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FOI Working Paper

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2010 / 7

FOI Working Paper 2010 / 7

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June 2010

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Acknowledgements
We gratefully acknowledge Coloplast A/S for providing financial support.

Abstract

In stated preference literature, the tendency to choose the alternative representing the status quo situation seems to exceed real life status quo effects. Accordingly, status quo bias can be a problem. In Choice Experiments, status quo bias is found to be strongly correlated with protest attitudes toward the cost attribute. If economic values are to be elicited, this problem is difficult to remedy. In a split sample framework we test a novel ex-ante entreaty aimed specifically at the cost attribute and find that it effectively reduces status quo bias and improves the internal validity of the hypothetical preferences.

Key words
Choice Experiment, Status Quo Bias, Entreaty, Stated Preference

JEL Codes: C10, C51, C52, C90

1 Introduction

When applying willingness to pay (WTP) measures from stated preference (SP) surveys in welfare economic analysis, there is set a narrow frame for how much the estimated benefits and costs can diverge from the true benefits and costs. Applying hypothetical preference surveys (i.e. SP surveys) researcher and practitioners are faced with the challenge of framing the survey so that the hypothetical setup mimics the potential real life choice situation had the good in question been marketable. One of the main reasons for doing this is to establish a realistic frame for the valuation questions and thereby minimise the level of potential biases reported in the literature to have a significant influence on the stated preference. These biases include hypothetical biases (Carlsson and Martinsson 2001; Lusk and Schroeder 2004; Alfness and Steine 2005) starting point bias (Ladenburg and Olsen 2008; Ladenburg 2009), price vector biases (Carlsson and Martinsson 2008; Mørkbak et al. 2009) and protest zero bias (Meyerhoff and Liebe 2009; Bonnichsen and Ladenburg 2009).

In this line of biases is status quo (SQ) bias (Samuelson and Zeckhauser 1988). This bias emerges if the respondent, relative to a real market situation, puts larger weight on the SQ alternative in an economic valuation experiment. Stated differently, in terms of utility and choice, the bias appears if the positive utility related to the SQ acts as a larger threshold which the hypothetical alternative(s) must exceed before they are chosen, compared to that threshold on a real market.

A clear distinction here is thus whether the observed stated SQ bias mimics real market SQ effects, hypothetical SQ bias or a combination of both. In the case of the former, the bias should be referred to as an "effect", which is a natural component in the utility function of the respondent, such as loss aversion, uncertainties regarding shifts in product and brands, etc. (Kahneman, Knetsch and Thaler 1991).

If the stated preferences cannot solely be ascribed to mimic real life choices, the SQ effect might be contingent on the setup of the hypothetical market. This would suggest that some (or all) of the utility threshold of the SQ alternative is motivated by protest beliefs and therefore represents a protest choice behaviour in the hypothetical market. In that case the SQ effect should be referred to as a SQ bias (Adamowicz et al. 1998; Boxall et al. 2009; Meyerhoff and Liebe 2009).

In the presence of SQ bias, two important consequences should be put forward. First of all, the results from the stated preference surveys will be biased as the stated preferences for the SQ do not correspond to a preference for the SQ on the real market, i.e. $WTP\text{-}SQ_{hyp} > WTP\text{-}SQ_{real}$. All things being equal, this would result in an underestimation of the welfare changes of a proposed policy change. Secondly, given that the SQ alternative is chosen too frequently, the effectiveness of the survey to elicit and identify the preferences for the changes in the attributes representing alternative policy situations is reduced. More specifically, if the respondents too frequently choose the SQ, information regarding the relative trade-offs between different attribute levels is reduced.

Applying a two split sample, we test the effect of a small entreaty previously found to have a positive effect on the level of protest zero bids (Bonnichsen and Ladenburg 2009). In a setup in which we elicit preferences for improving the attributes of respondents' ostomy pouches[1] we find that the entreaty reduces the threshold for choosing a hypothetical alternative and thereby reduces SQ bias. These results are positive as they suggest that the entreaty can reduce SQ bias and make the choice elicitation process more efficient. Furthermore, even though the entreaty makes the respondent choose the hypothetical alternatives more frequently, the demand curve is not pushed outwards. In other words the entreaty does not increase the overall demand, but makes the respondent do more trade-offs between the attributes and the corresponding attribute levels.

The paper is structured as follows. First the study design is presented, which is followed by the analytical framework, presentation of the samples, results, discussion and a conclusion.

2 Study Design

The overall frame of the present study was the elicitation of ostomates' preferences for improvements in their present ostomy pouches. In ostomy surgery a part of the intestine is brought through the abdominal wall creating an opening where stool is then passed. An ostomy surgery is life saving and the modern stoma management appliances give ostomates the possibility to live close to full lives (Cataldo 1999). One such appliance is an ostomy pouch. Pouches are made of soft plastic, clear or skin-coloured, and they lie flat against the skin. Pouches vary according to a number of attributes, the most important of which relate to the adhesive, filter and flexibility of the system.

2.1 Experimental Design

Collection of data was carried out through a mailed survey consisting of 1,200 questionnaires. Respondents were sampled from a nationwide group of Swedish ostomates consisting of approximately 20,000 people. In the questionnaire, respondents were presented with a scenario description which described different types of improvements to an ostomy pouch. In accordance with Lancaster's *attribute theory of value* (Lancaster 1998), the scenario introduced improvements to the current ostomy pouch with regard to three different attributes of the ostomy pouch: The flexibility of the system as a whole, the number of small starting leakages under the base plate per month and the filter lifetime (Bonnichsen 2010). An additional monthly expense was used as the payment vehicle[2]. The attributes were presented to the respondents with the descriptions shown in Table 1.

[1] In the survey the focus in the scenario description and the framing of the hypothetical market is on the improvements of the attributes and not on change of the respondents' existing ostomy pouch. Uncertainties of the functionality of a new ostomy pouch are thereby expected to be minimised or even completely eliminated.

