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Valuing PSS outputs and quality changes

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Summary

Background

1. The Gershon review of efficiency recommended that target improvements in efficiency should be met both through financial savings and through improvements in quality of outputs. This paper reports on a pilot project designed to feed into an approach for local authorities to quantify in monetary terms quality gains in the provision of personal social services (PSS), with a specific application to the provision of home care for older people.

2. There are a number of practical and theoretical problems with attributing monetary values to aspects of quality. The approach described here builds on ongoing work into the measurement of PSS outputs for the purposes of National Accounts and measuring changes in productivity and efficiency more widely. This approach distinguishes what services could provide (capacity for benefit) from the quality of what is provided in practice. By attaching a financial valuation to capacity for benefit we are able to attribute a monetary valuation to changes in the quality of provision measured (in the case of home care) through service user experiences of their care.

3. Capacity for Benefit (CfB) is defined in terms of eight domains of outcome that services address and four levels of need (no needs, all needs met, low needs, high needs) within these domains. In addition we identify whether people are living in their own homes, as a key attribute of care provision. The characteristics of the service (in terms of domains of outcome and whether living at home) and service users (in terms of level of need that need to be met) determine the CfB of a given service.

Method

4. In order to identify a financial valuation of CfB we need to attach monetary weights to each level of need within each domain. A survey of 500 people was used to collect information on their preferences, as well as background data. Two approaches were used to collect data and model people's preferences. The principal method was Discrete Choice Experiments (DCE) in which respondents chose which was the preferable of two scenarios described in terms of levels of need in two subsets of the domains and a level of financial benefits. A relatively new alternative approach was included for the purposes of comparison: Best-Worst, in which individuals choose the best and worst characteristics of a single scenario. Two focus groups and pilot interviews with 50 individuals were used to ensure that presentation and wording were clear and understood by respondents.

5. These data were then used to develop models that describe the choices that the respondents made in the experiments. These models allow us to quantify the 'value' that respondents place on both the various domains of outcome and monetary benefits; which used together allow us to obtain a monetary valuation of people's willingness to accept financial compensation for changes between levels within each outcome domain.

6. It is important to note that what we are collecting here is the monetary *value* that respondents place on each domain level. This is not necessarily the same as the amount they would currently have to pay in the existing market to achieve that level, or the amount that the system currently compensates them in the form of benefits. In fact, in an ideal situation we would hope that the services that local government provides would result in outcomes that the individual valued higher than the cost of achieving them, i.e. the services provide additional value.

Results

1. Sample quotas were set by age, gender, Social Economic Group (SEG) and location (urban/rural, north/south). Half of the main sample of 500 was selected to be 65 or over in order to allow a comparison of the preferences of older and younger adults. As a result the sample was not nationally representative but did provide sufficient numbers of different groups for us to investigate the impact of these factors on people's preferences.

2. Complete data were available for 495 cases. Responses to questions about the choice process and patterns of response suggested that the vast majority were making comparisons in a consistent way. People were excluded from the final analysis if they reported that they were unable to make the choices or found it difficult to put themselves in the imaginary position that they had been involved in a serious accident and required help to look after themselves. The final models reported here were based on a sample of 404 people.

3. The models based on the results of the DCE experiments provided a broadly consistent picture with what we might expect and allowed the generation of financial valuation for each domain and level.[1] In generating financial estimates the nature of the design meant that the values generated reflected 'willingness to accept' (WTA) rather than 'willingness to pay' (WTP) values. It is accepted within the economics literature that a disparity can exist between these values, with willingness to accept typically providing higher values.

4. It was important to investigate the impact of age on preferences as the approach was to be applied to services for older people. The only association found was that older people only put a value on being able to care for others if they were living in their own home, whereas younger adults valued this, whatever the setting.

5. Living at home was rated highly by respondents; further analyses suggested that this was even higher among those that knew or had known someone with care needs. Accommodation was also rated very highly – possibly related to the importance based on the home environment and/or the fact that two aspects of accommodation were made explicit and may have been interpreted as separate domains: 'cleanliness and comfort' and 'accessibility'. Personal comfort, sense of control and meals and nutrition were also rated highly.

1 The Best-Worst results also generated reasonably consistent models which are presented in the report but not summarised here as we do not recommend the use of these experimental findings without further work.

Application to home care for older service users

6. A subset of the financial valuations were identified that could be applied to the results of a previous study of 384 older home care service users in 14 local authorities. The average valuation of capacity for benefit for that sample was £822 per week with a 90 per cent confidence interval of +/-£191. Allowing for geographical variations did not have a major impact on estimates at a local authority level, although people living in one rural area did put a high valuation on control over daily life which resulted in noticeably higher estimates of CfB, suggesting scope for further work.

7. Capacity for benefit depends on the number of hours of home care received. The average value of capacity for benefit was estimated for size of the home care package based on number of hours of home care received. Values ranged from £527 for less than two hours, to £1,192 for >10 hours. These averages can then be applied to the proportions in each grouping to estimate national (or local authority) overall average capacity for benefit. In 2002/03 this was estimated as £729 per person per week nationally.

8. The approach to applying the value of capacity for benefit assumes that services are essentially doing the same thing over time. Ideally, where services are doing something different, such as increased emphasis on enablement, we would reflect such changes in our estimates. An illustration of how this might work is provided, although there are necessarily reservations to applying this with the limited sources of data available at present.

9. To estimate the value of what is actually delivered we need to apply a quality weighting. This is based on responses from the older home care service User Experience Survey (UES) that was conducted in 2002/03 and is being conducted for 2005/06. Previous research has related overall satisfaction (the question used as a basis for the Best Value Performance Indicator) to the quality of services received. This was used to weight the satisfaction question to provide a quality indicator that can be generated for each local authority based on the proportion that respond to each level of satisfaction. Nationally in 2002/03 the value was .632. Multiplying capacity for benefit by this indicator yields estimated value of output of £461 per person per week.

10. Financial valuations of increases in outputs can be generated through improved levels of satisfaction or through increased intensity of services. The value nationally of increased intensity of services between 2002/03 and 2004/05 was £30 per person per week. If levels of satisfaction increase by 5 per cent and intensity of service is held constant then the estimated value of the improvement in quality would be £9 per person per week.

Conclusions and implications

11. The preference study has successfully identified estimates of the monetary value of different levels of need in key domains of outcome of social care. While some methodological questions have been raised, overall the results are consistent and suggest Discrete Choice Experiments and Best-Worst as promising ways forward in the area of identifying monetary valuations of quality gains.

12. The results provide us with a basis on which to estimate CfB from PSS outputs and, drawing on previous research, a demonstration of a specific application in the case of home care for older people.

13. Although this was seen as a pilot study, it would probably be advisable to leave undertaking a larger-scale study until there was more information and a wider consensus on the domains and levels, and after further methodological work.

14. If the approach is seen as promising more immediate priorities might be to extend the approach to other services and groups of service users. An important gap in the current estimate is that we were not able to identify the benefits from home care services accruing to carers.

1 Background

The Gershon review of efficiency recommended that target improvements in efficiency (for local authorities 2.5 per cent per annum) should be met both through financial savings and through improvements in quality of outputs. In order to quantify the extent to which any improvements in quality contribute towards such targets it is necessary not only to be able to measure changes in quality but to be able to quantify them in monetary terms. This is a major challenge in all areas of government activity. We need first to identify potential improvements in the quality of outputs and then to establish how these can be quantified in financial terms.

In personal social services (PSS) we might expect improvements in quality to be delivered through:

- Shifts between modes of care (for example, in a care home, in extra care housing, care at home, or using direct payments. Assuming all needs are met, we might expect higher levels of welfare for some modes compared with others as people prefer in general to be in their own homes)
- Improved targeting and co-ordination of services on those who benefit most
- Improved purchasing and provision in terms of the process of care delivery

In order to quantify such improvements in quality, ideally we need to identify the value of services to service recipients in a way that reflects levels of met need, the benefit of those services, the quality of the care process and the impact on welfare of the location of care (in people's own homes or in a care home setting).

Ongoing developmental work on the measurement and understanding of PSS output and productivity in social care (Netten et al., 2005; 2006a) provides us with a starting point in establishing a financial valuation of improvements in social care. The proposed approach was initially developed with the aim of developing an output index that would provide a better basis for measuring the welfare gain or benefit from PSS outputs for National Accounts. There are similar concerns to that presented by the Efficiency Review in that the aim was to reflect changes in quality and productivity in government output. The approach is based on an outcome weighted output indicator as opposed to the current method of a cost weighted output measure.

For our purposes here we focus on the element of the output index that reflects people helped by services (rather than prevention, knowledge and information and increased productivity). For those interventions where the primary aim is to help people the output is the sum for each intervention of:

Capacity for Benefit x Quality x Weeks help

The capacity for benefit (CfB) term reflects the difference between the welfare state in the absence of the service and the welfare state if the best possible quality

service was delivered. This needs to reflect all the potential areas of outcome for personal social services and different welfare states resulting from variations in levels of reliance on services. For example, people with limited mobility might be able to manage to get themselves something to eat if no one was available to help them; people who were bed or chair bound would starve. The quality multiplier reflects the degree to which services are both meeting needs and delivering high quality care (in terms of respecting dignity and so on).

Nine domains of outcome/attributes of capacity for benefit have been identified.[2]

- Personal care/comfort
- Social participation and involvement
- Control over daily life
- Meals and nutrition
- Safety
- Environmental cleanliness, order and comfort access
- Employment and occupation
- Role support (as a carer, parent, etc)
- Living in one's own home

2 See Annex A for more details about the domains and levels.

These domains reflect both historical patterns of provision and map on to the key outcomes for social care identified in the recent green and white papers (Department of Health 2005a, b). In the past much emphasis has been put on meeting basic needs and these are reflected in domains such as personal care and food and nutrition. Increasing emphasis is being put on control and social participation and involvement and on alternative means of meeting these needs: through individual budgets, enablement, access to universal services and prevention, but the domains themselves remain core to the social care agenda. In the social care context 'outcomes' such as economic well-being and freedom from discrimination are part of the process of enabling people to be in control and meet their own needs. Health outcomes that result from meeting needs in these domains are addressed, but other health outcomes are not. One other area of outcome that has not been addressed is the impact of social care on people other than service users and their carers. This might be through reductions in danger to others resulting from challenging behaviours or through the benefit to society through increased citzenship and participation in society of people who currently are excluded. Ongoing research (see section 6 below) will help inform us whether there is a need to extend the range of domains in the future.

Any one service or care package would address a subset of possible domains of outcome. The aim of ongoing work is to map services in terms of capacity for benefit and quality and to identify regular data sources to indicate how this changes over time (in terms of user reliance on services and quality). At present the principal sources of quality measures are national surveys of service user experiences (UES) required by the DH to be conducted by local authorities (in 2003 and 2006 for older home care users) and the care standards reported on annually by the Commission for Social Care Inspection (CSCI).

There are two principal ways in which we might seek to quantify outputs and the quality of outputs in monetary terms. First, given that there is a market in many care services, there is the observable premium that people are prepared to pay for higher quality services. Second there is the attribution of monetary values through a preference study.

Where services are purchased directly by individuals they face the price so demonstrate their willingness to pay. There are problems in that consumers of care services often lack information and find it difficult to make comparisons between care providers. However, ongoing work has established a relationship between care standards (reported annually by CSCI) and prices for care homes

for older people and it may well be that this is the most appropriate way forward for the valuation of these services.[3] Local authority improvements in efficiency might be reflected in the degree to which they have purchased care from higher quality providers. For many services, however, we do not have information about variations in quality of services provided for self-funders and/or the prices paid so we cannot make a direct link between prices paid and quality of service. Moreover, this does not help us in other aspects of quality such as improved targeting and shifts in types of care provision.

3 It is interesting to note that a measure based on these standards showed a better relationship with prices when it was weighted to reflect information about preferences of older people derived from an earlier study (Netten et al., 2002).

There are particular problems in relating reported quality attributes of services to preferences or willingness to pay of individuals for these attributes as often services users (particularly older service users) will over-report satisfaction and performance of services. Thus when service users report that a care worker 'usually' arrives on time, in fact we know that probably means the care worker is often late. This makes it difficult to attach preferences to quality measures. The problem is even more marked for global indicators of satisfaction. We can, however, interpret reported satisfaction in the light of responses to other questions about the quality of the service and have derived a four level weighting for the older home care UES satisfaction item on that basis (see below and Netten et al., 2005).

Rather than attach a financial weighting to measures of quality directly the proposed way forward is to attach a financial valuation on to the capacity for benefit term which reflects what services could potentially deliver given what they are doing and who they are doing it for. The financial valuation of changes in service delivery and quality is then derived from changes in the value of the overall output.

It is important to be clear that social care domains cover very fundamental areas of people's lives, aspects of life that affect individuals' perceptions of themselves. This contrasts with tasks associated with social care that (to a greater or lesser degree) are undertaken by us all for ourselves and as such often perceived as unskilled and associated with low status and low paid work. Accordingly the fundamental 'value' of social care services will be higher than people are willing to pay.

Previous work provides us with a basis for estimating capacity for benefit from home care (see below and Netten et al., 2006a). The principal aims of this study were to derive preliminary estimates of monetary valuation for all the need states in the capacity for benefit component of the output measure, to investigate factors associated with variation in these, in particular whether they are age dependent, and to demonstrate the application of these in an approach that could be used for valuing changes in the quality of home care services for older people. Given resource and time limits, the preference study results are necessarily provisional so a secondary aim was to identify factors that would need to be taken into consideration in a full-scale study of population valuations.

We start by describing the methods adopted to establish valuations of social care outcome domains, the characteristics of the population sample, estimated models and financial valuations based on these models. We then apply these valuations to reported levels of need and domains of outcome that are addressed by home care packages and draw out the implications of the results for valuing quality changes. We conclude by identifying some of the implications of our findings, in particular drawing out issues that need to be taken into consideration in the design of a full-scale study.

2 Method

There are a variety of techniques that are used to identify people's preferences and valuations (for example, Discrete Choice Experiments, time trade-off, contingent valuation, standard gamble). All these approaches require a sample of respondents to make choices, rank or identify values in relation to hypothetical situations. An important consideration in the design of such studies is that the task that individuals are asked to undertake is relatively straightforward and makes sense to them.

Contingent valuation or willingness-to-pay techniques are the most direct ways to approach this and have been used in the field of health (Donaldson, 1990; Diener et al., 1998). However, a number of studies have reported inconsistent findings, and a report prepared for HM Treasury (Cave et al., 1993) recommends the indirect approach of using Discrete Choice Experiments over direct willingness to pay methods for the valuation of changes in quality of public services. Stated preference discrete choice modelling (SPDCM) is being increasingly used in health economics to address a range of policy questions, including that of valuing benefits within the framework of an economic evaluation (Ryan and Gerard, 2002). The advantage of this and related approaches is that the task for respondents is a simple and meaningful process, meaning that we are more likely to get reliable responses.

Previous work has used the SPDCM to estimate utility weights for social care outcomes for older people (Netten et al., 2002) based on a convenience sample of 350 people aged over 60. This approach allows us to incorporate a financial attribute and in that study we investigated the use of a financial attribute presented in terms of levels of benefits on a sub-sample of 50 respondents. Concerns had been raised that people would object to the inclusion of a financial attribute but in practice no problems were raised and we were able to derive a 'willingness to accept' (WtA) valuation based on this sub-sample.

Technical questions have recently been raised about the use of SPDCM in drawing conclusions over the relative importance of attributes (Louviere et al., 2004). Best-Worst scaling (Marley and Louviere 2004; Finn and Louviere 1992) is a form of SPDCM that addresses these concerns. This requires that individuals presented with a series of scenarios showing the attributes at a variety of different levels simply choose for each scenario which is the worst and which the best attribute; the respondent is also asked to accept or reject the scenario on offer (rejection implying acceptance of the respondent's current status). Again it is possible to include a financial attribute and derive a willingness to accept or pay valuation. Best-Worst scaling also has the advantage that we could envisage a respondent choosing the best and worst attribute from a list of nine or ten attributes; for a single Discrete Choice Experiment it is unlikely that respondents would be able to trade off scenarios with that many attributes.

To some extent the technical problems raised by Louviere and colleagues with regard to the use of Discrete Choice Experiments to measure preferences are addressed by the inclusion of a financial attribute. As a result, for this study we decided to use Discrete Choice Experiments as the primary approach but also incorporate in the design a Best-Worst experiment as a secondary data collection method. This was considered desirable as the results of this secondary experiment can be used to validate the estimates from the Discrete Choice Experiments and feed into thinking about the methodology for any subsequent study.

Design of survey

In this study, a survey was used to collect information on people's preferences, as well as background data. These data were then used to develop models that describe the implication of people's choices. These models allow us to quantify the 'value' that respondents place on both the various domains of outcome and monetary benefits; which used together allow us to obtain a monetary valuation of people's willingness to accept financial compensation for changes between levels within each outcome domain.

Data on preferences were collected through face-to-face interviews, in which interviewers guided the respondents through the questionnaire with the aid of laptops. The ethical review process identified the potential for causing respondents distress when asking them to consider situations where they required additional care to look after themselves. As a result, a protocol was developed for the interviewers to caution them about the potential for causing distress and guidance on how to deal with distressed respondents.

Previous work within this area (Netten et al., 2005) provided the initial starting point for the definition of the nine domains to be measured within the surveys. Early meetings of the project team, however, highlighted potential ambiguities in the descriptions of some of the levels of the domains. As a result, it was decided to undertake two focus groups (one with younger adults and one with older people) to help refine the wording of the levels to ensure that the descriptions captured the outcomes that the team was aiming to convey to respondents and also explore what would be an acceptable context for talking about hypothetical situations where an individual may find they required help with their care.

