The Capability Approach: developing an instrument for evaluating public health interventions

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CONTENTS

1. RESEARCH QUESTION

There is a growing interest in the application of Sen's [1] capability approach to the evaluation of health care programmes, including public health interventions. This project sought to develop a questionnaire to measure outcome within the capabilities framework, for use in the evaluation of public health and social interventions.

2. BACKGROUND

The capability approach suggests that wellbeing should be measured not according to what individuals actually do (functionings) but what they can do (capabilities). While Sen preferred not to stipulate what these capabilities might be, Nussbaum [2] suggested a list of ten items: life expectancy, bodily health, bodily integrity, senses imagination and thought, emotions, practical reason, affiliation, other species, play, and control over one's environment (see Appendix One).

There are a limited number of empirical applications of the approach, in part because many secondary data sources measure an individual's choices, their functionings, and not their capabilities *per se*.

In response to the lack of empirical research, Anand *et al* [3] sought to measure capability by utilising data from the British Household Panel Survey. Upon finding incompleteness, they developed further indicators. The result is a set of more than 60 indicators which reflect Nussbaum's list of ten capabilities. Anand *et al* [4] found strong evidence of a link to wellbeing, but noted that further research was required, particularly in terms of tailoring samples to focus on specific issues. While Anand's is not the only approach to measuring capabilities, its survey design is practical for use in large research projects which involve self completing questionnaires or interviews. It is also a generic approach, much like the SF-36 is a generic measure of health, and so offers the potential to provide a summary measure of wellbeing and capability, negating the need to develop specific instruments for every evaluation of complex social and public health interventions.

Economic evaluation – which seeks to identify whether a proposed change in service provision is a good use of scarce resources – involves comparing the additional costs associated with the change and the additional outcomes achieved by the change. Economic theory prescribes that such evaluations take a welfarist approach,[5] that is where outcomes are valued in monetary terms (e.g. cost benefit analysis – common in environmental economics). However, due to difficulties in placing a monetary value on life and health, within the speciality of health economics, an extra-welfarist approach [5] has developed, whereby health is valued for health's sake and outcomes are commonly assessed using quality adjusted life years (QALYs). One issue of assessing health related quality of life (HRQoL) and QALYs within an evaluation of complex social and public health interventions is that the focus is too narrow – simply health. The capability approach has a much wider focus (that is a broader evaluative space) and as such would appear to be an appealing alternative.

3. AIMS

This project aimed to:

– further develop and refine the survey instrument as proposed by Anand et al

– validate the instrument for use in public health evaluations
– propose how future evaluations might employ the capability approach

4. METHODOLOGY

This project was conducted in three phases:
– Phase One reviewed the literature on capability, questionnaire design and outcome measurement; this informed the initial design and layout of the questionnaire (see Appendix One – version 1). Members of the public were recruited for five focus groups, during which they discussed the range of questions, style of elicitation, their understanding and the overall questionnaire design. The results of these focus groups, together with secondary analysis (factor analysis) of Anand's original YouGov data (N=1048), then informed the first revision of the questionnaire (version 2).[1] This revised version was piloted in a postal survey and via interviews with members of the general public.
– Phase Two involved a thematic analysis of the interview data and a quantitative analysis of all completed questionnaires (factors analysis and correlation patterns) with the aim of identifying areas in which the questionnaire could be further reduced. The questionnaire was then redesigned using the reduced set of questions (version 3) prior to further interviews and a postal survey. The results from the second phase were used to validate and test the reliability of the instrument.
– Phase Three involved an analysis of the data from version 3 of the questionnaire, including further reflection on the debate between 'functioning' and 'capability' (by means of eliciting the public's preferences regarding each), and also an attempt to generate an index of capability.

4.1 ITEM REDUCTION AND QUESTIONNAIRE REFINEMENT

The item reduction process has been described previously in two interim reports available from the authors. In addition separate documents have detailed the literature review[2] and methodology[3] underlying the project phases. This report will, therefore, focus on the analysis of version 3 of the questionnaire, including the tests of the instrument's reliability, validity and sensitivities. In addition, this report will provide some initial reflections as to how future evaluations could employ the capability approach via the resulting questionnaire. A copy of the questionnaire (version 3 – including questions for validation purposes (Q21-23)) is reproduced in Appendix Two.

However, for completeness, a short description of the process of item reduction and questionnaire refinement that was undertaken in each stage is detailed below:

Phase One, item reduction (YouGov data); questions were removed if:
– factor loadings suggested correlation with other questions,
– pairwise correlations were significant, and
– there were multiple questions measuring a specific capability, or
– questions measured functioning rather than capability.

Phase One, questionnaire refinement (focus groups); questions were refined according to:

[1] Anand and colleagues initially developed the questionnaire to test the relationship between happiness and life satisfaction. The survey was administered by the professional social research company YouGov.
[2] Literature review: Outcome measure in economic evaluations and the role of the capability approach.
[3] Methodology and methods of questionnaire development and design.

– ordering,
– merging,
– consistency in question wording and answer options (including reduction in answer options),
– understanding and interpretation of terminology.

Phase Two, item reduction (pilot postal and interviews); questions were removed if:
– correlations were found,
– they appeared not to be a measure of capability (given qualitative analysis): this was complimented by the quantitative analysis (in terms of correlations and factor loadings)
– they were considered to be a capability in the developing country context, rather than specific to social and public health interventions.[4]

Phase Two, questionnaire refinement (discussion within the team and GCPH); questions were refined according to:
– ordering
– understanding and interpretation of terminology.

5. ANALYSIS OF VERSION 3

In October 2007, version 3 of the questionnaire was sent out to 1000 addresses within Glasgow City. Thirty-two were returned with incomplete or as ineligible addresses, while 180 questionnaires were returned completed. This resulted in a response rate of 18.6% (compared to initial expectations of 20%). In addition, during October and November 2007, 18 respondents completed the questionnaire in an interview setting (this sample size was constrained by the loss of the research assistant). Due to the small proportion of interview questionnaires relative to postal questionnaires, it did not make sense to undertake any comparative analysis by elicitation method (that is to compare postal with interview responses); therefore all questionnaires were analysed together giving a total sample size of 198. However, on completion of the interview based questionnaire, we did elicit further information from interviewees regarding their preferences for functioning versus capability, in part to inform the debate surrounding these terms within the literature. A discussion of this is provided in Section 6.