Table 1 Attributes and Attribute Levels

Attribute	Attribute Level
Flexibility of the system as a whole	Same as current
	Small improvement
	Large improvement
Number of small starting leakages under the base plate per month	3 leakages
	1 leakage
	No leakages
Filter lifetime	7 hours
	12 hours
	24 hours
Additional expense per month	(0 SEK)
	125 SEK
	200 SEK
	375 SEK
	500 SEK
	750 SEK
	1000 SEK

A zero-priced SQ alternative was used as a benchmark. Following Banzhaf *et al*. (2001), the SQ alternative was defined by the current system of the individual[3]. This information was then used to define the SQ in estimation.

As a full factorial design comprised 162 alternatives, a D-optimal fractional factorial design consisting of 18 alternatives was identified (Louviere *et al*., 2000)[4]. These alternatives were then arranged into 9 choice sets and assigned into two blocks[5], with the respondents evaluating five and four choice sets per block. Each treatment group had identical blocking structures so that the same choice sets appeared in both treatments. As such, a choice set consisted of three alternatives: The zero-priced SQ alternative and two policy generated improvement alternatives with an associated additional monthly expense. Figure 1 shows an example of a choice set used in the questionnaire.

The questionnaire used in the survey underwent numerous revisions following on from focus groups and a pilot study. Reminder and possible replacement questionnaires were mailed to respondents approximately ten days after the initial mailing.

[2] Ostomates had a maximum out of pocket expense of 1,800 SEK/year when the survey was conducted.

[3] In order to find the respondents' own status quo values, the questionnaire included a question asking the respondents to state the attribute levels of their current system with regard to flexibility, number of small leakages and filter lifetime.

[4] To minimise the number of dominating and non causal alternatives, the initially identified efficient design was subjected to the manual swapping procedure suggested by Huber and Zwerina (1996).

[5] In SAS, the %mktblock macro was used to assign the choice sets into blocks (Kuhfeld, 2005).

	Alternative 1	Alternative 2	My current system (i.e. no change)
Flexibility of the system as a whole (base plate and coupling)	Large improvement	Same as current	-
Number of small starting leakages under the base plate per month	3 leakages	No leakages	-
Filter lifetime	24 hours	12 hours	-
Additional expense per month	750 SEK	200 SEK	0 SEK
I prefer	❑	❑	❑
	(m a r k o n e b o x o n l y)		

Figure 1 Choice Set Example

2.2 The Entreaty

As mentioned SQ bias emerges in SP surveys when the respondent, via the choices between different alternatives, puts undue weight on the SQ alternative. The SQ thereby acts as an artificial threshold, which reduces the propensity to choose an alternative different from the SQ alternative. The aim of the present paper is to test if this artificial threshold/SQ bias can be reduced with the use of a Protest Reduction Entreaty (PRE)[6]. In order to test for the effect of the PRE on SQ bias, a two-split sample design was utilised. In both treatments respondents were introduced to a hypothetical market entailing choices between alternative ostomy pouches. Included in this section was a description of the attributes, reasons for the variations in the attribute levels, "cheap talk" focusing on the issue of hypothetical bias and budget reminders prior to the choice session. The questionnaires for both treatments were kept identical with the exception that respondents in treatment B were given a PRE, while respondents in treatment A were not. The PRE is presented below.

"*The hypothetical expense presented to you in the next questions is not an expense that you yourself will be responsible for paying, but it has been included merely to increase the realism of your choices and for you to convey how much you believe an improvement is worth. While this hypothetical expense will have no effect on the reimbursements received in Sweden and will not*

[6] The PRE was originally intended to reduce the number of protest zero bids (Bonnichsen and Ladenburg 2009). It has later been found that the PRE also affects the propensity for respondents to choose the SQ as well as the strength of preference for the SQ alternative.

result in any extra cost for ostomates, we kindly ask you to carefully consider the hypothetical expense, as if you were to pay it when making your choices."

3 Analytical Framework

To model the effect of the PRE on the level of SQ bias, a theoretical choice framework is setup by elaborating on the work by Ladenburg and Olsen (2008)[7].

Assume that a utility maximising individual *i* is faced with a choice *a* related to a single action, $a \in (0,1)$. In the present setup this equals that respondents choose one alternative ostomy pouch from a choice set consisting of the respondent's present ostomy pouch and two hypothetical versions of the present ostomy pouch in which the attribute levels of the pouch vary. In the model, the choice of action influences the individual's utility (U_i) through two separable components; a wealth component W_i and a moral component M_i.

$$U_i(a, n, s, q, sq) = M_i(a, n, s, sq) + W_i(a, q, c) \qquad (1)$$

Starting with the wealth component W_i, it depends on the perceived utility q of choosing action a and the implicit cost of that choice, i.e. c. Specifically, $\partial W/\partial q > 0$ and $\partial W/\partial c < 0$, meaning that W_i increases as the perceived value of the ostomy pouch attributes increases and the costs decrease. This framework is suitable for analysing loss aversion or uncertainty regarding the change from the existing ostomy pouch to a new (hypothetical) pouch, which influences a rational tendency to stick with the present ostomy system, i.e. SQ effect.

Moving to M_i[8], n represents the cost of social norms[9]. In the initial model by Levitt and List (2007), n is included to control for those factors such as social norms and legal rules, which prescribe a specific behaviour in a particular society. As such, the size and the sign of the n element might be influenced by several factors. Following the argumentation in Ladenburg and Olsen (2008), it can be argued that n might entail a moral responsibility to choose the ostomy pouch with the best levels of the attributes, even though the relative cost of that action exceeds the benefits. Such behaviour

[7] Ladenburg and Olsen (2008) test the influence of price vector in an instructional choice set used in a CE concerning protection of specific types of nature when planning motorways. In their paper, they attune a more theoretical model initially suggested by Levitt and List (2007).

