes have 3 possible levels each, and each of the other 3 attributes has 2 alternative levels). In order to reduce the number of scenarios to a manageable size, the SPSS Orthoplan procedure was used to provide a fractional factorial orthogonal design.[13] The procedure's application gave rise to 16 different scenarios, each representing a hypothetical maternity-ward. If all 16 options were to be compared to each-other, a large number of possible discrete choices would have emerged. To overcome this difficulty, one scenario was randomly chosen to be constant throughout the questionnaire (scenario A), and each of the remaining 15 scenarios was compared to it – resulting in 15 pair-wise combinations. Four 'dominant options' (one alternative had superior or identical levels for all attributes) were detected among the 15 paired combinations. Three were excluded and one pair was used to test for 'internal consistency'.[14] Realizing that it is difficult for women who had recently undergone a delivery to cope with 12 complex pair-wise choices, the 12 paired combinations were further split into two subsets, each with six or seven choices (the 'dominant option' was included in each subset). The resulting questionnaire was distributed randomly among the women interviewed in maternity-wards. The group of pre-natal class respondents filled out the full-size questionnaire, with 12 paired scenarios.

Exhibit 1 presents two examples of the pair-wise combinations presented to the respondents. Some of the attributes of maternity-ward A have higher levels, while the others are inferior (or equal) to those in maternity-ward B. The respondent, therefore, has to consider 'gains' versus 'losses' and estimate trade-offs between the attributes when making her complex 'multi-dimensional' choices. The respondent is also requested to assume that all other, not mentioned, attributes are identical in both of the paired scenarios; in particular, that the clinical conditions of the mother and the baby and the availability of pain-relief means are the same.[15] This type of choice simulates the real-life choice of a hospital.

Information was also collected regarding the socio-economic background characteristics of the respondents: age, education, per-

[13] There are two other alternative designs: the cyclical and the D-optimal designs. For a review see Carlsson and Martinsson (2003). They also show that the three designs produce unbiased estimations.

[14] A few women, who failed the test by preferring the inferior alternative, were excluded from the sample.

[15] This is a realistic assumption – all maternity wards in Israel have excellent clinical standards and all methods of pain relief, including epidural anesthesia, are available. It follows that the two important attributes of health outcome of the mother and baby, and availability of methods of pain relief have not been included in the questionnaire attributes.

Attributes of service (during labor, intra-partum care and natal care) of two maternity-wards, A and B, are described below. The two wards differ with respect to a number of attributes.

- Assume that all other attributes (on top of the 5 listed ones) are identical in the two wards.
- In each question, maternity-ward A is the same and ward B is different.
- Which maternity-ward would you prefer? (Please tick box below).
- Please answer all questions.

Question 1

Attributes	**Maternity-ward A (constant)**	**Maternity-ward B**
Number of beds in room	3 beds	private room (1 bed)
Attitude of staff towards patients	reasonable	reasonable
Professionalism of staff	very good	good
Information transfer	extensive	extensive
Travel time to hospital	45 minutes	30 minutes

Prefer Ward A ☐ Prefer Ward B ☐

Question 2

Attributes	**Maternity-ward A (constant)**	**Maternity-ward B**
Number of beds in room	3 beds	2 beds
Attitude of staff towards patients	reasonable	reasonable
Professionalism of staff	very good	very good
Information transfer	extensive	basic
Travel time to hospital	45 minutes	15 minutes

Prefer Ward A ☐ Prefer Ward B ☐

Exhibit 1. Discrete choice questions.

Table 2
Sample characteristics – means (SDs in parentheses) Israel, 2003.

Characteristics	(1) Pre-natal classes	(2) First birth	(3) Second birth or over
Age (years)	28.79 (3.24)	28.17 (3.84)	31.99 (4.66)
Younger than 25 (%)	8.90	12.37	7.52
Older than 40 (%)	6.85	2.06	7.08
Academic education: 13+ years of schooling (%)	76.03	60.82	53.54
Ethnicity: westerner (%)	32.88	30.93	34.51
Ethnicity: easterner (%)	26.71	28.86	35.84
Ethnicity: second generation Israeli	40.41	40.21	29.65
Religiosity: Jewish-secular (%)	71.92	52.58	48.23
Religiosity: Jewish-traditional (%)	13.70	27.83	19.47
Religiosity: Jewish-religious (%)	10.96	15.46	25.66
Non-Jewish	3.42	4.13	6.64
New immigrant (%)	2.05	4.12	0.88
Personal income: above average (%)	26.03	19.59	15.04
Household income: above average (%)	39.73	37.11	34.51
Number of women	146	97	226

Notes: The ethnic origin was defined by using country of birth and father's country of birth. 'westerner': born in Europe/America, or born in Israel and father was born in Europe/America; 'easterner': born in Asia/Africa (excluding Israel and South Africa), or born in Israel and father was born in Asia/Africa; 'second generation Israeli': born in Israel and father was born in Israel.
'New immigrant': less than 5 years in Israel.
Religiosity: self-definition.

sonal income, household income, ethnic origin, religious affiliation and duration of residence in Israel.[16]

4. The econometric model

Assuming a linear utility function, the marginal change in utility when moving from A to B is given by:

$$\Delta U_{A\to B} = \sum_{i=1}^{n} \beta_i X_i + u + \varepsilon; \quad (1)$$

The observed value of the dependent variable of the estimated preference equation (ΔU) is dichotomous and takes the value of 1, if maternity-ward B is chosen (i.e. the characteristics of maternity-ward B correspond to a higher level of utility compared to maternity-ward A); and the value of 0, if maternity-ward A is preferred.

The independent variables are the X_is, where X_i is the *difference* in the level of attribute i between B and A. They express changes from the reference level of the constant scenario and are outlined in Table 1. Each of the two three-level quantitative attributes was defined using two dummy variables (see note to Table 1). To account for the fact that each respondent makes several choices, a Random-Effects Probit was used for estimation.

β_i are the parameters of the model. In a Probit model the estimates of β_i (the regressions coefficients) are meaningless. However, the ratio of any two coefficients is an estimate of the marginal rate of substitution (MRS) between the respective attributes; Moreover, the DCE literature relates to the coefficients as *utility scores* (relative importance) of the attributes. The coefficients (estimates of β_i) will be used to calculate predicted probabilities of choosing maternity-ward B when attribute i changes from its lower level to the higher one. u is the error term that represents differences between the various choices of the same respondent (each respondent provides 6–8 discrete choice observations); and ε is the error term representing differences between respondents.