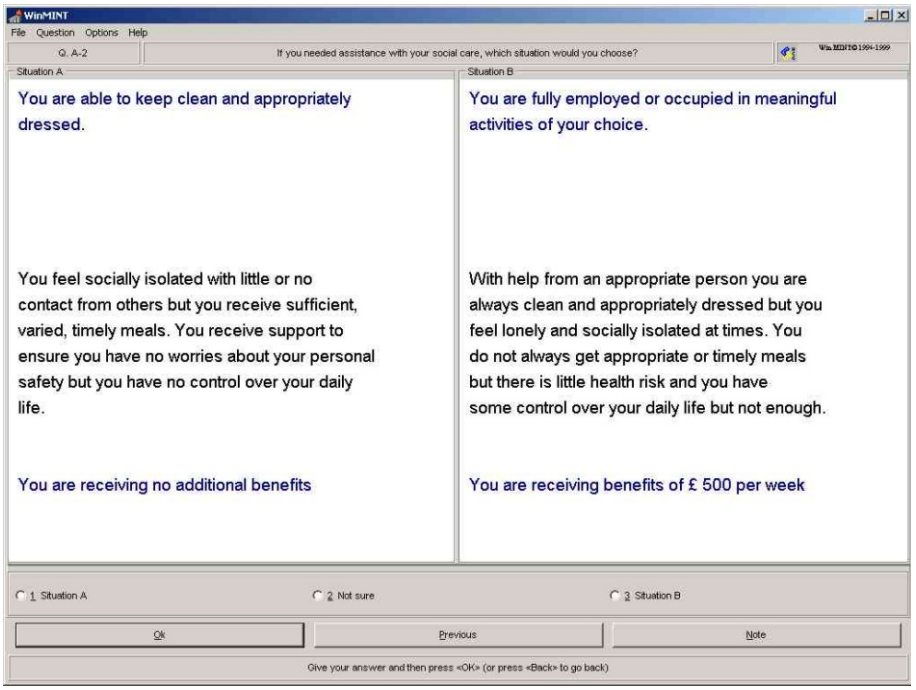
The focus groups led to some improvement to the domain wordings, and suggested that the use of the situation where someone had experienced an accident was a scenario that people could relate to as a cause for requiring assistance with their care and did not cause any significant distress. One important finding from the focus groups was the potential for distress from discussing the history of care requirements of those close to the respondents. This was viewed as potentially more distressing than the accident scenario and was likely to act to impede the actual interview. As a result it was suggested that any contextual questions about personal experience of care should be asked towards the end of the interview. This was felt to have the added advantage that if the respondent was distressed at the end of the interview, the interviewers could offer to stay a while. In the event, a small number of respondents were temporarily distressed but all were in a good frame of mind when the interviewer left them. Interviewers reported that respondents were, in fact, pleased to have the opportunity to talk.

We identified above that for reliable valuations it is important that the way people are asked to express their preferences is as simple as possible. In the current study an additional complication was the relatively large number of domains of

outcome. The approaches used both required respondents to undertake relatively straightforward tasks: either to choose between two situations (Discrete Choice Experiments (DCE)) or to identify the best and worst aspects of an individual situation (Best-Worst (B-W)).

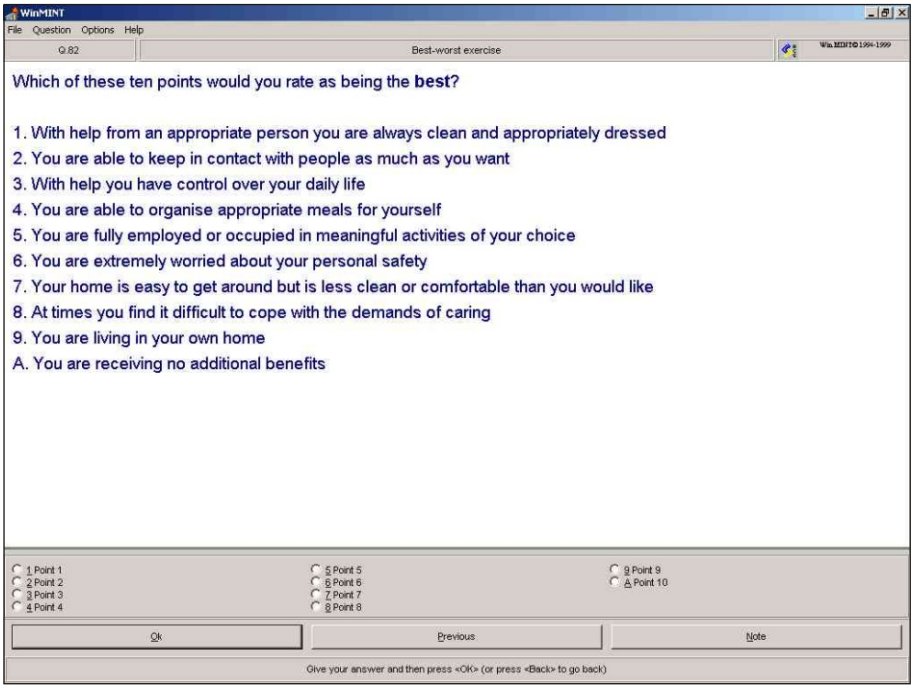
In the Discrete Choice Experiments respondents were presented with a choice between two different hypothetical alternatives and asked to choose the one that they preferred. Each alternative was described by a set of attributes levels (e.g. safety: '*You have no worries about your personal safety*'). The respondent was then asked to compare the two alternative situations and choose which they considered to be preferable. As there were too many variables to be presented in a single Discrete Choice Experiment, the domains were split into two (overlapping) groups. Each respondent was then shown two experiments, each with eight choices. Further details on the design of these Discrete Choice Experiments are provided in Annex B.

Figure 2.1: Example choice from the Best-Worst experiments



The Best-Worst Experiment used the same attribute levels but presented them in a different way. In this case, the respondent was shown one level for each of the ten attributes (nine domains plus level of benefits). They were then asked to first state which was the best attribute level in the set presented and then which was the worst. This was repeated ten times for each respondent. Further details on the design of the Best-Worst experiments are also provided in Annex B.

Figure 2.2: Example choice from the Best-Worst experiments



The survey was designed to use the Discrete Choice Experiments as the primary method of data collection, and as such greater resource, both in terms of development time and survey content, was committed to this first approach.

In addition to the two experiments used to elicit monetary valuations, each respondent was also asked a number of background questions. Three different groups of questions were asked. The first explored the respondents' socio-economic background, for example their age, income and gender. The second group of questions explored how respondent's had approached the Discrete Choice Experiment and were formulated to act as checks on comprehension. The final group of questions addressed whether the respondent (or anyone close to them) had previous experience of social care.

Respondent were recruited through house-to-house calling in person, once recruited the interviewer arranged a convenient time to undertake a face-to-face interview in the respondent's home.

Piloting of survey

A pilot survey was undertaken with 50 respondents in the Ashford area of Kent and in and around Hull to check that both the questionnaire and the survey approach were working as expected.

The findings from the pilot analysis suggested that on the whole the techniques being used to elicit monetary valuations appeared to be working. Specifically, a number of basic discrete choice and Best-Worst models were developed and the estimated coefficients gave intuitive results. A couple of minor changes were made to the experiments. Mainly these involved rewording some of the attribute levels or rearranging their order in the stated preference experiment. The final list of domain definitions and levels are presented in Annex A.

The analysis of the background questions suggested that there was room for improvement of the question wording or interviewer briefing for the income

question. In addition, an examination of the characteristics of the sample suggested that there were a couple of areas that would benefit from monitoring during the fieldwork in order to obtain a sample to meet the set quotas. Of particular note was the lack of ethnic mix in the pilot sample. This was addressed by replacing Hull with Nottingham as this area could be expected to provide a greater ethnic mix through random selection.

Following a number of minor revisions to the questionnaire a larger fieldwork exercise was undertaken with 500 respondents.

Model development

The data collected from the surveys were used to create two different sets of models.

Both the data from the Discrete Choice Experiments and the Best-Worst experiment are modelled on the principle that by observing a series of choices in which we know the options that are offered to the respondent, we can infer what is driving the choices that are made.

The data from the Discrete Choice Experiments were used to estimate a series of choice models.[4] In these models, the data are used to derive utility functions that describe people's preferences. Each alternative within the choice that the respondent faced is given a utility function, which is used to describe the value that the respondent placed on that alternative, on the basis of the domain levels presented within that alternative. The utility functions are made up of the attributes that describe the alternative (e.g. the level of each domain presented) multiplied by coefficients reflecting the importance of the attribute. The discrete choice model estimates the values of the coefficients to provide the best fit of the data to the choice behaviour observed on the basis of utility maximisation. The socio-economic data can also be used in the model estimation to assign separate coefficients to different groups of respondents to explain any differences that we observe in choice behaviour.

4 See Annex C for a more detailed description of the modelling of discrete choice data.

The data from the Best-Worst experiments[5] is similar to that collected in the Discrete Choice Experiments. Here we can define functions to explain the utility that a respondent would obtain from any of the Best-Worst pairs available in any scenario, and can infer that the pair that they pick has the largest utility difference of all the pairs available. The functions are simpler as they only include information on the two domain levels being compared, but there are many permutations which require consideration from any single scenario.[6] Again, we estimate coefficients on each of the domain levels that explain the importance that respondents give to the various attributes.

5 See Annex C for a more detailed description of the modelling of Best-Worst data.

6 In this case, with ten variables to compare, we have 90 Best-Worst pairs possible in each scenario.

3 Sample

The fieldwork for the main stage was conducted between 6 January and 27 January 2006. It was conducted in and around Ashford, Kent, and Nottingham.

Quotas were set by age, gender, SEG and location. In the modelling we are primarily interested in the values placed on the outputs of social care for those in the age group 65 and over, however, we considered this to be a useful opportunity to also gather data to provide insight into whether these values were different from the those under the age of 65, who are the group directly paying for provision at this time through taxation. A natural inclination may therefore be to only collect data with quotas by age group.

However, there are two complications. The first is that when collecting a random sample the demographics of those recruited to take part in the survey may be biased as a result of availability and willingness to participate, and as such will not be truly representative of the population. The second is that in order to pick up significant differences in valuation it is necessary to have sufficient numbers of observations in each group of interest to support statistical testing. As a result additional quotas were specified on gender, SEG and location to ensure that the sample collected contained sufficient data. These were considered sufficient to ensure an appropriate mix of the sample for modelling purposes.

The quotas were broadly met, as can be seen in table 3.1, although it should be noted that fewer interviews were achieved in Nottingham than originally intended.

Table 3.1: Quotas and interviews achieved

		500 interviews in total		250 in Nottingham area		250 in Kent	
	Quotas %	Required	Achieved	Required	Achieved	Required	Achieved
Age							
18-39 years	25	125	128	62	52	63	76
40-64 years	25	125	125	63	48	62	77
65+ years	50	250	249	125	103	125	146
Gender							
male	50	250	244	125	99	125	145
female	50	250	258	125	104	125	154
SEG							
AB	25	125	116	63	51	62	65
C1/C2	50	250	252	125	100	125	152
DE	25	125	134	62	52	63	82
Location							
urban	50	250	252	125	79	125	173
rural	50	250	250	125	124	125	126

Interviewers recorded 539 refusals to achieve the 502 interviews; 322 were in the Ashford area and 217 were in the Nottingham area.

At the end of the interview, interviewers asked the respondent if they would be willing to take part in future research; 188 said they would be.

Comparison of sample with population

As set out above, we intentionally collected a sample that would not be nationally representative. However, for the purposes of interpretation it is useful to understand the extent to which the sample is not representative.

Table 3.2 shows the true distribution of the two age groups that we imposed quotas on in the sample. This shows that our sample is significantly biased towards older respondents (although intentionally so for the reasons previously explained).

Table 3.2: Comparison of age categories in sample and population

Age	Population %	Sample %
16- 64 years	80.1	50.2
65 years or older	19.9	49.8
Total	100.0	100.0

The following tables split the sample according to age category, to allow insight into how representative each of the age groups is within the sample, as well as presenting the totals for the sample as a whole.

Table 3.3 shows that the sample closely achieves the national distribution of gender at the aggregate level, but when examined within each age group we can see that we are under-representing the males in the under 65 group and over-representing them in the over 65 group.

Table 3.3: Comparison of gender distribution in sample and population

Gender	Below 65		65+		Total	
	Population %	Sample %	Population %	Sample %	Population %	Sample %
Male	49.4	41.4	42.9	56.3	48.1	48.8
Female	50.6	58.6	57.1	43.7	51.9	51.2
Total	100.0	10.0	100.0	100.0	100.0	100.0

Table 3.4 shows that the sample broadly reproduces the expected split by SEG across the total population, although the balance between C1 and C2 is slightly biased and we appear to be under-representing those in SEG D and E. Questions are raised in particular about the SEG distribution for those in the over 65 group. In these cases we appear to be significantly under-sampling those in the SEG E, and generally over-sampling the other groups. However, although the data are provided on SEG for all ages, in the census SEG groups are 'not applicable' to people aged 75 or over (Office for National Statistics, 2001). Census guidance states that 'For households where the HRP is aged less than 16 or over 74 the social grade of people in the household will be determined by the household tenure' (para 6.109 p106 'Social Grade, approximated'). This suggests that disparate definitions are the problem as the fieldwork organization categorized retired respondents SEG on the basis of previous occupation.

Table 3.4: Comparison of SEG in sample and population

SEG	Below 65		65+		Total	
	Population %	Sample %	Population %	Sample %	Population %	Sample %
AB	25.5	24.1	8.5	21.9	22.2	23.0
C1	29.9	27.7	29.2	25.1	29.7	26.4
C2	18.2	25.7	1.8	22.3	15.1	24.0
D	20.3	13.3	3.5	13.0	17.0	13.1
E	6.1	9.2	57.0	17.8	16.0	13.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

The following tables present the distribution of some of the other background variables collected, which were not subject directly to quotas, although would obviously be indirectly affected by the other quotas.

Table 3.5 shows that the marital status of those participating in the survey. We observe that we are over-representing those that are widowed, as we would expect in a sample that is weighted towards old respondents, but even within the older age group we have a higher than expected number of people in this category. Otherwise, the sample looks very encouraging in this dimension.

Table 3.5: Comparison of marital status in sample and population

Marital status	Below 65		65+		Total	
	Population %	Sample %	Population %	Sample %	Population %	Sample %
Married	50.5	49.8	52.3	49.8	52.5	49.8
Living together and single	36.0	35.7	6.9	5.7	28.0	20.8
Widowed	1.8	4.0	34.6	36.0	8.6	20.0
Divorced	8.9	6.4	5.3	6.5	8.5	6.5
Separated	2.8	3.6	0.9	1.6	2.5	2.6
Refused/Don't know		0.4		0.4		0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.6 shows that our sample over-represents the retired population in the over 65 age group. In addition, we are under-sampling those working full-time in the under 65 age group and over-sampling those looking after home. These findings are not entirely surprising in a survey that has been undertaken through door-to-door recruitment. However, importantly for our purposes, we have sufficient sample in the working and retired groups to distinguish whether they have different values.

Table 3.6: Comparison of working status in sample and population

Working status	Below 65		65+		Total	
	Population %	Sample %	Population %	Sample %	Population %	Sample %
Working full time	52.9	39.0	3.5	2.0	47.2	20.6
Working part time	14.9	16.5	5.0	3.6	13.8	10.1
Student	8.2	9.2	0.2	0.0	7.3	4.6
Looking for work	3.7	4.4	0.3	0.0	3.3	2.2
Not looking for work		3.2		0.4		1.8
Unable for medical reason	5.4	8.8	4.9	0.4	5.3	4.6
Retired	4.5	4.8	82.9	90.7	13.5	47.6
Looking after home	7.2	13.7	1.1	2.0	6.5	7.9
Other (please specify)	3.2	0.4	2.2	0.8	3.1	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

One area that caused some concern following the pilot was the lack of any ethnic mix in the pilot sample. This was addressed by adding the Nottingham area in the main survey. The results are encouraging, and although we still have relatively little ethnic diversity in the sample, we see that this is actually representative of the population.

Table 3.7: Comparison of ethnic group in sample and population

Ethnic Group	Below 65		65+		Total	
	Population %	Sample %	Population %	Sample %	Population %	Sample %
White British	86.3	86.7	93.4	96.0	87.7	91.3
White Irish	1.4	0.8	2.0	0.8	1.5	0.8
Other White background	3.2	1.6	1.7	0.8	2.9	1.2
White and Black Caribbean	0.3	0.0	0.1	0.0	0.2	0.0
White and Black African	0.1	0.4	0.0	0.05	0.1	0.2
White and Asian	0.3	0.8	0.1	0.0	0.2	0.4
Other mixed background	0.3	0.8	0.1	0.4	0.2	0.6
Indian	2.3	1.6	0.9	0.0	2.0	0.8
Pakistani	1.4	0.0	0.4	0.4	1.2	0.2
Bangladeshi	0.5	2.0	0.1	0.4	0.4	1.2
Other Asian Background	0.5	0.4	0.2	0.0	0.5	0.2
Caribbean	1.2	2.0	0.8	0.0	1.1	1.0
African	1.0	2.4	0.1	0.0	0.8	1.2
Other Black background	0.2	0.4	0.0	0.0	0.2	0.2
Chinese	0.5	0.0	0.1	0.0	0.5	0.0
Any other ethnic group	0.5	0.0	0.1	1.2	0.4	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Use of sample with quotas in model estimation

The sample has been used unweighted in model estimation. The intention here is to provide values for those respondents participating in the preference experiments with estimated means and associated standard errors that are not biased by a weighting procedure. This allows judgments to be made about whether the values for different groups within the sample are significantly different.

The issue for model application is a little more complicated, and this is discussed further in Section 6.

4 Results of preference study

This section presents the final choice model results based on the data from the two different approaches: the Discrete Choice Experiments and the Best-Worst experiment.

Interpreting the model results

For each model, two sets of values are presented:

- Model summary statistics;
- Coefficient values and their associated t-ratios.

Table 4.1: Model summary statistics

Statistic	Definition
Observations	The number of observations included in the model estimation.
Final log (L)	This indicates the value of the log-likelihood at convergence. The log-likelihood is defined as the sum of the log of the probabilities of the chosen alternatives, and is the function that is maximised in model estimation. The value of log-likelihood for a single model has no obvious meaning. However comparing the log-likelihood of two models with different specifications allows the statistical significance of new model coefficients to be assessed properly.
D.O.F.	Degrees of freedom, i.e. the number of coefficients estimated in this model. Note that if a coefficient is constrained to a fixed value (indicated by(*)) then it is not a degree of freedom.
Rho2(0)	The rho-squared measure compares the log-likelihood (LL(final)) to the log-likelihood of a model with all coefficients restricted to zero (LL(0)): Rho2(0) = 1 – LL(final)/LL(0) A higher value indicates a better fitting model.