[8] In Levitt and List (2007) M_i also included a parameter; v representing the externality an action can have on other individuals. More specifically, v represents the loss to other people as a consequence of the gain individual *i* achieved by action *a* in for example a lab experiments involving payoffs. In a more policy relevant setting, Ladenburg and Olsen (2008) argue that *v* can represent the negative externality the choice of policy strategy with regard to the level of provision of an environmental good. However, in the present study, it is argued that a link between the choice of action and the impact on other individuals is not directly established. First of all, the good in question is a private good and the scenario description does facilitate an dependency between individual *i* and other ostomy pouch users via the action *a*. If the text in the questionnaire had a research and development orientated profile, such a dependency and thereby the relevance of including *v* in the utility function would probably have been more relevant.

[9] Here the term "cost of social norms" covers other similar expressions from the literature such as "social costs", "moral costs" or "prescription costs".

could be motivated by individual beliefs concerning that harmful things might occur due to inaction (Schwartz 1970, 1976). In the present CE setup, this would prescribe that individuals might have a tendency to choose a policy generated alternative (with better attribute levels) too frequently, when compared to the choices made solely based on the W_i component. On the other hand, the individual might also derive utility specifically by accepting high cost ostomy pouch improvements, because they see themselves as honest and socially responsible individuals, who for example want to push forward better research (Andreoni and Vesterlund 2001, Nyborg 2000, Akerlof and Dickens 1982). Independently of motivation for the cost of social norms (negatively motivated by not doing or positively motivated by doing), the cost of social norms positively influences M_i so that $M_i/\partial n > 0$.

The second component in M_i, is s, which refers to the fact that the choice of ostomy pouch might also be governed by moral utility if the respondent feels scrutinized by filling in the questionnaire.

The final variable is sq, which is added to the moral utility component to capture the choice behaviour in which an individual chooses the present ostomy pouch even though the individual would gain a net benefit (controlling for SQ effects) by choosing an improved ostomy pouch with higher costs, i.e. SQ bias.

As suggested by Adamowicz et al. (1998), Boxall et al. (2009) and Meyerhoff and Liebe (2009) SQ biases are perceived to be related to different elements in the hypothetical setup such as mistrust in the providing organisation, protest votes against the survey and the cost attribute, number of attributes and attribute level differences. Importantly, some of the elements can be accounted for if the researcher is cognizant, such as with the design of the choice sets (Boxall et al. 2009). However, protests attitudes towards paying for environmental improvements are less straight forward to solve, as a cost attribute must be in the choice sets if an economic value should be derived. In the present framework we therefore focus on the results from Meyerhoff and Liebe (2009). They find that the propensity to choose the SQ alternative is significantly influenced by the level of protest attitude the respondent has towards the payment of the hypothetical change in the good. Let p_i be the payment based protest attitude. Meyerhoff and Liebe (2009) categorise the protest attitude of each respondent based on the answers of four statements related to the attitude towards the payment of the good in focus. These protest statements are presented in Table 2.

Table 2 Statements of Protest Attitude from Meyerhoff and Liebe (2009)

"I already pay enough for other things"
"Lower Saxony should cut public spending for other things instead of expecting voluntary contribution from me"
"It is my right to have a high level of biodiversity in forests and not something that I should have to pay extra for"
"I refuse to assess nature in monetary terms"

Let p_k be the attitude towards one of the four specific protest statements. Following Meyerhoff and Liebe (2009), the p_k attitudes are assumed to have a simple cumulative influence on the propensity to exhibit SQ bias so that $p_i = \sum_{k=1}^{4} p_{ik}$. Accordingly, the propensity to state a SQ-biased preference is an increasing function of p_i i.e. $\partial sq_i/\partial p_i > 0$ (2).

With this framework the influence of the PRE is tested. As put forward, the PRE focuses on the payment of the good in question and remind the respondents that even though they are not going to pay up front, they should consider the costs as if they are going to pay for them. The wording of the PRE thus directly addresses the key aspects of the type of protest attitudes identified in Meyerhoff and Liebe (2009). As such it is expected that the PRE has a positive influence on the protest behaviour, such that $\partial p_i/\partial PRE < 0$ (3). Relating this to (2) means that $\partial sq_i/\partial PRE < 0$ (4).

Econometrically, the preferences for the SQ alternative and thereby potential SQ biases are commonly identified by including an alternative specific constant (ASC) for the SQ alternative in the preference model[10]. If this ASC_{SQ} is positive, it suggests that, with all things being equal, an SQ effect/bias is present. Meyerhoff and Liebe (2009) find the numerical size of the estimated ASC_{SQ} coefficient to be positively related to the level of protesters. This denotes that $\partial ASC_{SQ,i}/\partial p_i > 0$ and that SQ bias make the preferences for the SQ alternative stronger. Accordingly with the inclusion of the PRE, the numerical size of the ASC_{SQ} and thereby SQ bias can be reduced such that $\partial ASC_{SQ,i}/\partial PRE < 0 \rightarrow \partial SQ\,bias/\partial PRE < 0$.

4 Data

Of the 1,200 questionnaires mailed to the respondents, an initial sample (including protest responses) of 465 responses was obtained[11]. This was subsequently trimmed to an effective sample (excluding protest responses) of 254 usable responses. The distribution of effective responses between the two splits was found to be similar with treatment A containing 116 responses and treatment B containing 138 responses, while the distribution of responses across blocks was also found to be even. An analysis of a range of demographic background characteristics of the initial and the effective samples (Table 3) shows that the two treatment groups only differ significantly with respect to gender in both the initial and the effective samples[12]. With regard to the effective

[10] The coding and econometrics of the ASC-SQ are described in more detail in Section 5 of this paper.

[11] Before the initial sample of 465 was established, 145 responses were removed as they stated that they use pouches without a filter. These respondents were removed as they would not be able to relate to all of the attributes presented to them in the choice sets and would therefore not be able to make the required trade-offs. With the removal of these particular respondents, the mail out sample of 1,200 is actually equivalent to approximately 900, thereby resulting in a higher response rate.

