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The effect of information on preferences stated in a choice-based conjoint analysis

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ABSTRACT

Objective: The objective of the study was to investigate the effect of a priori information on preferences for treatment elicited in a discrete choice experiment.
Methods: A convenience sample of 100 subjects was randomly split into two groups. The groups received minimal or extensive information on the treatment of ankle and foot impairment in stroke. Then, they participated in a discrete choice experiment. Possible treatment was described using eight decision criteria with two to four levels each. Part-worth utility coefficients for the criteria levels, criteria importance and overall treatment preference were estimated. It was tested whether the amount of information that was received influenced the outcome of the discrete choice experiment.
Results: In the extensively informed group fewer reversals in the expected order of part-worth utilities were found. Criteria importance for four of the eight criteria and criteria importance ranking between the minimally and extensively informed subject groups were significantly different. The difference in part-worth utility of the levels had a minor effect on the predicted utility of the available treatments.
Conclusion: The lower number of level rank reversals in the extensively informed subjects indicates a better understanding of outcome desirability and thus a better understanding of the decision task. The effect of more extensive information on predicted treatment preference was minimal.
Practice implications: While interpreting the results of a discrete choice experiment, the effect of prior knowledge on the decision problem has to be taken into account. Although information seems to increase the understanding of the decision task, outcomes valuation can also be directed by information and more extensive information increases the cognitive burden which is placed on the subjects. Future research should focus on the exact nature and size of the effects and the results of this study should be clinically validated.

1. Introduction

In recent years, assessment of health care preferences has been promoted in health care decision making [1–3]. On a macro level, policy makers are interested in the values and preferences of the community to explain or predict the uptake of health care programs [4]. On a micro level the relevance of patient preferences in decision making is put forward in the models of shared and informed decision making [5,6]. As a result the use and usability of preference elicitation techniques are becoming a domain of interest in health care.

A preference elicitation technique that is often used to evaluate the mode and effect of health care is a conjoint analysis (CA) [7]. A specific form of CA is a discrete choice experiment (DCE). In a DCE a subject is asked to choose the preferred health state, product or service from a set of two or more scenarios. The hypothetical scenarios are constructed from short statements (levels) on the key characteristics (attributes or criteria) of the health state, product or service. A subject is expected to weigh criteria importance and level attractiveness during the decision task. A set of part-worth utilities for the criteria levels is estimated from the observed choices of the subject. A part-worth utility is the value of a criterion level to the subject. More attractive levels have higher part-worth utility. With the part-worth utilities for all levels, the relative importance of decision criteria and the overall preference for treatment can be estimated [8–10].

In earlier studies some methodological issues were raised with regard to the application of discrete choice experiments [11,12]. It is known that the framing of the scenarios can influence outcome [12,13]. However, no previous studies were focused on the effect of a priori information on the outcome of a DCE. This is important, because although information is seen as a prerequisite for decision

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making, it is known that the order, type and framing of information can influence the way information is used to make real-life decisions [14–16]. Moreover, it was found that observed treatment preference is influenced by the information that is available to a patient [17]. It is unknown whether preferences elicited in a hypothetical situation, such as a DCE, are also influenced by the information that is available to a subject prior to partaking in the experiment. In DCEs, much attention is focused on the description of the scenarios by ensuring that relevant information is presented in a comprehensible way in the description of criteria levels [9]. It could be hypothesized that as much attention is required to determine how much and which information is presented prior to a DCE, if the outcome of such a study is influenced by the information which is available to a subject.

Therefore, the aim of the current study was to determine if informing subjects with the actual harms and benefits of treatment and the available treatment options in an informational brochure before participating in a DCE influences its outcome, i.e., the part-worth utilities of criteria levels, the importance of decision criteria, and the predicted preference for treatment.

The decision context in the study was the treatment of ankle and foot impairment in stroke. In stroke, a deviant position of the ankle and foot that hinders standing and walking is a common disability. Determining the best treatment in ankle and foot impairment is a value-based decision, as the evidence of the effect of the treatment alternatives on patient performance is limited [18,19]. Surgical, technological and orthotic treatment alternatives are available, which differ widely in terms of impact of treatment to the patient, in comfort and cosmetics, and in the required use of walking aids or braces during and post-treatment. This makes the decision for treatment in ankle and foot impairment extremely suitable for a trading exercise such as a DCE.

