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EXPLORATIONS OF THE EFFECT OF EXPERIENCE ON PREFERENCES: TWO HEALTH-CARE CASE STUDIES

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ABSTRACT

Explorations of the Effect of Experience on Preferences: Two Health-Care Case Studies

The standard assumption in economic theory is that preferences are stable. In particular, they are not changed as a result of experience with the good/service/event. Behavioral scientists have challenged this assumption and claimed (providing evidence) that preferences are constantly changing when experience is accumulated. This paper tests the effect of experience on preferences for attributes of health-care events. We are using two very different samples and a methodology that facilitates the estimation of marginal utilities of various attributes of a composite non-traded health-care service. Discrete Choice Experimental design is employed for the analysis of samples of (1) women who gave birth, and (2) women who were diagnosed with breast cancer. For each group we had information on experience. In the case of women who gave birth, the sample was decomposed into 3 sub-samples: pregnant women with their first child (no experience); women after one delivery (single experience); and mothers after more than one delivery (multiple experience). Preferences of the 3 sub-groups have then been compared. The breast cancer patients reported the number of chemotherapy/radiation treatments they have already received, thus enabling the construction of an experience variable and testing for the effect of experience on preferences. The basic finding is that preferences for health-care attributes are significantly changed as a result of experience with the health event. However, the amount of experience is irrelevant.

JEL Classification: D1, D12 and I19
Keywords: breast cancer, delivery, discrete choice experiment, experience, health-care and preferences

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EXPLORATIONS OF THE EFFECT OF EXPERIENCE ON PREFERENCES: TWO HEALTH-CARE CASE STUDIES

1. Introduction

The standard assumption in economic theory is that preferences are stable. As a result, an individual has a stable preference (utility) pattern for the various attributes of a given commodity or service (e.g. hospital). When faced with the need to be hospitalized for medical treatment, he will choose the hospital that yields maximum utility. The estimated utility considers both the attribute levels (that differ between hospitals) and the assigned utilities of attributes that are derived from the stable preference pattern and are therefore identical for all hospitals.

The question that this paper sets out to answer is whether these assigned utilities are changed when the individual accumulates real-life experience with hospitalization, leading in turn to a different subsequent choice made by the same utility maximizing person.

The effect of experience on preferences (utilities) is examined using a Discrete Choice Experiment (DCE) that elicits preferences for hospital attributes. Given the lack of revealed preferences in publicly provided health care systems an experimental design could and should be employed. DCE is used to present individuals with hypothetical scenarios (hospitals) described in terms of hospital attributes. For each pair of scenarios they are requested to choose which they prefer. Data on choices made is then used to estimate utilities of the various hospital attributes.

Two very different populations will be examined in order to elicit the effect of experience on preferences. (1) Women who are choosing a hospital for delivery; and at the other end (2) women, diagnosed with breast cancer, a life threatening disease, who are considering a hospital for chemotherapy/radiation treatment. Findings that preferences of

these two dramatically different populations are similarly affected by experience will contribute to the robustness of the results and might lead to their generalization.

The paper is structured as follows: The next section presents a background literature survey on the effect of experience on preferences. The Discrete Choice Experiment and the samples are described in Section 3. Section 4 presents the findings and Section 5 offers conclusions and a discussion.

2. Background

Quite surprisingly, the literature on the effect of experience on preferences (utilities) is relatively small.

2.1 Economic modeling

One of the most basic assumptions in economic theory is that preferences are *stable*, complete and transitive[1]. In particular, accumulated experience with the commodity/event under discussion has not been considered as a factor that is responsible for instability of preferences[2]. The individual decision maker is assumed to maximize his expected utility from the commodity/service/event subject to a stable, well-defined utility function.

2.2 Behavioral perspective: Experienced utilities versus decision utilities

In contrast to this classical theory of choice, there is a growing body of evidence that supports an alternative conception that preferences are often constructed – not merely revealed – in an elicitation process (Slovic, 1991; Payne et al., 1992). Numerous experiments illustrate that preferences are sensitive to the framing of the problem (e.g. Tversky and Kahneman, 1986), the method of elicitation (e.g. Tversky et al., 1988) and the context of the

[1] Several studies challenged the assumption of stability. Two main approaches have been used to empirically test its validity: (1) Parametric tests of structural stability of demand functions; and (2) Non-parametric tests of the *axiom* of stability. See San Miguel et al. (2002) for a Literature Survey of these two approaches.

[2] A potential effect of past experience on consumption (along with other variables such as other consumption patterns) has mentioned by Weizsacker von (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.

choice (Tversky and Simonson, 1993). It is claimed that such effects can even cause preference reversals[3].