5.1 SAMPLE DESCRIPTIVES

Table 1 presents a detailed description of the demographics of the sample. In summary the majority of respondents were:
– white (97%),
– female (62%),
– employed full-time (50%),
– had some form of higher education (45%) or no qualifications (24%),
– either married (30%) or never married (34%),
– with no dependent children (69%),
– had no religion (35%), were Presbyterian (26%) or Catholic (28%),
– with a household income of under £30,000 per year (61%).

[4] Given the capability approach was developed with respect to poverty and human development, some of the concepts and questions are not relevant to the domain of social and public health (i.e. choices in matters of reproduction).

The average age of respondents was 46 years old (range 19 to 91 years).

The original sampling algorithm (based on postcode sectors), was stratified to over-sample in deprived areas to compensate for the expected low response rate in such areas. The final panel of Table 1 (together with Table 2) shows that as a consequence of this strategy the proportion of respondents living in each deprivation decile is relatively similar to that of the Glasgow population as a whole at the time of the last census. Just over half of the survey respondents live in a decile 10 postcode sector, compared with 54% of the population of Glasgow.

Before going on to analyse each of the capability measures, it is of interest to understand further the characteristics of the survey respondents. Table 3 presents information on their health profile, as measured by the EQ5D [6] and a global quality of life (QoL) scale [7], as well as their personality profile (discussed further below). Respondents have an average EQ5D 'utility score' of 0.757, ranging from -0.18 to 1.00.[5] The average wellbeing score was 70 (range 0 to 100), which specifically corresponds (see questionnaire in Appendix Two) to 'good quality of life'.

Figure 1 provides a graphical representation of the relationship between EQ5D and global QoL. A positive relationship is apparent, as is evident in the upward sloping linear regression line, but some divergence is also evident: this is likely to be due to the EQ5D being more heavily focused on physical health, and the QoL measure being more generalist and wellbeing based.

Table 4 presents in more detail a comparison of the respondents' health profile, with respect to EQ5D, relative to established UK norms for each age group.[8] In general, the sample of respondents report a worse health state for almost every age category, and specifically males aged 25 to 35, 45 to 55 and greater than 75 years old report significantly worse health; similarly females in each of the ten year age bands between 35 to 65 years old also report a significantly worse health state. Whether this is representative of Scotland or Glasgow is unknown and future research should consider estimating Scottish norms.

Personality was measured in terms of five traits: extroversion, agreeableness, conscientiousness, emotional stability, and openness to experiences. In order to gain an understanding of the personality profile of the respondents, it is necessary to compare the survey sample with normative scores from an American sample.[9][6] Table 5 presents this comparison by gender. The survey respondents are generally more introverted, less agreeable and conscientious, more emotionally unstable and less open to new experiences than the American comparison group. Statistically significant differences are apparent on some of these traits, whereby males in the Glasgow survey appear to be less emotionally stable (sometimes referred to as more neurotic) and have lower levels of openness, while female respondents also display these significant differences together with lower levels of conscientiousness.

[5] EQ5D is a commonly used measure of health status in health economics. Five questions/domains each with three levels are used to elicit information on an individual's health profile. Each profile corresponds with a tariff (a utility, value or preference) which was estimated from interviews with the general public.[5] A value of 1 represents perfect health and 0 represents dead, although there are some states considered to be worse that dead, for example -0.18 would represent some problems walking, some problems washing or dressing, some problems performing usual activities, extreme pain or discomfort, extremely anxious or depressed.

[6] Note that no comparable UK or European data are available.

5.2 INDIVIDUAL CAPABILITIES

Version 3 of the questionnaire includes 18 specific questions related to capability (Q5-Q19) which map onto one of Nussbaum's Ten Capabilities: life, bodily health, bodily integrity, senses imagination and thought, emotions, practical reason, affiliation, other species, play, and control over one's environment.[2]

Before analysing the instrument as a whole, each of the ten capabilities and questions forming these capabilities are analysed in detail.

5.2.1 LIFE

Respondents were asked to provide an estimate of their life expectancy given their family history, dietary habits, lifestyle and health status. Despite the sensitive nature of this question, and initial reservations regarding its inclusion, only 17 respondents failed to answer this question. The average age (life expectancy) was 77 years, ranging from 50 to 100 years old. A histogram of responses is presented in Figure 2. To put this question into the context of a capability, the difference between one's actual life expectancy (given each respondent's age and gender – using life tables for Glasgow City) and predicted (or expected) life expectancy was calculated. The mean difference was -2.24 years: that is to say the average respondent underestimated their life expectancy relative to the Glasgow City average (standardised for age and gender). The histogram of deviations in life expectancy is presented in Figure 3.

5.2.2 BODILY HEALTH

The majority of respondents (75% – see Figure 4) felt that they were not limited in their daily activities. Of note is the fact that those who reported their health limiting their daily activities also reported poor health as measured by the EQ5D (mean EQ5D, 0.43 vs 0.86, p-value: <0.001). Despite this, a binary question is unlikely to provide the necessary level of discrimination for the purposes of this instrument, and it may have been more prudent to have considered using a question with more response options, such as the general health question employed in the census.

Figure 5 shows that while most people felt their accommodation is suitable, some regard their home as unsuitable given their current needs. This would imply that the majority of the sample are able to have adequate shelter.

5.2.3 BODILY INTEGRITY

Figure 6 shows that the majority of respondents felt safe in their own neighbourhoods, while a few feel very uncomfortable walking alone near their homes. Figure 7 would suggest that the majority of respondents are capable of achieving bodily integrity by not expecting to be a victim of assault.

5.2.4 SENSES, IMAGINATION AND THOUGHT

Figures 8 and 9 show that the majority of respondents felt that they were able to express themselves freely and creatively, and therefore are assumed to have some degree of capability to (in the words of Nussbaum) use the senses to imagine, think and reason. Notably, the

question about being free to use one's imagination is new to version 3 of the questionnaire, replacing the educational qualification questions which was previously used to measure this capability (which was strictly measuring functioning). A crosstabulation between this new question and education (recoded to aggregate infrequent categories), found some commonalities, but also a number of differences (see Table 6). A number of individuals with no qualifications (equating to 'no capability' in the previous version) are now coded as having this capability as they feel that they can use their imagination and creativity. The chi-squared test for differences in proportions was not significant (p-value: 0.337), but despite this it would appear to discriminate well and differently enough from the education question to warrant its continued inclusion.