2. Methods

2.1. Study design and procedure

The study was reviewed by the Human Subjects Ethics Review Board of the Roessingh Centre for Rehabilitation and was exempted from formal approval because it was a onetime experiment without emotional impact to subjects. A convenience sample of 80 bachelors and master students and 20 colleagues in the research department was approached for the study and agreed to participate. All subjects were familiar with health research, as they were involved in a health research project or in a health oriented study program. The subject sample was randomly split into two equal groups using block randomization. Both groups received a short flyer which explained the decision context. Additionally, one group received a more extensive informational brochure. All subjects received one of the four versions of a DCE. The informational brochure and the design of the experiment are described in the next paragraph. The subjects were given time to read the information at their own pace before participating in the DCE. Of the whole sample, 41 (21 male, 20 female, mean age 31.0 (S.D. 11.6)) subjects in the minimally informed group and 45 subjects (25 male, 20 female, mean age 29.9 (S.D. 12.9)) in the extensively informed group returned the completed DCE.

2.2. Design and content of the informational brochure

The short flyer consisted of one page of text which described a stroke as being an interruption of the blood flow to one side of the brain with an effect on the functioning of the muscles on the other side of the body. The decision problem was described as the availability of multiple treatment alternatives for the ankle and foot impairment with different short- and long-term consequences and with the preferred treatment being strongly dependent on personal preferences. The decisive criteria and the range of levels were described to the subjects using general statements, i.e.: "The duration of a treatment is the time between the first contact with the physiatrist and the moment when the end result of treatment is final. Treatment duration varies between 1 and 9 months between treatments" or "The result of treatment is the expected benefit for the patient in terms of functioning. A successful treatment can result in improved foot position, increased ankle stability and/or unlimited choice of footwear".

The extensively informed group received the short flyer along with an extended informational brochure. In five pages of information the specific treatment alternatives were detailed. Each of the five available treatment alternatives [19] was systematically described along the lines of the decision criteria (which are presented in Table 1). An example of an extensive description can be found in Appendix A. Positive or negative aspects of each treatment were explicitly stated and a short patient testimonial was added along with some pictures of the treatment. Technical language was not included in the brochure. The comprehensibility of the flyer and the brochure was tested in eight stroke patients with ample experience with ankle and foot impairment. Most patients received at least two of the treatments described in the brochure (in successive order). The pilot testing resulted in some rephrasing of evidence-based outcomes such as the presentation of success and risk proportions. Some patients preferred percentages to the proportions which were initially presented. Changes were made accordingly, and the decision was made to present proportions along with percentages, in the brochure as well as in the description of criteria levels.

2.3. Discrete choice experiment

The decision criteria were based on a decision tree that had been created in collaboration with an interest group of physiatrist and which was subsequently judged by an expert team in an earlier phase of the study [19]. In collaboration with four experts the decision tree was adapted to meet the demands put on decision criteria by the methodology [13]. During a meeting each treatment alternative was described in all criteria by the experts (column 1; Table 1). The descriptions were restructured to a successive series of outcome definitions in which duplicate descriptions were combined and some intermediate categories were added. Eight criteria with two to the four levels were formulated to cover all treatment alternatives. The phrasing of criteria levels retained the experts original description of the consequences of treatment as much as possible. The criteria and levels are presented in Table 1. Eight patients with ample experience in the treatment of ankle–foot impairment judged the face validity of a set of example choice tasks derived from the criteria and levels as being adequate.

However, the random combination of eight criteria with two, three or four levels yielded a potential of ($4^6 \times 3 \times 2 =$) 24.576 different treatment scenarios. It is not feasible to obtain a subject's judgment on that many treatment scenarios, so statistical design techniques were used to limit the number of scenarios to a fractional set of 160 scenarios while maintaining enough variety in the scenarios to estimate main effects. It was verified that no dominant choice-sets (with all levels in one treatment scenario being more attractive) were included. Previous experience taught us that a subject is able to judge 20 two-scenario choice sets (40 scenarios), before becoming tired or bored, so 80 two-scenario choice sets were divided over four different versions of the experiment. These versions of the experiment were distributed equally over the two groups. The experiment was preceded by a short introduction on the growing

Table 1
The eight decision criteria in the treatment of ankle–foot impairment with the levels which describe treatment in column 1.