[12] To test if the PRE has an effect on the distributions of the various demographic background characteristics of the initial and effective samples (i.e. sampling bias), an analysis of whether the characteristics differ significantly between the initial and effective samples was carried out. The χ^2-tests reveal that there was no significant difference between the characteristics of the initial and effective samples in both splits. Results are available from the authors upon request.

sample, women account for 40 percent of the total in treatment A whereas this share is 51 percent in treatment B.

Table 3 Respondent Demographics Compared Across Treatment Groups

	Initial sample			Effective sample		
	Treat-ment A %	Treat-ment B %	Significance in χ^2-test[a]	Treat-ment A %	Treat-ment B %	Significance in χ^2-test
Gender						
Male	39	47	*	40	51	*
Female	61	53		60	49	
Household gross income (SEK)						
<150,000	12	12		11	9	
150,000-299,999	32	28	NS	33	26	NS
300,000-499,999	32	33		29	31	
>500,000	24	28		27	34	
Age						
18-34	6	6		9	7	
35-54	33	27	NS	29	32	NS
55-74	61	67		62	62	
Education						
Primary and vocational	75	72		72	68	
Short-middle academic (college)	16	17	NS	16	19	NS
Long-term academic (university)	9	10		12	13	
Type of stoma[b]						
Colostomy	34	34	NS	31	33	NS
Ileostomy	66	66		69	67	
Length of time of stoma in place						
<1 yr	1	0.5		1	1	
1-5 yrs	31	31	NS	31	35	NS
5-10 yrs	27	26		23	27	
>10 yrs	42	41		45	38	
Blocking						
Block 1	-	-		58	70	NS
Block 2	-	-		58	75	

NS indicates no significant difference at 95% level, * indicates a significant difference at 95% level.
[a] The χ^2-test is employed on the basis of the actual numbers behind the percentages.
[b] There are three types of stoma: Colostomy, ileostomy, urostomy. The sample does not contain ostomates with urostomy.

Due to the different distributions of gender in the two treatments, analyses were carried out on an overall level as well as on a gender specific level. This approach was taken in order to ascertain whether potential differences with regard to both the number of SQ choices and the preferences of the respondents in the two treatments are caused merely by an overall impact of the PRE or if there is a gender specific effect.

5 Econometric Specifications

The parametric analysis applies three types of econometric models: Conditional Logit (CL), Error Component Logit (ECL) and Random Parameter Error Component Logit (RPECL). The models rely on the random utility model (McFadden 1974), which states that the true but ultimately unobservable utility U is broken down into two components, an observable systematic component V and the unobservable random component, the error term ε. Individual n's true utility for the ith alternative can be written:

$$U_{ni} = V_{ni}(x_{ni}, S_{ni}, \beta) + \varepsilon_{ni},$$

where the observable component V_{ni} is a function of the attributes of the alternatives x_{ni}, characteristics of the individuals S_{ni} and a set of unknown preference parameters β. The observable component V_{ni} is assumed to be a linear function:

$$V_{ni} = ASC + \beta_k x_{ki},$$

where β_k denotes a vector of preference parameters associated with attribute k, x_{ki} a vector of attributes of alternative i and ASC denotes an alternative specific constant. Assuming a specific parametric distribution of the error term allows a probabilistic analysis of individual choice behaviour:

$$P_{ni} = Prob\big(V_{ni} + \varepsilon_{ni} \geq V_{nj} + \varepsilon_{nj}\big) \forall i, j \in C, j \neq i,$$

where P_{ni} is the probability that individual n's utility is maximised by choosing alternative i from choice set C.

5.1 Conditional Logit

If the error terms are assumed to be independently and identically Gumbel distributed, then this results in a CL specification for the probability of individual n choosing alternative i:

$$P_{ni} = \frac{e^{V_{ni}}}{\sum_{j \in C} e^{V_{nj}}},$$

where the scale parameter is normalised to 1, and omitted while the error term is left out for simplicity. The CL model imposes several restrictive assumptions in that it does not allow for random taste variation, for unrestricted substitution patterns and for correlation in unobserved factors over time (Train 2003). The model also suffers from having to adhere to the restrictive independence of irrelevant alternatives (IIA) property. Due to these restrictions, the CL may be unsuitable for identifying a possible SQ bias and other models that avoid some of these restrictions are presented.

5.2 Error Component Logit

In the ECL model, an additional error component is incorporated in the CL model to capture any remaining SQ effects in the stochastic part of utility (Scarpa et al. 2005). The additional error component has zero-mean and is a normally distributed random parameter assigned only to the two hypothetical alternatives. Following Meyerhoff and Liebe (2009), the utility function of the ECL specification can be written as:

$$U_{ni} = V_{ni} + E_{ni} + \varepsilon_{ni},$$

where V_{ni} is the systematic component of utility, E_{ni} are the error components and ε_{ni} is the same Gumbel distributed error term from the CL. When the error components are associated with the hypothetical alternatives, the utility functions can be written as:

$$U_1 = \beta x_1 + E_{12} + \varepsilon_1,$$
$$U_2 = \beta x_1 + E_{12} + \varepsilon_2,$$
$$U_{SQ} = ASC_{SQ} + \beta x_{SQ} + \varepsilon_{SQ},$$

where subscripts *1* and *2* indicate the hypothetical alternatives and the subscript *SQ* indicates the current system of the respondent, i.e. the SQ. By including the additional error components E_{12}, the IIA restriction is eliminated and any remaining systematic effect of the SQ is captured by the ASC-SQ (Scarpa et al. 2005).