5.2.5 EMOTIONS

The majority of respondents are able to enjoy the love, care and support of their family (see Figure 10). Interestingly Figure 11 shows that many respondents suffer from loss of sleep (more than half of respondents lose sleep due to worry some/most or all of the time) which would suggest, given the way this specific capability has been defined (emotions – not having one's emotional development blighted by fear or anxiety), that they may not be capable of emotional development.

5.2.6 PRACTICAL REASON

Most respondents appear capable of engaging in critical reflection about planning one's life; only a small few (8.7%) disagree that the statement "I am free to decide for myself how to live my life" (Figure 12).

5.2.7 AFFILIATION

This specific capability domain is represented by three questions: one regarding respecting, valuing and appreciating people (as shown in Figure 13); another regarding social interaction (Figure 14); and the third regarding discrimination (outside of employment) (see Figure 15). The question regarding socialising is dichotomous and again, as with the health limiting activities question, would appear not to provide enough discrimination. It is suggested that any future version of the questionnaire should include an "always to never" response instead. Interestingly, the question regarding discrimination has the greatest variation of all the questions. As part of the item reduction and questionnaire refinement, we collapsed the various types of discrimination (race, gender, religion, sexual orientation, age and health) into one question. Consequently, we are unable to pinpoint the nature of the discrimination. Nonetheless, as a measure of self-respect, discrimination (irrespective of the basis of it) imposes constraints on an individual's capability to be treated with dignity.

5.2.8 SPECIES

Figure 16 provides a representation of respondents' ability to live with concern for, and in relation to animals, plants and the world of nature. As found in the earlier pilot work, there is limited ability for such a question of this nature and topic to truly discriminate between those with and those without this capability.

5.2.9 PLAY

The ability to laugh, play and enjoy recreational activities is presented in Figure 17. Notably nearly a quarter of respondents felt that over the past month they have either never or hardly

ever enjoyed recreational activities. Future research might consider why this is the case, what constraints it is they face or whether it is a matter of choice.

5.2.10 CONTROL OVER ONE'S ENVIRONMENT

A considerable number of respondents (N=83, 43%) disagree, or strongly disagree, that they are able to influence decisions affecting their local area (Figure 18). This question alone has the greatest level of disagreement, and implies that respondents feel they have limited capability to participate effectively in political choices. With respect to the material aspects of controlling one's environment, most respondents owned their own home (53%), and the majority of those who did not stated the reason for this as being that they could not afford to buy (n=67), or could not obtain a mortgage (N=12) (see Figures 19 and 20).

Finally, Figure 21 shows considerable variation with respect to the likelihood of experiencing discrimination in the workplace. A crosstabulation of this and the question about discrimination outside of the workplace (see Table 7) shows that these questions are strongly correlated (p-value: <0.001). However, there are some variations and importantly they map onto different capability domains, and as such should be asked separately.

5.3 INEQUALITIES IN INDIVIDUAL CAPABILITIES

Given the extent of inequalities within Glasgow, and the Glasgow Centre for Population Health's remit to aid the understanding of patterns and causes of Glasgow's enduring poor health, it is necessary to consider how various groups of individuals fare with respect to each of the capabilities and as whole within an index of capability.

Three groupings, or inequalities, were considered: deprivation (as measured by Carstairs deprivation deciles); income; gender and age. In order to undertake meaningful comparisons it was necessary to combine some of the categories for both deprivation and income. Three deprivation groups were created, those in postcode sectors with a deprivation decile of 1 to 6 are grouped together, as are those in postcode sectors with a deprivation decile of 7 to 9. These two groups are compared to respondents who resided in deprivation decile 10. Likewise, household income has been grouped into 4 groups of: less £10,000 per year; between £10,000 and £20,000 per year; between £20,000 and £40,000; and household income greater than £40,000 per year. Age was categorised as less than 40 years old, between 40 and 60 years old and greater than 60 years old.

Given the large number of comparative analyses undertaken (18 capabilities by 4 groups), Table 8 provides a summary of the relevant test statistic only, generally a Chi-squared test (except the comparison of mean deviations in life expectancy which was undertaken using an F test). Significant findings are identified using an asterisk, and each significant difference is presented in more detail in Figures 22 – 36.

Comparing specific capability responses between male and female respondents (column 2 of Table 8) finds very few significant results. Interestingly, males and females appear to have different expectations regarding their life expectancy, with males giving much more accurate predictions of their life expectancy than females (see Figures 22(a) and 22(b)). The mean deviation implies that the average female provided an age of death that was 3½ years lower than would be expected given age and gender standardised life tables.

Males and females were also found to have different perceptions of the likelihood that they will be a victim of assault. As is illustrated in Figure 23, males believe they are more likely to

experience an assault in the future. This belief accords with national crime statistics, whereby despite the fact that females are more likely to be victims of sexual assault and domestic violence, males are more likely victims of 'general' violent crimes and assaults (Scottish Executive, 2002).

Column 3 of Table 8, which considers the relationship between age and individual capabilities, shows that older respondents are more likely to report that their health limits their activities (also see Figure 24). This result is not surprising, and highlights some differences in capabilities which although are 'inequalities' are not 'inequities' per se. Table 8 column 3 also shows a significant relationship between discrimination and age. Figure 25 presents a graphical presentation of this, and shows that respondents aged less than 60 years old reported that they felt they were likely to experience discrimination outside of employment, while those over 60 years old felt they were unlikely to experience such discrimination. One factor that could be driving this is the age of retirement, that is those over 60 years old will not make a distinction between this and the question regarding discrimination in one's current (or future) employment (Q18). Notably, employment discrimination was not found to be significantly related to age (see the last figure in column 3), even when filtering out those aged 60 and over, that is comparing responses of those aged under 40 years old to those aged between 40 and 60 years old (note this analysis is not reported).

With respect to deprivation groups, there are four significant differences within the 18 specific capabilities. Those living in the most deprived areas report their health as having greater limitations on their daily activities (Figure 26), a result which is not unexpected given the association between poor health and deprivation. Those respondents who resided in the most deprived postcode also reported feeling less safe walking around their neighbourhood (Figure 27), having fewer opportunities to meet socially with friends and family (Figure 28) and were less able to afford to own property (Figure 29) (note this combines the question regarding owning your home, Q13, and why they have not bought their home, Q14).