Criteria and levels	Extensively informed		Minimally informed		Statistics	
					Z	*p*-value
(1) Treatment duration						
a. 1 month (AFO)	1.42	(0.97)	3.50	(1.06)	−7.107[a]	0.000
b. 3 months (OS; EFES)	1.89	(1.49)	1.73	(1.16)	−0.290	0.772
c. 6 months (IFES)	−1.34	(1.30)	−2.84	(1.61)	−4.561[a]	0.000
d. 9 months (STS)	−1.97	(1.56)	−2.39	(1.27)	−1.288	0.198
(2) Treatment impact						
a. No surgery (AFO, OS and EFES)	2.65	(2.13)	3.98	(2.29)	−2.892[a]	0.004
b. Surgery; implantation foreign materials (IFES)	−0.12	(2.59)	−1.37	(1.48)	−2.827[a]	0.005
c. Surgery; permanent changes in muscles (STS)	−2.53	(3.15)	−2.62	(2.09)	−0.765	0.444
(3) Ease of use						
a. Temporary aid; daily investment 3 min during treatment (STS)	4.91	(2.62)	6.69	(2.92)	−2.659[a]	0.008
b. Temporary aid; daily investment 10 min during treatment	3.28	(1.59)	2.78	(1.93)	−1.025	0.306
c. Permanent aid; daily investment 3 min (IFES; AFO; OS)	−3.46	(1.60)	−3.52	(2.60)	−0.177	0.859
d. Permanent aid; daily investment 10 min (EFES)	−4.73	(2.67)	−5.94	(3.16)	−2.296[a]	0.022
(4) Complication type						
a. Skin irritation; light inflammation of skin (STS, EFES and IFES)	0.84	(0.96)	0.79	(1.44)	−0.571	0.568
b. Pressure sores; serious inflammation of skin (AFO and OS)	−0.84	(0.96)	−0.79	(1.44)	−0.571	0.568
(5) Complication rate						
a. 1/100 (1%)	0.73	(1.17)	0.01	(1.07)	−2.750[a]	0.006
b. 5/100 (5%) (all, in absence of scientific evidence)	0.55	(1.21)	1.37	(1.10)	−2.935[a]	0.003
c. 10/100 (10%)	−1.28	(0.89)	−1.39	(0.91)	−1.301	0.193
(6) Comfort and cosmetics						
a. Invisible and imperceptible (STS)	2.88	(2.21)	3.03	(0.76)	−0.506	0.613
b. Perceptible; invisible (IFES)	−0.06	(1.34)	0.15	(0.76)	−0.960	0.337
c. Visible; imperceptible (OS)	−0.74	(1.23)	−2.24	(1.25)	−4.751[a]	0.000
d. Visible and perceptible (EFES and AFO)	−2.08	(1.77)	−0.93	(1.24)	−3.195[a]	0.001
(7) Result						
a. Improved foot position with custom-made shoes (OS)[a]	−2.42	(1.03)	−5.09	(1.06)	−7.458[a]	0.000
b. Improved foot position and ankle stability with custom-made shoes (AFO and OS)	−0.74	(1.38)	1.37	(1.88)	−3.454[a]	0.001
c. Improved foot position with ready-made shoes (EFES and IFES)	−0.27	(1.37)	−1.68	(2.12)	−5.218[a]	0.000
d. Improved foot position and ankle stability with ready-made shoes, barefoot walking possible (STS)	3.43	(1.78)	5.39	(2.08)	−4.405[a]	0.000
(8) Success rate						
a. 99/100 (99%)	2.35	(1.63)	1.39	(1.93)	−2.261[a]	0.024
b. 95/100 (95%) (all, in absence of scientific evidence)	1.32	(2.03)	0.65	(1.72)	−1.595	0.111
c. 90/100 (90%)	−1.12	(1.85)	0.40	(0.96)	−3.826[a]	0.000
d. 80/100 (80%)	−2.55	(1.64)	−2.43	(2.19)	−0.272	0.785

The treatment alternative from which a criterion level was derived is put between parenthesis, with AFO (ankle–foot orthotic), OS (orthopeadic footwear), EFES (external functional electrical stimulation), IFES (implanted FES) and STS (soft tissue surgery). Columns 2 and 3 present the estimated part-worth utility coefficients for the extensive and minimal informed subject group. *Z* statistics and *p*-values are presented in column 4.