In interpreting the coefficient values the following points should be considered.

- **A positive coefficient** means that the variable level or constant has a positive impact of utility and so reflects a higher probability of choosing the alternatives to which it is applied.
- **A negative coefficien**t means that the variable level or constant has a negative impact on utility and so reflects a lower probability of choosing the alternative to which it is applied.
- **Some coefficients are multiplied by continuous variables** and therefore reflect the disutility per unit of the variable, e.g. benefits, which reflect the relative utility per pound of benefit.
- **Some coefficients are applied to categorical variables**; these therefore reflect the total utility increase or decrease for that variable, relative to a base situation, e.g. the increase in utility as a result of differences in the level of

attribute 'Safety' is always compared to the base situation of level 4 ('You are extremely worried about your personal safety') of that same attribute.

The t-ratio defines the (statistical) significance of the coefficient estimate; regardless of the sign, the larger the t-ratio, the more significant the estimate. A coefficient with a t-ratio greater than +/-1.960 is estimated to be significantly different from zero at the 95 per cent confidence level. In the model estimation procedure we have used the 95 per cent confidence interval coupled with professional judgement to determine which coefficients to retain in the model.

Models from the data collected in the Discrete Choice Experiment

The data from the surveys was checked for accuracy and five records were discarded on the basis of concerns with the data files.

A number of additional observations were removed. These were:

- People who felt that they 'were unable to answer the choices' (nine respondents).
- People who said that they could not 'put themselves in the imaginary position that they had been involved in a serious accident and required help with looking after themselves' (82 respondents). The responses given by this group of people were not consistent with those that felt that they could place themselves in the imaginary position, with many coefficients being either insignificant or significant with a much lower value.

This left a total of 404 respondents for analysis in the choice models.

Main model

The model that has been developed incorporates the data from both Discrete Choice Experiments (i.e. SP1 and SP2) together, taking account of possible error variation between the datasets.[7] A large number of models were estimated during the model development to test the existence of nonlinearities, correlation between variables and other behavioural effects. However, the best fit to the data was obtained using a utility function that is relatively simple and the resulting coefficient values are significant and appear to be intuitive. The model reported in tables 4.2 to 4.4 takes account of any differences that we observe in responses for people above or below the age of 65, it does not include disaggregation across the other socio-economic variables. Table 4.2 shows the coefficients for this model, including the only significant interaction with age: the value placed on 'role'.[8] It is important to note, however, that some of the estimated coefficients are not statistically different from each other. For example, the estimated values for the first two levels of 'Personal cleanliness and comfort' are not statistically different. Within this model all of the coefficients are of the anticipated sign and order, i.e. increases in benefits are valued positively and moving to a level where more needs are met is valued as a gain.

Table 4.3 presents a revised model in which those coefficients which are not statistically different from each other are combined. For example, levels 1 and 2 of Personal cleanliness and comfort are now described by one single coefficient. By comparing the log likelihood, it is clear that the simplification in the latter model does not lead to a significant loss of model fit.

7 Annex C provides further details of the modelling approach used.

8 In addition to the domains, the model also contains constants on the 'not sure' alternative, separated according to experiment, and a term reflecting the relative scale of the error variance from the second experiment.

Table 4.2: Model identifying differences by age

	Coefficient value	t-ratio
Personal cleanliness and comfort		
1. You are able to keep clean and appropriately dressed	0.9262	11.6
2. With help from an appropriate person you are always clean and appropriately dressed	0.9368	11.7
3. You are occasionally less clean than you would like or not properly dressed	0.5195	6.6
4. You are much less clean than you would like, with poor personal hygiene	0.0000	n/a
Social participation and involvement		
1. You are able to keep in contact with people as much as you want	0.6752	8.3
2. With help you see people as often as you want	0.5569	7.1
3. You feel lonely and socially isolated at times	0.2389	3.0
4. You feel socially isolated with little or no contact from others	0.0000	n/a
Control over daily life		
1. You have control over your daily life	0.7544	10.3
2. With help you have control over your daily life	0.5694	8.6
3. You have some control over your daily life but not enough	0.4086	6.4
4. You have no control over your daily life	0.0000	n/a
Meals and nutrition		
1. You are able to organise appropriate meals for yourself	0.7421	9.5
2. You receive sufficient, varied, timely meals	0.8267	10.4
3. You do not always get appropriate or timely meals but there is little health risk	0.5820	7.3
4. You have an inadequate diet potentially resulting in a health risk	0.0000	n/a
Employment and occupation		
1. You are fully employed or occupied in meaningful activities of your choice	0.4820	6.3
2. You have enough to do to keep you occupied	0.3045	3.9
3. You don't have enough to do and you are often bored	0.0759	1.0
4. You have nothing to do at all	0.0000	n/a
Safety		
1. You have no worries about your personal safety	0.5942	4.7
2. You receive support to ensure you have no worries about your personal safety	0.5281	4.3
3. You have some worries about your personal safety	0.2364	2.2
4. You are extremely worried about your personal safety	0.0000	n/a
Accommodation		
1. Your home is clean and comfortable and is easy to get around	1.1049	6.6
2. Your home is easy to get around but is less clean or comfortable than you would like	0.5707	4.7
3. Your home is clean and comfortable but difficult to get around	0.6637	5.2
4. Your home is not clean or comfortable and is difficult to get around	0.0000	n/a
Role		
1Y. You are providing someone you care for with the quality of support that you want (Young people)	0.4862	3.5
1O. You are providing someone you care for with the quality of support that you want (Old people)	0.0259	0.1
2. You are not providing someone you care for with the quality or type of support that you would wish	0.0769	0.8
3. At times you find it difficult to cope with the demands of caring	-0.0587	-0.6
4. You frequently find it very difficult to cope with the demands of caring	0.0000	n/a
Living at home		
1. You are living in your own home	0.8542	6.6
2. You are not living in your own home	0.0000	n/a
Benefits	0.0016	10.4
ASCNoSure1	-0.0657	-0.4
ASCNoSure2Y	-0.9034	-3.4
ASCNoSure2O	-1.6318	-4.5
SP2Scale	0.7463	8.1
Interactions		
You are living in your own home AND you are providing someone you care for with the quality of support that you want (Old people)	0.7868	3.4
Model diagnostics		
Final Log Likelihood	-4771.6	
D.O.F	32	
$Rho^2(0)$	0.328	

Table 4.3: Model identifying diffeences by age, with coefficients merged

	Coefficient value	t-ratio
Personal cleanliness and comfort		
1. You are able to keep clean and appropriately dressed	0.9347	13.4
2. With help from an appropriate person you are always clean and appropriately dressed		
3. You are occasionally less clean than you would like or not properly dressed	0.5161	6.6
4. You are much less clean than you would like, with poor personal hygiene	0.0000	n/a
Social participation and involvement		
1. You are able to keep in contact with people as much as you want	0.6126	8.8
2. With help you see people as often as you want		
3. You feel lonely and socially isolated at times	0.2359	3.0
4. You feel socially isolated with little or no contact from others	0.0000	n/a
Control over daily life		
1. You have control over your daily life	0.7528	10.4
2. With help you have control over your daily life	0.5668	8.6
3. You have some control over your daily life but not enough		
4. You have no control over your daily life	0.0000	n/a
Meals and nutrition		
1. You are able to organise appropriate meals for yourself	0.7867	11.4
2. You receive sufficient, varied, timely meals		
3. You do not always get appropriate or timely meals but there is little health risk	0.5855	7.4
4. You have an inadequate diet potentially resulting in a health risk	0.0000	n/a
Employment and occupation		
1. You are fully employed or occupied in meaningful activities of your choice	0.4409	6.5
2. You have enough to do to keep you occupied	0.2718	3.9
3. You don't have enough to do and you are often bored	0.0000	n/a
4. You have nothing to do at all	0.0000	n/a
Safety		
1. You have no worries about your personal safety	0.5653	5.0
2. You receive support to ensure you have no worries about your personal safety		
3. You have some worries about your personal safety	0.3541	2.1
4. You are extremely worried about your personal safety	0.0000	n/a
Accommodation		
1. Your home is clean and comfortable and is easy to get around	1.0937	6.7
2. Your home is easy to get around but is less clean or comfortable than you would like	0.6150	5.5
3. Your home is clean and comfortable but difficult to get around		
4. Your home is not clean or comfortable and is difficult to get around	0.0000	n/a
Role		
1Y. You are providing someone you care for with the quality of support that you want (Young people)	0.4403	3.6
1O. You are providing someone you care for with the quality of support that you want (Old people)	0.0000	n/a
2. You are not providing someone you care for with the quality or type of support that you would wish	0.0000	n/a
3. At times you find it difficult to cope with the demands of caring	0.0000	n/a
4. You frequently find it very difficult to cope with the demands of caring	0.0000	n/a
Living at home		
1. You are living in your own home	0.8443	6.7
2. You are not living in your own home	0.0000	n/a
Benefits	0.0016	10.4
ASCNoSure1	-0.1021	-0.7
ASCNoSure2	-1.2151	-4.5
SP2Scale	0.7492	8.1
Interactions		
You are living in your own home AND you are providing someone you care for with the quality of support that you want (Old people)	0.8342	4.6
Model diagnostics		
Final Log Likelihood	-4779.6	
D.O.F	22	
$Rho^2(0)$	0.327	

The following table presents the implied monetary value associated with each attribute level (calculated from the marginal rate of substitution). The t-ratios presented reflect those of the ratio once have taken account of the correlation between responses from the same respondent.[9]

9 See Annex E for further details on the jack-knife correction employed.

Table 4.4: Monetary values from model identifying differences by age

	Before jack-knife			After jack-knife		
	Attribute value £	Std Dev £	t-ratio	Attribute value £	Std Dev £	t-ratio
Personal cleanliness and comfort						
1. You are able to keep clean and appropriately dressed	599	70	8.5	598	78	7.6
2. With help from an appropriate person you are always clean and appropriately dressed						
3. You are occasionally less clean than you would like or not properly dressed	330	57	5.8	329	76	4.3
4. You are much less clean than you would like, with poor personal hygiene	0	n/a	n/a	0	n/a	n/a
Social participation and involvement						
1. You are able to keep in contact with people as much as you want	392	57	6.9	394	43	9.1
2. With help you see people as often as you want						
3. You feel lonely and socially isolated at times	151	53	2.9	152	54	2.8
4. You feel socially isolated with little or no contact from others	0	n/a	n/a	0	n/a	n/a
Control over daily life						
1. You have control over your daily life	482	56	8.7	483	45	10.7
2. With help you have control over your daily life	363	50	7.3	364	41	8.9
3. You have some control over your daily life but not enough	262	45	5.8	262	40	6.6
4. You have no control over your daily life	0	n/a	n/a	0	n/a	n/a
Meals and nutrition						
1. You are able to organise appropriate meals for yourself	504	63	8.0	503	56	9.1
2. You receive sufficient, varied, timely meals						
3. You do not always get appropriate or timely meals but there is little health risk	375	61	6.1	374	57	6.6
4. You have an inadequate diet potentially resulting in a health risk	0	n/a	n/a	0	n/a	n/a
Employment and occupation						
1. You are fully employed or occupied in meaningful activities of your choice	282	50	5.6	283	44	6.5
2. You have enough to do to keep you occupied	174	48	3.7	175	49	3.6
3. You don't have enough to do and you are often bored	0	n/a	n/a	0	n/a	n/a
4. You have nothing to do at all	0	n/a	n/a	0	n/a	n/a
Safety						
1. You have no worries about your personal safety	362	71	5.1	360	57	6.3
2. You receive support to ensure you have no worries about your personal safety	157	69	2.3	158	56	2.8
3. You have some worries about your personal safety	0	n/a	n/a	0	n/a	n/a
4. You are extremely worried about your personal safety						
Accommodation						
1. Your home is clean and comfortable and is easy to get around	700	100	7.0	694	104	6.7
2. Your home is easy to get around but is less clean or comfortable than you would like	394	69	5.7	391	63	6.2
3. Your home is clean and comfortable but difficult to get around						
4. Your home is not clean or comfortable and is difficult to get around	0	n/a	n/a	0	n/a	n/a
Role						
1Y. You are providing someone you care for with the quality of support that you want (Young people)	282	78	3.6	278	88	3.1
1O. You are providing someone you care for with the quality of support that you want (Old people)	0	n/a	n/a	0	n/a	n/a
2. You are not providing someone you care for with the quality or type of support that you would wish	0	n/a	n/a	0	n/a	n/a
3. At times you find it difficult to cope with the demands of caring	0	n/a	n/a	0	n/a	n/a
4. You frequently find it very difficult to cope with the demands of caring	0	n/a	n/a	0	n/a	n/a
Living at home						
1. You are living in your own home	541	76	7.1	536	80	6.7
2. You are not living in your own home	0	n/a	n/a	0	n/a	n/a
Interactions						
You are living in your own home AND you are providing someone you care for with the quality of support that you want (Old people)	534	114	4.7	532	112	4.8

It is important to note that what we are estimating here is the monetary *value* that they place on each domain level. This is not necessarily the same as the amount they would currently have to pay in the existing market to achieve that level, or the amount that the system currently compensates them in the form of benefits. In fact, in an ideal situation we would hope that the services that local government provides would result in outcomes that the individual valued higher than the cost of achieving them, i.e. the services provide additional value.

- **Personal cleanliness and comfort**
  The results show that we can not detect a difference in the value that people place on being able to be clean and appropriately dressed with or without assistance. Since the coefficients are not statistically different they have been merged. It can also be seen that respondents place a lower value on being occasionally less clean than they would like or not appropriately dressed, which is the expected result.
- **Social participation and involvement**
  As in the previous attribute, we can not detect a statistically significant difference between the value placed on the top two levels, here we found no perceived disbenefit from requiring assistance to achieve the desired level of social interaction.
- **Control over daily life**
  In this we can estimate a distinct value for the top level, which reflects the situation where the respondent has control over their daily life. However, we do not observe a difference in the value attributed to the middle two levels, suggesting that needing some help to achieve control over daily life is valued similarly to having some control but not enough. As such, these results suggest that when it comes to control, respondents placed significant value on independence.
- **Meals and nutrition**
  When it comes to meals and nutrition, equal value is given to the top two levels, reflecting the situations where the respondent would receive sufficient, varied and timely meals, and when they would be able to organise appropriate meals for themselves. Here, again the issue is one of not differentiating between being assisted to achieve a high quality of life and being self sufficient.
- **Employment and occupation**
  In the pilot, the values associated with moving to the higher levels of this domain were surprisingly high. Following the pilot the base level was reworded to remove the suggestion of depression with having nothing to do, and this has resulted in lower values placed on the higher levels (which are also more in line with expectation). It is interesting to note that we do not estimate significantly different values for having enough to do and being often bored from having nothing to do at all.
- **Safety**
  In the pilot, the values placed on this domain were lower than anticipated. The results achieved with this larger sample are more encouraging and are now of the magnitude that we would anticipate.
- **Accommodation**
  The values placed on the accommodation levels are higher than we would have initially anticipated. In this domain we have two confounding issues: that of the home being clean, and that of it being easy to get around. The middle two levels show that having either one of these aspects when not having the other is given the same amount of value, and the top level that reflects having both of these is approximately the sum of the two.
- **Role**
  Only one of the levels of this domain was found to have a value that was significantly different from the others, and that was being able to provide someone you care for with the quality of life that you would want, and as a main effect (independent of other domains) this was only significant for the younger respondents (under 65 years of age). There was value placed on this

level for the older respondents in some specific circumstances, but these are covered later in the consideration of interactions between domains.

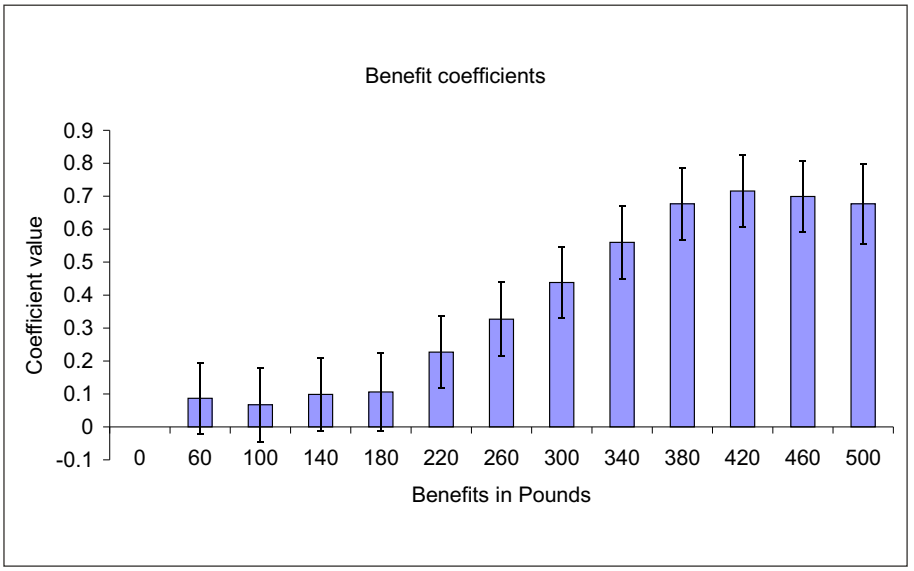
- **Living at home**
  All respondents placed a statistically significant, and high, value on situations where they would be living in their own home.
- **Interaction – living at home * role (older respondents)**
  Within the model we have picked up an interaction between the value placed on living in your own home and being able to provide someone you care for with the quality of life that you would want. This only applies to the older respondents over 65 years of age. As observed earlier, we see that younger respondents place a value on being able to care for others independent of whether they are living in their own home, but for the older respondents this aspect of being able to care for others is only relevant when they are still living in their own home.

Further issues explored in model development

Whilst the primary interest in this pilot study was to obtain preliminary values to use in calculating the capacity for benefit for the older members of the population, the sample provided an opportunity to explore whether there are other socio-economic characteristics that can have a bearing on the value that different individuals place on the various domains. No associations were found with gender, marital status, household composition, income, benefit receipt, or health state. Associations were found between SEG and location and the domains of personal cleanliness, control over daily life and living at home. In terms of care experiences, those that had known someone that needed help put a higher value on living in their own home. The model, which is described in detail elsewhere (Burge et al., 2006), provided some useful insights, but would require some caution if it were to be applied in calculating benefits accruing from personal social services.