Analyses of differences within each capability by income group finds seven significant differences (see the final column of Table 8). Although not apparent when grouped by deprivation decile, when grouped by income there does appear to be a difference in respondents' (cap)ability (as measured by their own perceptions of their life expectancy) to live to the end of a life of normal length and not die prematurely or before life is so reduced it is not worth living. Figures 30(a) to 30(d) show that those with low household incomes were more likely to provide a life expectancy well below that expected given their age and gender, compared to those on high incomes. Indeed those with income less than £10,000 per year reported perceived life expectancies of 5½ years lower than the age and gender adjusted Glasgow City estimates..

Similar differences were found for income groupings as were found for deprivation groups with respect to bodily health and limitations on daily activities (Figure 31), affiliation and social networks (Figure 32) and control over one's environment and property ownership (Figure 33). Two interesting differences that were not apparent in any of the other groupings are the significant relationship between income and loss of sleep due to worry, the ability to enjoy recreation, and influence on local decisions. Figure 34 shows that those on low incomes are more likely to report losing sleep due to worry as occurring 'always' or 'most of the time'. Similarly those with low household incomes were found to report that they are 'hardly ever' or 'never' able to enjoy recreational activities; whereas those on higher income appear to have the capability to do this (see Figure 35). Whether this is a causal association is unknown. However, it is likely to be the case that recreational activities are constrained by one's budget.

One final interesting finding is reported in Figure 36. This shows that those on high incomes believe that they are more able to influence decisions affecting their local area, while those with low household incomes appear to be more indifferent and more strongly disagree about their ability to influence decisions.

5.4 POTENTIAL FOR FURTHER ITEM REDUCTION

Factor analysis is one approach to analysing how well the instrument performs, specifically in terms of whether further reductions and/or refinements are possible. The results of factor analysis, whereby the principal-factor method is used to analyse the correlation matrix (a statistical representation of the strength of the relationship between each question), are presented in Tables 9 and 10. In summary, without providing too much statistical detail, the factor analysis suggests that there are significant interdependencies (this is also confirmed in the correlation matrix presented in Table 11) and as such there appears to be limited scope for reducing the questionnaire further.

5.5 INDEX OF CAPABILITY

Two criteria must be satisfied in order to estimate an index of capability. First it is necessary to consider whether the instrument itself is actually measuring capability, and whether a different composite instrument (with different questions and/or domains) could exist. Secondly, it is necessary to consider the weights (or tradeoffs) of the different components of the instrument (that is the specific capabilities) and how they might relate to each other.

If we assume that we are able to measure the concept of capability using these 18 questions, then ideally rather than having to consider each of the 18 questions individually it would aid the use of the instrument if they could be considered as a whole, that is combined into an index. Indexes are useful as they aid comparison across interventions and groups, such that one can compare differences on one scale, rather than a number of different scales.

When combining questions, the simplest approach to take is to assume equal weight for each capability. For instance, not having the capability to live a normal length of life is as important as not being capable of having self respect, which is considered equally important as whether one is capable of having adequate shelter or forming concept of good and engaging in critical reflection.

To estimate the index of capability in this study, the same weight was given to each question, and an index generated by aggregating the scores for all questions.[7]

For example, if a respondent was *completely capable* within each domain, then:
- they expected to live their life up to or beyond their estimated life expectancy[8],
- their health did not limit their daily activities[9],
- their home was very suitable for their current needs,
- they felt very safe walking alone in their area,

[7] Note that as some capabilities domains are represented by more than one questions, strictly speaking this means some domains/capabilities are overrepresented – further work will consider alternative approaches to collapsing questions/domains/capabilities.

[8] Note that deviations in life expectancy, a continuous variable, has been dichotomised such that those with deviations above average are coded as a 1, and those below average are coded as 0. Using quintiles was found to make little difference to the results.

[9] Binary responses were recoded as 1 or 0, while five scale responses were coded as 1, 0.75, 0.5, 0.25 or 0.

- they felt it was very unlikely that they would be assaulted in the future,
- they strongly agreed that they were able to express their views,
- they strongly agreed that they were free to use their imagination and creativity,
- they found it very easy to enjoy love, care and support,
- they never lost sleep over worry,
- they strongly agreed that they were free to make decisions on how to live their life,
- they strongly agreed that they were able to be respected and valued,
- they were able to meet socially with friends, colleagues and family,
- they felt it was very unlikely that they would experience discrimination outwith employment,
- they strongly agreed that they were able to appreciate and value nature,
- they were always able to enjoy recreational activities,
- they strongly agreed that they were able to influence local decisions,
- they owned property, or were able to own property but chose not to,
- they felt it was very unlikely that they would experience discrimination in their employment;

and thus, that respondent would score 18. Anyone expressing lesser/lower capabilities would have an index value of less than 18, while someone with no capability, that is scoring lowest in each and every question would get a score of 0.

Taking this approach and applying it only to the sample of respondents who answered every one of the 18 questions (N=166), it is estimated that the mean index of capability for the sample is 12.44 (range: 3–17.75). Figure 37 presents a histogram of the index.

Given that EQ5D is an accepted measure of outcome in economic evaluations (at least for health care interventions), it is interesting to see how similar this index of capability is to EQ5D as a measure of health. Figure 38 provides a graphical representation of this, and statistical analysis finds that they are highly correlated (pairwise correlation: 0.576; p-value: <0.001). Notably there are some deviations from the mean, which suggests that they are capturing/measuring some concepts differently. Figure 39, shows a similar relationship between global QoL and the capability index.

As well as considering the health profiles of the respondents and the relationship to this derived capability index, it is also interesting to consider if personality influences capability. A linear regression (see Table 12) would suggest that those who are more extravert, conscientious and emotionally stable have higher levels of capability.

Given a number of significant differences were found when considering the specific capabilities across the predefined groups of interest – gender, age, deprivation and income – it is of interest to analyse whether such differences also exist with the index of capability. Table 13 presents a descriptive analysis of the mean index for each group and in the final column provides evidence of the level of significance of any difference. Notably, there are no evident gender or age differences; however, both those in deprived areas and those of low income are found to have less capability as measured by the index.