[a] Treatment alternative (OS) can be described using two levels (a and b), dependant on the exact finish of the product. For determining treatment preference, level b was used.

importance of patient choice in health care and discrete choice experiments were introduced as a possible way to elicit patient preferences for treatment. The importance of trading behavior in determining preference was highlighted with some examples (e.g. "if you are concerned about the impact of treatment in your personal life, you might prefer a treatment that has a slightly worse outcome, but only takes a limited amount of time to complete"). The subjects were asked to select the treatment they would prefer in the case of ankle and foot impairment after stroke from each choice set. For an example of a decision task see Appendix B.

2.4. Outcome measures

The choice sets were generated using commercially available software [20] which was also used to estimate the part-worth utility coefficients of the utility function at the group level. A multinominal logit technique was used and a linear main effects additive model was fitted. To estimate part-worth utility coefficients at the individual level hierarchical bayes analysis was performed [10].

From the part-worth utilities (β) of the levels of the criterion, the importance (W) of a criterion (i) was estimated by calculating the coefficient range (τ_i), which is the difference between the smallest (negative) part-worth utility and the largest part-worth utility within the criterion levels of i, and dividing it by the sum of the coefficient ranges τ_i for the eight criteria ($i = 1$–8; Eq. (1)).

$$W_i = \frac{\tau_i}{\sum_{i=1}^{8} \tau_i} \tag{1}$$

Subjects were classified based on criteria importance [21]. If no criterion is more important than 25% a subject is categorized as a balanced chooser. Subjects that choose a treatment based on one dominant criterion (thus have a distinct preference for that criterion) show an extremely skewed preference distribution. Subjects with a distinct preference for one criterion were subdivided based on the most important criterion. The 25% threshold was arbitrarily chosen because it is twice the importance that is expected compared to a situation when all criteria are

equally important. With a total of eight criteria, if a single criterion has an importance of >25% it is almost always dominant in establishing treatment preference (the best performing treatment on this criterion is the preferred treatment).

The utility (U) of a treatment (AFO, ankle–foot orthotic; OS orthopeadic footwear; EFES, external functional electrical stimulation; IFES, implanted FES and STS, soft tissue surgery) was derived by summing the part-worth utilities which correspond to the level of the criterion (i) that describes the treatment alternative (treatment) for all criteria (i = 1–8; Eq. (2)).

$$U(\text{treatment}) = \sum_{i=1}^{8} \beta_i(\text{treatment}) \quad (2)$$

The preferred treatment is the treatment with the highest utility.

2.5. Hypothesis and statistical analysis

The main assumption of this study was that all relevant information on the treatment alternatives is included in the description of the attribute levels in the choice experiments.

Therefore, the null hypothesis was that the extensiveness of the brochure would not change subjects' preferences for treatment.

We determined the expected order of criteria levels prior to conducting the experiment. The levels with a natural ordering (criteria 1, 5 and 8) were expected to be ranked accordingly, with shorter duration and lower risk and higher success rates being preferred (a < b < c < d). Although a natural ordering did not exist in the other criteria, we expected non-surgical treatment to be preferred to the surgical alternatives (a < b and c) in criterion 2, temporary aids with shorter donning and doffing to be preferred in criterion 3 (a < b < c < d) and skin irritation to be preferred to pressure sores (a < b) in criterion 4. Criteria 6 and 7 were atypical because no a priori expectation on the order of some the levels could be identified. However, invisible and imperceptible aids were expected to be preferred to visible and perceptible aids (a > d) in criterion 6 and the possibility of barefoot walking without aids was expected to be preferred to the other levels (d > a–c) in criterion 7. The expected order of criteria levels was compared to the observed order of the part-worth utilities. Agreement can be considered as confirmation of face validity (level preference was judged as was intended by the expert panel) of the level descriptions and is used as a performance evaluation of subjects.

Descriptive analysis of part-worth utility order, criteria order and treatment preference was performed. We expected (1) the sequence of part-worth utilities, (2) the importance ranking of criteria and (3) estimated treatment preference to be similar between the groups, if no effect of the extensive information was present.

A non-parametric Mann–Whitney U-test was used to test whether there was a significant difference in the part-worth utilities of the criteria levels and the relative importance of the criteria between the extensively and minimally informed groups.

3. Results

3.1. Part-worth utilities

Some differences were found in the ranking of criteria and the order of criteria levels between the two groups (Table 1). The order of preference of the part-worth utilities in the criteria with a natural order was as expected for criterion 8 ("success rate") in both groups. However, the expected order of preference was violated for criterion 1 in both groups and for criterion 5 in the minimally informed group (Table 1).