The data, compiled from the completed questionnaires of the three groups of women, were used to estimate three sets of regressions for the three groups of respondents. Two regression models were estimated for each group: main-effects regressions that include only the five main-effects (attributes)[17]; and interactive regressions, which also include interactions of main-effects with socio-economic background variables (education, age and household income). The latter were added, to test for differences in preferences that stem from the different backgrounds of the respondents, and to arrive at net valuations of the examined attributes. Moreover, the socio-economic variables also represent alternative costs (e.g. education and age are proxies of human capital, and hence of the cost of time) and incomes. Their inclusion controls for cost and income differences, which could have biased the estimates of main-effects.

5. Results

5.1. The sample

146 women, who were expecting their first child, were interviewed during pre-natal classes conducted in the three public hospitals included in the experiment: Sheba (in Ramat-Gan – 90 women), Rabin (in Petach-Tikva – 21 women) and Meir (in Kfar-Saba – 44 women). 323 women who recently gave birth were interviewed in maternity-wards in the same three hospitals: 97, 90 and 136 women in each of the hospitals, respectively. The sample of 323 women has been split into two sub-samples: 97 women after their first delivery and 226 women after at least two deliveries. The overall response rate was around 80% in pre-natal classes and 50% in maternity-wards. Respondents in pre-natal classes, who filled out the full-size questionnaire with 12 comparisons, provided a total of 1743 observations. Women after delivery, who filled out the half-size questionnaires, provided 633 observations of women who had their first child and 1466 observations of women who experienced more than one delivery.

Table 2 presents socio-economic characteristics of women in the three groups. As is evident from Table 2, women in the three

[16] The questionnaire also included questions on the actual levels of the quantitative variables: actual 'travel time' to the hospital, and the 'number of beds' in the room in which the respondent was currently hospitalized.

[17] Interaction effects between any two main-effects are assumed to be zero, due the orthogonality of the design.

sub-groups have quite similar socio-economic characteristics. The average age is around 30; more than a half have an academic (at least partial) education; the ethnic stratification is the following: about one-third are westerners (born in Europe/America or born in Israel and the father was born in Europe/America), about one-third are easterners (born in Asia/Africa or born in Israel and the father was born in Asia/Africa), and the rest are second generation Israeli born; more than half define themselves as secular Jews; about one-third say that their household income is above average ('above average', or 'way above average', where the monthly average gross income in Israel 2003 was 7000 shekel per household member); the share of individual earners of above average personal income is significantly lower, reflecting the lower wages of women; very few are new immigrants (1–4% are less than 5 years in Israel).

A comparison of women in pre-natal classes expecting their first baby, with women who just gave birth to their first child (columns 1 and 2), shows that the former tend to be more educated (76% versus 61%, with an academic education), secular (72% versus 53%), and have a higher personal income (26% in the first group have income above average, compared to 20% in the second group). The higher income stems most probably from higher education.

A comparison of women after their first delivery with those who had at least two deliveries (columns 2 and 3) reveals that the former are (naturally) somewhat younger (average ages of 28 and 32; 12% and 7%, respectively, are under the age of 25; and 2% versus 7% are above the age of 40).[18] The latter have a higher percentage of an eastern ethnic origin, and a larger representation of religious women. This reflects ethnic/religious differences in the 'taste for children'.

Socio-economic backgrounds might affect preferences. It follows that, in order to get the net effects of experience on preferences, differences in characteristics need to be controlled for. This was done by adding interactions of main-effects with socio-economic characteristics (Table 4).

5.2. Main-effects preference structures

Main-effects preference structures for the three groups are presented in Table 3 (columns (1), (2) and (3), respectively). All five attributes (main-effects) are defined as dummy variables: Each of the two-level attributes – 'attitude of staff towards patients', 'professionalism of staff' and 'information transferred from staff to patients' – is represented by one dummy variable that equals one, for the higher level of the attribute. Each of the three-level attributes – 'number of beds' and 'travel time' – is represented by two dummy variables. Dummy variables are used also for these quantitative variables to allow non-monotonic impacts as we move from one level to the next. Table 3 presents two sets of figures: (i) the Probit coefficients, that are referred in the DCE literature as 'utility scores', and are used to denote relative valuations; and (ii) the marginal predicted probabilities to choose the maternity-ward with the 'higher' level of the attribute (main-effect) under consideration (in bold). While the latter have a simpler interpretation, it is common in the DCE studies to present the former. We therefore present both. The numbers in parentheses are the Z-scores that are identical or very similar for the two sets of figures.[19] The rankings of the main-effects are also similar for the two sets. It follows that conclusions on preference patterns can be based on either the coefficients or the probabilities.

To test for the significance of the differences between coefficients (probabilities) of patients with different levels of experience, a joint regression of the two groups under consideration was employed, with interaction terms of each of the main-effects with a dummy variable that equals 1 if the respondent belongs to one group and 0 if she belongs to the other. The coefficient of the interaction term relates to the difference between respective coefficients, and the Z-statistics of the interaction term was used to test the difference's significance. They are presented in the fourth and fifth columns of Table 2. The differences in the marginal probabilities and their Z-statistics are in bold.

An examination of preference patterns of women with no experience (regression 1); women with the experience of one delivery (regression 2); and women with accumulated experience of more than one delivery (regression 3); shows that women with no experience have different preferences compared to women who experienced at least one delivery. However, the *number* of deliveries (intensity of experience) does not have a significant effect on preferences.

A comparison of regressions (2) and (3) indicates that women with more than one delivery are not significantly different from women who experienced only one delivery, in the valuation of all attributes. This is evident from the last column in Table 3, which looks at differences between the respective coefficients and the marginal probabilities of the various attributes, and they are all insignificant (at the 0.05 significance level).

Within each of the two groups, 'professionalism of staff' ranks first, followed by 'attitude of staff', 'information transferred from staff to patients', 'travel time' and 'number of beds'. The last ranking attribute is not a significant one – two beds in a room and even a private room are not significantly preferred over a three-bed room. As well, one may notice that the women in each of the two sub-samples are indifferent when choosing between travel time of 30 and 15 min (i.e., 15 or 30 min less than the reference group, of 45 min, are equally valued).