In order to determine whether these significant differences in mean capability scores are independent of the effects of other variables, a multivariate regression was undertaken. Capability was estimated as a function of gender, age, income and deprivation. The regressions results are presented in Table 14. Table 14 shows that respondents aged over 60 years have marginally higher capability than those under 40 years old (p value < 0.10), while those with a household income between £10,000 and £19,000 also have marginally higher

capability than those respondents in the lower income group. Respondents earning more than £20,000 were found to have significantly higher (more than two times higher) capability than those in the reference category (earning less than £10,000 per year). Notably the significant (pairwise) relationship between area-based deprivation and capability (as presented in Table 13), is not found to hold in this multivariate regression, suggesting that income is a more dominant explanatory variable.

6. CAPABILITIES VERSUS FUNCTIONING

At the completion of the interview based questionnaire, each respondent was asked to provide some insight regarding what they valued more: the capability (being able to do something) or the functioning (actually doing something). Specifically they were asked to provide a preference for the capability domains of bodily health, senses, imagination and thought, emotions, practical reason and control over one's environment. They were asked "What, in your view, do you value more":

- Being able to be adequately nourished or actually being adequately nourished?
- Being able to express your views, including political views or actually expressing them?
- Being able to plan how you would like your life to be or actually doing so?
- Being able to enjoy the love, care and support of your family and friends or actually enjoying it?
- Being able to influence decisions affecting my local area or actually doing so?

Table 15 provides a graphical representation of interviewees' responses. There appears to be a significant support for having the capability to express one's views rather than the actual expression of them, and also to have the capability to influence decisions, rather than actually influencing them. The other capability domains have a more mixed response. Future research should analyse this issue further, not only to inform the debate on capabilities versus functioning, but also with regard to eliciting preferences for capabilities.

7. APPLICATIONS OF THE CAPABILITY APPROACH TO THE ECONOMIC EVALUATION OF PUBLIC HEALTH INTERVENTIONS AND FUTURE WORK

The aim of economic evaluation is to identify whether a proposed change in service provision (be that through large scale regeneration, a screening programme or smoking cessation counselling) is a good use of scarce resources. This requires a comparison of the additional costs associated with the change and the additional outcomes achieved by the change. The definition, assessment and measurement of the outcomes are key issues for economic evaluation. In healthcare, outcomes are commonly assessed using QALYs and results are presented through an incremental cost effectiveness ratio (ICER) indicating the additional costs per additional QALYs gained from the intervention.

With public and social health interventions, there may be implications for a diverse range of outcomes, which are deemed important to policy makers but which are not captured within the QALY framework. This creates a dilemma for economic evaluation. Do we persevere with the cost per QALY approach even though we are aware it may not capture all the important outcomes? Do we present the cost and the diverse outcomes (consequences) separately even though this does not provide a single answer to the question regarding the use

of resources? Or do we attempt to find a new measure which can incorporate all of the outcomes of interest/importance in order to answer the question on resources? An index of capability, such as the one presented in section 5.5 above, could provide such a measure.

If we were to advocate an index approach, then it would be considered inadequate, from an economic viewpoint, to merely assume equality across each of the questions/capabilities as assumed above. The preferred approach would be to undertake a valuation exercise, to determine the relative importance of the different dimensions/domains. This would involve a representative sample of the general public valuing each dimension and in doing so consider tradeoffs. This is the approach that was undertaken by the Measurement and Valuation of Health (MVH) Group when they undertook an exercise to estimate the tariffs associated with each EQ5D state. They employed a time trade-off and rating scale valuation approach.[6] Similarly when states within the SF6D[10] were estimated, preference weights were revealed using three different techniques, standard gamble, time trade off and visual analogue scale.[10] More relevant to the capability approach, Coast and colleagues [11;12] used a discrete choice experiment (DCE) to elicit values for their capability index (a measure specific to the elderly).

Importantly, when an index is valued using a 'preference weight', it has greater scope for use in economic evaluations, as it is able to address not only technical, but also allocative efficiency; that is, a preference based outcome measure in public health would be able to contribute to the decision making process when rationing scarce resources.

Developing a preference based measure was outside the scope of this project. However, future research, in the form of an ESRC/TSG PhD studentship[11] (within which the GCPH has a collaborative centre role), will investigate this further. In the case for support for the studentship it was proposed that the project will undertake a more participatory approach (such as advocated by Sen) than undertaken here, consulting with individuals (the general public, academics and government advisors) in order to identify a core set of capabilities (that is, rather than taking Nussbaum's list as a starting point, the studentship will attempt to elicit capabilities independently, without bias, and then see if they match Nussbaum's list, or indeed any other lists that exist). It was proposed that this core set is developed into a questionnaire which will be tested in a real life situation. Notably this will also provide an opportunity to (re)test the questionnaire developed here. It is possible that some of the nested studies within GoWell[12] would be candidates for this validation process. It was also proposed that the student would reduce their questionnaire to an index (the PhD will provide an excellent environment within which to test the range of techniques available).

However, whether an index of capability, and any resulting cost effectiveness analysis using capability as an outcome (e.g. cost per 'capability adjusted life year' gained) would be welcomed and accepted by other health economists remains open to debate. While the evaluative space is much wider than that of welfarist approaches (that focusing on the one dimension of health, moreover the functioning of health, as measured in the EQ5D or SF6D), the evaluation conducted within the evaluative space also diverges from welfarist and extra-welfarist approaches. The 'pure' capability approach avoids the use of individuals' own

[10] The SF6D is a descriptive system extracted from the SF-36 to generate numbers of health profiles consisting of 6 dimensions with levels, like the EQ5D it can be used to provide values/weights for QALYs.

[11] The Economic and Social Research Council together with The Scottish Government is funding a collaborative PhD studentship.

[12] GoWell (Glasgow Community Health and Well-being Research and Learning Programme) is a longitudinal study of the processes and impacts of housing improvement and neighbourhood transformation, which includes a number of shorter-term nested studies of specific initiatives aimed at improving particular aspects of life in deprived communities.

preferences in evaluation, for reasons of adaptation (individuals may not recognise their own lack of capability because they have adapted to their situation), and instead advocates an expert-centred approach, which conflicts with the movement towards patient and public involvement in decision making. The capability approach also contrasts with current health economic approaches which seek to maximise health; the capability approach is more interested in equity, the equality of capabilities.