In the criteria with an expectation on order which was based on common sense, the level order was as expected for both groups. In the criteria without prior expectations about order, the two middle levels were ordered similarly in the groups for the criterion "comfort and cosmetics" (6). An imperceptible aid was preferred above an invisible aid. For the criterion "result" (7) the preference for the two middle levels (b and c) differed between the groups. The benefit of ready-made shoes was valued higher in comparison to improvements in ankle stability in the extensively informed group, and this preference was reversed in the minimally informed group.

With regard to differences in preferences between the groups, the most remarkable finding was that the extensively informed group had a higher acceptance of longer treatment duration and of the implantation of foreign materials, whereas the minimally informed group preferred non-surgical treatment and shorter treatment duration.

3.2. Average criteria importance

"Ease of use" was, on average, the most important criterion in both groups (Fig. 1). Treatment impact and result were ranked

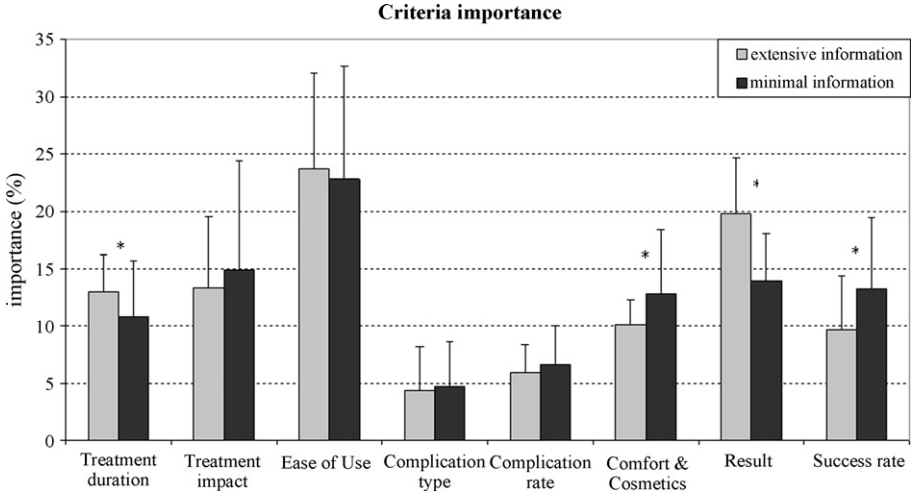

Fig. 1. The importance (W) of treatment criteria (average with standard deviation) in determining treatment preference for the minimally and extensively informed subject group. *Groups significantly different ($p < 0.05$).

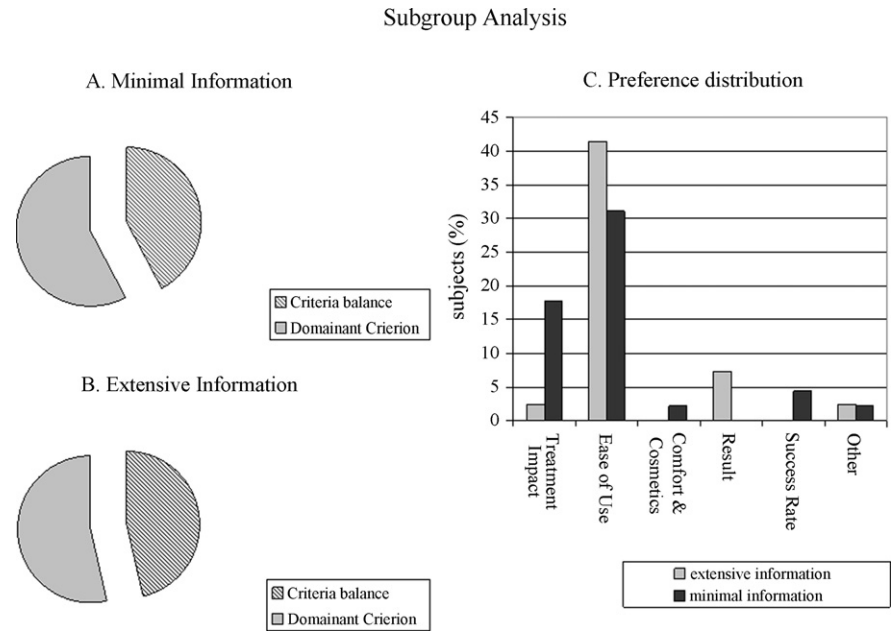

Fig. 2. The distribution of subjects with regard to criteria preference. A, The effect of minimal information on criteria balance. B, The effect of extensive information on criteria balance. C, Outline of the distribution of dominant criteria in treatment preference in the subject with a distinct preference for one criterion.