5.3 Random Parameter Error Component Logit

To further extend the ECL model, the RPECL specification is applied. The specification allows for taste heterogeneity in preferences by specifying some or all attribute coefficients as random. The model also does not exhibit the restrictive IIA property and it allows for correlation in unobserved utility over alternatives and time (Train 2003). Here individual *n*'s true utility for the *i*th alternative can be rewritten as:

$$U_{ni} = V'_{ni}(x_{ni}, \beta, \beta_n) + E_{ni} + \varepsilon_{ni},$$

where β_n denotes individual specific random parameters while β denotes the fixed parameters and the characteristics of the individuals are left out for simplicity. The model is specified with the ASC-SQ and the price coefficient being fixed and all other coefficients being normally distributed[13]. Assuming that the error term is still Gumbel distributed, the probability of individual *n* choosing alternative *i* can be written:

[13] It could be argued that a normal distribution might not be entirely appropriate as it allows for negative and positive values in the sample. However, several of the respondents have expressed that they presently have a well functioning ostomy pouch in the sense that they have very few leakages and a filter lifetime of more than 12 hours. Consequently, some part of the respondents might associate the attribute levels with negative utility.

$$P_{ni} = \int \left(\frac{e^{V'_{ni}+E_{ni}}}{\sum_{j \in C} e^{V'_{nj}+E_{nj}}} \right) \phi(\beta|b,W) d\beta,$$

where $\phi(\beta|b,W)$ is the normal density with mean b and covariance W. This probability can be described as an integral of the standard CL function evaluated at different values of β with the density function as a mixing distribution (Train 2003).

5.4 The Alternative Specific Constant for the Status Quo

The models used for estimation all include an ASC for the SQ alternative in order to capture the systematic effect of the SQ (Scarpa et al. 2005). The ASC-SQ is coded to equal one if the SQ is chosen and zero otherwise. This should clean the ASC-SQ for any SQ effects so that only SQ bias is investigated. Additionally, in order to reduce potential SQ effects associated with the change of ostomy pouch, the questionnaire scenario description is worded so that focus is placed on preference for changes in the attributes themselves and not a shift/change of ostomy pouch per se.

The ASC-SQ expresses the utility associated with the SQ alternative relative to the two hypothetical alternatives. This utility is attributed to the SQ alternative in itself and cannot be explained by other explanatory variables in the model[14]. As mentioned before, the SQ is defined by the current system of the individual. The respondents were asked to state their own current levels of the attributes of their ostomy pouches. This information was used to define the SQ in estimation instead of using a zero-coded or effects-coded SQ. This approach eliminates the need for effects coding the attributes to be able to interpret the ASC.

6 Results and Discussion

6.1 The Number of Status Quo Choices

The aim of the present study is to ascertain whether the entreaty reduces the threshold for choosing a hypothetical alternative and thereby reduces SQ bias. Table 4 compares the number of observations of SQ choices as opposed to one of the two hypothetical alternatives across treatment groups.

[14] According to Meyerhoff and Liebe (2009) the interpretation of the ASC parameter depends on whether one sees it mainly as a technical parameter capturing the average effect of all relevant factors that are not included in the model. Or one chooses to associate the ASC parameter with a behavioural assumption. As suggested by Adamowicz et al. (1998), we choose the latter approach and interpret the ASC-SQ as the utility of the SQ alternative.

Table 4 Observations According to Alternative Chosen

	Treatment A	Treatment B	% difference[a]	χ^2-test[b]
Full sample				
Alternative 1 or 2	129	218	37.4%	6.76×10^{-6}
Status quo	376	403	12.8%	
Male				
Alternative 1 or 2	52	133	67.4%	4.06×10^{-7}
Status quo	156	181	23.1%	
Female				
Alternative 1 or 2	75	84	13.2%	0.204
Status quo	218	206	-4.5%	

[a] Weighted according to the number of respondents in each sample.
[b] Taking into consideration the number of respondents in each sample.

After accounting for the sample sizes of the treatment groups, one can see from the χ^2-test results that there is a significant difference between treatment groups of the number of observations for the choice of the SQ and the choice of a hypothetical alternative. Respondents in treatment B seem much more willing to choose one of the hypothetical alternatives than the respondents in treatment A. More specifically, the PRE seems to have increased the number of observations of a hypothetical alternative choice by almost 40 percent. The choice frequency of the SQ alternative is not significantly influenced by the PRE.

When looking at the number observations on a gender specific level, the numbers could suggest that male respondents are driving this difference. When carrying out the tests on gender specific levels, male respondents from treatment B choose a hypothetical alternative significantly more frequently compared to the male respondents in treatment A. This difference across treatment groups is not significant for female respondents.

6.2 Preference Models

In the present section, the effect of the PRE on SQ bias is tested using CL, ECL and RPECL models. It should be noted that the ECL and RPECL models allow for the panel structure of the CE data by allowing for the utility coefficients to vary over respondents, but remain constant over choice occasions for each respondent (Train 2003), while the CL model does not. The effect of the PRE is tested using the full samples and gender specific samples. The results are presented in Tables 5, 6, and 7. WTP is in SEK per month.