It is not surprising that 'professionalism of staff' is the most important trait of a surgical procedure, which affects both the mother and the baby. The most unexpected finding is that the physical facilities of hospitalization, such as 'number of beds in hospital room', do not matter at all – a private room is not more valued than sharing a room with two other women. It is also somewhat surprising to find that the relative importance of 'attitude of staff' is not very different from that of 'professionalism'. Within the sample of women after their first delivery, the valuations of these two attributes (coefficients of 1.5659 and 1.7276; marginal probabilities of 47.07% and 57.18%, to choose the ward with the preferred level of the attribute) are not significantly different. Moreover, 'attitude of staff' is valued much more than 'information transferred from staff to patients', which includes all possible types of information: about the delivery, the baby, breastfeeding, etc. Another somewhat unexpected finding is the one that women are indifferent between travel times reduced by 30 or 15 min.[20]

While women with any level of experience have similar preference patterns, they differ significantly from women with no experience at all – those expecting their first child. A comparison of regressions (1) and (2) shows that the ranking of the

[18] While women in pre-natal classes and women after their first delivery are on average at the same age of 28, the group of the former includes less very young women (under the age of 25) and more older women (above the age of 40).

[19] The differences in the Z-scores stem, most probably, from the iterated methods of estimation.

[20] A possible explanation for this finding could be that time might be perceived as a crucial factor for women who are in an advanced stage of labor. A 45 min travel time (the reference group) could endanger her if she will not arrive to the hospital on time. A decrease in travel time to 15 min and even to 30 min is, therefore, significantly valued. However, the 15 min difference between 30 min and 15 min was not considered, by women in our samples, to be significantly important.

two most important attributes is similar: 'professionalism of staff' ranks highest (coefficients of 1.8357 and 1.7276, in regressions 1 and 2, respectively; respective marginal probabilities of 72.89% and 57.18% to prefer a maternity-ward with the 'better' levels of the attribute) and second comes 'attitude of staff' (coefficients of 1.2975 and 1.5659, respectively; respective marginal probabilities of 47.37% and 47.07%). The relative importance of 'professionalism' is similar for women with no experience and for those who recently gave birth (a *Z*-score of 0.57 for the difference, which relates to a *p*-score of 56.8%). However 'attitude' is less valued by the former (the difference is significant at 9%). 'Information' is significantly less important for in-experienced women (a coefficients' difference of 0.2852 and probabilities' difference of 11.04%; a *Z*-statistics of 1.91 that relates to significance of 5.6%). 'Travel time' has similar valuations in the two groups, with the similar indifference between 30 and 15 min. Travel time from residence to hospital is significantly valued, but less than all of the other attributes (in the sample of pre-natal women) and less than most attributes (except 'number of beds in room of hospital', in the sample of women who gave birth). As well, indifference is evidenced in the valuation of travel times shorter by 30 or 15 min (compared to the 45 min reference group). While time is an important factor in decision making, it is not surprising that in the present health-care event it plays quite a minor role – there is only one round-trip drive between residence and hospital. Women would not want to travel 45 min (that might also be dangerous if they are in advanced stages of labor), but are indifferent as to traveling 30 or 15 min. The most outstanding result relates to the importance of a private room: while women who have recently experienced a delivery do not value it at all, it is highly and significantly valued by women in pre-natal classes (a coefficient of 0.8140; marginal probability of 31.59% to prefer a private room over a 3-bed room; $Z > 9$). The difference between the valuations of women from the two sub-populations is highly significant (a *Z*-statistics above 4, $p = 0.000$).

To conclude: women who are expecting their first delivery have preference patterns that are significantly different from preferences of women who have already experienced a delivery: only 'professionalism of staff' and 'travel time' are similarly valued by the two groups. A private room is more highly valued by in-experienced women, while 'attitude' and 'information' have lower utilities for

Table 3
Main-effects regressions – Random-Effects Probit by different levels of experience: pre-natal women, women who gave birth for the first time, and women who gave birth for the second time and over, Israel, 2003.

Independent variables	(1) Pre-natal classes	(2) First birth	(3) Second birth or over	Differences between	
				Pre-natal classes and first birth	First- and second-birth or over
Number of beds (reference: 3 beds)					
Two beds	0.0865 (1.03)	−0.1102 (0.76)	0.1200 (1.28)	0.1988 (1.18)	−0.2351 (1.34)
	0.0343 (1.03)	**−0.0360 (0.78)**	**0.0426 (1.25)**	**0.0777 (1.17)**	**−0.0766 (1.43)**
Private room	0.8140 (9.34)	0.0419 (0.30)	0.1346 (1.40)	0.7724 (4.62)	−0.0958 (0.55)
	0.3159 (9.98)	**0.0139 (0.29)**	**0.0478 (1.36)**	**0.3003 (4.81)**	**−0.0323 (0.57)**
Attitude	1.2975 (15.48)	1.5659 (9.94)	1.4156 (13.91)	−0.2799 (1.69)	0.2000 (1.15)
	0.4737 (17.03)	**0.4707 (10.38)**	**0.4565 (14.52)**	**−0.1075 (1.71)**	**0.0713 (1.12)**
Professionalism of staff	1.8357 (19.55)	1.7276 (10.97)	1.8595 (17.07)	0.0926 (0.57)	−0.0688 (0.41)
	0.7289 (20.50)	**0.5718 (12.60)**	**0.6528 (19.55)**	**0.0358 (0.57)**	**−0.0237 (0.41)**
Information	0.7083 (9.09)	0.9846 (7.25)	0.7801 (9.07)	−0.2852 (1.91)	0.2389 (1.55)
	0.2809 (9.38)	**0.3258 (8.35)**	**0.2738 (10.30)**	**−0.1104 (1.91)**	**0.0824 (1.55)**
Time of travel (reference: 45 min)					
30 min	0.4927 (5.67)	0.3723 (2.42)	0.5256 (5.19)	0.1182 (0.67)	−0.1430 (0.77)
	0.1945 (5.76)	**0.1277 (2.30)**	**0.1915 (4.97)**	**0.0461 (0.67)**	**−0.0477 (0.80)**
15 min	0.6062 (5.64)	0.4666 (2.65)	0.5346 (4.57)	0.1353 (0.66)	−0.0528 (0.25)
	0.2380 (5.86)	**0.1642 (2.51)**	**0.1978 (4.41)**	**0.0529 (0.65)**	**−0.0180 (0.25)**
Number of observations	1743	633	1466	2376	2099
Number of women	146	97	226	243	323
Log likelihood	−781.35	−269.89	−645.78	−1051.25	−915.88
ρ	0.4220	0.4063	0.4639	0.4177	0.4478
χ^2 for likelihood ratio test of $\rho = 0$ (significance level)	195.76 (0.00)	40.14 (0.00)	132.12 (0.00)	235.87 (0.00)	71.83 (0.00)
Notes: The coefficients of the following pairs of main-effects are not significantly different (at a significance level of 0.05)	Private room and information; travel time of 15 and 30 min; information and travel time of 15 min	Attitude and professionalism; travel time of 15 and 30 min	Travel time of 15 and 30 min	–	–