Despite the debate described above, the benefits of using a capability approach to evaluate social and public health interventions are numerous. It offers a much richer set of dimensions for evaluation, which, given the nature of social and public health interventions, with their many and complex outcomes, makes the approach ideal for capturing all these outcomes, rather than focusing solely on health status. The equitable underpinnings of the approach are also appropriate for use with social and public health interventions which often involve reducing inequalities across groups as an overriding aim. In terms of the practical issues of measuring capabilities, it would appear that the questionnaire reduced and refined here, provides one means of doing this. It appears to be responsive to different groups of individuals, and it appears to measure something additional to health and wellbeing, although is still highly correlated with these measures.

Implementing the approach, however, will involve a number of challenges. One is the issue of measuring preferences for each capability and thereby developing an index of capability. Adaptation will be an issue if the public are used to operationalise it, and while this can be avoided if public health experts are used to provide preferences, this is not in keeping with the new public/patient centred culture of decision making. Which valuation technique to use will also provide challenges, as will the issue of whether to, and if so how to, anchor the index so that it could potentially be used in a similar manner to QALYs.[13] Future research, and specifically the ESRC/TSG PhD studentship, should address many of these challenges, but one challenge that will remain for some time is that the extra-welfarist approach is now the norm in health economics. The National Institute for Health and Clinical Excellence (NICE) (which now has the remit to consider public health interventions) has a clear recommendation that QALYs should be used as the reference case,[13] while research on methods for cost effectiveness analysis (as opposed to outcomes research) continues to grow. Although there are a number of alternative approaches (experienced utility [14] and happiness/life satisfaction/wellbeing [15;16]) which provide possible competition if support for the extra-welfarist approach was to waiver, the capability approach would appear to have strength as a means of measuring the effectiveness (and cost effectiveness) of social and public health interventions.

8. ACHIEVEMENTS

Karen Lorimer presented the project at two international conferences in 2007:

- "Using mixed methods to operationalise the capability approach: an application in public health." Human Development and Capability Association's annual conference, New York, September 2007.
- "How capable are we at evaluating public health interventions?" Vital City Conference, Glasgow, September 2007.

[13] For QALYs, which use the EQ5D to measure the quality of life component, 1 as full health and 0 as dead provide anchors.

Paula Lorgelly will be presenting work from the project at:

- A seminar in the Department of Economics, Georg-August-University of Göttingen, Göttingen, Germany in June 2008
- 'Capabilities and Health' Workshop in Pavia, Italy in June 2008(special invitation from Paul Anand)
- The European Health Economics Conference (ECHE) in Rome, Italy in July 2008(oral presentation)

Paula Lorgelly co-organised a special GCPH seminar: "Economic evaluations of public health interventions: a role for the Capability Approach?" The seminar was chaired by Phil Hanlon; Paula Lorgelly, Elisabeth Fenwick and Proochista Ariana from the Oxford Poverty & Human Development Initiative, discussed and described the issues surrounding operationalising the capability approach.

Paula Lorgelly co-organised and chaired a conference session at the International Health Economics Association (iHEA) Congress, Copenhagen, Denmark, July 2007 on the role of the capability approach in health economics.

Paula Lorgelly and Elisabeth Fenwick (together with Prof Ade Kearns, Department of Urban Studies) have been awarded an Economic and Social Research Council (ESRC) and Scottish Government PhD studentship on "Evaluating public health interventions using the capability approach". It is expected the student will start in October 2008.

9. PAPERS

Coast J, Smith R, Lorgelly PK. "Should the capability approach be applied in health economics?" *Health Economics*, **17**, 667-670.

Coast J, Smith R, Lorgelly PK. "Ideas changing health: the influence of capabilities on health care decision making in the UK." Forthcoming in *Social Science and Medicine*.

Writing is under way to publish the qualitative data generated throughout this project. A draft paper, with Karen Lorimer as lead author, will be produced with the aim of submitting it to *Social Science & Medicine*.

Two further papers are also planned: a process paper describing the methodology, item reduction and validation of the instrument; and a reflective piece, which will consider some of the limitations and issues that arose during the project and remain outstanding.

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TABLES & FIGURES

Table 1: Respondents Characteristics (Descriptive Statistics and Frequencies)

	Count* or Mean	Percentage or Std Dev
Age	45.84	16.13
Gender		
Male	72	37.3
Female	121	62.7
Marital Status		
Married	58	30.1
Living as married	18	9.3
Separated (after being married)	14	7.3
Divorced	22	11.4
Widowed	16	8.3
Never married	65	33.7
Number of children	0.46	0.81
Employment status		
Working full time (30 or more hours per week)	98	50.8
Working part time (8 to 29 hours per week)	13	6.7
Full time student	9	4.7
Retired	35	18.1
Unemployed	15	7.8
Not working for other reason	23	11.9
Annual Household Income		
£0 (nothing)	2	1.0
£1 to £9,999 per year	48	24.5
£10,000 to £19,999 per year	44	22.4
£20,000 to £29,999 per year	26	13.3
£30,000 to £39,999 per year	22	11.2
£40,000 to £59,999 per year	21	10.7
£60,000 or more per year	18	9.2
Prefer not to answer	8	4.1
Don't know	7	3.6
Highest Educational Attainment		
Postgraduate degree	23	11.7
First degree	41	20.8
Higher education below degree	25	12.7
Highers/A Levels or equivalent	19	9.6
Standard Grades 1-3/GCSEs or equivalent	18	9.1
Standard grades 4-7/CSE or equivalent	7	3.6
Foreign or other qualification	6	3.0
No qualification	47	23.9
Don't know	11	5.6
Ethnicity		
White	188	97.4
Mixed ethnic group	1	0.5
Asian or Asian British	2	1.0
Black or Black British	1	0.5
Other ethnic group	1	0.5

Table 1: Respondents Characteristics continued…

	Count* or Mean	Percentage or Std Dev
Religious Denomination		
Church of England	1	0.5
Church of Scotland	53	27.0
Muslim	2	1.0
Other Christian	8	4.1
Roman Catholic	54	27.6
Another religion	4	2.0
None	69	35.2
Prefer not to answer	5	2.6
Deprivation decile		
1	1	0.5
2	13	6.7
3	0	0.0
4	6	3.1
5	6	3.1
6	7	3.6
7	16	8.2
8	9	4.6
9	35	17.9
10	102	52.3

* Note the counts may not sum to 198 as not every question was completed by every respondent, however the percentage takes these missing responses into account