In developing the models, particular attention was paid to people's attitudes towards benefits. A number of models were developed to test nonlinearities in people's valuations of benefits. For example, figure 4.1 shows the estimated values for the coefficients associated with each amount of benefit available in the choices. The results show that a linear approximation is actually a reasonable fit to the value that respondents have placed on benefits.

Figure 4.1: Further issues explored in model development



It is noteworthy, however, that the data suggest that respondents may give little value to benefits below £180/week, with figure 4.1 showing that the coefficients for benefits below £180/week are not statistically different from zero. In addition, we observe an apparent tailing off of the value placed on high levels of benefits. A number of more complicated functional forms were tested to see whether there was a statistical basis for imposing a non-linear value on benefits; none of these were found to give a significantly better model fit on the data available. As a result, it is not possible to obtain a conclusive answer as to whether benefits are valued linearly – the current evidence shows no statistical justification for using any more complicated functional form, but there is certainly a suggestion that there may be some more complicated behaviour that should be investigated in any following study, which may benefit from a larger sample.

Particular attention was also paid to the role of the income of the respondents. In the survey almost 40 per cent of respondents either 'didn't know' their income or 'declined to answer' this question. Regardless of this large component of sample for which income was not known, a number of tests were conducted to test whether there was an income effect in the valuation of benefits.

First, a detailed analysis was carried out to identify the socio-economic characteristics of the people who didn't provide an answer. It was found that this group was evenly spread across the whole sample. Then, a number of models were developed to test the impact of income on behaviour in the choice experiments. Models were developed where the value of benefits was examined for each income band, grouping those that did not provide an income as a separate distinguishable group. These tests revealed no significant differences in the valuation of benefits between income groups, or in fact between those providing and not providing an estimate of income. As a result it was judged that no income effect could be observed.

In addition, the effect of SEG and age on the value placed on benefits was tested. Again, no significant differences were found. We also tested whether people currently receiving benefits value the additional benefits in the experiments differently to people who are currently not receiving any benefits; again no significant differences were observed. In summary, with the current data the best model fit is obtained by assuming that all respondents value benefits in the same linear fashion.

Models from the data collected in the Best-Worst experiment

In modelling the Best-Worst data we have used a disaggregate modelling approach which closely matches that used in analysing the data from the Discrete Choice Experiments. This analysis works on the paired data (i.e. modelling the maximum utility difference) and uses dummy coding of the variables[10] as in the earlier models. The key difference in these models is that whilst the earlier models from the discrete choice data required each variable to have a reference base level (in our case level 4), the Best-Worst data only requires the model to have a reference level for one of the variables (in this case level 4 of the role domain).

At this stage, the Best-Worst data has been used to estimate a single model, which represents the average valuations across all respondents in the sample. The results are presented in table 4.5.

The model formulation is explained in further detail in Annex C.

10 An attribute level is assigned a value of 1 if it appears in the choice pair and 0 if it does not.

Table 4.5: Model developed from Best-Worst experiment data

	Coefficient value	t-ratio
Personal cleanliness and comfort		
1. You are able to keep clean and appropriately dressed	3.2917	31.8
2. With help from an appropriate person you are always clean and appropriately dressed	2.9488	27.4
3. You are occasionally less clean than you would like or not properly dressed	-0.0611	-0.6
4. You are much less clean than you would like, with poor personal hygiene	-0.8268	-8.8
Social participation and involvement		
1. You are able to keep in contact with people as much as you want	3.0324	28.5
2. With help you see people as often as you want	2.7171	24.2
3. You feel lonely and socially isolated at times	-0.5256	-5.6
4. You feel socially isolated with little or no contact from others	-0.5089	-5.3
Control over daily life		
1. You have control over your daily life	3.7231	36.5
2. With help you have control over your daily life	3.0744	29.0
3. You have some control over your daily life but not enough	1.4671	12.4
4. You have no control over your daily life	-0.8802	-9.4
Meals and nutrition		
1. You are able to organise appropriate meals for yourself	2.3930	21.2
2. You receive sufficient, varied, timely meals	2.2552	19.2
3. You do not always get appropriate or timely meals but there is little health risk	0.8685	7.4
4. You have an inadequate diet potentially resulting in a health risk	-0.3176	-3.2
Employment and occupation		
1. You are fully employed or occupied in meaningful activities of your choice	3.1740	30.1
2. You have enough to do to keep you occupied	2.7095	24.5
3. You don't have enough to do and you are often bored	0.1564	1.5
4. You have nothing to do at all	-0.2289	-2.3
Safety		
1. You have no worries about your personal safety	2.4650	21.6
2. You receive support to ensure you have no worries about your personal safety	2.4321	21.2
3. You have some worries about your personal safety	0.5944	5.3
4. You are extremely worried about your personal safety	-0.1733	-1.7
Accommodation		
1. Your home is clean and comfortable and is easy to get around	2.8176	26.0
2. Your home is easy to get around but is less clean or comfortable than you would like	1.2359	10.2
3. Your home is clean and comfortable but difficult to get around	1.3669	11.1
4. Your home is not clean or comfortable and is difficult to get around	0.1586	1.5
Role		
1. You are providing someone you care for with the quality of support that you want	2.7732	25.0
2. You are not providing someone you care for with the quality or type of support that you would wish	-0.0895	-0.9
3. At times you find it difficult to cope with the demands of caring	0.2268	2.1
4. You frequently find it very difficult to cope with the demands of caring	0.0000	n/a
Living at home		
1. You are living in your own home	3.5483	38.6
2. You are not living in your own home	-0.7414	-9.0
Benefits		
Constant	0.9438	9.4
Gradient	0.0061	27.9
Model diagnostics		
Final Log Likelihood	-16475.9	
D.O.F	35	
$Rho^2(0)$	0.262	

As with the model from the Discrete Choice Experiment, it is possible to obtain monetary valuations of the domain levels by dividing by the coefficient that applies to the gradient of the value of benefits. In order to measure the incremental value, these are subtracted from the value of the base level of each domain.

Table 4.6: Monetary values from Best-Worst experiment

	Attribute value £
Personal cleanliness and comfort	
1. You are able to keep clean and appropriately dressed	671
2. With help from an appropriate person you are always clean and appropriately dressed	615
3. You are occasionally less clean than you would like or not properly dressed	125
4. You are much less clean than you would like, with poor personal hygiene	0
Social participation and involvement	
1. You are able to keep in contact with people as much as you want	577
2. With help you see people as often as you want	526
3. You feel lonely and socially isolated at times	-3
4. You feel socially isolated with little or no contact from others	0
Control over daily life	
1. You have control over your daily life	750
2. With help you have control over your daily life	644
3. You have some control over your daily life but not enough	382
4. You have no control over your daily life	0
Meals and nutrition	
1. You are able to organise appropriate meals for yourself	442
2. You receive sufficient, varied, timely meals	419
3. You do not always get appropriate or timely meals but there is little health risk	193
4. You have an inadequate diet potentially resulting in a health risk	0
Employment and occupation	
1. You are fully employed or occupied in meaningful activities of your choice	554
2. You have enough to do to keep you occupied	479
3. You don't have enough to do and you are often bored	63
4. You have nothing to do at all	0
Safety	
1. You have no worries about your personal safety	430
2. You receive support to ensure you have no worries about your personal safety	425
3. You have some worries about your personal safety	125
4. You are extremely worried about your personal safety	0
Accommodation	
1. Your home is clean and comfortable and is easy to get around	433
2. Your home is easy to get around but is less clean or comfortable than you would like	176
3. Your home is clean and comfortable but difficult to get around	197
4. Your home is not clean or comfortable and is difficult to get around	0
Role	
1. You are providing someone you care for with the quality of support that you want	452
2. You are not providing someone you care for with the quality or type of support that you would wish	-15
3. At times you find it difficult to cope with the demands of caring	37
4. You frequently find it very difficult to cope with the demands of caring	0
Living at home	
1. You are living in your own home	699
2. You are not living in your own home	0

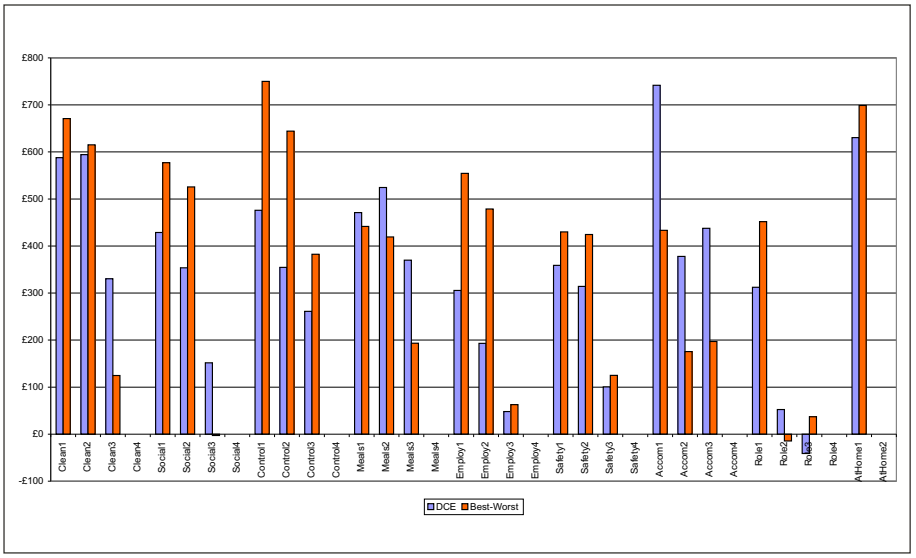
The values obtained from this model are compared with a model from the Discrete Choice Experiment data in which there is no differentiation between different groups of respondents.

There are clearly some differences in the values obtained from the two approaches. Most notably, the control and employment domains are valued considerably higher in the Best-Worst experiment, and the accommodation domain is valued significantly lower in the Best-Worst experiment.

In interpreting these results it should be remembered that the Discrete Choice Experiment was set up as the primary form of data collection, and as a result the survey was constructed to place greater weight on this experiment. The approximate levels of agreement between the two approaches is encouraging and suggests that there may be merit from further examination of the Best-Worst

approach for such purposes. However, at this time, without sufficient agreement between the two approaches it is difficult to recommend the Best-Worst experiment as a complete replacement for the Discrete Choice Experiments.

Figure 4.2: Comparison of results from Discrete Choice Experiment and Best-Worst experiment



5 Applying values to home care

As described above, the immediate purpose of identifying financial valuations for the domains of outcome was to provide a basis for a financial valuation in improvements in output, particularly changes in quality. We drew on the model presented in table 4.4 above to identify financial valuations of need states.

This value is not, and should not be interpreted as, the amount they would have to pay in the existing market or the amount that currently compensates them in the form of benefits. We expect local government services to provide outcomes valued higher than the cost of delivery i.e. the services add economic value.

There are also some methodological issues that need considering in interpreting the values estimated in this study, the key issue here is that the values that have been generated reflect 'willingness to accept' rather than 'willingness to pay'.

In general it is accepted within the economics literature that a disparity can exist between values obtained through 'willingness to accept' (WTA) and 'willingness to pay' (WTP), with willingness to accept typically providing higher values. However, the difference between the values obtained by each approach is very dependent upon the context of the valuation. From a practical perspective, in the design of this study we decided that WTA (i.e. compensatory payment) was the only measure that really made sense in a situation where we were asking people to imagine the value they would associate with being placed in a significantly worse state than that they were currently experiencing.

In the discussion of WTA and WTP it is worth noting that one of the explanations used in other contexts for lower values being obtained by WTP methods is that of budgetary constraints. This issue is particularly relevant in the case of long-term care, where we are asking respondents to consider a serious reduction in their quality of life, which they may believe has a value in excess of the resources they have available to pay for improvements resulting from care. With WTA we avoid this complication, as we are asking the respondent how much they would require in benefits to compensate them for their deterioration in condition, however, it does bring with it an incentive for respondents to overstate the value they may place on these scenarios.

The only way to gain a true understanding of the magnitude of any difference between WTA and WTP in the case of valuing the outputs of social care would be to undertake a study with instruments using both approaches, although as already noted, this would bring with it a number of additional practical and theoretical challenges. For the purposes of this study we have restricted ourselves to recognising the potential for a disparity in the values that may be obtained through WTA and WTP, and present the values obtained through a WTA approach; these should be considered an upper bound on the range of values that one could expect to obtain with other formulations.

Table 5.1 shows the values that were used to identify the WTA CfB valuation for home care. 'All needs met' for most domains was the second level: for example for safety 'You receive support to ensure you have no worries about your personal safety'. 'Low needs' was defined as 'You have some worries about your personal safety' and 'High level needs' was when 'You are extremely worried about your personal safety'. As described above, for each domain high level needs was set at zero so we could estimate the additional value from moving from high level needs to low to having all needs met. In the case of safety these were £158 and £360 per week respectively.

Table 5.1: Financial valuations of levels of met need

Domain	All needs met £	Low needs £	High needs £
Personal care/ comfort	598	329	0
Social participation and involvement	394	152	0
Control over daily life	364	262	0
Meals and nutrition	503	374	0
Safety	360	158	0
Accommodation	694	391	0
Employment and occupation	175	0	0

11 It did not prove possible to separately identify the impact of meals or other care services so the values apply to the whole of the care package received by home care service users. This is largely the basis for the overall satisfaction question in User Experience Surveys which asks about services received in the home and is used as a basis for the measurement of quality. In theory the satisfaction question does not cover day care services, which a quarter of the home care sample used, but the fact that we could not separately identify the impact of day care for this group suggests that the implications for measuring the impact of quality changes are likely to be marginal.

Information about what domains services are addressing and expected levels of need in the absence of those services was drawn from a survey of older home care service users conducted in 14 local authorities as part of an ongoing study to feed into the relative needs formula for allocating central government funding for older people's services to local authorities (Darton et al., 2005). In total 387 people were interviewed, selected to over represent those receiving more intensive packages of care. A set of additional questions was included to allow us to estimate capacity for benefit. These asked in turn for each domain the degree to which the individual had any unmet needs, whether services helped the respondent in this area of his or her life, if so which services and what their expected level of need would be in the absence of services.[11] Table 5.2 shows the domains and levels of need reported by the sample of home care service users.[12]

Table 5.2: Domains of outcome and levels of need when home care service user identified that need was addressed by service package

Domain	Helped by services (n=384)		High needs (n=354)	Low needs (n=354)	No needs (n=354)
	N	%	%	%	%
Personal comfort	260	68	33	20	20
Social participation	103	27	12	10	7
Control	174	45	26	20	3
Meals	166	43	26	14	6
Safety	165	43	20	19	7
Accommodation	239	62	34	26	7
Occupation	64	17	7	7	3
Any	354	92	-	-	-

12 Some service users reported that services helped them but that all needs would be met in the absence of services. Follow up interviews investigated this and found that for the most part this reflected reality. For example, one respondent was helped with personal care. In the absence of services, rather than be unwashed she would have continued to shower in the bath at some risk to her personal safety.

In order to estimate capacity for benefit, the values in table 5.1 are applied to the level of need that service users identified they would have if they did not receive service. This value is then deducted from the value for 'all needs met' in order to estimate capacity for benefit. For example, if an individual identified that in the absence of services he or she would have low personal care needs their capacity to benefit from the service in this domain would be estimated as £598 (all needs met) less £329 (expected level of need if there were no services), that is £269[13] per week. Individuals' total capacity for benefit is the sum of these values for all domains. We then estimate the capacity for benefit of a service based on the average value of service users' capacity for benefit. This reflects both what the

13 For the purposes of this analysis no individuals were identified scoring the maximum capacity for benefit of £694 for accommodation as home care services are only concerned with household cleanliness and comfort and were assumed not to have an impact on accessibility.

services are doing (domains of outcome) and service users' reliance on them (levels of need if they did not have the service).

For home care we would expect different values dependent on the hours of care received, with more intensive packages delivering higher capacity for benefit than low level services. Table 5.3 shows the estimated value of CfB for home care categorising service users in terms of the number of home care hours they are receiving using HH1 groupings of hours receipt reported by local authorities each year (Department of Health, 2005c). As a result of the basis for sampling, a higher proportion of the respondents in the home care user survey received more intensive services than among home care service users as a whole. There was no statistically significant difference in estimated capacity for benefit between those receiving 11 or 12 hours per week and those receiving more intensive packages.

Table 5.3 shows the proportions nationally in the groups for the years 2000/01 through to 2004/05 and estimated increase in CfB per person per week over the period (£59 per person per week or 8 per cent). Between 2002/03 and 2004/05 the estimated value of the increase in CfB from increased intensity of service provision was £30, or 4 per cent.

Table 5.3: Valuation of CfB per person per week by number of home care hours

Home care hours per week	Home care sample		% of service users in England				
	Financial value £	% (n=367)	2000/01 %	2001/02 %	2002/03 %	2003/04 %	2004/05 %
0-2	527	14	32	29	27	25	24
2-5	606	24	29	29	28	28	27
5-10	691	28	22	23	23	24	24
>10	1,192	35	17	19	21	23	26
Average CfB value £	822		694	707	719	731	746
90% CI (1.645 * SE) £	+/-193		+/-174	+/-176	+/-177	+/-179	+/-181

Before applying these values to derive estimates of the value of quality changes it is helpful to understand how the value of CfB might vary given alternative assumptions.

Variations in valuation of capacity for benefit

Figure 5.1 presents the confidence intervals on the estimates of CfB obtained from the discrete choice model.[14] These 90 per cent confidence intervals take account of cumulative effect of the variance (and correlation) in the estimated coefficients on the monetary benefits and each of the domains. The average CfB of £822, has a 90 per cent confidence interval of +/-£191. A larger preference study would provide more observations to obtain a more accurate estimation of the mean coefficient values, which would reduce the magnitude of these confidence intervals.