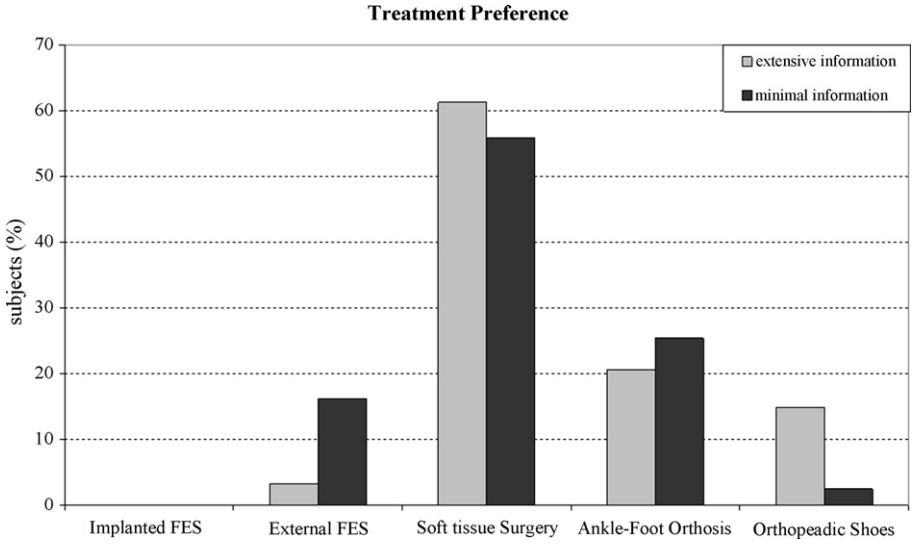

Fig. 3. The influence of information provision on the preferred treatment.

second and third in the minimally informed group, and vice versa in the extensively informed group. This reversal in importance ranking was probably caused by a significant difference in the relative importance of "result" ($Z = -5.215$; $p = 0.000$) between the groups, because the difference in the average importance of treatment impact was negligible. For the lower ranked criteria, the criteria "success rate" ($Z = -2.741$; $p = 0.006$) and "comfort and cosmetics" ($Z = -2.145$; $p = 0.032$) were ranked higher and were deemed significantly more important in the minimally important group, while "treatment duration" ($Z = -2.702$; $p = 0.007$) was more important in the extensively informed group.

3.3. Dominant criteria in treatment preference

From Fig. 2a and b it can be seen that the proportions of subjects making a balanced choice or having a distinct preference for a criterion were about equal in both groups. However, the dominant criteria were different between groups, with a larger percentage of extensively informed subjects selecting a scenario based on "treatment impact", compared to "ease of use" in the minimally informed patient group (Fig. 2c).

The difference between the two groups in criteria importance and part-worth level utilities had only a limited effect on treatment preference (Fig. 3). A slightly higher proportion of subjects in the extensively informed group preferred orthopedic shoes over external functional electrical stimulation.

4. Discussion and conclusion

4.1. Discussion

In the current study significant differences in preference estimates were found between two groups of subjects. Preference differences were mainly observed in part-worth utilities. It seems

that more extensive information resulted in a: (1) decrease in level order reversals in the criteria with a natural order; (2) higher acceptance of negative treatment aspects in favor of a more positive treatment result and (3) higher preference for ready-made shoes at the cost of ankle stability.

We speculate that the decreased number of rank reversals in the extensively informed group is an indication of a more analytical and higher quality analysis of preference prior to the experiment. It was previously suggested that the first part of a DCE is used to construct rather than express preferences [22]. As a result of more information, it could be speculated that fewer preference ''errors'' are made during the experiment. This would argue in favor of providing extensive information prior to a DCE.

At the same time, the second and third findings of this study indicate a difference in value judgments between the two groups. The higher acceptance of negative aspects of treatment highlights the effect that information can have on subjects' judgment of a positive outcome. It seems that the extensively informed subjects make a different trade-off in choosing treatment, accepting longer treatment duration and surgical intervention in favor of a better result with regard to foot and ankle functioning and choice of footwear. From a health maximization perspective, this could be regarded as a positive effect of more extensive information.