Table 2: Glasgow population proportions for each deprivation decile

Deprivation decile	Population share	Percentage Sampled
1	0.06	0.04
2	4.83	2.88
3	0.00	0.00
4	5.00	2.98
5	4.13	2.46
6	5.08	3.03
7	7.91	4.71
8	5.20	3.10
9	13.70	16.33
10	54.10	64.48

Source: McLoone [17]

Table 3: Health and personality profile of sample respondents

	Mean	Std. Dev	Minimum	Maximum
EQ5D (N=197)	0.76	0.28	-0.18	1.00
Global QoL (N=198)	69.55	19.86	0	100
Personality				
Extraversion (N=186)	4.27	1.33	1	7
Agreeableness (N=185)	5.04	1.22	1	7
Conscientiousness (N=189)	4.98	1.28	1	7
Emotional stability (N=190)	4.41	1.41	1	7
Openness to experiences (N=190)	4.77	1.27	1	7

Note: A higher value indicates either: better health related quality of life; better global quality of life; more extraverted; more agreeable; more conscientious; more emotionally stable; or more open to experiences.

Table 4: Comparison of EQ5D, survey respondents and UK norms

Age band	Survey responses	Norms	p-value
Males			
<25	0.90	0.94	0.555
25 to 35	0.80	0.93	0.024*
35 to 45	0.86	0.91	0.230
45 to 55	0.65	0.84	0.006*
55 to 65	0.80	0.78	0.833
65 to 75	0.68	0.78	0.435
>75	0.44	0.75	0.007*
Females			
<25	0.90	0.94	0.232
25 to 35	0.92	0.93	0.650
35 to 45	0.79	0.91	0.000*
45 to 55	0.71	0.85	0.011*
55 to 65	0.60	0.84	0.000*
65 to 75	0.61	0.78	0.079
>75	0.74	0.71	0.815

Note: a higher value indicates better health related quality of life. Significant differences are indicated by an asterisk.
Source: Kind *et al* [8]

Table 5: Comparison of personality traits, survey respondents and US norms

Age band	Survey responses	Norms	p-value
Males			
Extraversion	3.93	4.25	0.077
Agreeableness	4.83	5.06	0.112
Conscientiousness	5.07	5.19	0.421
Emotional Stability	4.58	5.13	0.001*
Openness to Experiences	4.75	5.34	0.000*
Females			
Extraversion	4.51	4.54	0.827
Agreeableness	5.20	5.32	0.290
Conscientiousness	4.97	5.51	0.000*
Emotional Stability	4.35	4.66	0.029*
Openness to Experiences	4.81	5.4	0.000*

Note: A higher value indicates either: more extraverted; more agreeable; more conscientious; more emotionally stable; or more open to experiences. Significant differences are indicated by an asterisk.
Source: Gosling *et al* [9]

Table 6: Crosstabulation of education and imagination

	Free to use imagination and express creativity				
Education	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Degree	28	29	7	0	0
Highers	12	24	5	3	0
Standard grades	9	11	4	1	0
Foreign	1	4	0	0	0
No qualifications	16	15	11	2	1

Table 7: Crosstabulation of discrimination within and outwith the workplace

	Outside of employment				
Current employment	Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely
Very likely	9	1	2	1	1
Likely	3	24	6	12	4
Neither likely nor unlikely	1	9	22	4	1
Unlikely	1	5	6	36	6
Very unlikely	0	3	3	8	21

Table 8: Summary test statistics (chi-sq and F tests) for differences in individual capability questions by gender, deprivation and income groupings

	Gender	Age	Deprivation	Income
Life				
Life expectancy (deviations)[a]	5.514**	0.137	0.352	6.655**
Bodily Health				
Daily activities[b]	0.850	11.655**	8.374*	39.831**
Suitable Accommodation	2.895	3.906	4.409	16.120
Bodily integrity				
Neighbourhood safety	8.559	5.355	29.991**	12.314
Potential for assault	10.755*	9.548	8.202	13.601
Senses imagination and thought				
Freedom of expression	4.535	6.006	4.523	14.734
Imagination and creativity	6.717	14.895	6.817	14.304
Emotions				
Love and support	4.347	13.616	14.859	20.056
Losing sleep	3.244	5.223	10.080	21.750*
Practical Reason				
Planning one's life	5.947	6.989	14.423	12.382
Affiliation				
Respect and appreciation	7.121	5.807	1.527	14.450
Social networks[b]	0.037	2.418	8.025*	13.458**
Discrimination	2.586	18.569*	5.514	16.180
Species				
Appreciate nature	0.764	2.017	10.363	12.133
Play				
Enjoy recreation	0.209	2.584	11.447	25.648*
Control over one's environment				
Influence local decisions	2.452	12.778	14.869	31.934**
Property ownership[b]	1.912	2.057	14.602**	55.575**
Employment discrimination	2.218	3.302	5.501	10.039

[a] as this is a continuous variable, the test statistic employed is an F-test, all other variables are categorical and as such a chi-squared test is used.

[b] note these questions have binary answers, as such they have fewer degrees of freedom

** significant at 1% level

* significant at 5% level

Table 9: Factor analysis

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	4.24975	2.93217	0.6266	0.6266
Factor2	1.31758	0.36795	0.1943	0.8209
Factor3	0.94963	0.28017	0.1400	0.9610
Factor4	0.66947	0.23029	0.0987	1.0597
Factor5	0.43918	0.11438	0.0648	1.1244
Factor6	0.32480	0.18731	0.0479	1.1723
Factor7	0.13749	0.06781	0.0203	1.1926
Factor8	0.06968	0.03556	0.0103	1.2029
Factor9	0.03412	0.02592	0.0050	1.2079
Factor10	0.00821	0.04166	0.0012	1.2091
Factor11	-0.03345	0.05634	-0.0049	1.2042
Factor12	-0.08979	0.02096	-0.0132	1.1910
Factor13	-0.11075	0.06470	-0.0163	1.1746
Factor14	-0.17545	0.00446	-0.0259	1.1488
Factor15	-0.17991	0.06602	-0.0265	1.1222
Factor16	-0.24593	0.02861	-0.0363	1.0860
Factor17	-0.27454	0.03387	-0.0405	1.0455
Factor18	-0.30841	.	-0.0455	1.0000