Notes: Stata 10 was used for estimation (Random-Effects Probit, with no constant).
Figures in bold relate to the probability to choose a maternity-ward that has the higher level of the main-effect (levels of other main-effects being equal).
Numbers in parentheses are absolute *Z*-statistics.
The regressions of each of the three groups were estimated separately. The significance of the differences between the main-effects of any two groups, is derived from a pooled regression of the two groups, with interactions to check for differences and their significance. The reported difference is the coefficient of interaction term. It is not identical (but similar) to the difference between the two separate coefficients, due to the non-linearity of Random-Effects Probit regression.
Hospital A (the constant set) has the following attributes: number of beds – 3; attitude – reasonable.
Professionalism of staff – very good; information – extensive; travel time – 45 min.
Women in pre-natal classes filled out a questionnaire with all 12 pair-wise choices. Women in maternity-wards had questionnaires with either 6 or 7 choices (the dominant option pair was included in both types).

Table 4
Interactive regressions – Random-Effects Probit main-effects regressions with socio-economic interactions, women in pre-natal classes and women who gave birth, Israel, 2003.

Independent variables	(1) Pre-natal classes: main-effects	(2) Pre-natal classes: interacted model	(3) Maternity-wards: main-effects	(4) Maternity-wards: interacted model
Number of beds (reference: three beds)				
Two beds	0.0865 (1.03)	0.0876 (1.04)	0.0524 (0.67)	0.0583 (0.73)
	0.0343 (1.03)	**0.0348 (1.03)**	**0.0182 (0.66)**	**0.0200 (0.72)**
Private room	0.8140 (9.34)	0.6883 (4.17)	0.1098 (1.38)	−0.1841 (1.50)
	0.3159 (9.98)	**0.2693 (4.34)**	**0.0384 (1.35)**	**−0.0616 (1.55)**
Attitude of staff	1.2975 (15.48)	1.1698 (11.75)	1.4567 (17.11)	1.4557 (14.86)
	0.4737 (17.03)	**0.4328 (12.87)**	**0.4610 (17.86)**	**0.4559 (15.68)**
Professionalism of staff	1.8357 (19.55)	1.5989 (10.22)	1.8153 (20.35)	1.5736 (13.79)
	0.7280 (20.50)	**0.6339 (10.37)**	**0.6274 (23.35)**	**0.5377 (14.66)**
Information	0.7083 (9.09)	0.5759 (6.04)	0.8402 (11.61)	0.7548 (8.83)
	0.2809 (9.38)	**0.2283 (6.15)**	**0.2904 (13.26)**	**0.2579 (9.64)**
Time of travel (reference: 45 min)				
30 min	0.4927 (5.67)	0.4994 (5.70)	0.4793 (5.69)	0.4700 (5.50)
	0.1954 (5.76)	**0.1971 (5.79)**	**0.1720 (5.43)**	**0.1670 (5.22)**
15 min	0.6062 (5.64)	0.6054 (5.58)	0.5092 (5.25)	0.5082 (5.16)
	0.2380 (5.86)	**0.2377 (5.79)**	**0.1860 (5.03)**	**0.1840 (4.93)**
Interaction terms:				
High income of household × private room	–	0.2518 (1.50)	–	0.4078 (2.58)
		0.1002 (1.51)		**0.1495 (2.46)**
Academic × private room	–	0.0525 (0.28)	–	0.3015 (2.01)
		0.0208 (0.28)		**0.1080 (1.94)**
High income of household × attitude	–	0.3807 (2.55)	–	0.1462 (1.04)
		0.1509 (2.58)		**0.0512 (1.02)**
Academic × professionalism	–	0.2803 (1.68)	–	0.3359 (2.58)
		0.1111 (1.68)		**0.1148 (2.59)**
High age (≥35) × professionalism	–	0.4639 (1.95)	–	0.3860 (2.62)
		0.1839 (1.95)		**0.1319 (2.63)**
High income of household × information	–	0.3785 (2.58)	–	0.3311 (2.37)
		0.1500 (2.58)		**0.1131 (2.37)**
Number of observations	1743	1743	2099	2099
Number of women	146	146	323	323
Log likelihood	−781.35	−772.06	−919.81	−905.06
ρ	0.4220	0.4291	0.4460	0.4592
χ^2 for Likelihood ratio test of $\rho = 0$ (significance level)	195.76 (0.00)	198.68 (0.00)	172.02 (0.00)	175.91 (0.00)

Notes: Stata 10 was used for estimation (Random-Effects Probit, with no constant).
Figures in bold relate to the probability to choose a maternity-ward that has the higher level of the main-effect (levels of other main-effects being equal).
Numbers in parentheses are absolute *Z*-statistics.
Hospital A (the constant set) has the following attributes: number of beds – 3; attitude – reasonable; professionalism of staff – very good; information – extensive; travel time – 45 min.
Women in pre-natal classes filled out a questionnaire with all 12 pair-wise choices. Women in maternity-wards had questionnaires with either 6 or 7 choices (the dominant option pair was included in both types).

this group. On the other hand, women after one and after more than one delivery, were found to exhibit similar preference patterns. It follows that the amount (intensity) of experience does not affect preferences. It is probably only the fresh experience that affects utilities (preferences).

5.3. Interactions with socio-economic background variables

The regressions presented in Table 3 are simple main-effects regressions. The coefficients are weighted averages over all respondents in the respective group, and give an overall picture of preferences. To control for differences in the socio-economic make-up of the various groups[21] and to test for differences between preference patterns of socio-economic sub-groups, a set of interaction variables was added to the list of main-effects independent variables. These interaction variables relate to socio-economic background variables with each of the main-effects. The two sub-samples of women in maternity-wards that have similar preference patterns as well as similar socio-economic characteristics, have been merged into one sample.[22] Table 4 presents results of regressions that include interactions that were significant in at least one group of women. In order to facilitate comparison with the main-effects regressions, they are also presented in Table 4.

The inclusion of the interaction terms also results in a finer analysis and a more sophisticated comparison between preference patterns of in-experienced versus experienced women. It adds to the information about how experience influences main-effects, additional information on the probable differential effects within various socio-economic sub-groups.