A danger associated with providing extensive information is being directive. During the design of the brochure, we took maximal effort to provide impartial information. However, the increased desirability for ready-made shoes at the cost of ankle stability in the extensively informed group might be an indication that value-based information was included in the extensive brochure. The ability to wear ready-made shoes is regarded as an important benefit associated with higher impact treatments. Although the criterion ''result'' was presented without recommendation on the most preferred outcome in the extensive brochure, in hindsight it might be that the benefit of ready-made shoes was deduced from the statement ''I'm now able to shop for shoes in normal stores'' in the patient testimonial. Although being directive is not necessarily detrimental in terms of outcome valuation, more extensive information can bring new and implicit information into the choice task, because it is not included in the level descriptions.

Another drawback of providing more extensive information is that it does not always result in an increased understanding of the decision task, while at the same time the cognitive demand on the subject is increased because more information has to be processed [23]. From the body of literature on informed consent it is known that older age, lower educational levels and cognitive impairment can negatively influence understanding of written information [16,24]. It is sometimes argued that it is shorter and more simplified formats that should be used to improve patients understanding [24], and a DCE is a perfect example of a short and simplified description of the consequences of treatment. Therefore, in future studies the optimum in the amount of information provision and the influence of literacy and disease burden on the effect of informational brochures has to be determined.

In this study the extensive informational brochure had only a minor effect on the predicted uptake of treatment alternatives. On a policy level, this seems a positive finding, as it suggest that the outcome of a DCE can be interpreted without making reference to prior knowledge of or experience with the actual situation. However, it might be that this finding is a direct consequence of the design of the experiment. In four out of eight criteria the most positive outcome is associated with surgical treatment, so it might be that surgical treatment is dominant to the other treatment alternatives. We suggest that in future research the most preferred criteria levels are evenly distributed over the alternatives.

Some more limitations can be made with regard to the outcome of this study. For one, we have no way of knowing how much of the information in the extensive brochure was new, how well it was read and how much it increased the knowledge of subjects, as this was not verified. Second, although the experimental setup of the study was useful for testing our hypothesis, the convenient nature of the sample did influence the generalizability of the results to patient populations and to real-life decision making. The irrelevance of the decision problem to the healthy participants could have negatively influenced the motivation of the subjects to process the information in the brochure and/or express preference for a hypothetical situation. On the other hand, actual patients in the decision making process might have a higher level of hands-on knowledge about the disease and its treatment, which in turn can diminish the effect of an informational brochure in actual patients. Additionally, the preferences expressed in this study might be modified by the age or gender of the participants. These subject characteristics can potentially influence the importance and value of outcomes, for instance with regard to the importance of treatment impact or comfort and cosmetics of outcome. The current sample lacked power to study these potential effects, but future studies should test the effect of age, gender, disease, literacy and comprehension of information on the valuation of treatment characteristics. Third, because no actual decision for treatment was made predicted preference cannot be compared with observed preference and we have no way of knowing whether the outcome of the experiment is a representation of true preferences. We recommend that these limitations are averted in future studies and that the effect of extensive information on treatment preference is tested in various patient populations during actual treatment decision making.

The final limitation with regard to the interpretation of the results of this study is concerned with estimation of part-worth utilities. In conjoint analysis experiments decision criteria should be mutually independent, that is, the outcome on one criterion should not influence the preference for other criteria. However, in this study some interaction between the levels of the criteria is expected, for instance between complication type and complication rate. From a methodological standpoint, fitting an additive model is considered inaccurate. The use of an additive model arose from the inevitable scenario reduction in the design phase, which prevents the estimation of interaction between criteria. Scenario reduction and the assumption of additivity are common practice in conjoint analysis research. In literature it is argued that using an additive model works well in practice and that using multilevel analysis would make data analysis more complicated while at the same time it hardly increases the fit of the model [25]. Although the choice of model does not account for the differences found between the minimally and extensively informed groups, further study should focus on the effect of model choice on estimated part-worth utilities.