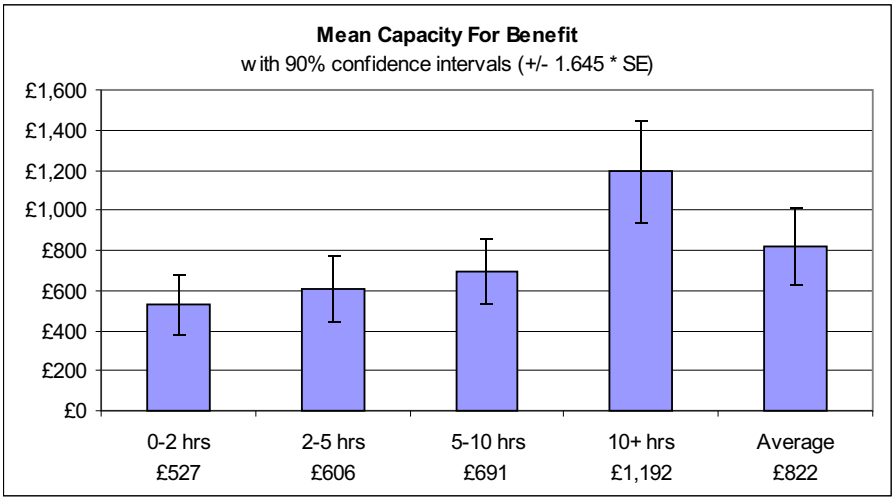
14 Annex F provides details on the calculation of these confidence intervals.

It should be noted that these confidence intervals only take account of the variance in the coefficient estimates and do not account for any sampling error that may exist in the sample of home care service users to which these values are applied.

From the confidence intervals in Figure 5.1 we can observe that the mean CfB for those with 0-2 hours, 2-5 hours and 5-10 hours of care are not statistically significantly different from each other at the 90 per cent level, however the value

for those with greater than 10 hours of care is significantly different from that of the previous three groups.

Figure 5.1: Confidence intervals on valuations of CfB



As described above the Best-Worst (B-W) approach was very much seen as a back up to the Discrete Choice method, but it is of interest to identify the impact of using the financial valuations shown in table 5.1. As table 5.4 shows, overall the levels of capacity for benefit are much higher: average estimated CfB value for the home care sample was £1,040 compared with £822 using the DCE based estimates.

Table 5.4: DCE and Best-Worst estimated capacity for benefit

Home care hours per week	Main model £	B-W £
0-2 hrs	527	700
2-5 hrs	606	788
5-10 hrs	691	903
10 hrs	1,192	1458
Average CfB value	822	1040

Enablement

As described above, a key assumption in all these estimates is that the most the service could deliver is to meet needs in the identified domains of outcome. Enablement services might be expected to do more than this: to enable people to meet their own needs and reduce or eliminate the need for service interventions. A major problem in estimating the impact of such services is accurate attribution of such effects. In particular to attribute outcomes over periods where people are not receiving services would require robust evidence which is not easy to obtain.

One second (or third) best approach would be to identify those home care person weeks where enablement services had been put in place. For those cases we could apply valuations of capacity for benefit that assumed that the aim was for individuals to achieve the top level in each of the identified domains of outcome using the values shown in table 4.4. Thus control over daily life maximum value would be £483 (rather than £364) and for occupation £283 would replace £175. For our purposes here, we also reflect the (non-statistically significant) difference in the top levels of social participation and involvement shown in table 4.2 and replace £392 with £355 for all needs met by services and create a new maximum

value of £430 for independence interim domain. As no difference was identified for personal care it is not possible to reflect potential welfare gain in this domain. Table 5.5 below shows the resulting estimated capacity for benefit values and the estimated increase in values based on an assumption that in 2004/05 50 per cent of hours were from 'enablement' services. This results in an increase in capacity for benefit per person per week of £71 or 10 per cent.

Table 5.5: Including enablement in capacity for benefit

Hours of home care	CfB estimates		2002/03	2004/05
	Maintenance £	Enablement £	100% cases maintenance %	50% cases enablement %
0-2	527	615	27	24
2-5	606	694	28	27
5-10	691	782	23	24
>10	1,192	1,313	21	26
Mean CfB per person per week £	822	922	719	794
90% CI (1.645 * SE) £	+/-193	+/-214		

Of course there are a lot of assumptions in this estimate and, as the confidence intervals show, the difference between the 'enablement' and 'maintenance' CfB is not statistically significant, but it illustrates how at least some allowance could be made for changes in the role of services. In practice we would expect that such changes would also affect the domains that would be identified by service users so in practice ideally a survey would be conducted of such service users.

Quality changes

As described above, to measure actual output we need to adjust these figures to reflect the quality of services provided. This adjustment is based on home care service users level of satisfaction with the services they receive as reported by the triennial user experience survey (UES) conducted by all councils. In 2003 information was collected from 87,000 services users in all local authorities in England using detailed guidance on sampling procedures and conduct of the survey (Department of Health, 2003). The Best Value Performance indicator based on this question (per cent extremely or very satisfied) has a confidence interval of +/-0.3 per cent (Department of Health, 2003).

More detailed information about quality of home care in 34 authorities was collected by an extension to the UES survey conducted by PSSRU (Netten et al., 2004) that it is planned to repeat in 2006. This study investigated and confirmed the validity of the best value indicator based on the satisfaction measure. Analysis of the data from that study derived measures of quality of services received that were highly correlated with the general satisfaction item. The overall quality measure (incorporating items on service quality, care worker quality and levels of met need) was used to weight the satisfaction item to reflect user experiences of quality of service (see Appendix C in Netten et al., (2006a) for a full description). Table 5.6 below shows the quality weights based on the best solution in that it reflects all the statistically significant different levels of satisfaction in terms of quality.

Table 5.6: Quality of home care services

Level of satisfaction	Quality weights	% Older service users	Level of service quality
Extremely	1	25.02	.250
Very	.668	32.47	.217
Quite	.426	31.37	.133
Neutral/dissatisfied	.279	11.14	.031
Total	n/a	100	.632

On this basis the estimated value of outputs per person per week of home care packages in 2002/03 of

.632 x £729=£461

At present we just have the 2002/03 value for service quality. However, we can illustrate likely valuations of quality changes. The most extreme change we might envisage is if a local authority that had the lowest quality rating in the extended UES in 2002/03 (.579) increased to the maximum quality rating (.744). The estimated difference in quality is £120 per person per week. In practice changes are much more likely to be much less pronounced. Table 5.7 below shows the impact of a 5 per cent, 10 per cent and 15 per cent increase in the proportion of service users that report they are extremely or very satisfied.[15]

15 Using B-W based values the impact of a 5 per cent increase in satisfaction would be £11 per week per person compared with £9 per week.

Table 5.7: Impact of increased reported levels of satisfaction

	Quality score	Outputs value £	Quality differences pp pw in financial terms £
Quality + 5%	0.644	469	9
Quality + 10%	0.656	478	18
Quality + 15%	0.668	487	26

Note: Based on 2002/2003 values of home care outputs with no change in intensity of service

Using these data authorities could estimate the financial value of their levels of home care output based on the intensity of service provision (Table 5.3) and levels of service user satisfaction (Table 5.6).

For the most part we would expect differences in local authorities' policies, such as Fair Access to Care (FACS) criteria, would be reflected in different levels of service provision, assuming some consistency in matching needs to service inputs, so variation in capacity for benefit is reflected through number of home care hours. However, if authorities felt it likely that the relationship between care hours and capacity for benefit was different they could conduct a survey of home care service users to identify local capacity for benefit. It would be important that service users were the source of information about capacity for benefit rather than providers so estimates reflected most closely what was actually being provided in practice rather than what authorities and providers thought was happening.

6 Conclusions and implications

Necessarily the results of this study must be treated with some caution and we discuss below some particular methodological issues that need to be addressed. Nevertheless the study does provide us with a helpful starting point in the difficult issue of attributing a financial valuation to quality gains. In this section we start by identifying methodological issues that have arisen in the course of this study that could inform future analyses and data collections. We consider questions raised by the application to home care of older people and identify possible next steps in taking the approach forward before a few concluding comments.

Methodological issues

Weighting of model results

As discussed in Section 3, the sample for this study used quotas to ensure that the groups of primary concern were sufficiently represented within the sample. This has provided data to allow a systematic examination of any differences in value that different groups, with different background characteristics, place on the domains. However, we are aware that the sample is not representative of the wider population, so this raises an issue about how best to apply these models. In the cases where there are no statistically different values observed between groups we do not have an issue, as the same value applies to all people. However, in some cases we observe that there are statistically significant values, and this poses questions as to whether and how the results should be weighted.

The approach adopted within this preliminary study has been pragmatic. We are applying a model that only differentiates between young and old respondents, and in cases where these values are different we are applying those of the older group.

However, the subsequent modelling has revealed that there are other statistically significant differences, particularly by SEG and interview location. We know that our sample is not representative with respect to SEG, so if we were to apply this model we would need to conduct weighting to ensure that the final values after aggregation represented a sensible average for the true population. We would suggest that the most appropriate approach under such circumstances is to estimate the model with the unweighted data (as done in this study) and then calculating weighted averages of the estimated values using the proportions of people within each group in the population.

Practical problems are raised by lack of good census data on the SEG of the 65+ population (see section 3 above). Wide and challenging questions are raised for the policy maker by the presence of differences by demographic group. In implementing a model that includes demographic differences it is possible to

detect the difference in value that different groups place on various services, but this then raises equity questions when deciding which policies to invest in, or which areas of service improvement to reward. If those in lower socio-economic groups place lower values on some aspects of output (which we observe in our model), should we implement incentives to service providers that recognise these differences and could result in lower investment in improving services for these individuals within society? Clearly this modelling raises challenges which will require further consideration as we move towards a system that aims to introduce incentives to improve service delivery based on the values of users or society.

Collection of data on income

The survey undertaken within this study included a question on household income, which is clearly a variable of interest when modelling economic valuations of individuals. This was an area where we encountered some problems in the data collection, resulting in a large proportion of the sample not reporting their income. Whilst we would usually expect some non-reporting, the levels experienced within this study were surprisingly high, as generally this is a question that respondents are willing to answer.

It is suggested that the possible cause of this high level of non-reporting may have been the heightened concern of the study team over the issues of confidentiality. The pilot survey contained some wording that reassured respondents that the data collected was confidential, however, as we experienced higher than expected levels of non-reporting we attributed this to privacy concern and added additional reassurances around the income question. It is possible that the additional written reassurances, coupled with a briefing to interviewers to verbally reassure respondents, may have acted to heighten the respondents' awareness to an issue of confidentiality that they would otherwise not have considered. In addition, for the older respondents income may not be the most appropriate measure of wealth, and this may also be reflected in the high level of non-reporting on income.

For the purposes of this study, the high level of non-reporting has not caused significant problems. We have observed that the non-reporting was distributed across all socio-economic groups and ages, and showed little correlation with variables that could act as proxies for income. In addition, for those respondents reporting their income we observe no significant differences in valuation of either the outcome domains or the monetary variable. We also do not detect any differences between those that provide their income and those that do not.[16]

16 As a result we have not invested additional resource into this issue. However, if income had been found to play an important role, we would have undertaken a regression to predict household income for those not reporting a value on the basis of the characteristics of those that did provide a value. Such a regression would investigate variables such as respondent's age, working status, household composition, tenure and gender to assign an appropriate income to those with missing values.

Location

Location was found to be a significant influence on people's preferences. It is likely that these are associated with unmeasured socio-economic or cultural differences. It would be important in any future study to ensure that a wide range of locations was included in order to reflect national preferences. Further analysis of socio-economic and cultural differences in the geographical areas in this study might inform the data collection in terms of likely associations with preferences.

Framing and wording effects

Feedback from interviewers suggested that people enjoyed the Best-Worst task and found it easier than the discrete choice task of making decisions between two scenarios.[17] The DCE models attributed values to domains such as accommodation were higher than we might have expected and it is interesting that the Best-Worst model ranking of the domains in terms of relative importance was perhaps more intuitive than that which emerged from the DCE model. However, the technique is still very new so it is important that further analysis investigates

17 We asked the respondents to feedback directly on the Discrete Choice Experiments at the end of the survey. It is suggested that in future work the opportunity should be taken to also ask the respondents to feedback directly on the Best-Worst task to provide comparable insight into comprehension and ability to answer the choices.

the reliability of the results. The financial values were higher than those estimated on the basis of the discrete choice models. It would be important to understand the reason for this in any further work.

In the discrete choice analysis it was clear that the results were very sensitive to the wording used. The pilot study had found unexpectedly high valuations for the occupation domain and re-wording appeared to have reduced the value put on this dramatically. While we might not be surprised that people are as happy (or happier) to have people manage and prepare meals for them, it was surprising that people did not identify any welfare loss associated with needing help with personal care, as long as all needs were met. It is likely that the absence of the effect was to do with people not fully absorbing the implications of the term 'with help'.

In comparing the results from the DCE and the Best-Worst approaches it is also important to recognise that the variables were presented differently in the two approaches. In the DCE we have used the variables to create a paragraph that describes the combined effect of the levels, whereas in the Best-Worst experiment these are simply presented as a list of variables, which it could be argued provide a task where it is easier for the respondent to focus on particular aspects. Indeed, one interpretation of the difference in the relative importance of the accommodation domain was that, when described in vignette form for the Discrete Choice Experiment, accessibility and cleanliness and comfort were treated as two separate domains rather than as a single aspect of the situation as in the list for the Best-Worst approach. It would therefore be interesting to conduct a further piece of work where the method of presentation within the DCE is tested; presenting respondents with equivalent information in a DCE with the variables as a list and in a DCE with the variables put together into a description. This would allow the values resulting from the two approaches to be compared with each other, and with those emerging from the Best-Worst experiment.

Application to home care of older people

The absolute values generated by the preference study do seem very high when applied to home care and put alongside the costs of service packages. However, as we discuss above, the amount people are prepared to accept to live with situations of unmet need may be very different compared with what they would pay given both their knowledge of costs and budgetary constraints. Further work could investigate this further.

In the sample there was no statistically significant difference in estimated capacity for benefit between those receiving 11 or 12 hours per week and those receiving more intensive packages. This could be due to a number of factors. There are a two reasons we might expect this to reflect what is happening in practice. First, home care addresses a limited number of domains so inevitably there will be a reduction in the marginal capacity for benefit as services increase, so we would expect a flattening effect at higher levels of provision. Second, some increases in service provision may reflect difficulty in meeting needs rather than increased levels of outcome (for example, it may take longer to help someone with challenging behaviour to get dressed than someone with physical impairment).

Of course, there are methodological issues. The lack of increased capacity for benefit at higher levels of home care may reflect the relatively crude nature of the measure, with only two levels of unmet need in each domain. We have also had to assume that the level of services provided *could* have met needs in the identified domains, whereas in practice this may be an overestimate at lower levels of provision – the hours are insufficient to raise people to that level of welfare even if the service were perfect. Ideally, such under-provision should be reflected in the

quality measure: lower levels of satisfaction among those who were not getting sufficient hours of care. There is some evidence to support this. Other work has found that reported service quality (highly correlated with satisfaction) declines with increased levels of provision in a non-linear fashion and only starts to increase when people are receiving >20 hours (Netten et al., 2006b).

The assumptions about the maximum level of welfare that services could achieve in each domain if they were delivering their full potential also have implications when services change their role. We discussed above the potential for applying the approach when there is a shift to enablement rather than meeting needs. Clearly this presents a lot of challenges, particularly when the intention is to provide benefits that last beyond the period that services are delivered. Nevertheless there may be scope for an approximation of the impact of such changes. It would be important to if such an approach were to be taken forward both to get empirical evidence about the difference in what services are doing from the user perspective and, ideally, to draw on future work that was able to distinguish the welfare gains associated with independence of services for all relevant domains.

Next steps

Clearly this is only the first step in the process of identifying a financial valuation of quality changes. To take the work forward we could to undertake both methodological work to validate findings and explore apparent anomalies and work to extend the coverage of the approach. In planning future work it will be important to bear in mind other ongoing research and plans for the future:

- The applicability of the domains and levels to future patterns of provision will be investigated through the evaluation of the Individual Budget pilots and an evaluation of a POPP pilot authority
- A proposed Treasury funded ONS led Invest to Save project would involve PSSRU taking the work on measuring PSS outputs forward, focusing particularly on outputs from the voluntary sector.

In terms of methodological work it would be advisable to conduct further analyses and follow up work rather than undertake a full-scale preference study in the near future. Analysis of the data collected as part of this study could investigate further the Best- Worst techniques and investigate weighting the results to reflect the national picture in terms of socio-economic groups. Further fieldwork could be conducted with respondents who identified that they were prepared to be interviewed in the future to explore issues such as the more surprising results (such as value for accommodation) for validation; the implications for choices of changing wording; and location factors.

The results from this study can also be used to inform the sample sizes that may be desirable for the full-scale survey. In making such calculations it is important to recognise that the standard errors of the estimates within the existing models are not exact as they do not account for the correlation that exists between the multiple responses from each individual. As a first approximation to the true standard errors we have employed the jack-knife method, although given more time we would recommend estimating a mixed logit model that allows treatment of such panel data. It is therefore suggested that at present the corrected standard errors (see tables 4.2 to 4.4) are used as appropriate measures of the variable confidence intervals.

Clearly, home care of older people is only one area of provision and was addressed because this is where data were available. In terms of extending the approach an important gap is that at present we have no information about the benefits of mainstream services for carers. Essentially we are underestimating the output of

home care service packages as in many instances it is carers who benefit in terms of their own sense of control, social participation and so on as well as support in the caring role. One possible way forward would be a larger scale study of home care incorporating carer outcomes. Alternatively it might be seen as important to identify capacity for benefit from other service areas and for other client groups – priority perhaps given to those where there are highest levels of expenditure. The advantage of addressing care homes is that this is both an area of high expenditure and care standards provide us with a starting point in the critical issue of monitoring changes in quality. However, care standards and regulatory process is under review so it would be important to tie this in to this process. Some work in this area is planned as part of the ONS Invest to Save project identified above. The most helpful way forward would be for the Department and local authorities to identify those areas that are seen to be the priority for this type of approach to be developed and for plans to be based on these priorities.

Concluding comments

Overall the results of this pilot study are encouraging. The DCE preference study model yields financial valuations that are generally consistent with what we would expect. Age had less of an impact than we might have expected, but the importance to older people of being able to care for others when in their own home but not otherwise and the absence of this effect for younger adults makes sense and gives us some confidence that people were thinking through their decisions in the way we might hope. It was interesting to note both the high valuation overall put on living at home and that those most likely to have some knowledge about care home settings (through knowing others in need of care) put an even higher weight on this domain.