Experience might be an important factor in the process of shaping and construction of preferences[4].

Behavioral scientists integrate the effect of experience into the process of preferences' construction by distinguishing between two types of utility: *experienced utility* versus *decision utility*. Using the terminology of Kahneman et al. (1997) [5], *experienced utility* of an event is the measure of the hedonic experience of that event. 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" (Page 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.

The experienced utility then leads to *remembered utility*, which is constructed "based on the subject's retrospective reports of total pleasure of displeasure associated with past outcomes" (Page 376), Kahneman et al. (1997), report results of experiments that examined the procedure of construction of remembered utility and have found empirical evidence for *the peak-end evaluation*: the remembered utility of pleasant (or unpleasant) episodes is quite accurately predicted by averaging the *peak* (most intense value) of instant utility (or disutility) and the instant utility recorded near the *end* of the experience. A consequence of the Peak-End evaluation that has been confirmed is the *duration neglect*: The duration of experiences has little or no independent effect on their remembered utility (Page 381).

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[3] Rabin (1998) has an excellent review of many of these articles.

[4] Economists might refer to it as habit formation e.g. Pollak, 1976 Constantinides, 1991). However this 'habit formation' is essentially equivalent to convergent stable long run demand.

[5] In this 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.

Decision utilities are the weights assigned by the decision maker to the various attributes (or outcomes) of the commodity under discussion[6].

How are the decision utilities defined by the decision maker? If past experience exists, resulting in a set of remembered utilities, they will most probably be used to construct decision utilities. If there is no past experience and it is a first time event, the decision utilities represent *predicted utilities* and refer to *beliefs* about the experienced utilities of the attributes (outcomes).

In economic models of decision-making – decision utilities are used and experienced utility is essentially ignored. The rejection of experienced utility is justified by two standard arguments: (1) subjective hedonic experience cannot be observed or quantitatively measured; and (2) choices provide all the necessary information about the utility of the outcomes, because rational agents optimize their hedonic experience.

It follows that economists argue that decision utilities are not distinct from experienced utilities. If this is the case there is no rationale to examine the linkage between experienced utility and decision utility or the effect of accumulated experience on decision utilities.

However, an empirical finding that preferences (decision utilities) change with experience (everything else being equal) indicates that the new experience changed the experienced utility, leading to a change in remembered utility and consequently creating a new set of decision utilities that are now used for decision making, replacing the previous set. A better understanding of the effect of experience on health care utilities is of utmost importance. It might lead to improved and more cost-effective health-care services and above all: to an increase in patients' satisfaction and well-being.

[6] The decision utilities are both inferred from observed choices and in turn used to explain these choices.

2.3 Health-care experimental literature

Several researchers (most of them medical doctors) have directly addressed the question of stability of preferences recognizing that they may change with experience. In many studies the time trade-off instrument (TTO)[7] has been used and stability of time trade-offs has been examined. The results were mixed and inconclusive.

Several studies have claimed that utilities are stable over time. For example, Llewellyn-Thomas et al., (1984, 1991) examined patients undergoing radiation therapy for laryngeal cancer. In one study they have found that patients assigned similar values to attributes of voice quality over the course of treatment despite deterioration in their voice quality. In another study of 66 patients, using time trade-offs (TTO) and a visual analog scale 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 utilities 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-offs scores despite improvements in scores for fatigue, physical measures, relationships and depression (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 utilities 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.

In another set of papers it has been found that preferences changed temporarily, *during* the health care event and then shifted back to the original values. The *impulsive response*

[7] The TTO instrument estimates the trade-off between 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 (e.g. Tsevat et al., 1993).

during the event is therefore different from the *long-term preferences* (terms used by Christensen-Szalanski, 1984).

Kestle et al., (1989) found that utilities deteriorated in patients with breast cancer shortly after beginning chemotherapy, then improved upon completing the course of chemotherapy. Christensen-Szalanski (1984) examined attitudes of 18 pregnant women toward avoiding pain versus avoiding anesthesia. She found that the women preferred to avoid using anesthesia during childbirth when asked one month before labor or during early labor; however, (not surprisingly) during active labor their preferences shifted towards avoiding pain (and toward using anesthesia) and then shifted again toward avoiding the use of anesthesia when evaluated one month postpartum. The author concludes that experience matters, but in fact her findings suggest that preferences of pregnant women are not different from preferences of women who have experienced a delivery. So, experience has not changed the cost-benefit analysis of pain versus anesthesia that leads to preferences. Obviously, a woman who is in extreme pain of active labor will ask for anesthesia, ignoring everything else.