Table 5 Preference Models of the Full Sample

	CL			ECL			RPECL		
	A	B		A	B		A	B	
Mean estimates									
ASC_SQ	1.68***	1.04***		3.01***	1.19***		3.00***	1.34**	
Leaks_1	0.951***	0.758***		1.45***	0.984***		1.45***	1.27***	
Leaks_0	1.74***	1.41***		3.00***	1.9***		3.01***	2.42***	
Filt_12	0.28NS	0.36*		0.661NS	0.351NS		0.657NS	0.555NS	
Filt_24	0.0939NS	0.682***		0.636NS	0.994***		0.631NS	1.15***	
Flex_S	0.848***	0.257NS		1.55**	0.424NS		1.55**	0.547NS	
Flex_L	0.767**	0.528**		1.45**	0.834**		1.45**	0.676NS	
Price	-0.00342***	-0.0031***		-0.00547***	-0.00523***		-0.0055***	-0.0068***	
Standard deviation									
Leaks_1	-	-		-	-		0.03NS	0.243NS	
Leaks_0	-	-		-	-		0.00685NS	1.56**	
Filt_12	-	-		-	-		0.118NS	0.0756NS	
Filt_24	-	-		-	-		0.0997NS	0.961NS	
Flex_S	-	-		-	-		0.0627NS	0.0729NS	
Flex_L	-	-		-	-		0.122NS	1.73***	
EC_12	-	-		2.56***	2.77***		2.53***	3.40***	
WTP			ΔWTP (T-value)[a]			ΔWTP (T-value)			ΔWTP (T-value)
ASC_SQ	492	336	156 (0.92)	550	228	322 (1.70)	547	197	350 (1.86)
Leaks_1	278	245	33 (0.31)	264	188	76 (0.62)	264	186	78 (0.63)
Leaks_0	509	455	54 (0.46)	549	363	186 (1.48)	548	355	193 (1.52)
Filt_12	82	116	-34 (-0.43)	121	67	54 (0.53)	120	82	38 (0.44)
Filt_24	27	220	-193 (-1.99)	116	190	-74 (-0.76)	115	169	-54 (-0.56)
Flex_S	248	83	165 (1.47)	284	81	203 (1.83)	283	80	203 (1.80)
Flex_L	224	170	54 (0.47)	265	159	106 (0.88)	263	99	164 (1.39)
N	505	621		505	621		505	621	
Halton draws				1000	1000		1000	1000	
LL(b)	-303.9	-464.1		-256.3	-388.7		-256.2	-381.6	
Adj. R^2	0.438	0.308		0.522	0.417		0.511	0.419	
LR-test	10.6 (9)NS, b			14.0 (10)NS			26.1(16)NS		

NS indicates no significance, * indicates significance at 95% level, ** at 99% level and *** at 99.9% level.

[a] An asymptotic t-test of the significance of the differences in WTP.

[b] Here NS indicates a non-significant scale parameter at the 95% significance level of the LR-test of equality in preferences.

Preference Ordering

Although models used in rational choice theory are diverse, all assume individuals choose the best action according to stable preference functions and constraints facing them. A standard assumption in economic theory is more is preferred to less. Without any biases this relation is expected to emerge in stated preferences for hypothetical goods. However, if the preferences are governed by an unwarranted (and strong) tendency to choose the SQ alternative, the "stickiness" of the SQ alternative might disturb the otherwise rational preference ordering. The choice of the SQ alternative in the choice modelling framework gives information about whether the respondent is indifferent to the attributes of the hypothetical alternatives. Depending on the attribute levels of the existing ostomy pouch (of those respondents stating a SQ-bias preference), the bias in the preference ordering will pull in a different direction.

In the present application a rational preference ordering should induce the respondents to have stronger preferences for no leakages per month compared to one leakage per month, a filter life time of 24 hours compared to 12 hours and a pouch system which has a large improvement in flexibility compared to a small improvement in flexibility (i.e. the "best" pouch). Looking at the estimated coefficients from treatment A, it would seem that a rational preference structure as mentioned above is not generally present. More specifically, preferences for a filter with a lifetime of 24 hours and large flexibility system are preferred less than a filter with a life time of 12 hours or a small flexibility, respectively. Though these differences are not significant, they suggest that the respondents on average have not traded rationally between the SQ and the filter lifetime and flexibility attributes. Interestingly in treatment B, the respondents' choice between the SQ alternative and the two hypothetical alternatives appears to be rational in relation to the preference ordering. A filter with a lifetime of 24 hours and large flexibility system is preferred more than a filter with a lifetime of 12 hours or a small flexibility, respectively. Accordingly, the PRE seems to have influenced the rationality in the preference structure and thereby reduced the preference ordering effect of the SQ bias.

Preferences for the Status Quo Alternative

As put forward in the non-parametric analysis, the hypothetical alternatives are chosen more frequently when the respondents are presented to the PRE (treatment B). Controlling for the influence of the attributes in the alternatives on the choices, the econometric models support the non-parametric results. The WTP for the SQ via $WTP_{ASC\text{-}SQ}$ is considerably reduced. In treatment A, $WTP_{ASC\text{-}SQ}$ is between 492 and 550. In treatment B, $WTP_{ASC\text{-}SQ}$ is reduced to between 197 and 336. Though this difference is only significant at the 90 percent significance level in the ECL and RPECL models, the results still indicate that the PRE has lowered the preferences for the SQ alternative.

Relative Preferences
Across the three models, the most important attribute level for the average respondent is a system with no leakages. With this in mind it is worth focusing on the WTP estimates for the no leakages attribute and the ASC-SQ. In treatment A the $WTP_{ASC\text{-}SQ}$ is between 492 and 550 and is thus nearly identical to the WTP for the no leakage attribute. Or stated differently, on an average level in treatment A, when confronted with the choice between a pouch that does not leak and the existing pouch, the average respondent will be indifferent. This is due to the strong preference for the SQ via the ASC-SQ. For all other attributes and their levels the SQ alternative is preferred. Moving on to treatment B, the relative preferences between the SQ alternative and the other attributes are changed. In treatment B the WTP estimates for no leakages are between 35 percent and 80 percent higher than $WTP_{ASC\text{-}SQ}$. The difference between $WTP_{ASC\text{-}SQ}$ and all of the other attributes has also been considerably reduced.

In SQ bias terminology, this suggests that SQ bias is reduced. With the introduction of the PRE, the utility threshold associated with the SQ alternative is reduced relative to the other attributes. This change in the relative levels is not governed by a uniform increase in the WTP for other attributes. On the contrary the WTPs generally appear to be relatively constant. This is also confirmed in the insignificant Likelihood Ratio (LR) test of equality in preferences reported in the bottom of Table 5.