The models yielded values that were consistent and could be applied to home care at a local authority level. In order to estimate changes in the value of output and changes in quality the results can be applied to HH1 data about the numbers of hours home care service users are receiving and responses to the overall satisfaction question in the User Experience Surveys conducted in 2002/3 and 2005/6. The results provide us with a first step in attributing a financial valuation to quality changes in home care for older people and the potential for wider applications in the future.

Annex A

Attributes and levels

This annex presents the attributes and the respective levels that were used in both the stated preference and Best-Worst experiments, along with the text used to introduce the attributes to the respondents at the start of the survey.

Personal cleanliness and health

Here we will talk about whether you are personally clean and comfortable, presentable in appearance and are in bed or up at appropriate times of the day. The possible levels will be:

- You are able to keep clean and appropriately dressed
- With help from an appropriate person you are always clean and appropriately dressed
- You are occasionally less clean than you would like or not properly dressed
- You are much less clean than you would like, with poor personal hygiene

Social participation and involvement

Here we will talk about whether you are content with your level of emotional support, general social contact and level of community participation. The possible levels will be:

- You are able to keep in contact with people as much as you want
- With help you see people as often as you want
- You feel lonely and socially isolated at times
- You feel socially isolated with little or no contact from others

Control over daily life

Here we will talk about whether you can choose what to do and when to do it, having control over your daily life and activities. The possible levels will be:

- You have control over your daily life
- With help you have control over your daily life
- You have some control over your daily life but not enough
- You have no control over your daily life

Meals and nutrition

Here we will talk about whether you have a nutritious, varied and culturally appropriate diet with meals at regular, timely intervals. The possible levels will be:

- You are able organise appropriate meals for yourself
- You receive sufficient, varied, timely meals

- You do not always get appropriate or timely meals but there is little health risk
- You have an inadequate diet potentially resulting in a health risk

Personal safety

Here we will talk about whether you feel safe and secure. We are taking concerns about safety to include fear of abuse, falling or other physical harm and fear of being attacked or robbed as social care interventions are put in place to address these issues. The possible levels will be:

- You have no worries about your personal safety
- You receive support to ensure you have no worries about your personal safety
- You have some worries about your personal safety
- You are extremely worried about your personal safety

Accommodation

Here we will talk about whether you feel that the environment you live in is clean and comfortable and is easy to get around. The possible levels will be:

- Your home is clean and comfortable and is easy to get around
- Your home is easy to get around but is less clean or comfortable than you would like
- Your home is clean and comfortable but difficult to get around
- Your home is not clean or comfortable and is difficult to get around

Employment and occupation

Here we will talk about whether you have enough to do, and whether you are able to participate in leisure or work activities. The possible levels will be:

- You are fully employed or occupied in meaningful activities of your choice
- You have enough to do to keep you occupied
- You don't have enough to do and you are often bored
- You have nothing to do at all

Having a caring role

Here we will talk about whether you are able to care for any dependant(s) as much as you wish without becoming overburdened. The possible levels will be:

- You are providing someone you care for with the quality of support that you want
- You are not providing someone you care for with the quality or type of support that you would wish
- At times you find it difficult to cope with the demands of caring
- You frequently find it very difficult to cope with the demands of caring

Living at home

Here we will talk about whether you are living in your own home or not. The possibilities will be:

- You are living in your own home
- You are not living in your own home

Payment of benefits

Here we will talk about the level of additional financial benefits that you receive. The possible levels will be:

- You are receiving no additional benefits
- You are receiving benefits of £ {value from cost band 1} per week

Annex B

Design of experiments for eliciting the respondents' valuations

Background to Discrete Choice Experiments

Discrete Choice Experiments provide an analytical method for understanding and predicting how individuals make decisions between discrete (mutually exclusive) alternatives; for example, whether to travel by bus or train. It is a technique that has been widely used in transport economics and is increasingly used in environmental and health economics.

In the case of this study we have asked respondents to indicate which of two different life situations they would prefer, where they have differing levels of need, and differing monetary compensation in the form of benefits.

Within this framework, it is possible to investigate the importance of specific drivers of choices. For example how important safety is compared to a person's control over daily life. The outputs from the modelling can also be used to develop predictive models of behaviour. These modelling techniques provide empirically-derived data for making informed decisions, be that at a strategic level or for developing an operational understanding of service delivery.

Stated Preference (SP) discrete choice data has many useful statistical properties as the way the hypothetical choices are presented can be controlled so that, there is little or no correlation between explanatory variables; additionally both small and large variations in explanatory variables can be tested. The technique is also data efficient, more than one choice scenario can be presented to respondents within one interview.

In a SP Discrete Choice Experiment (DCE), hypothetical choice situations – where each alternative is described by a set of variables (control over daily life, meals and nutrition etc in the case of this study) – are presented to each individual. Each of the variables in the experiment is described by a number of levels. The variable levels are combined using principles of experimental design to define different service packages, which respondents evaluate in surveys by choosing one of the alternatives within the choice situation, dependent upon the levels offered and their own personal preferences.

Variables

We had nine domains that we wished to elicit monetary values for (which introduces the tenth variable: cost). For the design, most of these variables had four levels, although 'living at home' had only two levels. One goal was to choose a design that maximised the number of levels for the monetary variable, so that a wide range of willingness to accept levels could be investigated.

Table B.1: Variables for consideration in experimental design

	Variable	Number of Levels
1	Personal cleanliness and comfort	4
2	Social participation and involvement	4
3	Control over daily life	4
4	Meals and nutrition	4
5	Safety	4
6	Employment and occupation	4
7	Accommodation	4
8	Role	4
9	Living at home	4
10	Monetary compensation	As many as feasible

There were too many variables to evaluate in a single Discrete Choice Experiment, so we split the variables across two separate experiments whilst maintaining some common variables in each which would allow us to control for any scale differences and perform a simultaneous estimation of all of the coefficients in a single joint model.

In determining the blocks of variables to assign together we considered which interactions we wished to explore in the modelling. The proposed interactions that were identified were:

- if isolated (social participation) then concerns about safety would be expected to be more serious (and possibly vice versa)
- If feel in control concerns in possibly all the other domains might be less

Based on this we decided to include the 'control over daily life' variable in both experiments, in addition to the monetary variable.

The final groupings of the variables is shown below.

Table B.2: Division of variables between the two choice experiments

	DCE 1		DCE 2
1	Personal cleanliness and comfort	5	Safety
2	Social participation and involvement	7	Accommodation
4	Meals and nutrition	8	Role
6	Employment and occupation	9	Living at home
3	Control over daily life	3	Control over daily life
10	Monetary compensation	10	Monetary compensation

DCE 1 required a design for 5 variables with 4 levels and 1 variable (cost) with as many levels as feasible.

DCE 2 required a design for 4 variables with 4 levels, 1 variable with 2 levels and 1 variable (cost) with as many levels as feasible.

With regard to the monetary variable, an approach was implemented where we defined four different bands and then for each individual one value from each band was picked randomly. This allowed greater variation in the monetary values explored across the sample.

The following table shows how four levels were used to cover 13 benefit levels:

Table B.3: Levels used for benefits variable

Benefit band	Values £
1	£0
2	£60, £100, £140, £180
3	£220, £260, £300, £340
4	£380, £420, £460, £500

In all cases the value assigned to the first band was 'You are receiving no additional benefits'.

It is important to note that what we are attempting to explore here is the monetary value that they place on each domain level. This is not necessarily the same as the amount they would currently have to pay in the existing market to achieve that level, or the amount that the system currently compensates them in the form of benefits. In fact, in an ideal situation we would hope that the services that local government provides would result in outcomes that the individual valued higher than the cost of achieving them, i.e. the services provide additional value.The upper bound of £500 is larger than the reality of benefits in the region of £200. However, this does not raise a problem, and is in fact necessary. The cases we are presenting can relate to very serious life conditions (e.g. insufficient food to maintain health), so we need sufficiently high values to capture the incremental value of moving to such poor states.

In determining the levels of benefit to present in the experiment we had two main considerations. The first issue is whether the range is sufficiently large to capture the more extreme values that some people in the population may hold. The second issue is one of experimental efficiency. If the range of benefits is pushed too high (e.g. £5000/week) we may end up with situations where we are offering compensation far in excess of that required by respondents, and in this case the benefits variable will start to dominate (i.e. people will always choose the option with the best benefits as these far outweigh the situation that accompanies them). In such a case we would be unable to obtain significant estimates of the other variables, and hence would not be able to value them.

The values presented in table B.3 were specified by looking at the levels of benefit typically received and the levels of payment required for obtaining care in a private care home setting. These were then tested in a pilot survey of 50 respondents to determine whether the range appeared to be appropriate, the evidence from this suggested that the range was appropriate in so far as we were able to estimate credible and statistically significant coefficients on most attributes.

Now that we have the data from the main phase of data collection, with 500 respondents, with the luxury of hindsight, we are now able to make some more in-depth judgements about the appropriateness of the range.

When considering whether the range is sufficiently wide to pick up the more extreme high values that some respondents may have, we have some evidence from our data that the value placed on monetary benefits may be starting to flatten at the upper end of the range, suggesting that there may be less additional value placed on higher benefits. On the basis of this evidence we are reasonably happy with the range we have used within this study, although in a larger study it may be sensible to push the range a little higher to explore whether there are certain groups that would have higher values that we have not detected.

With respect to the potential concern that the highest values may be too high, we can see that the model we have been able to estimate from the data collected seems to provide a reasonable balance between the monetary term and the various

outcome dimensions – we get significant coefficients on both the benefits and the domains, suggesting that the balance is probably about right. This is, however, an area of the design that may benefit from more experimentation in a larger study (e.g. presenting different benefits ranges to different subgroups of respondents).

Format of choice experiments

Two options were considered for presenting the information in the scenario, either presenting the information as a list of variables, or grouping the variable descriptions together according to the level of needs met. The latter of these was chosen following experience in a previous study (Netten et al., 2002). Figure B.1 and figure B.2 show example choice screens from each of the Discrete Choice Experiments.

Figure B1: Example of presentation of information in DCE 1

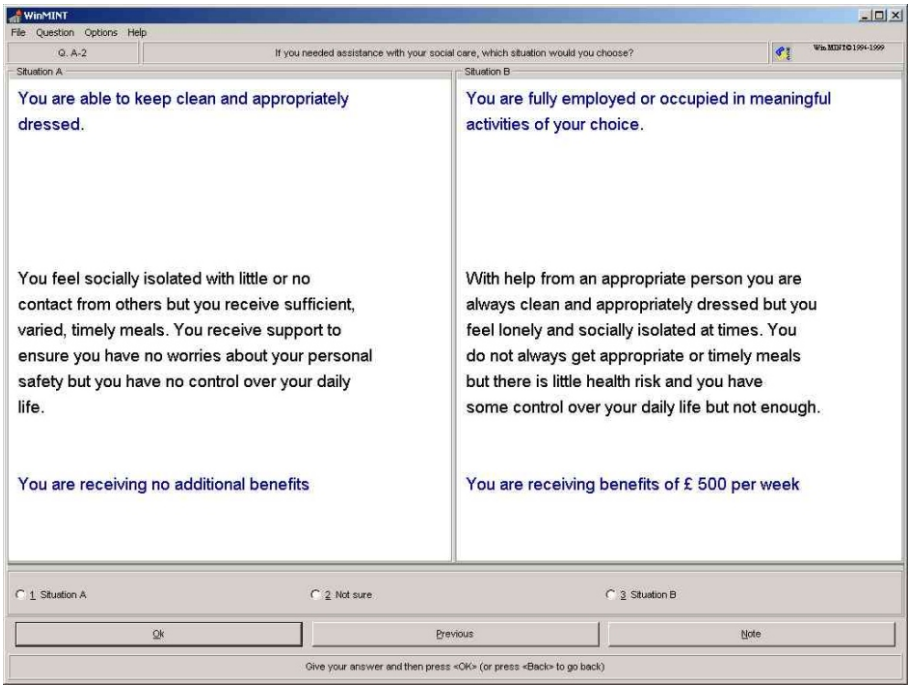
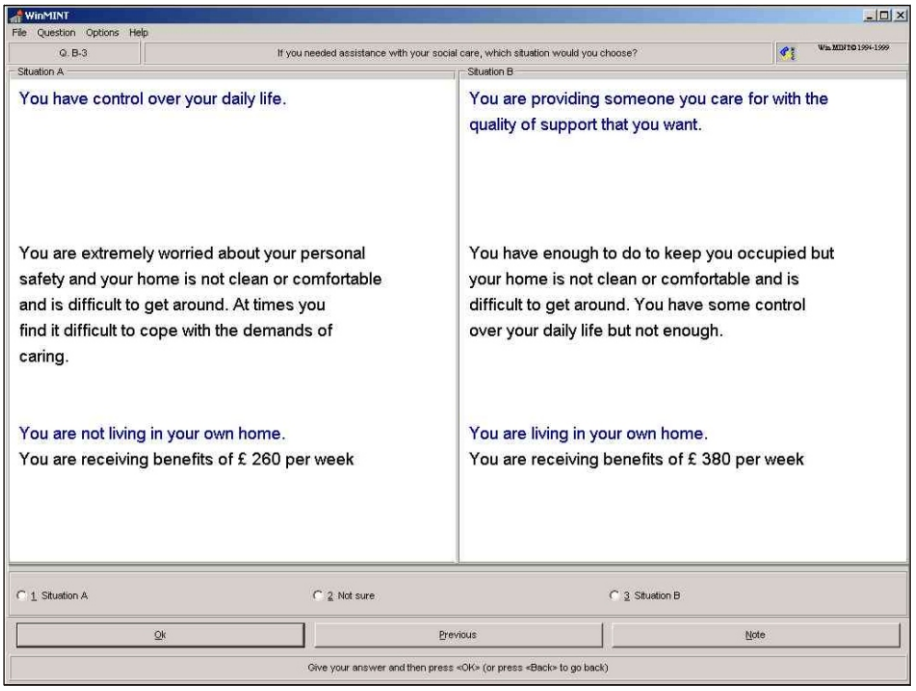


Figure B2: Example of presentation of information in DCE 2



Experimental design

The choice pairs were specified using a L^{mn} design approach, in which the variables within each alterative are defined independently from each other (although they use common levels). One significant advantage of this approach was that it allows the estimation of interactions between variables.

A fractional factorial design with 12 variables with 4 levels each (i.e. DCE 1) requires 64 treatments. One of the four level variables in the design could be collapsed down to two levels for DCE 2. Clearly 64 treatments is too many for any one respondent to work through (especially if there are two such experiments). As a result we decided to present 8 treatments to each respondent in each experiment.

One approach would have been to use a series of fixed designs so that a relatively small number of different subsets of the treatments would be considered across the respondents. However, as we were using laptop computers for presenting the choices to respondents we decided that it would be better for the 8 treatments to be drawn randomly for each respondent from the 64 possible treatments available. This acted to ensure better coverage of the potential groupings across the sample.

Best-Worst experiment

The Best-Worst experiment contained exactly the same variables as the Discrete Choice Experiments, but rather than split the variables into two blocks, all ten were evaluated in a single situation. This was judged to be feasible as the respondents would only be asked to look at a list of ten items and decide which was best and which was worst, so the task posed a significantly smaller cognitive burden than a DCE where they would need to weigh up the combined value of all the attributes simultaneously.

The choice pairs were specified using a orthogonal main effects plan that allowed ten variables to be tested with four levels each; one of the variables was then collapsed down to two levels for the 'living at home' domain. This plan contained 64 treatments.

As with the DCE, it was judged that 64 treatments were too many for any one respondent to work through, so each respondent was given a subset of these drawn at random. In the pilot the respondents were presented with 8 Best-Worst choices, which was increased to 10 choices in the main survey.

Figure B.3 and figure B.4 show an example of a choice situation where the respondent is first asked to choose the best variable level, and then conditional on this, choose the worst variable level.