In yet another set of papers 'experience' is defined as the 'status quo' – what patients already know and it is claimed that they prefer what they know best. Examples of such papers are: Porter and Macintyre (1984), and Salkeld et al., (2000).

These reported studies are embedded in realistic medical settings and add important information of patients' behavior. However they are not very compatible and comparable with studies on similar issues performed by economists because very different definitions (even of the core subjects of the study: preferences or utilities and experience) methodologies and statistical approaches are employed in the two disciplines.

2.4 Health-economics literature

Economic analysis of health-care and health related topics started in the early 1970s with the seminal studies of Grossman (e.g. 1972, 1975, 1978, 1982) and Fuchs (e.g. 1974, 1978). There is a rich and growing body of research in health economics. However, the effect of experience on preferences for health attributes has been neglected.

Only recently, in the 2000s, two studies have been published on the effect of experience on preferences for health-care events. Both are using a discrete choice experimental design to elicit preferences for various attributes of the event. The first by San Miguel et al., (2002) examines preferences for out-of-hours care by general practitioners and the second by Ryan and Ubach, (2003) studies preferences for a repeat prescription new service. Both test the effect of experience of preferences and the results are not conclusive. In the first case it is claimed that preferences are stable and are not affected by experience, while the second experiment indicates a significant effect of experience on preferences.

We will discuss each of the two studies in more detail.

-The first study by San Miguel et al., (2002) titled: "Are Preferences Stable? The Case of Health Care", examines preferences of parents for out-of-hours care for their sick children, using DCE. Two identical questionnaires were given to the parents two months apart. Each questionnaire had a set of pair-wise choices between the hypothetical out-of-hours treatment facilities described in terms of four attributes (each with different levels)[8]. Respondents have been asked to mark the preferred facility and, based on their choices a preference pattern for the various attributes was estimated. In order to test the effect of experience on preferences the sample has been split into two sub-samples: Parents who experienced a visit to a facility between the two experiments and parents who have not had this additional experience. Two

[8] The attributes are: Where the child is seen (3 levels); who sees the child (2 levels); Time between telephone call and treatment (in minutes, 4 levels); and whether the doctor seems to listen to what the patient has to say (2 levels).

preference patterns have been estimated for each sub-sample, based on each of the two experiments.

In order to test for stability of preferences the authors used non-parametric tests (gross level of agreement and gross agreement corrected for chance (Cohen's kappa coefficient) and a parametric test based on the estimated preference patterns (likelihood ratio test)[9].

They found a good level of agreement for the 'experienced' and 'non-experienced' groups in the non-parametric test, while in the parametric test the results were the opposite to what they had expected. – The likelihood ratio test *supports stability for the group that had additional experience* between experiments and *does not support stability of preferences for the group that did not have that experience.* The authors conclude, "Whilst the results provide evidence of stability, further research is required before these results are generalized". (Abstract, Page 1).

The authors offer possible explanations for the unexpected results of the parametric test. We would like to suggest that the core variable *'experience' has not been identified* and therefore its effect has not been isolated.

[9] The likelihood ratio test is a test for the stability of the function (equation). It is also possible and interesting to test for differences in the valuation of the different attributes (differences between coefficients in the 2 regressions).

The following table demonstrates that in fact there are four distinct groups of respondents:

TABLE 1:

Group	**Experience before 1st experiment**	**First experiment**	**Experience between the 2 experiments**	**Second Experiment**	**Total experience at the 2nd experiment**
1	No	ˇ	No	ˇ	No experience at all
2	No	ˇ	Yes	ˇ	Experience only between experiments
3	Yes	ˇ	No	ˇ	Experience only before 1st experiment
4	Yes	ˇ	Yes	ˇ	Experience both before 1st experiment & between experiments

In the reported study, groups 1 and 3 are treated equally (as 'non-experienced' groups) and so are groups 2 and 4 that are referred to as the 'experienced' groups. The experience before the first experiment is ignored, although 48% of respondents had such an experience[10]. Moreover, experience is treated as a dichotomous variable – yes or no. It might well be the case that the intensity of the experience also matters and it is not only the existence of any experience that affects preferences but also the 'amount' of accumulated experience[11]. The time distance between the experience and the experiment could also be important, the closer it is, the stronger is probably the effect on 'remembered utility' and consequently on 'decision utility'. A better identification of the experience variable and a finer definition might lead to different results.

[10] In the discussion the authors report an attempt to consider experience before the first experiment and split the sample into 2 sub-samples based on that but then the experience between experiments is not properly controlled for.