6.3 Reduction of Status Quo Bias

The essence of the above preference model results is that the PRE seems to have an impact on the stated preferences on two levels. First of all, without the PRE, the preference ordering is not satisfactory from a theoretical point of view. Secondly, without the PRE, the relative preferences for the SQ alternative compared to the attribute improvements is so strong that the respondents are indifferent to having their present ostomy pouch and an improved pouch, which does not leak. The inclusion of the PRE seems to remedy some of these issues simultaneously. These results suggest that without the PRE, some respondents tend to choose the SQ alternative without actually paying much attention to the attributes of the hypothetical ostomy pouch alternatives per se. It would appear that the PRE makes the respondents make a more considered choice in this relation. When presented to the PRE, the hypothetical alternatives are chosen more frequently and in the choice among the alternatives, the respondents choose an improvement of their ostomy pouch in a theoretically systematic matter.

Jointly, these results strongly indicate that the stated preferences in treatment A to a higher extent are governed by SQ bias and that this bias (via the PRE) is reduced in treatment B.

6.4 Preference Models of the Gender-Specific Samples

As stated earlier, there were found to be significantly different distributions of gender in the two treatments. The following analyses were carried out on a gender specific level so as to ascertain

whether potential differences with regard to the preferences of the respondents in the two treatments are caused merely by an overall impact of the PRE or if there is a gender specific effect. The preference models for male respondents are shown in Table 6 while those for female respondents are shown in Table 7.

Table 6 Preference Models of the Male Subsample

	CL			ECL			RPECL		
	A	B		A	B		A	B	
Mean estimates									
ASC_SQ	1.85^{***}	0.977^{***}		3.21^{***}	0.747^{NS}		3.24^{***}	0.813^{NS}	
Leaks_1	0.91^{**}	0.576^{**}		1.45^{*}	0.803^{*}		1.46^{*}	1.56^{NS}	
Leaks_0	1.86^{***}	1.15^{***}		2.93^{***}	1.54^{***}		2.99^{***}	3.34^{*}	
Filt_12	0.197^{NS}	0.427^{*}		0.282^{NS}	0.361^{NS}		0.289^{NS}	1.04^{NS}	
Filt_24	-0.522^{NS}	0.539^{**}		-0.1^{NS}	0.858^{**}		-0.115^{NS}	1.51^{*}	
Flex_S	0.833^{NS}	0.385^{NS}		1.31^{NS}	0.603^{NS}		1.31^{NS}	1.46^{NS}	
Flex_L	0.537^{NS}	0.522^{NS}		1.1^{NS}	0.928^{*}		1.11^{NS}	1.39^{NS}	
Price	-0.00298^{***}	-0.00216^{***}		-0.00399^{*}	-0.00431^{***}		-0.00407^{**}	-0.00866^{**}	
Standard deviation									
Leaks_1	-	-		-	-		0.245^{NS}	0.294^{NS}	
Leaks_0	-	-		-	-		0.296^{NS}	2.99^{*}	
Filt_12	-	-		-	-		0.131^{NS}	0.223^{NS}	
Filt_24	-	-		-	-		0.404^{NS}	2.41^{NS}	
Flex_S	-	-		-	-		0.296^{NS}	0.133^{NS}	
Flex_L	-	-		-	-		0.0327^{NS}	2.80^{*}	
EC_12	-	-		2.11^{***}	3.05^{***}		2.10^{***}	5.71^{**}	
WTP			ΔWTP (T-value)[a]			ΔWTP (T-value)			ΔWTP (T-value)
ASC_SQ	619	453	166 (0.42)	804	173	631 (1.22)	797	94	703 (1.39)
Leaks_1	305	267	38 (0.18)	363	186	177 (0.66)	359	180	179 (0.65)
Leaks_0	622	536	86 (0.31)	736	358	378 (1.05)	736	386	350 (0.97)
Filt_12	66	198	-132 (-0.96)	71	84	-13 (-0.08)	71	120	-49 (-0.31)
Filt_24	-175	250	-425 (-2.45)	-25	199	-224 (-1.20)	-28	174	-202 (-1.05)
Flex_S	279	179	100 (0.52)	330	140	190 (0.83)	322	168	154 (0.68)
Flex_L	180	242	-62 (-0.29)	277	215	62 (0.26)	273	161	112 (0.47)
N	208	314		208	314		208	314	
Halton draws				1000	1000		1000	1000	
LL(b)	-123.4	-267.1		-108.9	-219.4		-108.1	-212.0	
Adj. R^2	0.425	0.197		0.488	0.338		0.461	0.342	

NS indicates no significance, * indicates significance at 95% level, ** at 99% level and *** at 99.9% level.

[a] An asymptotic t-test of the significance of the differences in WTP.

Table 7 Preference Models of the Female Subsample

	CL			ECL			RPECL		
	A	B		A	B		A	B	
Mean estimates									
ASC_SQ	1.67***	1.1***		2.97***	1.36*		3.09***	1.22NS	
Leaks_1	1.01***	1.26***		1.53*	1.51***		1.64NS	1.90***	
Leaks_0	1.78***	2.07***		3.27***	2.71***		3.42***	3.21***	
Filt_12	0.413NS	0.254NS		1.05*	0.343NS		1.05*	0.390NS	
Filt_24	0.625NS	0.886***		1.27*	1.18**		1.29*	1.12NS	
Flex_S	0.895**	-0.0856NS		1.78**	0.0266NS		1.83*	-0.185NS	
Flex_L	0.959**	0.415NS		1.69*	0.575NS		1.73*	0.146NS	
Price	-0.00382***	-0.00458***		-0.00668***	-0.00681***		-0.00691***	-0.00832***	
Standard deviation									
Leaks_1	-	-		-	-		0.0178NS	0.0613NS	
Leaks_0	-	-		-	-		0.0799NS	0.992NS	
Filt_12	-	-		-	-		0.740NS	0.308NS	
Filt_24	-	-		-	-		0.180NS	0.979NS	
Flex_S	-	-		-	-		0.00762NS	0.564NS	
Flex_L	-	-		-	-		0.256NS	1.53NS	
EC_12	-	-		2.92***	2.16***		3.02***	2.24***	
WTP			ΔWTP (T-value)[a]			ΔWTP (T-value)			ΔWTP (T-value)
ASC_SQ	437	240	197 (1.12)	445	200	245 (1.40)	447	146	301 (1.66)
Leaks_1	265	274	-9 (-0.08)	229	222	7 (0.05)	238	228	10 (0.07)
Leaks_0	466	451	15 (0.13)	490	398	92 (0.69)	496	385	111 (0.81)
Filt_12	108	55	53 (-0.92)	158	50	108 (1.17)	152	47	105 (1.12)
Filt_24	164	193	-29 (-0.26)	190	173	17 (0.17)	186	135	51 (0.48)
Flex_S	234	-19	253 (1.98)	266	4	262 (2.22)	264	-22	286 (2.09)
Flex_L	251	91	160 (1.27)	253	84	169 (1.38)	250	18	232 (1.64)
N	293	290		293	290		293	290	
Halton draws				1000	1000		1000	1000	
LL(b)	-172.6	-174.241		-142.5	-154.6		-142.6	-153.0	
Adj. R^2	0.439	0.428		0.529	0.487		0.511	0.473	