Figure B3: Example of presentation of 'best' choice

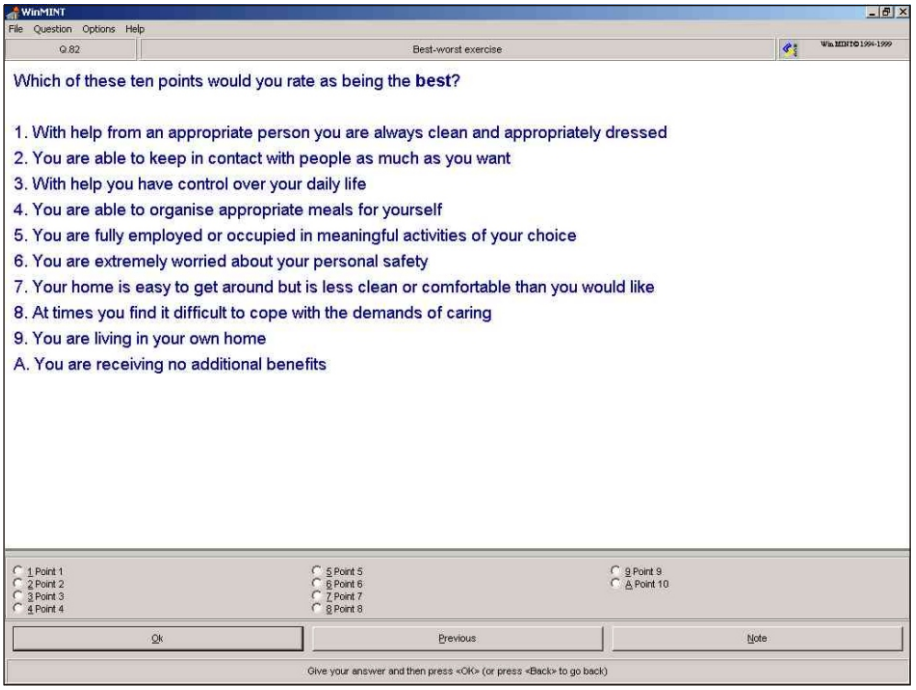
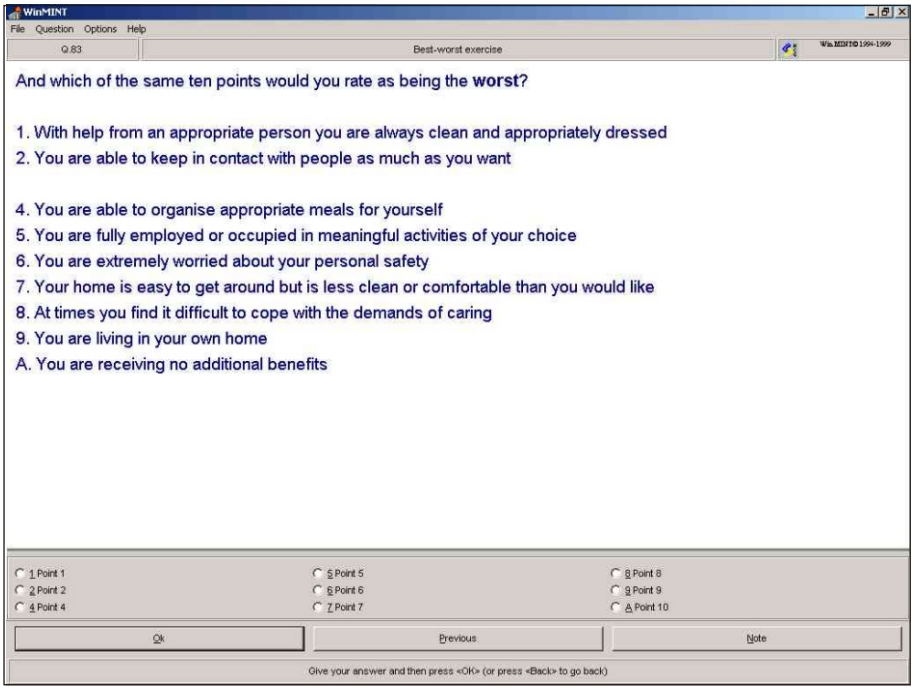


Figure B4:: Example of presentation of 'worst' choice



Annex C

Modelling of discrete choice data

This annex describes in more detail the theoretical underpinning and statistical modelling of discrete choice data, be it that from a Discrete Choice Experiment or a Best-Worst experiment.

Discrete choice models are used to gain insight into what drives the decisions that individuals make when faced with a number of alternatives.

These models are constructed by specifying the range of alternatives that were available to the decision maker. Each of these alternatives is described by a utility equation, which reflects the levels of each of the attributes that were present in the choice that they faced. Each term in the model is multiplied by a coefficient which reflects the size of its impact on the decision making process.

It is the model coefficients that are estimated in the model calibration procedure. The model is based on the assumption that each respondent chooses the alternative that provides him or her with the highest utility. An error term is included on each utility function to reflect unobservable factors in the individual's utility. The estimation can therefore be conducted within the framework of random utility theory, i.e. accounting for the fact that the analyst has only imperfect insight into the utility functions of the respondents.

The most popular and widely available estimation procedure is logit analysis. The estimation procedure produces estimates of the model coefficients, such that the choices made by the respondents are best represented. The standard statistical criterion of Maximum Likelihood is used to define best fit. The model estimation provides both the values of the coefficients (in utility terms) and information on the statistical significance of the coefficients.[18]

Additional terms and non-linear variations in the variables can be added to these utility functions, with the testing of the appropriate forms for the utility functions being an important part of the model estimation process. By examining different functional forms we can investigate whether different groups of respondents place different values on the attributes in the choices, and can also test whether there are certain groups of respondents that are more likely to systematically choose one alternative over another.

18 Further information on the estimation of dicrete choice models can be obtained from: (i) Train, E. (2003); (ii) Ben-Akiva, M. and Lerman, S. (1985).

Modelling of data from Discrete Choice Experiment

Each respondent was presented with two Discrete Choice Experiments. Within each of these experiments they were presented with three options: 'choose A', 'choose B' and 'not sure'. In developing the models of choice behaviour a utility function is specified for each alternative. For example, a basic model for the first experiment can be specified by the following utilities:

U(Choose_A)	= βclean1	* (1 if clean level A = 1, 0 otherwise)
	+ βclean2	* (1 if clean level A = 2, 0 otherwise)
	+ βclean3	* (1 if clean level A = 3, 0 otherwise)
	+ βsocial1	* (1 if social level A = 1, 0 otherwise)
	+ βsocial2	* (1 if social level A = 2, 0 otherwise)
	+ βsocial3	* (1 if social level A = 3, 0 otherwise)
	+ βmeals1	* (1 if meals level A = 1, 0 otherwise)
	+ βmeals2	* (1 if meals level A = 2, 0 otherwise)
	+ βmeals3	* (1 if meals level A = 3, 0 otherwise)
	+ βemployment1	* (1 if employment level A = 1, 0 otherwise)
	+ βemployment2	* (1 if employment level A = 2, 0 otherwise)
	+ βemployment3	* (1 if employment level A = 3, 0 otherwise)
	+ βdailylife1	* (1 if daily life level A = 1, 0 otherwise)
	+ βdailylife2	* (1 if daily life level A = 2, 0 otherwise)
	+ βdailylife3	* (1 if daily life level A = 3, 0 otherwise)
	+ βbenefits	* (value of benefits A in pounds)
U(Choose_B)	= βclean1	* (1 if clean level B = 1, 0 otherwise)
	+ βclean2	* (1 if clean level B = 2, 0 otherwise)
	+ βclean3	* (1 if clean level B = 3, 0 otherwise)
	+ βsocial1	* (1 if social level B = 1, 0 otherwise)
	+ βsocial2	* (1 if social level B = 2, 0 otherwise)
	+ βsocial3	* (1 if social level B = 3, 0 otherwise)
	+ βmeals1	* (1 if meals level B = 1, 0 otherwise)
	+ βmeals2	* (1 if meals level B = 2, 0 otherwise)
	+ βmeals3	* (1 if meals level B = 3, 0 otherwise)
	+ βemployment1	* (1 if employment level B = 1, 0 otherwise)
	+ βemployment2	* (1 if employment level B = 2, 0 otherwise)
	+ βemployment3	* (1 if employment level B = 3, 0 otherwise)
	+ βdailylife1	* (1 if daily life level B = 1, 0 otherwise)
	+ βdailylife2	* (1 if daily life level B = 2, 0 otherwise)
	+ βdailylife3	* (1 if daily life level B = 3, 0 otherwise)
	+ βbenefits	* (value of benefits B in pounds)
U(Not_sure)	= βnotsure	

One of the levels of each variable is omitted from the equations to avoid over-specifying the models. As a result, the coefficients (?'s) that are estimated reflect the value of the level in question relative to the omitted base level of the variable.

In the case of this study we have data from two experiments, each of which have two common variables: 'control over daily life' and 'benefits'. As a result we can set up a joint estimation, where the coefficients on these common variables are

estimated from both experiments, working on the assumption that the effect of the variables in both experiments is the same. The variance of the unmeasured components of utility are not constrained to be the same in the two experiments, and we estimate an extra coefficient in the joint estimation that is the square of the ratio of the variances of the unmeasured components of utility in each experiment. This additional coefficient is reported in the models as the 'scale' parameter. Further details of the joint estimation of models using data from two sources are available in Bradley and Daly (1991).

Modelling of data from Best-Worst experiment

In the Best-Worst experiment, each respondent undertakes another task which can be represented as a discrete choice, and therefore can be modelled using a logit model. In this case we specify utility functions for every Best-Worst pair that could have been chosen, where the utility function measures the utility difference between the variable level chosen as the best and that chosen as the worst. In the case of this study, we have ten variables, so in each situation the respondent was able to choose any one of ninety available Best-Worst pairs.

For the purposes of this annex we focus on the definition of just one of the ninety possible Best-Worst pairs, that of the case where the clean level presented is considered to be best and the social level presented is considered to be worst:

U(Best_Clean_Worst_Social) =[βclean1 * (1 if clean level A = 1, 0 otherwise)
+ βclean2 * (1 if clean level A = 2, 0 otherwise)
+ βclean3 * (1 if clean level A = 3, 0 otherwise)
+ βclean4 * (1 if clean level A = 4, 0 otherwise)]
- [βsocial1 * (1 if social level A = 1, 0 otherwise)
+ βsocial2 * (1 if social level A = 2, 0 otherwise)
+ βsocial3 * (1 if social level A = 3, 0 otherwise)
+ βsocial4 * (1 if social level A = 4, 0 otherwise)]

When the Best-Worst pair includes the benefits variable, this is represented by a linear function, with both a coefficient for a constant and a coefficient for the gradient.

Whereas in modelling the Discrete Choice Experiments it is necessary to omit one of the levels of each variable from the equations to avoid over-specifying the models, in the case of the Best-Worst data it is only necessary to omit one level from one variable (in the case of the models estimated here we have omitted the base level of the 'role' variable). As a result, the coefficients (?'s) that are estimated reflect the value of the level of the variable in question relative to the one omitted base level.

Annex D

Questionnaire and responses in main survey

INTRODUCTION

Thank you for agreeing to participate in this survey. This interview is being conducted by Accent, we are a market research organisation and will conduct this interview under the Market Research Society Code of Conduct.

The data that we are collecting will be analysed by the Personal Social Services Research Unit (PSSRU) at the University of Kent and RAND Europe, who are being funded by the Department of Health.

I'd like to remind you that this is a genuine research experiment. The questionnaire will take approximately 30 minutes. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

As you are probably aware, people who are not able to care for themselves make use of services such as home helps, meals on wheels and care homes. These services are both bought by the individuals themselves and funded by national and local government. It is important that we understand whether these services provide value for money and if they are getting better or worse at doing what is expected of them. We are therefore helping the Department of Health to develop a measure of the outcomes of social care services. The aim of this study is to assess the importance of the different aspects of outcome of social services.

In order to find out how important people feel these outcomes are we are interviewing a representative sample of the population.

In this interview I will ask you to imagine that you have had an accident and so are no longer able to care for yourself. You will be asked to choose between a series of situations, described in terms of your quality of life and any additional financial benefits you may be receiving.

At the end of the interview I will also ask you to provide a few details about yourself so that when we analyse these choices we can identify whether, for example, people's age affects what they think is important.

All the information you supply will be confidential and all results will be reported anonymously. If at any stage you are not happy with the interview you are free to withdraw.

From this point on I would like you to imagine that you are in a situation where you have had an accident and so are no longer able to care for yourself. I will ask you to consider a number of different situations, where the accident may have affected your ability to live your life the way the way you would wish.

INTERVIEWER: Is this a real or practice interview?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Real interview	496	100.0	10.0	100.0

INTERVIEWER: Please enter your interviewer number

INTERVIEWER: Please enter the URN from the sample

SP EXPERIMENT 1

I will ask you to look at a series of choices – in each we will present two different situations to you. These situations will have different good and bad aspects.

In this set of choices we will be concerned with:
- Personal cleanliness and comfort
- Social participation and involvement
- Meals and nutrition
- Employment and occupation
- Control over daily life
- Financial benefits

I will first tell you the various levels that each of these may take.

Personal cleanliness and health

Here we will talk about whether you are personally clean and comfortable, presentable in appearance and are in bed or up at appropriate times of the day. The possible levels will be:
- You are able to keep clean and appropriately dressed
- With help from an appropriate person you are always clean and appropriately dressed
- You are occasionally less clean than you would like or not properly dressed
- You are much less clean than you would like, with poor personal hygiene

Social participation and involvement

Here we will talk about whether you are content with your level of emotional support, general social contact and level of community participation. The possible levels will be:
- You are able to keep in contact with people as much as you want
- With help you see people as often as you want
- You feel lonely and socially isolated at times
- You feel socially isolated with little or no contact from others

Meals and nutrition

Here we will talk about whether you have a nutritious, varied and culturally appropriate diet with meals at regular, timely intervals. The possible levels will be:
- You are able organise appropriate meals for yourself
- You receive sufficient, varied, timely meals
- You do not always get appropriate or timely meals but there is little health risk

- You have an inadequate diet potentially resulting in a health risk

Employment and occupation

Here we will talk about whether you have enough to do, and whether you are able to participate in leisure or work activities. The possible levels will be:
- You are fully employed or occupied in meaningful activities of your choice
- You have enough to do to keep you occupied
- You don't have enough to do and you are often bored
- You have nothing to do at all

Control over daily life

Here we will talk about whether you can choose what to do and when to do it, having control over your daily life and activities. The possible levels will be:
- You have control over your daily life
- With help you have control over your daily life
- You have some control over your daily life but not enough
- You have no control over your daily life

Payment of benefits

Here we will talk about the level of additional financial benefits that you receive. The possible levels will be:
- You are receiving no additional benefits
- You are receiving benefits of £ {value from cost band 1} per week
- You are receiving benefits of £ {value from cost band 2} per week
- You are receiving benefits of £ {value from cost band 3} per week

I would like you to weigh up the pros and cons and tell me if you were in the situation where you needed help, which situation you would choose.

These situations are imaginary, but I would like you to think about how you would feel if you were in these situations. There are no right or wrong answers to these choices; we are only interested in your views.

SP EXPERIMENT 1 GOES HERE

SP EXPERIMENT 2

In this set of choices we will be considering:
- Personal safety
- Accommodation
- Having a caring role
- Living at home
- Control over daily life
- Financial benefits

I will first tell you the various levels that each of these may take.

Personal safety

Here we will talk about whether you feel safe and secure. We are taking concerns about safety to include fear of abuse, falling or other physical harm and fear of being attacked or robbed as social care interventions are put in place to address these issues. The possible levels will be:
- You have no worries about your personal safety
- You receive support to ensure you have no worries about your personal safety

- You have some worries about your personal safety
- You are extremely worried about your personal safety

Accommodation

Here we will talk about whether you feel that the environment you live in is clean and comfortable and is easy to get around. The possible levels will be:

- Your home is clean and comfortable and is easy to get around
- Your home is easy to get around but is less clean or comfortable than you would like
- Your home is clean and comfortable but difficult to get around
- Your home is not clean or comfortable and is difficult to get around

Having a caring role

Here we will talk about whether you are able to care for any dependant(s) as much as you wish without becoming overburdened. The possible levels will be:

- You are providing someone you care for with the quality of support that you want
- You are not providing someone you care for with the quality or type of support that you would wish
- At times you find it difficult to cope with the demands of caring
- You frequently find it very difficult to cope with the demands of caring

Control over daily life

As before, we will talk about whether you can choose what to do and when to do it, having control over your daily life and activities. The possible levels will be:

- You have control over your daily life
- With help you have control over your daily life
- You have some control over your daily life but not enough
- You have no control over your daily life

Living at home

Here we will talk about whether you are living in your own home or not. The possibilities will be:

- You are living in your own home
- You are not living in your own home

Payment of benefits

As before, we will talk about the level of additional financial benefits that you receive. The possible levels will be:

- You are receiving no additional benefits
- You are receiving benefits of £ {value from cost band 1} per week
- You are receiving benefits of £ {value from cost band 2} per week
- You are receiving benefits of £ {value from cost band 3} per week

I would like you to weigh up the pros and cons and tell me if you were in the situation where you needed help, which situation you would choose.

These situations are imaginary, but I would like you to think about how you would feel if you were in these situations. There are no right or wrong answers to these choices; we are only interested in your views.

SP EXPERIMENT 2 GOES HERE

BEST-WORST EXPERIMENT

So far you have told me about the choices you would make when considering two different situations. I would now like you to consider all of the aspects together.

I will show you a list where each aspect will be presented at one of its levels. We would then like you to tell me out of this list which of them you would consider to be the best, and then which the worst.

Again, there are no right or wrong answers to these choices; we are only interested in your views.

BEST-WORST EXPERIMENT GOES HERE

QUESTIONS ABOUT YOURSELF

We would now like to ask you some questions about yourself.

I'd like to remind you that this is a genuine research exercise, which is being conducted under the Market Research Society Code of Conduct, and any information you provide will be treated in confidence.

Please enter your gender

		Frequency	Per cent	Valid percent	Cumulative per cent
Valid	Male	242	48.8	48.8	48.8
	Female	254	51.2	51.2	100.0
	Total	496	100.0	100.0	

Can you tell me your age at your last birthday?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	18-24 years	37	7.5	7.5	7.5
	25-30 years	30	6.0	6.0	13.5
	31-39 years	59	11.9	11.9	25.4
	40-49 years	50	10.1	10.1	35.5
	50-64 years	73	14.7	14.7	50.2
	65-79 years	194	39.1	39.1	89.3
	80 years or older	53	10.7	10.7	100.0
	Total	496	100.0	100.0	

What is your marital staus?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Married	247	49.8	49.8	49.8
	Living together	31	6.3	6.3	56.0
	Single	72	14.5	14.5	70.6
	Widowed	99	20.0	20.0	90.5
	Divorced	32	6.5	6.5	97.0
	Separated	13	2.6	2.6	99.6
	Refused / don't know	2	.4	.4	100.0
	Total	496	100.0	100.0	

How many children under th age of 16 live at your household?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Zero	358	72.2	72.2	72.2
	1	52	10.5	10.5	82.7
	2	51	10.3	10.3	92.9
	3	28	5.6	5.6	98.6
	4	6	1.2	1.2	99.8
	5 or more	1	.2	.2	100.0
	Total	496	100.0	100.0	

How many people aged 16 and over live in your household (including yourself)?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	1	158	31.9	31.9	31.9
	2	265	53.4	53.4	85.3
	3	49	9.9	9.9	95.2
	4	18	3.6	3.6	98.8
	5 or more	6	1.2	1.2	100.0
	Total	496	100.0	100.0	

What is your education level?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	No formal qualifications	200	40.3	40.4	40.4
	GCSE / O level	120	24.2	24.2	64.6
	'A' levels or equivalent	58	11.7	11.7	76.4
	Professional below degree	54	10.9	10.9	87.3
	Degree level or equiv	40	8.1	8.1	95.4
	Higher degree	18	3.6	3.6	99.0
	Other (please specify)	5	1.0	1.0	100.0
	Total	495	99.8	100.0	
Missing	-1.00	1	.2		
Total		496	100.0		

Do you currently own the house or flat you are living in?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Own outright	213	42.9	43.2	43.2
	Buying with mortgage/loan	86	17.3	17.4	60.6
	Part rent/part mortgage	6	1.2	1.2	61.9
	Renting	140	28.2	28.4	90.3
	Rent free	18	3.6	3.7	93.9
	Other (please specify)	30	6.0	6.1	100.0
	Total	493	99.4	100.0	
Missing	-1.00	3	.6		
Total		496	100.0		

We would like to make sure that we take account of the views of people of all incomes. Could you tell me which of the following income bands your household falls into?