[11] For a sub-sample of questionnaires the authors collected information on the number of times the child has seen a doctor between the 2 experiments.

-The second study by Ryan and Ubach, (2003) titled, "Testing for an Experience Endowment Effect in Health Care", also uses DCE to test the affect of previous experience of preferences for a new system of issuing repeat prescriptions. With the new system, patients obtain medicines straight from the pharmacy. Three attributes of the new system have been considered: convenience; lower cost of ordering and collecting; and quality of information received. Preferences for the new system have 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. If prior experience affects preferences then the two preference patterns will show significant differences. This was indeed the case: while the experienced patients significantly valued all three attributes presented in the questionnaire, the 'non-experienced' patients expressed significant utility only from the cost attribute. The conclusion from this study is therefore that experience affects preferences. To gain more insight the intensity of experience and how close it was to the experiment could have been added as interaction explanatory variables. This could help answer the question if it is only the existence per se that matters or also its magnitude and timing.

3. Method and Sample

3.1 Discrete choice experiments (DCE)

The statistical tool that is used to elicit preferences and to detect preference changes due to accumulated experience is *a Discrete Choice Experiment (DCE).*

Within DCE, respondents are faced with a series of pairs of hypothetical scenarios described in terms of some relevant attributes (assuming that all other attributes are identical in the 2-paired scenarios). For each pair of scenarios they are asked to choose which they prefer. It is assumed that the subject will choose the alternative that leads to the highest level of utility. One scenario (A) is usually kept constant while its counterpart (B) varies. Some

attributes have higher levels in scenario B, while the others are inferior (or equal) in scenario B. The respondent is therefore making complex choices that relate to trade-offs between attributes.

Formally, assuming a linear utility function and two types of scenario (hospitals) A and B, the utility in moving from A to B is given by

$$(1) \qquad \Delta U_{A-B} = \sum_{i=1}^{n} \beta_i X_i + U_i + \varepsilon$$

Where, ΔU is the change in utility, in moving from A to B. The dependent variable is therefore a dichotomous variable that takes the value of 1 if hospital B is chosen and the value of 0 if hospital A is preferred. X_i is the difference in the level of attribute i between A and B, β_i are the parameters of the model to be estimated. The estimates represent marginal utilities. U_i is the error term due to differences amongst observations and ε is the error term that stems from differences between respondents (each individual made several pair-wise choices). Data based on the multiple choices is then used for the Random-Effects Probit regression.

3.2 Design of the questionnaire

The first step in applying DCE is to determine the list of attributes, their levels and the verbal description. Table 2 presents the attributes and levels used in the questionnaires of the two samples. They have been chosen based on a careful analysis of the relevant literature; an in depth interview of women of the two population groups under discussion and pilot questionnaires.

TABLE 2

Attributes, Levels and Coding (in parentheses)

Questionnaires of Women Who Gave Birth and Women Diagnosed with Breast Cancer

Attributes (Independent variables)	(1) Women who gave birth	(2) Women diagnosed with breast cancer
Professionalism of staff/institute	Good (0) Very good (1)	Good (0) Very good (1)
Information transferred to patient	Basic (0) Extensive (1)	Basic (0) Extensive (1)
Attitude of staff	Reasonable (0) Very good (1)	Reasonable (0) Very good (1)
Travel time to hospital	45 minutes (2) 30 minutes (1) 15 minutes (0)	An hour or over (1) Half an hour or less (0)
Reputation of doctor	--	Standard (0) Well renowned (1)
Number of beds in room	3 beds (3) 2 beds (2) 1 bed (1)	--
Number of potential scenario Number of scenario used in questionnaires	$72= 2^3 \times 2^2$ 16 (split 8 and 8)	$32= 2^5$ 23 (split 11 and 12)

Notes: - Travel time has different levels due to the two very different situations: Women with a life threatening disease are willing to travel more to seek cure.

- In the case of women suffering from cancer, a distinction has been made between 'Professionalism of institute' and 'Reputation of doctor' because it has been found that these two factors are important and distinct from each other.

- Treatment of cancer (chemotherapy/radiation) is performed in a day-care institute (within the hospital), number of beds is therefore irrelevant

The number of potential scenarios is 72 in the first case and 32 in the second. For the first questionnaire – SPSS Orthoplan has been used to reduce the large number of potential scenarios to a manageable number of 16 orthogonal main-effect scenarios.

One of the scenarios has been chosen arbitrarily as the constant hospital (A). The constant scenarios are the following:

For the first sample: Professionalism – good; Information – extensive; Attitude – reasonable; Travel time – 30 minutes; Number of beds – 2.