4.2. Conclusion

The results of this study indicate that the amount of a priori information influences preferences which were elicited with a DCE. The absence of rank reversals in the extensively informed group suggests that relevant information was acquired from the extensive information. This argues in favor of providing a patient with more extensive information. However, the positive effects of extensive information have to be weighted against the increased demand extensive information puts on the cognitive abilities of the subject. Moreover, the danger of information being directive has to be taken into account. A careful consideration between the benefits

and drawbacks of providing extensive information has to be made in each individual study.

4.3. Practice implications

While interpreting the results of a discrete choice experiment, the effect of prior knowledge on the decision problem has to be taken into account. Although information seems to increase the understanding of the decision task, outcomes valuation can also be directed by information and more extensive information increases the cognitive burden which is placed on the subjects. Future research should focus on the exact nature and size of the effects, and the results of this study should be clinically validated in a study sample that is in the process of decision making.

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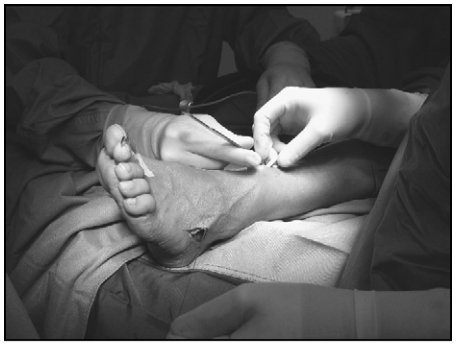
Appendix A. Example of an extensive description of one of the treatment alternatives

A.1. Soft tissue surgery

An ankle and foot impairment can be treated with soft tissue surgery. In this treatment changes are made in the muscles in your foot.

A muscle can either be lengthened or transferred.



Soft tissue surgery

A muscle with a high muscle tension is lengthened by making small incisions in the muscle fibers. A muscle with a normal tension is transferred to another position on the foot. In doing so, this muscle can compensate for the loss in activity of other muscles. By making these changes in muscle dynamics, the foot is balanced in the neutral position. These changes are permanent.

After the surgery the foot is temporarily placed in a cast for a short period of time. For the duration of treatment, the foot has to be supported by a brace (aid) for 24 h a day. The aid can result in skin irritation. After treatment, the position of the foot is normalized and ankle stability is improved. Ready-made shoes can be worn and it is possible to walk barefoot. The duration of treatment is 6–9 months.

The story of Bas Havelaar:

Bas Havelaar is 37 years old, father of two sons and had a stroke 2 years ago. After initial treatment, he chose to be treated with soft tissue surgery. This is his story.

"Two years ago I suddenly collapsed during work. I could not speak, my mouth dropped and for a short amount of time I could not remember the simplest of things, like the names of my kids. Initially, the worst thing was that I could not take care of myself and I could not walk. For the largest part this was resolved by intensive treatment and exercise.

What remained was an annoying"dropping and turning" of my left foot, especially when I was tired. For the first year, I wore high, custom made shoes to prevent this from happening. This was especially bothersome in summer, because the high shoes resulted in skin irritation. During a holiday I even developed pressure sores because my walking ability improved and we were very active. Then, I was told of the possibility of soft tissue surgery by my therapist. I was operated 6 months ago. During the surgery, muscles were transferred to improve the position of my foot. I was told that the risks of surgery were acceptable. The surgery went well, although I developed some skin inflammation from the small stitches on my foot and ankle. For the last 6 months, I have worn a brace during the day and night. Now, I can walk without the brace or the high shoes. I can shop for shoes in regular stores and this summer, I can even go to the pool with my sons, because I can now walk barefoot without aids!

Appendix B. Discrete choice experiment

Please indicate the treatment you would prefer by checking the box under the treatment.

Treatment 1	Treatment 2
The treatment duration is 9 months	The treatment duration is 3 months
You do not need surgery	You need surgery in which permanent changes are made to the muscles in your foot
You need to wear a permanent aid after treatment, it will take 3 min to donn or doff.	You need to wear a temporary aid during treatment, it will take 10 min to donn or doff.
The aid can cause skin irritation and light inflammations	The aid can cause pressure sores and serious inflammations
This happens to 10 in 100 people	This happens to 1 in 100 people
The aid is both visible and perceptible	The aid is not visible, but it is perceptible
The result of treatment is a improved foot position with custom-made shoes	The result of treatment is an improved foot position and ankle stability with ready-made shoes, and the ability to walk barefoot without aids.
The treatment is successful in 99 out of 100 people.	The treatment is successful in 80 out of 100 people.
☐	☐

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