NS indicates no significance, * indicates significance at 95% level, ** at 99% level and *** at 99.9% level.

[a] An asymptotic t-test of the significance of the differences in WTP.

Preference Ordering
The issue of rational preference ordering seems to be highlighted in the male subsample. The male respondents in treatment A seem not to have a rational preference ordering. They have expressed a negative WTP between -25 and -175 for a filter with a lifetime of 24 hours compared to a WTP between 66 and 71 for a filter with a lifetime of 12 hours. They have also expressed a higher WTP for a system with small overall flexibility compared to a high flexibility. In treatment B, the preference ordering is rational. The male respondents are willing to pay between 174 and 250 for a filter lifetime of 24 hours compared to between 84 and 198 for a filter lifetime of 12 hours. With the exception of the RPECL model, the rational preference ordering is also restored for the WTP for the flexibility of the system. If we look at the female respondents, irrational preference ordering does not seem to be a problem in treatment A with the exception that WTP_{Flex_S} is slightly higher than the WTP_{Flex_L} in the ECL and RPECL models. The differences in WTP are also much smaller when compared to the case of male respondents.

Preferences for the Status Quo Alternative
For both male and female respondents, the PRE reduces the demand for the SQ alternative. The effect is particularly strong among male respondents. More specifically, for the male subsample the reduction of the WTP for the SQ alternative is as large as 631 and 703 in the ECL and RPECL models respectively (though not significant). For females the reduction in $WTP_{ASC\text{-}SQ}$ is more moderate and lies between 197 and 301.

Relative Preferences
Starting with the male respondents, the findings from the full sample models are even more apparent. In treatment A, the $WTP_{ASC\text{-}SQ}$ is at least twice as high as the WTP for all the attributes and equal to WTP_{Leaks_0}. The male respondents are on average actually close to being indifferent between their present pouch and one that does not leak, but also has a filter lifetime of 24 hours and has a large improvement in flexibility[15] (i.e. the "best" pouch). In treatment B, these issues are remedied. In the ECL and RPECL models, WTP_{Leaks_0} is more than twice as high as $WTP_{ASC\text{-}SQ}$ and WTP_{Leaks_1}, WTP_{Filt_24}, WTP_{Flex_S} and WTP_{Flex_L} are all higher or equal to $WTP_{ASC\text{-}SQ}$. The relative preference structure of the female respondents in treatment A and B are similar to the structure for the male respondents. As with the male respondents, the females' WTP_{Leaks_0} is more than twice as high as their $WTP_{ASC\text{-}SQ}$ while WTP_{Leaks_1} and WTP_{Filt_24} are higher or nearly equal to $WTP_{ASC\text{-}SQ}$. The relative WTP for the flexibility attribute does not seem to be influenced by the PRE.

These results indicate that the PRE has influenced male respondents to a larger extent than female respondents in terms of a restoration of a more rational preference ordering and a reduction in the demand for the SQ alternative. This is also observed when looking at the results for the number of choices of the SQ alternative presented in Section 6.2. These results are interesting, as they somewhat move against some of the recent research testing for gender specific information impacts in stated preferences surveys, such as Carlsson et al. (2008), Ladenburg and Olsen (2008),

[15] In the CL model, the respondents are indifferent.

Ladenburg (2009) and Ladenburg et al. (2010). Jointly, the studies find that female respondents are more affected by direct or indirect information compared to male respondents. One explanation for the observed differences in gender information response could be that female conformity behaviour often is found in studies focusing on male orientated topics such as the environment (Eagly and Carli 1981), which is the topic in the three above mentioned studies. However the present study focuses on health, which in the psychology literature is neutral orientated (Eagly and Carli 1981). Accordingly, the relative difference in gender specific levels of conformity might have changed. Further research is naturally warranted.

7 Conclusion

The aim of this paper was to test if the threshold for choosing a hypothetical alternative that exists in stated preference surveys (i.e. a status quo bias), can be reduced with the use of a short and simple entreaty presented to respondents prior to the actual choice situation. Applying a health economic Choice Experiment case and a two-split sample design, we firstly find that the entreaty leads to a more stable preference ordering that conforms to economic theory. Secondly, the respondents not presented to the entreaty have a dominant preference for the status quo (suggesting status quo bias), while those respondents presented with the entreaty do not show dominant preferences for the status quo alternative. In this relation, we also find that the respondents presented with the entreaty have effectively increased their choice of a hypothetical alternative by approximately 37 percent, thereby reducing the threshold for choosing a hypothetical alternative as opposed to the status quo alternative. These results could lead one to expect that the respondents might show stronger marginal preferences for the attributes of the hypothetical alternatives compared to the status quo (i.e. an increase in hypothetical bias), but this has not been observed. Instead, the marginal demand for the attributes appears to have been reduced. This suggests that that the use of the entreaty is an easy-to-implement and effective method to reduce status quo bias.

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