For the second sample: Professionalism – very good; Information – extensive; Attitude – reasonable; Travel time – an hour or more; Reputation of doctor – standard.

In the counter scenario (B) the attributes vary and they are compared pair-wise with the constant option. Several pairs had a 'dominant option', where one scenario was superior in any attribute to the other. Those pairs (except for one) have been dropped. One has been kept in order to test for 'internal consistency' whether the respondent understood the task of choice she was requested to perform. The final numbers of pair-wise scenarios presented to the respondents have been 12 and 22 for the first and second sample respectively. Researchers who used Conjoint Analysis claimed that a respondent could cope well with 9-16 pairs (choices). The final number of scenarios has therefore been split into two questionnaire types. The pair with a dominant option has been included in both types. The two types have been distributed randomly among women in the sample. The questionnaire also included questions on socio economic background variables such as: age, education, occupation, income, ethnic origin, residence in the country.

3.3 Populations and samples

Two dramatically different populations have been chosen for our empirical study: The first is mothers to be and women who recently gave birth and the second consists of women who have been diagnosed with breast cancer and are treated in oncology institutes with

chemotherapy and/or radiation. While women of the two populations experience very different health-care events, the two groups are exposed to the effect of accumulated experience: in the first case it is the experience of a delivery or an additional delivery and in the second case it is the experience of another course of treatment. If we detect basically similar effects of experience for these two populations it will contribute to the significance of the results and the conclusions.

Women who gave birth: To examine the effect of experience of preferences for attributes of maternity wards, a distinction has been made between three sub-samples: women who are pregnant with their first child; women who gave birth to their first baby; and women who had two or more deliveries. A sample of 155 women who are expecting their first child has been interviewed in prenatal classes in three public[12] hospitals: Sheba (in Ramat-Gan – 90 women), Beilinson (in Petach-Tikva – 21 women) and Meir (in Kfar-Saba – 44 women). Women who recently gave birth have been interviewed in maternity wards in the same three hospitals: 97, 90 and 136 women in each of the hospitals (mentioned above) respectively. The sample of 323 women has been split into two sub-samples: 97 women after their first delivery and 226 women who had at least two deliveries. Preference patterns for maternity ward attributes (presented in Table 2) have been estimated for each sub-sample separately and significance of differences between respective coefficients has then been examined.

The three sub-samples relate to different women – it is not a longitudinal data set that follows the same women along their reproduction time path. While a longitudinal data set might have methodological advantages, it is obviously technically impractical – such a follow up will take a significant number of years and will most probably suffer from high dropout rates and from low response rates.

[12] Israel has a public health-care system. Only a negligible number of women give birth in private maternity wards or at home.

The three groups have different levels of experience. However, differences between the preference patterns of the three groups might stem from different socio-economic backgrounds and not necessarily from different levels of experience. To control for the possible 'interference' of background variables, we have also included in our main-effects regression the interactions of socio-economic variables (that had significantly different levels in the three sub-samples) with the various main-effects.

Women diagnosed with breast cancer: Ninety five women successfully completed the questionnaire. They have been approached and interviewed in oncological institutes in three public hospitals: Hadassah Ein-Karem (in Jerusalem), Beilinson (in Petach-Tikva) and Sheba (in Ramat-Gan). Unfortunately we have only five women who have not yet started any treatment. The sample of women with no experience is therefore very restricted. All other 90 women are at different stages of treatment. The women have somewhat different protocols of treatment: 51 undergo chemotherapy (first) plus radiation, 26 have a course of chemotherapy only and 15 have radiation only[13]. The questionnaire also included a question on the treatment received at the time she is interviewed. For each respondent we have the number of chemotherapy and/or radiation treatments she has already experienced. We can therefore relate to accumulated experience and test for its effect on preferences.

4. Results

4.1 Women who gave birth:

The three sub-samples and the date of the completed questionnaires were used to estimate three main-effects Probit Random Effects regressions (based on equation (1), Page ---). The results are presented in Table 3. The independent variables relate to the attributes of the maternity ward (see Table 2) and are defined using dummy variables. For 'number of

[13] In few cases a prescription of hormonal or biological treatment is also added.

beds' we have two dummy variables: 'two beds' and 'private room' with the reference group of 'three beds'; 'attitude', 'professionalism of institute' and 'information transferred from staff to patient' relate to more compared to less; and 'travel time' is defined by two dummies: '30 minutes' and '15 minutes' with the reference group of '45 minutes'.