It appears that religious affiliation, ethnic origin and immigration status (less than 5 years in the country) do not affect preferences (interaction terms with those variables were therefore omitted from the regressions). The three socio-economic variables

[21] See Table 2 and Section 5.1.

[22] Women after more than one delivery are more religious and have a higher representation of women with an eastern ethnic origin. However these two demographic characteristics are not affecting preferences (insignificant interaction terms with the main-effects). Hospitalization facilities (in labor rooms and in maternity-wards) and duration of hospitalization after a delivery are also identical for all deliveries (first or above first).

that evidenced significant interactions with hospital attributes were: education (defined using a dummy variable: academic = 1 versus non-academic = 0); age (defined by a dummy variable high-age = 1 if age ≥ 35); and household income (a dummy variable high-income = 1 if income is above average).[23]

Regressions (1) and (3) repeat the main-effects preference structures of in-experienced and experienced women, respectively. In regressions (2) and (4) interactive terms between individual socio-economic characteristics and main-effects were added. Interactions that were insignificant in both equations have been omitted.

An examination and comparison of the results indicate the following:

(i) A *private room* is significantly valued by *all* the women in the pre-natal classes. There are no differences between either the academic versus non-academic (interaction term of 'academic × private room' is insignificant within this group: $Z = 0.28$, $p = 78.2\%$) nor between high-income versus low-income groups (Z of interaction term is 1.50, $p = 13\%$). On the other hand, within the sample of women who had recently given birth (regression 4), those who are less-educated and also have a low household income changed their preferences after a delivery: low-educated, low-income women in maternity-wards do not value a private room at all (coefficient is even negative, has the size of −0.1843 that relates to a negative probability of −6.16%. However it is insignificant with $Z = 1.50$, $p = 13\%$). Academic women have a significant coefficient of 0.3015 (indicating the probability of 10.8% to prefer a private room over a 3-bed room; $Z = 1.94$) and women who enjoy a high household income have a significant coefficient of 0.4078 (probability of 14.95%; $Z = 2.46$). It follows that women who are either highly educated or have a high household income are less affected by the experience of a delivery, and academic women who also enjoy a high household income undergo only marginal changes in their preferences for a 'private room' (the sum of the relevant interaction coefficients is 0.4078 + 0.3015 = 0.7093, compared to a coefficient of 0.8140 before experiencing a delivery; the corresponding probabilities are 14.95% + 10.80% = 25.75% versus 31.59%). To conclude: experience with a delivery changes significantly, and quite dramatically, the valuation of a private room among women from a lower socio-economic status.[24] Women who belong to a higher socio-economic strata (are more educated and enjoy a higher income), are less affected by experience. The effect of experience becomes insignificant for academic women with above average household income.

(ii) Regressions (1) and (3) demonstrate that *attitude of staff* is valued less by in-experienced patients. A finer examination, based on regression (2) and (4), reveals that this is true only for low-income women. High-income pre-natal women have an extra valuation by a coefficient of 0.3807 (probability of 15.09%; $Z = 2.58$). It appears that the valuation of the pre-natal women with high-income is similar to that of the experienced women (1.1698 + 0.3807 = 1.5505, and 1.4567, respectively; respective probabilities of 43.28% + 15.09% = 58.37% versus 46.10%). In this case too it was found that it is the 'weaker' women (less educated and with lower income) who are those to exhibit a significant change in preferences due to experience.

(iii) Preferences for *Professionalism of staff* do not change with accumulated experience. The interactive models demonstrate that it is more valued (both before and after giving birth) by more educated women and by older women (age ≥ 35). The much higher and very significant interaction coefficients of 'age ≥ 35' × 'professionalism' are most probably related to the high-risk pregnancies of older women, who therefore value more a highly professional staff.

(iv) Regressions (1) and (3) indicate that women who had recently given birth value the *information transferred from staff to patients* somewhat more than pre-natal women. A closer inspection of regressions (2) and (4) reveals that it is the low-income women who have changed their preferences considerably (coefficients of 0.5759 and 0.7548, before and after giving birth, respectively). While the high-income respondents also exhibit a change in preferences, it is relatively smaller (coefficients of 0.5759 + 0.3785 = 0.9544 and 0.7548 + 0.3311 = 1.0859, before and after giving birth, respectively. The respective probabilities are 37.83% versus 37.11%). Both before and after giving birth, high-income women seem to value information more highly compared to their low-income counterparts. The excess-valuation does not change with experience (similar coefficients of the interaction terms of about 0.3).

(v) The preference for *travel time* does not change with experience and is identical in all socio-economic sub-groups (in both groups of women, interaction terms of travel time, with all socio-economic variables, were insignificant). The regression results can be explained by the fact that traveling to the maternity-ward is a one-time episode. The levels assigned to the attribute of travel time are 30 and 15 min (compared to the reference value of 45). These are quite short time distances that reflect the fact that hospitals in Israel are located all over the country within short travel distances (the average real travel time of the interviewed women was about 20 min). In a parallel study on preferences of women diagnosed with breast cancer, who travel extensively for numerous chemotherapy/radiation treatments, it was found that women who are more educated value travel time significantly more than less-educated women (Neuman, 2010), due to their higher cost of time.

To conclude: experiencing a delivery led to a change in most preferences, mainly of the less-educated and low-income women.

6. Conclusions and discussion

In this study, DCEs were used to estimate preference structures for attributes of maternity-ward services among three groups of women, in order to detect the effect of experience on preference patterns. A comparison of preferences of women with no experience (women expecting their first child), one experience episode (women who had experienced their first delivery), and more than one experience event (women who had more than one delivery) leads to the following main conclusions: (a) it appears that *experience changes the preference pattern.* This result is in line with the findings reported by Ryan and Ubach (2003); (b) the *amount (intensity) of experience seems to be irrelevant.* The fresh, real-life experience affects preferences, but it appears that repetitive realistic incidents do not have an additional accumulated effect; and (c) *socio-economic background variables seem to matter.* Less-educated

[23] Each of these variables has a set of values. We experimented with various specifications. The use of the dummy variables defined above seemed most reasonable. Personal income was not included due to the large number of missing values. It was also highly correlated with education.