Please take account of the income of all those in the household (before tax and national insurance) and include any pensions, benefits or extra earnings.

If you don't know, please provide us with your best guess.

This information will be treated in confidence.

Could you tell me which of the following income bands your household falls into? Please take account of the income of all those in the household (before tax and national insurance) and include any pensions, benefits or extra earnings

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Less than £10,000	87	17.5	17.5	17.5
	£10,000 to £19,999	94	19.0	19.0	36.5
	£20,000 to £29,999	55	11.1	11.1	47.6
	£30,000 to £39,999	35	7.1	7.1	54.6
	£40,000 to £49,999	17	3.4	3.4	58.1
	£50,000 or more	14	2.8	2.8	60.9
	Don't know	61	12.3	12.3	73.2
	Decline to answer	133	26.8	26.8	100.0
	Total	496	100.0	100.0	

Are you currently receiving any regular benefits at this time? Please do not count any state pension or child benefit payments you may receive

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	115	23.2	23.2	23.2
	No	381	76.8	76.8	100.0
	Total	496	100.0	100.0	

How much are you currently receiving in benefits in a typical week?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	.00	27	5.4	23.5	23.5
	12.00	1	.2	.9	24.3
	17.00	2	.4	1.7	26.1
	18.00	1	.2	.9	27.0
	20.00	2	.4	1.7	28.7
	27.00	1	.2	.9	29.6
	30.00	2	.4	1.7	31.3
	34.00	1	.2	.9	32.2
	35.00	1	.2	.9	33.0
	39.00	1	.2	.9	33.9
	40.00	6	1.2	5.2	39.1
	42.00	1	.2	.9	40.0
	44.00	1	.2	.9	40.9
	45.00	1	.2	.9	41.7
	55.00	1	.2	.9	42.6
	56.00	1	.2	.9	43.5
	60.00	6	1.2	5.2	48.7
	63.00	1	.2	.9	49.6
	66.00	1	.2	.9	50.4
	70.00	4	.8	3.5	53.9
	73.00	1	.2	.9	54.8
	76.00	1	.2	.9	55.7
	78.00	1	.2	.9	56.5
	80.00	3	.6	2.6	59.1
	81.00	1	.2	.9	60.0
	85.00	1	.2	.9	60.9
	90.00	1	.2	.9	61.7
	92.00	1	.2	.9	62.6
	99.00	1	.2	.9	63.5
	100.00	5	1.0	4.3	67.8
	109.00	1	.2	.9	68.7
	110.00	1	.2	.9	69.6
	120.00	9	1.8	7.8	77.4
	140.00	2	.4	1.7	79.1
	150.00	4	.8	3.5	82.6
	160.00	4	.8	3.5	86.1
	180.00	1	.2	.9	87.0
	191.00	1	.2	.9	87.8
	200.00	2	.4	1.7	89.6
	220.00	1	.2	.9	90.4
	240.00	1	.2	.9	91.3
	265.00	1	.2	.9	92.2
	300.00	4	.8	3.5	95.7
	350.00	1	.2	.9	96.5
	400.00	1	.2	.9	97.4
	960.00	1	.2	.9	98.3
	1000.00	1	.2	.9	99.1
	1110.00	1	.2	.9	100.0
	Total	115	23.2	100.0	
Missing	-1.00	381	76.8		
Total		496	100.0		

Note: last three values correspond to cases where individual has counted income from part-time work in addition to benefits

Are you working, not working or studying at the moment?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Working full time	102	20.6	20.6	20.6
	Working part time	50	10.1	10.1	30.6
	Full-time student	18	3.6	3.6	34.3
	Part-time student	5	1.0	1.0	35.3
	Looking for work	11	2.2	2.2	37.5
	Not looking for work	9	1.8	1.8	39.3
	Unable for medical reason	23	4.6	4.6	44.0
	Retired	236	47.6	47.6	91.5
	Looking after home	39	7.9	7.9	99.4
	Other (please specify)	3	.6	.6	100.0
	Total	496	100.0	100.0	

What is the occupation of the head of household or chief wage earner in your household?

What are his/her qualifications or responsibilities?

INTERVIEWER: CODE REPONDENTS SEG BASED ON OCCUPATION AND QUALIFICATIONS OR RESPONSIBILITIES OF HEAD OF HOUSEHOLD

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	A	4	.8	.8	.8
	B	110	22.2	22.2	23.0
	C1	131	26.4	26.4	49.4
	C2	119	24.0	24.0	73.4
	D	65	13.1	13.1	86.5
	E	67	13.5	13.5	100.0
	Total	496	100.0	100.0	

To which of these ethnic groups would you say you belong to? Tick only one

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	White British	453	91.3	91.3	91.3
	White Irish	4	.8	.8	92.1
	Other White background	6	1.2	1.2	93.3
	White and Black African	1	.2	.2	93.5
	White and Asian	2	.4	.4	94.0
	Other mixed background	3	.6	.6	94.6
	Indian	4	.8	.8	95.4
	Pakistani	1	.2	.2	95.6
	Bangladeshi	6	1.2	1.2	96.8
	Other Asian background	1	.2	.2	97.0
	Caribbean	5	1.0	1.0	98.0
	African	6	1.2	1.2	99.2
	Other black background	1	.2	.2	99.4
	Any other ethnic group	3	.6	.6	100.0
	Total	496	100.0	100.0	

Overall, how would you rate your health at this time?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Very good	142	28.6	28.6	28.6
	Good	183	36.9	36.9	65.5
	Fair	109	22.0	22.0	87.5
	Bad	43	8.7	8.7	96.2
	Very bad	19	3.8	3.8	100.0
	Total	496	100.0	100.0	

Which of the following describes where you live?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	A London Borough	113	22.8	22.8	22.8
	Another city/large town	5	1.0	1.0	23.8
	Suburb of city/large town	133	26.8	26.8	50.6
	Rural village/small town	245	49.4	49.4	100.0
	Total	496	100.0	100.0	

QUESTONS ABOUT THE SURVEY

We would now like to ask you a couple of questions about this questionnaire.

Did you feel that you could put yourself in the imaginary position that you had been involved in a serious accident and required help with looking after yourself?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	410	82.7	82.7	82.7
	No	86	17.3	17.3	100.0
	Total	496	100.0	100.0	

What did you assume about the length of time that you would be in the situation?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Didn't think about it	221	44.6	44.6	44.6
	Permanent or rest of life	149	30.0	30.0	74.6
	A number of years	35	7.1	7.1	81.7
	About a year	18	3.6	3.6	85.3
	A number of months	37	7.5	7.5	92.7
	A number of weeks	21	4.2	4.2	97.0
	Less	15	3.0	3.0	100.0
	Total	496	100.0	100.0	

When faced with situations where you were no longer able to participate in leisure or work activities, did you consider any loss of earnings that you may have faced?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	127	25.6	25.6	25.6
	No	172	34.7	34.7	60.3
	Didn't think about it	197	39.7	39.7	100.0
	Total	496	100.0	100.0	

In the choices, did you understand the descriptions?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	479	96.6	96.6	96.6
	No	17	3.4	3.4	100.0
	Total	496	100.0	100.0	

What espects weren't clear to you? (Number of multiple choices chosen)

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	1.00	14	2.8	82.4	82.4
	2.00	3	.6	17.6	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		13	2.6	76.5	76.5
	Personal cleanliness	4	.8	23.5	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		15	3.0	88.2	88.2
	Social participation	2	.4	11.8	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		16	3.2	94.1	94.1
	Control over daily life	1	.2	5.9	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		16	3.2	94.1	94.1
	Meals and nutrition	1	.2	5.9	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		17	3.4	100.0	100.0
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		17	3.4	100.0	100.0
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		16	3.2	94.1	94.1
	Accommodation	1	.2	5.9	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		13	2.6	76.5	76.5
	Having a caring role	4	.8	23.5	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		17	3.4	100.0	100.0
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		16	3.2	94.1	94.1
	Payment of benefits	1	.2	5.9	100.0
	Total	17	3.4	100.0	
Missing	-1.00	479	96.6		
Total		496	100.0		

What aspects weren't clear to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		12	2.4	66.7	66.7
	Other (specify in notepad)	6	1.2	33.3	100.0
	Total	18	3.6	100.0	
Missing	-1.00	478	96.4		
Total		496	100.0		

Did you look at aspects in the choices?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	492	99.2	99.2	99.2
	No	4	.8	.8	100.0
	Total	496	100.0	100.0	

Which aspect was the MOST important for you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Personal cleanliness	88	17.7	17.7	17.7
	Social participation	42	8.5	8.5	26.2
	Control over daily life	111	22.4	22.4	48.6
	Meals and nutrition	21	4.2	4.2	52.8
	Employment and occupation	18	3.6	3.6	56.5
	Personal Safety	37	7.5	7.5	63.9
	Accommodation	10	2.0	2.0	65.9
	Having a caring role	28	5.6	5.6	71.6
	Living at home	107	21.6	21.6	93.1
	Payment of benefits	33	6.7	6.7	99.8
	Other (specify in notepad)	1	.2	.2	100.0
	Total	496	100.0	100.0	

Which aspect was the SECOND MOST important for you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Personal cleanliness	86	17.3	17.4	17.4
	Social participation	68	13.7	13.7	31.1
	Control over daily life	106	21.4	21.4	52.5
	Meals and nutrition	32	6.5	6.5	59.0
	Employment and occupation	16	3.2	3.2	62.2
	Personal Safety	30	6.0	6.1	68.3
	Accommodation	12	2.4	2.4	70.7
	Having a caring role	26	5.2	5.3	76.0
	Living at home	84	16.9	17.0	92.9
	Payment of benefits	34	6.9	6.9	99.8
	Other (specify in notepad)	1	.2	.2	100.0
	Total	495	99.8	100.0	
Missing	-1.00	1	.2		
Total		496	100.0		

Did you feel that you were able to answer the choices?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	487	98.2	98.2	98.2
	No	9	1.8	1.8	100.0
	Total	496	100.0	100.0	

Questions about your experience of social care

Finally, we would like to ask you some questions about your own experiences of social care in the past. Have you ever personally been in a situation where you have not been able to care for yourself?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	115	23.2	23.2	23.2
	No	381	76.8	76.8	100.0
	Total	496	100.0	100.0	

Did you get any help?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	100	20.2	87.0	87.0
	No	15	3.0	13.0	100.0
	Total	115	23.2	100.0	
Missing	-1.00	381	76.8		
Total		496	100.0		

Who helped you? (Number of multiple choices chosen)

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	.00	1	.2	1.0	1.0
	1.00	58	11.7	58.0	59.0
	2.00	24	4.8	24.0	83.0
	3.00	13	2.6	13.0	96.0
	4.00	2	.4	2.0	98.0
	5.00	2	.4	2.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Who helped you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		24	4.8	24.0	24.0
	Family	76	15.3	76.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Who helped you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		78	15.7	78.0	78.0
	Friends or neighbours	22	4.4	22.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Who helped you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		75	15.1	75.0	75.0
	Social Services	25	5.0	25.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Who helped you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		94	19.0	94.0	94.0
	Voluntary or charitable org	6	1.2	6.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Who helped you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		69	13.9	69.0	69.0
	Health services	31	6.3	31.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Who helped you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	.00	97	19.6	97.0	97.0
	1.00	3	.6	3.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Are you still getting help, or are you now able to care for yourself?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Still getting help	36	7.3	36.0	36.0
	Caring for self	64	12.9	64.0	100.0
	Total	100	20.2	100.0	
Missing	-1.00	396	79.8		
Total		496	100.0		

Have you been in a situation where someone close to you has not been able to care for themselves?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	213	42.9	42.9	42.9
	No	283	57.1	57.1	100.0
	Total	496	100.0	100.0	

Who helped them? (Number of multiple choices chosen)

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	.00	3	.6	1.4	1.4
	1.00	100	20.2	46.9	48.4
	2.00	61	12.3	28.6	77.0
	3.00	36	7.3	16.9	93.9
	4.00	12	2.4	5.6	99.5
	5.00	1	.2	.5	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Who helped them?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		199	40.1	93.4	93.4
	No-one	14	2.8	6.6	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Who helped them?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		27	5.4	12.7	12.7
	Family	186	37.5	87.3	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Who helped them?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		179	36.1	84.0	84.0
	Friends or neighbours	34	6.9	16.0	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Who helped them?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		153	30.8	71.8	71.8
	Social Services	60	12.1	28.2	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Who helped them?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		196	39.5	92.0	92.0
	Voluntary/ charitable org	17	3.4	8.0	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Who helped them?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid		146	29.4	68.5	68.5
	Health services	67	13.5	31.5	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Who helped them?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	.00	208	41.9	97.7	97.7
	1.00	5	1.0	2.3	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Are they still getting help, or are they now able to care for themselves?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Still getting help	57	11.5	26.8	26.8
	Caring for self	31	6.3	14.6	41.3
	Have since passed away	125	25.2	58.7	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Have you ever been seriously concerned for your own personal safety?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes, crime	37	7.5	17.4	17.4
	Yes, other	42	8.5	19.7	37.1
	No	134	27.0	62.9	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

Have you ever been seriously concerned for the safety of someone else close to you?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes, crime	25	5.0	11.7	11.7
	Yes, other	62	12.5	29.1	40.8
	No	126	25.4	59.2	100.0
	Total	213	42.9	100.0	
Missing	-1.00	283	57.1		
Total		496	100.0		

End of interview.

That was the last question.

Thank you very much for your help in this research.

This research was conducted under the terms of the MRS code of conduct and is completly confidential. If you would like my credentials or those of Accent you can call the MRS freeon 0500 396999.

Would you be prepared to be contacted in the future to take part in other research on social care?

Would you be prepared to be contacted in the future to take part in other research on social care?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Yes	188	37.9	37.9	37.9
	No	308	62.1	62.1	100.0
	Total	496	100.0	100.0	

INTERVIEWER: Please re-enter whether real or practice interview

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Real interview	496	100.0	100.0	100.0

INTERVIEWER: Do you confirm that this interview was conducted under the terms of the Market Research Society Code of Conduct and is completely confidential?

		Frequency	Per cent	Valid per cent	Cumulative per cent
Valid	Real interview	496	100.0	100.0	100.0

Annex E

Jack-knifing of models to estimate the standard errors

This annex presents the rationale for jack-knifing the models.

The jack-knife is a parametric approach to estimate the 'true' standard errors of estimates in cases where the theory does not provide an exact estimate of the error.[19] In Discrete Choice Experiments (and also Best-Worst experiments) we have repeated observations from the same individuals, and as such some of the observations are not independent and therefore we do not get true likelihood estimates. It is possible to explicitly model this correlation between observations using panel analysis techniques, and in the case of logit choice models a mixed logit formulation; however, this would necessitate the transfer of the model to a different modelling package where we may find disadvantages in other aspects of the modelling, e.g. pooling the data between the two experiments, dealing with the large number of Best-Worst alternatives, etc. For the purposes of this project, we have therefore employed the jack-knife technique to provide an improved estimate of the standard errors over those provided by the naive estimation that assumes independence between observations.

19 For further information see: (i) Bissell, A.F. and Ferguson, R.A (1975); (ii) Miller, R.G. (1974); (iii) Cirillo, C., Daly, A. and Lindveld, K. (1998).

The jack-knife works by dividing the sample into R non-overlapping random subsamples of roughly the same size, where R should be at least 10, and in the case of these runs a value of 20 has been used. The procedure is set up such that all observations from a given individual fall in the same subsample. One model is then estimated on the full sample and then R additional models are estimated each excluding one of the subsamples in turn. Each estimation is therefore performed on approximately (R-1)/R of the observations.

For a given variable, suppose that we get estimate b_0 from the full sample, and an estimate b_r for each of the subsamples r = 1 to R.

The jack-knife estimate of b is then:

$$b = R * b_0 - (R-1)/R * \Sigma_{1=1,R}\, b_r$$

The variance of that estimate is:

$$s^2(b) = (R-1)/R * \{ (\Sigma_{1=1,R}\, b_r^2) - (\Sigma_{r=1,R}\, b_r)^2 / R \}$$

Annex F

Calculation of confidence intervals on estimates of CfB

Suppose the utility of a product is given by

$$U = V + \epsilon$$

where ϵ is some residual error with a standard expectation and

$$V = \beta_0.\text{cost} + \Sigma_i \beta_i.\Delta x_i$$

where β are the estimated coefficients of the utility function and

Δx are the changes in utility given by the product relative to a (free) null product.

Then we define the willingness to pay for this product to be

$$WTP = \Sigma_i \beta_i.\Delta x_i / \beta_0$$

Note that this is the price of the product that would make its utility equal (apart from ϵ) to the free null product.

Now the coefficients (are estimated with error. Suppose the variance-covariance matrix of the estimates other than β_0 is $B = [b_{ij}]$, so that the standard error of a coefficient β_i is b_{ii}. Then we apply the standard formula for the calculation of the error of a ratio of random variables

$$\text{var WTP} = \{\text{var } \Sigma_i \beta_i.\Delta x_i + WTP^2.\text{var } \beta_0 - 2.WTP.\text{covar } (\Sigma_i \beta_i.\Delta x_i, \beta_0)\} / \beta_0^2$$

where:

$$\text{var}(\Sigma_i \beta_i.\Delta x_i) = \Delta x^T.B.\Delta x$$

$$\text{covar } (\Sigma_i \beta_i.\Delta x_i, \beta_0) = \Sigma_i \Delta x_i.\text{covar}(\beta_i,\beta_0)$$

For the purposes of this study, we are examining Capacity for Benefit rather than Willingness to Pay, which involves substituting the free null product with the situation where the domains are at the 'all needs met' level and the individual receives no benefits. To aid the calculations the model was re-estimated with the domain coefficients relative to this 'all needs met' level, which is exactly the same

model, but provides the coefficient estimates and their variances with respect to these levels directly.

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