A separate regression is estimated for each of the three samples. The coefficients are estimates of the marginal utilities of the attributes (main effects).

To test for the significance of the differences between marginal utilities of patients with different levels of experience a joint regression of the two groups under consideration is employed with interaction terms of each of the main effects with a dummy variable that equals 1 if the respondent is in one group and 0 if she belongs to the other group. A significant interaction term means that the difference is indeed significant.

An examination of preference patterns of women with no experience (regression 1 – women pregnant with first child, in prenatal classes), 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 a delivery. However, the *number* of deliveries (intensity of experience) has no significant effect on preferences.

Women with more than one delivery are not significantly different from women who experienced one delivery only, in the valuation of all attributes: 'professionalism of staff' ranks first, followed by 'attitude', 'information', 'travel time' (with indifference between 30 and 15 minutes of travel time) and 'number of beds' that ranks last and is not significant: two beds in a room and even a private room are not significantly preferred over a three beds room. Not only is the ranking similar but the estimated marginal utilities of the attributes (the coefficients) are also not significantly different as is evidenced by the *Z* statistics of the

interaction terms (last column in Table 3)[14]. While it is not surprising that 'professionalism of staff' is most important in a surgical procedure that relates to both the mother and the baby, it is less expected to find that 'attitude' is valued much more than 'information' (regarding the delivery, the baby, breastfeeding etc.), that women are indifferent to between 30 and 15 minutes of 'travel time' and that physical facilities such as number of beds do not matter at all.

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 (regression 1). The ranking of the two most important attributes is similar: 'professionalism of staff' ranks highest (a coefficient of 1.9182) and second comes 'attitude' (a coefficient of 1.2970). The marginal utility of 'professionalism' is similar for women with no experience and for those who recently gave birth, however 'attitude' is less valued by the former. The difference is significant at α = 0.076). A private room is highly and significantly valued by women in prenatal classes (a coefficient of 0.7950, Z = 9.28) while women who have recently experienced a delivery do not value it at all. 'Information' is less significantly valued by inexperienced women. 'Travel time' has similar marginal utilities for the two groups with the similar indifference between 30 and 15 minutes.

To conclude: women who are expecting their first delivery have preference patterns that are significantly different from preferences of women who 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 inexperienced women while 'attitude' and 'information' have lower marginal utilities in this group. However, the amount of experience has not been found to affect preferences – women who had one delivery exhibit similar preferences to those of women who had more than one delivery. It is probably the fresh experience that affects

[14] The socio economic characteristics of the 2 samples are not significantly different. We therefore do not need to control for the effect of background variables on the main effects. Even if they are present they affect similarly the 2 samples.

‘remembered utilities’ and consequently the choices made and then used to estimate preferences. The group of pregnant women is also in a realistic setting – they are expecting a delivery within a few months. Nevertheless, the real experience results in a significant change of preferences.

4.2 Women diagnosed with breast cancer

Our sample of 95 women has various levels of experience with chemotherapy/ radiation. Unfortunately we have only 5 women who have not started treatment at all – a tiny sample that cannot be used for estimation of preferences for the institute attributes.

Three alternative definitions of experience have been employed: (1) The first is a dummy variable that equals 1 if the patient had at least three chemotherapy treatments (the standard protocol is 6 –8) or in case she is treated with radiation only, if she had at least 10 radiation treatments (the range of radiation in our sample is 17 – 35, with a mode of 30). About sixty-five percent of women in the sample are experienced by this definition; (2) The second definition is restricted to a more homogenous sample of women who had chemotherapy, excluding women who had a protocol of radiation only. The variable ‘experience’ is defined as a continuous variable that relates to the number of chemotherapy treatments the patient already had (ranges between 0 and 14) and (3) using the same restricted sample, experience is defined as a continuous variable that equals 1 if the woman has already finished the whole course of chemotherapy. Fourteen percent of women in our sample are at this stage – they are fully experienced with chemotherapy.

Preference patterns are estimated first without reference to experience (Model I in Table 4) and the three definitions of experience are then used separately to create interaction of experience with the main effects. Models II III and IV are using the three definitions of experience, respectively.

Turning first to Model I we realize that 'professionalism of institute' and 'reputation of doctor' are similarly valued (coefficients of 1.4902 and 1.4212, respectively). Then come 'attitude' and 'information' that have similar marginal utilities (of 0.5514 and 0.5452 respectively) and last with a marginal utility of 0.4036 comes 'travel time' (traveling more than an hour is negatively valued compared to 'travel time' of half an hour or less). It is not surprising that patients of a life threatening disease value most the quality of the institute and the doctor. However, 'information', 'attitude' and 'travel time' are also highly and significantly valued.