[24] It should be noted that maternity-wards in all Israeli hospitals are public. All Israeli citizens are covered by public health insurance. It is optional to buy additional private health insurance to cover extra medical expenses, such as medication and treatments that are not included in the public health benefits. However a private maternity room is not included in any type of private insurance. It follows that high-income women do not have better access to private maternity rooms. Women after delivery are hospitalized in a private room based on availability and sometimes based on special needs for privacy.

women with a lower household income seem to be more affected by experience, when compared to their highly educated and high-income counterparts.[25]

Why does an experience with the health-care event lead to a change in the preferences for its attributes? In fact, we do not know, and more investigation and testing are needed, in order to reveal what are the factors that drive the change in preferences (and in turn lead to a change in decision making). Hypotheses regarding this issue might differ for economists and behavioral scientists. Economists might argue that it is the quantity of information gathered by the individual that leads to the change. However, it should be noted that the experience/information is related to the health event, and not necessarily to the attributes under consideration. For instance, the significant drop in the valuation of a private room for women who had given birth, is not a response to the experience with a private room during hospitalization (most hospitals in Israel have only few private rooms). It is the experience of having a delivery in a maternity-ward (and not information about how it feels to be in a private room) that led to the change in the preference for this attribute, as well as for others. On the other hand, behavioral scientists might claim that new preferences had been constructed as a result of the maternity-ward experience of having a delivery.

To resolve the differences between economists and behavioral scientists, the distinction between *predicted utilities* and *experienced utilities* needs to be mentioned. If there is no past experience and it is a first time event, *predicted utilities* are affecting preferences (and used for decision making). These refer to *beliefs* about the utilities of the attributes (outcomes). After experiencing the event, the expected utilities are updated, and a new set of utilities replaces the old set. These are the experienced utilities. Using the terminology of Kahneman et al. (1997),[26] *experienced utility* of an event (attribute) is the measure of the hedonic utility of that event (attribute), i.e., the total pleasure (or displeasure) associated with it.[27] In contrast to pregnant women, whose preferences are based on expected utilities; women who have experienced a delivery, exhibit a preference pattern that is based on the new set of updated and newly constructed experienced utilities, which seem to differ from the expected ones.

So, it seems that the difference between neo-classical economists and behavioral scientists, with regard to the reason for why preferences change with experience, is a rather semantic one – while the former argue that preferences are stable but are not revealed unless the individual gets better information via experience; the latter claim that preferences are constructed, and experience helps in the construction and exposition of the true preferences. In any case, the matter of the fact is that stated preferences do change with experience.

Will the modified preferences, shaped by recent experience, last for long or will a *reversal and convergence to the original pattern of the inexperienced patient take place*? In other words: does experience create a short-term transitory change or a permanent one? Our restricted samples cannot be used to answer this important question and it should be explored in future studies.

Socio-economic background variables matter. Adding interaction terms of socio-economic variables with the main-effects, allows controlling for socio-economic differences (between women in pre-natal classes and in maternity-wards, mainly in terms of age), and allows distinguishing between preference patterns of various sub-groups.

Empirical results have *policy implications*, in terms of marketing and attracting potential patients, and also in suggesting adjustments and new treatment policies. However, if different patients (e.g. women who are pregnant with their first child and women who already have children) have different preferences – whose preferences should be accommodated? Obviously, there is no clear answer to this question. However, this information should be considered by hospital policy makers. While the policy implications are beyond its scope.

[25] This finding seems to be at odds with results of studies that compared valuations of health status among different rater groups: They suggested that the different valuations did not stem from different demographic characteristics of respondents, such as age, sex or socio-economic status (Rosser and Kind, 1978; Dolan, 1996). However, these studies referred to the overall one-dimensional valuation of the state of health and not to the more detailed structure of preferences that is examined in this study.

[26] In the paper they survey, integrate and extend the literature that explores the notion of utility, its history and its various variants. Formal analysis and proofs are also presented.

[27] The basic building block of experienced utility is *instant utility*: "A measure of hedonic and affective experience which can be derived from immediate reports of subjective experience or from physiological indices" (Kahneman et al., 1997, p. 376). This notion of utility dates back to Bentham (1789) (who referred to utility as 'pleasure' and 'pain') and to the economic writings of the 19th Century.

References

Anand, P., 1987. Are the preference axioms really rational? Theory and Decision 23, 189–214.

Anand, P., 1993. The philosophy of intransitive preferences. The Economic Journal 103, 337–346.

Arana, J.E., Leon, C.J., Quevedo, J.L., 2006. The effect of medical experience on the economic evaluation of health policies: a discrete choice experiment. Social Science and Medicine 63, 512–524.

Aumann, R.J., 1962. Utility theory without the completeness axiom. Econometrica 30, 445–462.

Base, E.B., Steinberg, E.P., Pitt, H.A., 1994. Comparison of the rating scale and standard gamble in measuring patient preferences for outcomes of gallstone disease. Medical Decision Making 14, 307–314.

Ben-Akiva, M., Lerman, S., 1985. Discrete Choice Analysis: Theory and Application to Travel Demand. MIT Press, Cambridge.

Bentham, J., 1789. An Introduction to the Principle of Morals and Legislation. Blackwell, Oxford, UK (reprinted 1948).

Bergstrom, T.C., 2002. Evolution of social behavior: individual and group selection. Journal of Economic Perspectives 16 (2), 67–88.

Blume, L.E., Easley, D., 1992. Evolution and market behavior. Journal of Economic Theory 58 (1), 9–40.

Blume, L.E., Easley, D., 2006. If you're so smart, why aren't you rich? Belief selection in complete and incomplete markets. Econometrica 74 (4), 929–966.

Blume, L.E., Easley, D., 2007. Rationality. Cornell University, Mimeo.

Bowles, S., 1998. Endogenous preferences: the cultural consequences of markets and other economic institutions. Journal of Economic Literature 36 (1), 75–111.

Bradbury, H., Ross, K., 1990. The effects of novelty and choice materials on the intransitivity of preferences of children and adults. Annals of Operations Research 23, 141–159.

Brooks, R., 1996. EuroCol: the current state of play. Health Policy 37, 53–72 (with the EuroCol Group).

Bronstein, J., Morrisey, M., 1991. Bypassing rural hospitals for obstetrics care. Medical Care 16, 87–118.

Brown, S., Lumley, J., 1994. Satisfaction with care in labor and birth: a survey of 790 Australian women. Birth 21 (1), 4–13.

Bryan, S., Buxton, M., Sheldon, R., Grant, A., 1998. Magnetic resonance imaging for the investigation of knee injuries: an investigation of preferences. Health Economics 7, 595–603.

Buxton, M.J., Ashby, J., 1988. The time-trade-off approach to health state valuation. In: Teeling-Smith, G. (Ed.), Measuring Health: A Practical Approach. John Wiley & Sons, London, pp. 69–87.