Adding interaction terms of 'experience' and attributes (models II, III and IV) does not change the basic ranking and magnitudes of the marginal utilities. Interestingly, accumulated experience has no significant effect on the main effects, no matter which definition is used.

All interaction terms are insignificant[15] and this leads to the conclusion that women do not change their valuation of attributes as they accumulate more experience. The use of various alternative definitions of experience adds to the robustness of the results.

The results are also in line with parallel results for the sample of women who gave birth – their preferences have also not changed with more experience. Obviously, similar results for very different populations also contribute to the robustness and generality of results.

5. Conclusions and Discussion

Using two dramatically different populations we have found that the accumulation of *more* experience has no significant effect of preference patterns for hospital health-care attributes. In the case of women who gave birth we were also able to relate to the effect of

[15] In Model IV one interaction term – exp. & professionalism is negative at a significance level of 0.076, Z = 1.78, i.e. women who have completed chemotherapy tend to value 'professionalism of institute' less.

existence of experience (delivery) compared to no experience and conclude that it has a significant effect on preferences – both on the ranking and on the magnitudes.

Our tests have been performed in a realistic setting during or shortly after the relevant experience takes place, using a discrete choice experimental design.

5.1 Discussion

Several points merit further emphasis and discussion.

- It appears that *preferences are not stable and experience changes the preference pattern.* In contrast to decision making of pregnant women that is based on 'decision utilities' women who experienced a delivery are using 'experienced utilities' to elicit preferences. The different preferences of the two groups indicate that the original 'decision utilities' have been replaced by new utilities that have been shaped by the recent experience. This result is in line with the findings reported by Ryan and Ubach, (2003). They estimated preferences for a new system of issuing repeat prescriptions using two samples: one of patients with no prior experience with the new system and the second of patients who have already used the new system. Preference patterns of the two groups appeared to be significantly different.

- In both samples, the *amount (intensity) of experience is irrelevant.* A realistic situation affects preferences but it appears that the repetition of realistic incidents has no additional accumulated effect. Interestingly, when the hospital staff (doctors and nurses) was asked to complete the same questionnaires and choose, as if they were patients, they exhibited preferences that are similar to those of pregnant women. This can be explained by lack of experience of most of them (or distant experience of nurses who have their own kids).

- Could it be that the *different preferences* of women in prenatal classes compared to women who recently gave birth *stem from different characteristics of respondents in the two groups*? Women in our two samples are somewhat different in terms of education, ethnic

origin and religious affiliation[16]. In order to control for these differences and arrive at a net effect of experience, we added to the regression equation of the joint sample, interactions of these socio-economic variables and all the variables of the equation – the basic results have not changed: experience does effect preferences significantly; preferences of women in prenatal classes differ significantly from preferences of women in maternity wards after a delivery.

- Will the modified preferences that have been shaped by recent experience last for long or would 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.

- Empirical results have *policy implication*, 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 the first child and women who already have kids) have different preferences – whose preferences should be accommodated? Obviously, there is no clear answer to this question and discussions of hospital policy should take into account additional factors (on top of preferences).

- Moreover, preferences lead to choice of hospital, but the process of *hospital choice is more complex* and is based on various additional factors such as: past hospitalization in the hospital that is being considered (of the patient or of close relatives), either for the same health event or for a different health incidence; information or recommendations of friends and relatives (network effects); popularity (herd effects), and more. These factors should be studied before useful and efficient policy implications could be derived.

[16] Women in prenatal classes are somewhat more educated and have a higher percentage of Israeli born and of a non-religious affiliation.