Canadian Erythropoietin Study Group, 1990. Association between recombinant human Erythropoietin and quality of life and exercise capacity of patients receiving Hemodialysis. British Medical Journal 300, 573–578.

Carlsson, F., Martinsson, P., 2003. Design techniques for stated preference methods in health economics. Health Economics 12, 281–294.

Cattin, P., Wittink, D., 1982. Commercial use of conjoint analysis: a survey. Journal of Marketing 46, 44–53.

Christensen-Szalanski, J.J., 1984. Discount functions and the measurement of patients' values: women's decisions during childbirth. Medical Decision Making 4 (1), 47–58.

Constantinides, G.M., 1990. Habit formation: a resolution of the equity premium puzzle. Journal of Political Economy 98, 519–543.

Cox, J.C., Oaxaca, R.L., 1982. The political economy of minimum wage legislation. Economic Inquiry 20, 533–555.

Day, R.H., 1986. On endogenous preferences and adaptive economizing. In: Day, R.H., Eliasson, G. (Eds.), The Dynamics of Market Economies. Elsevier Science Publishers, Amsterdam, pp. 153–170.

de-Wit, G.A., Busschabach, J.V., de-Charro, F.T., 2000. Sensitivity and perspective in the valuation of health status: whose values count? Health Economics 9, 109–126.

Dolan, P., 1996. The effect of experience of illness on health state valuations. Journal of Clinical Epidemiology 5, 551–564.
Donaldson, C., Hundley, V., Mapp, T., 1998. Willingness to pay: a method for measuring preferences for maternity care. Birth 25, 32–39.
Dubra, J., Maccheroni, F., Ok, E.A., 2004. Expected utility theory without the completeness axiom. Journal of Economic Theory 115 (1), 118–133.
EuroCol Group, 1990. EuroCol: a new facility for the measurement of health related quality of life. Health Policy 16, 199–208.
Fuchs-Seliger, S., Mayer, O., 2003. Rationality without transitivity. Journal of Economics 80 (1), 77–87.
Green, P., Carmon, F., Wind, I., 1972. Subjective evaluation models and conjoint measurement. Behavioral Science 7, 288–299.
Guth, W., Kliemt, H., 1998. The indirect evolutionary approach: bridging the gap between rationality and adaptation. Rationality and Society 10 (3), 377–399.
Hughs, R.I.G., 1980. Rationality and intransitive preferences. Analysis 40, 132–134.
Hundley, V., Ryan, M., Graham, W., 2001. Assessing women's preferences for intrapartum care. Birth 28 (4), 254–263.
Hundley, V., Ryan, M., 2004. Are women's expectations and preferences for intrapartum care affected by the model of care on offer? British Journal of Obstetrics and Gynecology 111, 550–560.
Janssen, P.A., Klein, M.C., Harris, S.J., Soolsma, J., Seymour, L.C., 2000. Single room maternity care and client satisfaction. Birth 27 (4), 235–243.
Johnson, F.R., Mathews, K.E., 2001. Sources and effects of utility – theoretic inconsistency in stated preference surveys. American Journal of Agricultural Economics 5, 1328–1333.
Kahneman, D., Wakker, P.P., Sarin, R., 1997. Back to Bentham? Explorations of experienced utility. Quarterly Journal of Economics 112, 375–405.
Kim, T., Richter, M.K., 1986. Non-transitive non-total consumer theory. Journal of Economic Theory 38, 324–363.
Kind, P., 2005. Applying paired comparison models to EQ-5D valuations: deriving TTO utilities from ordinal preference data. In: Kind, P., Brooks, R., Habin, R. (Eds.), EQ-5D Concepts and Methods: A Developmental History. Springer, Netherlands, pp. 201–220.
Korhonen, P., Moskowitz, H., Wallenius, J., 1990. Changing behaviour in interactive multiple criteria decision making. Annals of Operations Research 23, 161–179.
Lancaster, K., 1966. A new approach to consumer theory. Journal of Political Economy 74, 134–157.
Llewellyn-Thomas, H.A., Sutherland, H.J., Ciampi, A., Etezadi-Amoli, J., Boyd, N.F., Till, J.E., 1984. The assessment of values in laryngeal cancer: liability of measurement methods. Journal of Chronic Disease 37, 283–291.
Llewellyn-Thomas, H.A., Sutherland, H.J., Thiel, E.C., 1993. Do patients' evaluations of a future health state change when they actually enter the state? Medical Care 31 (11), 1002–1012.
Longworth, L., Ratcliffe, J., Boulton, M., 2001. Investigating women's preferences for intra-partum care: home versus hospital births. Health and Social Care in the Community 9 (6), 404–413.
Loomes, G., Starmer, C., Sugden, R., 1991. Observing violations of transitivity by experimental methods. Econometrica 59 (2), 425–439.
Louviere, J., Hensher, D., Swait, J., 2000. Stated Choice Methods: Analysis and Application. Cambridge University Press, Cambridge.
Luce, D., Tukey, J., 1964. Simultaneous conjoint measurement: a new type of fundamental measurement. Journal of Mathematical Psychology 1, 1–27.
Machina, M.J., 1982. 'Expected Utility' analysis without the independence axiom. Econometrica 50, 277–323.
Machina, M., 1991. Dynamic consistency and non-expected utility. In: Bacharach, M., Hurley, S. (Eds.), Foundations of Decision Theory. Basil Blackwell, Oxford.
Mas-Collel, A., 1974. An equilibrium existence theorem without complete or transitive preferences. Journal of Mathematical Economics 1, 237–246.
McClennen, E.F., 1989. Sure-thing doubts. In: Gardenfors, P., Sahlin, N.E. (Eds.), Decision Probability and Utility. Cambridge University Press, Cambridge.
McGuirk, M.A., Porell, F.W., 1984. Spatial patterns of hospital utilization: the impact of distance and time. Inquiry 21, 84–95.
Neuman, E., 2010. What is important in a fight for life? Preferences of women diagnosed with breast cancer for attributes of an oncological institute. Applied Economic Letters 16 (16–18), 1665–1670.
Neuman, E., 2009. Reference-dependent preferences: what is the reference point? University Center of Ariel, Mimeo.
Neuman, E., Neuman, S., 2008. Reference-dependent preferences and loss aversion – a discrete choice experiment in the health-care sector. Judgment and Decision Making 3 (2), 162–173.
Neuman, E., Neuman, S., 2009. Agency in health care: are medical care givers perfect agents? Applied Economic Letters 16 (13–15), 1355–1360.
Nord, E., 1992. Methods for quality adjustments of life years. Social Science and Medicine 34, 559–564.
O'Connor, A.M.C., Boyd, N.F., Warde, P., Stolbach, L., Till, J.E., 1987. Eliciting preferences for alternative drug therapies in oncology: influence of treatment outcome description, elicitation technique and treatment experience on preferences. Journal of Chronic Disease 40 (8), 811–818.
Ok, E.A., 2002. Utility representation of incomplete preference relation. Journal of Economic Theory 104, 429–449.
Opaluch, J., Swallow, S., Weaver, T., Wessells, C., Wichelns, D., 1993. Evaluating impacts from noxious facilities: including public preferences in current sitting mechanisms. Journal of Environmental Economics and Management 24, 41–59.
Payne, J.W., Bettman, J.R., Johnson, E.J., 1993. The Adaptive Decision Maker. Cambridge University Press, New York.
Phibbs, C., Mark, D., Luft, H., Petzman-Rennie, D., Garnick, D., Lichtenberg, E., McPhee, S., 1993. Choice of hospital for delivery: a comparison of high risk and low risk women. Health Services Research 28, 201–220.
Pollak, R.A., 1976. Habit formation and long-run utility functions. Journal of Economic Theory 13, 272–297.
Porter, M., Macintyre, S., 1984. What is must be best: a research note on conservative or deferential response to antenatal care provision. Social Science and Medicine 19 (11), 1197–2000.
Rabin, M., 1998. Psychology and Economics. Journal of Economic Literature 36, 11–46.
Rahtz, D.R., Moore, D.L., 1988. An examination of attribute saliency in the Obstetrics/Gynecology profit center. Journal of Health Care Marketing 8 (3), 50–53.
Rosser, R.M., Kind, P., 1978. A scale of valuation of states of illness: is there a social consensus? International Journal of Epidemiology 7, 347–358.
Ryan, M., Amaya-Amaya, M., 2005. 'Threats' to and hopes for estimating benefits. Health Economics 14, 609–619.
Ryan, M., Bate, A., 2001. Testing the assumptions of rationality, continuity and symmetry when applying discrete choice experiments in health care. Applied Economics Letters 8, 59–63.
Ryan, M., Gerard, K., 2003. Using discrete choice experiments to value health care programmes: current practice and future research reflections. Applied Health Economics and Health Policy 2 (1), 55–64.
Ryan, M., Hughes, J., 1997. Using conjoint analysis to assess women's preferences for miscarriage management. Health Economics 6, 261–273.
Ryan, M., McIntosh, E., Shackley, P., 1998a. Using conjoint analysis to elicit the views of health service users: an application to the patient health card. Health Expectation 1, 117–129.
Ryan, M., McIntosh, E., Shackley, P., 1998b. Methodological issues in the application of conjoint analysis in health care. Health Economics 7, 373–378.
Ryan, M., Ratcliffe, J., Tucker, J., 1997. Using willingness to pay to value alternative forms of antenatal care. Social Science and Medicine 44, 371–380.
Ryan, M., San Miguel, F., 2003. Revisiting the axiom of completeness in health care. Health Economics 12 (4), 295–307.
Ryan, M., Scott, D.A., Reeves, C., Bate, A., van Teijlingen, E., Russell, E., Napper, M., Robb, C., 2001. Eliciting public preferences for health care: a systematic review of techniques. Health Technology Assessment 5 (5), 1–186.
Ryan, M., Ubach, C., 2003. Testing for an experience endowment effect in health care. Applied Economics Letters 10, 407–410.
Sadler, L.C., Davison, T., McCowan, L.M.E., 2001. Maternal satisfaction with active management of labor: a randomized controlled trial. Birth 28 (4), 225–235.
Salkeld, G., Ryan, M., Short, L., 2000. The veil of experience: do consumers prefer what they know best? Health Economics Letters 9, 267–270.
San Miguel, F., 2000. Testing the Assumptions of Completeness, Stability and Rationality of Preferences in Health Economics Using Discrete Choice Experiments. Ph.D. Thesis. University of Aberdeen, Aberdeen.
San Miguel-Inza, F., Ryan, M., Amaya-Amaya, M., 2008. Irrational stated preferences – a quantitative and qualitative investigation. In: Ryan, M., Gerard, K., Amaya-Amaya, M. (Eds.), Using Discrete Choice Experiments to Value Health and Health Care. Springer, Dordrecht, The Netherlands.
San Miguel, F., Ryan, M., Scott, A., 2002. Are preferences stable? The case of health care. Journal of Economic Behavior and Organization 48, 1–14.
Scott, A., 2002. Identifying and analysing dominant preferences in discrete choice experiments: an application in health care. Journal of Economic Psychology 23, 383–398.
Sen, A., 1993. Internal consistency of choice. Econometrica 61, 495–521.
Shiell, A., Seymour, J., Hawe, P., Cameron, S., 2000a. Are preferences over health states complete? Health Economics 9 (1), 47–55.
Shiell, A., Hawe, P., Seymour, J., 2000b. Will our understanding of completeness ever be complete? Health Economics 9 (8), 729–731.
Slovic, P., 1991. The construction of preferences. American Psychologist 5 (5), 364–371.
Stigler, G., Becker, G., 1977. De Ggustibus non est dispudandum. American Economic Review 67 (2), 76–90.
Sugden, R., 1985. Why be consistent. Economica 52, 167–184.
Swallow, S., Opaluch, J., Weaver, T., 1992. Sitting noxious facilities: an approach that integrates technical, economical, and political considerations. Land Economics 68, 283–301.
Tsevat, J., Goldman, L., Soukup, J.R., Lamas, G.A., Connors, K.F., Chapin, C.C., Lee, T.H., 1993. Stability of time-trade-off utilities in survivors of Myocardial Infraction. Medical Decision Making 13, 161–165.
Vick, S., Scott, A., 1998. Agency in health care: examining patients' preferences for attributes of the doctor-patient relationship. Journal of Health Economics 17, 587–605.
von Neumann, J., Morgenstern, O., 1944. Theory of Games and Economic Behavior. Princeton University Press, Princeton.
von Weizsacker, C.C., 1971. Notes on endogenous changes of tastes. Journal of Economic Theory 3, 345–372.
Wardman, M., 1988. A Comparison of revealed reference and stated preference models. Journal of Transport Economics and Policy 22, 71–91.
Wilcock, A., Kobayashi, L., Murray, I., 1997. Twenty-five years of obstetric patient satisfaction in North America: a review of the literature. Journal of Prenatal and Neonatal Nursing 10 (4), 36–47.