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TABLE 3

Main-Effects Regressions – Probit Random-Effects

by Different Levels of Experience: Prenatal 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) Prenatal classes	(2) First birth	(3) Second birth or over	Differences between: Prenatal classes – and first birth	Differences between: first- and second birth or over
Number of beds (reference: 3 beds)					
Two beds	0.0527 (0.64)	-0.1102 (0.76)	0.1200 (1.28)	0.1669 (0.99)	-0.2351 (1.34)
Private room	0.7950 (9.28)	0.0419 (0.30)	0.1346 (1.40)	0.7535 (4.52)	-0.0958 (0.55)
Attitude	1.2970 (15.68)	1.5659 (9.94)	1.4156 (13.91)	-0.2936 (1.77)	0.2000 (1.15)
Professionalism of staff	1.9182 (20.42)	1.7277 (10.97)	1.8595 (17.07)	0.1581 (0.97)	-0.0688 (0.41)
Information	0.7211 (9.37)	0.9846 (7.25)	0.7801 (9.07)	-0.2818 (1.89)	0.2389 (1.55)
Time of travel (reference: 45 minutes)					
30 minutes	0.5220 (6.09)	0.3723 (2.42)	0.5256 (5.19)	0.1448 (0.82)	-0.1430 (0.77)
15 minutes	0.6167 (5.86)	0.4666 (2.65)	0.5346 (4.57)	0.1419 (0.69)	-0.0528 (0.25)
Number of observations	1855	633	1466	2488	2099
Number of women	155	97	226	252	323
Log Likelihood	-815.29	-269.89	-645.78	-1085.24	-915.88
ρ	0.4380	0.4063	0.4639	0.4303	0.4478
x^2 for Likelihood ratio test of $\rho=0$ (significance level)	220.46 (0.00)	40.14 (0.00)	132.12 (0.00)	240.64 (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 of 30 minutes; Information and Travel time of 15 minutes	Attitude and Professionalism; Travel time of 15 and of 30 minutes	Travel time of 15 and of 30 minutes	-	-

Notes:
- Stata 8 was used for estimation (Random-Effects Probit, with no constant).
- Numbers in parentheses are 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 minutes
- Women in prenatal 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).
- 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.
- The coefficients in the column that refers to prenatal classes and first birth are (approximately) the difference between coefficients of the first column (Prenatal Classes) and the second (1st birth). Similarly, the coefficients in the column that refers to 1st and 2nd birth or over are (approximately) the difference between the coefficients of the second column and the third.

TABLE 4
Random-Effects Probit Regressions: Effect of Experience

Breast Cancer Patients

Israel, 2003

	Model I	**Model II**	**Model III**	**Model IV**
Independent variables	**Main-effects All respondents**	**Main-effects and interactions with experience (dummy) All respondents**	**Main-effects and interactions with experience (continuous) Excluding women with radiation only**	**Main-effects and interactions with end of treatment (dummy) Excluding women with radiation only**
Information	0.5452 (5.59)	0.7351 (4.31)	0.6159 (4.20)	0.6127 (5.22)
Attitude	0.5514 (5.49)	0.5324 (3.07)	0.4476 (2.98)	0.5152 (4.28)
Professionalism of institute	1.4902 (13.33)	1.2674 (6.93)	1.4855 (8.84)	1.6065 (11.69)
Reputation of doctor	1.4212 (13.61)	1.4901 (8.27)	1.3204 (8.51)	1.4865 (11.75)
Travel time	-0.4036 (.32)	-0.4412 (2.71)	-0.4813 (3.49)	-0.4162 (3.71)
Interaction terms of experience with main-effects:				
Experience * Information	-	-0.2829 (1.37)	-0.0005 (0.03)	0.0336 (0.12)
Experience * Attitude	-	0.0421 (0.20)	0.0217 (1.27)	0.4371 (1.48)
Experience * Professionalism	-	0.3525 (1.58)	0.0089 (0.46)	-0.5402 (1.78)
Experience * Reputation	-	-0.0791 (0.37)	0.0087 (0.48)	-0.4406 (1.50)
Experience * Travel time	-	0.0703 (0.35)	0.0031 (0.20)	-0.2872 (1.01)
Log likelihood	-502.27	-498.81	-409.73	-415.96
χ^2 for likelihood ratio test of ρ =0 (significance level)	153.39 (0.00)	153.67 (0.00)	104.27 (0.00)	106.71 (0.00)
Sample size	93	93	77	77
Number of observations	1058	1058	878	878

Notes: - Numbers in parentheses are *Z* -statistics.
- Stata 8 is used for estimation (Random-Effects Probit with no constant).
- Hospital A (the constant set) has the following characteristics: Information – extensive; Attitude – reasonable; Professionalism – very good; Reputation of doctor – standard; Travel time – more than an hour.
- Model I and Model II include women who are treated with chemotherapy only (26 women); radiation only (16) and both chemotherapy and radiation (51). In Model III and Model IV women who were treated with radiation only have been excluded.
- In Model II Experience is a dummy variable that takes the value of 1 if the patient had at least 3 chemotherapy treatments, <u>or</u> if she had a protocol of radiation only – she had at least 10 radiation treatments.
- In Model III all patients were treated with chemotherapy and Exp is defined as a continuous variable and relates to the actual number of treatments the patient has already received.
- In Model IV all respondents were treated with chemotherapy (and the majority also with radiation) and Exp is a dummy variable that equals 1 if the patient finished all chemotherapy treatments.