Number of observations = 169
Retained factors = 10
Number of parameters = 135
LR test: independent vs. saturated: $chi^2(153) = 856.55$; $prob>chi^2 = 0.000$

Table 10: Factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8	Factor9	Factor10	Uniqueness
life_Q10	-0.4998	-0.0427	0.0387	0.0539	0.3359	0.0662	0.1457	-0.0682	-0.0090	-0.0031	0.6008
bod_healt~Q5	-0.4451	-0.0742	0.3741	-0.1921	-0.0787	0.1032	-0.0543	0.1187	0.0555	-0.0062	0.5825
bod_healt~15	0.4980	-0.0924	-0.1691	-0.1778	0.0596	0.0409	0.2030	0.1069	-0.0386	0.0022	0.6239
bod_int_Q16	0.4937	-0.2247	-0.0272	-0.2855	0.2076	-0.1199	-0.0643	-0.0380	-0.0579	-0.0202	0.5567
bod_int_Q17	-0.4428	0.4278	-0.1240	0.2814	-0.1058	0.1521	0.1287	-0.0217	-0.0117	-0.0067	0.4748
sens_img~11b	0.5789	0.0515	0.1871	-0.0366	0.1705	0.1739	-0.0257	-0.0251	0.0259	-0.0144	0.5644
sens_img~11f	0.4680	0.3553	0.2770	0.2147	-0.0761	-0.0751	-0.0791	-0.0177	-0.0947	0.0249	0.5042
emotion_Q7	0.6028	0.1077	-0.1755	0.0927	-0.1205	0.0692	-0.0693	-0.0807	0.0727	-0.0204	0.5493
emotion_Q8	-0.5985	-0.0025	0.1068	0.0681	0.2481	-0.1138	-0.0570	0.0208	0.0457	0.0494	0.5430
pract_re~11e	0.5989	0.1552	0.2005	0.2528	0.1459	0.0571	-0.0153	0.1044	0.0186	-0.0220	0.4766
affil_Q11d	0.4106	0.3606	0.1642	0.0418	0.0461	-0.3061	0.1063	0.0387	0.0493	-0.0145	0.5614
affil_Q6	0.4864	0.0681	-0.4207	0.1234	0.2038	-0.1201	-0.0405	0.0005	0.0466	0.0130	0.5066
affil_Q19	-0.3297	0.5402	-0.3373	-0.2289	0.0077	0.0016	-0.0156	0.0175	0.0212	0.0060	0.4322
species_Q11c	0.3164	0.4167	0.3926	-0.2300	-0.0172	-0.0275	0.0664	-0.0606	0.0075	0.0173	0.5096
play_Q9	0.6893	-0.1250	-0.1821	0.1385	-0.0345	0.1467	-0.0061	0.0762	-0.0093	0.0407	0.4266
politic_Q11a	0.3710	0.1018	0.1246	-0.1266	0.1617	0.2756	0.0003	-0.0546	0.0203	0.0197	0.7145
politic_Q13a	-0.4255	0.0213	0.0795	0.3252	0.2115	0.0305	-0.0625	0.0250	-0.0302	-0.0246	0.6547
politic_Q18	-0.2679	0.5264	-0.2059	-0.2225	0.1185	0.0800	-0.1211	0.0626	-0.0460	-0.0132	0.5179

Table 11: Pairwise correlation matrix

	Q10	Q5	Q15	Q16	Q17	Q11b	Q11f	Q7	Q8	Q11e	Q11d	Q6	Q19	Q11c	Q9	Q11a	Q13a	Q18
Q10	1																	
Q5	0.1374	1																
Q15	-0.1729*	-0.2881*	1															
Q16	-0.2151*	-0.2129*	0.3050*	1														
Q17	0.2556*	0.0798	-0.2393*	-0.5254*	1													
Q11b	-0.2647*	-0.2044*	0.1975*	0.2752*	-0.2928*	1												
Q11f	-0.3093*	-0.1919*	-0.0205	0.1225	-0.0248	0.3183*	1											
Q7	-0.3474*	-0.3901*	0.3287*	0.2551*	-0.2171*	0.2848*	0.2054*	1										
Q8	0.4093*	0.3267*	-0.4191*	-0.3042*	0.1865*	-0.2942*	-0.1999*	-0.4729*	1									
Q11e	-0.2596*	-0.2147*	0.2188*	0.1968*	-0.0904	0.4275*	0.4087*	0.3253*	-0.2816*	1								
Q11d	-0.2581*	-0.2069*	0.2392*	0.2101*	-0.1133	0.2424*	0.3542*	0.3212*	-0.2166*	0.3356*	1							
Q6	-0.1889*	-0.4736*	0.2598*	0.3080*	-0.1569*	0.1927*	0.1771*	0.4029*	-0.2874*	0.2603*	0.2602*	1						
Q19	0.1035	-0.0054	-0.0668	-0.1627*	0.3112*	-0.2262*	-0.1266	-0.0608	0.1374	-0.2081*	0.0720	0.1059	1					
Q11c	-0.1573*	0.0677	0.0428	0.0818	-0.0364	0.3064*	0.3685*	0.1140	-0.1216	0.1983*	0.3138*	-0.0642	0.0175	1				
Q9	-0.3710*	-0.4056*	0.4220*	0.3147*	-0.2501*	0.3523*	0.2671*	0.4524*	-0.5043*	0.3840*	0.1814*	0.5005*	-0.2032*	0.0299	1			
Q11a	-0.1660*	-0.0730	0.1565*	0.2235*	-0.0887	0.3936*	0.2052*	0.2231*	-0.1526*	0.3198*	0.1485*	0.0578	-0.0686	0.2827*	0.2060*	1		
Q13a	0.3337*	0.1356	-0.3069*	-0.2670*	0.2683*	-0.1500*	-0.1077	-0.2989*	0.3756*	-0.1316	-0.1458*	-0.2276*	-0.0108	-0.1860*	-0.2935*	-0.1374	1	
Q18	0.1272	0.0523	-0.0812	-0.1398	0.2795*	-0.1147	-0.0650	-0.0985	0.1822*	-0.1521*	-0.0443	-0.0393	0.5805*	0.0925	-0.2409*	-0.0219	0.1155	1

* indicates significant at the 5% level

Table 12: Personality as a predictor of capability

	Coefficient	Std Error	p-value
Extraversion	0.562	0.141	0.000*
Agreeable	0.175	0.164	0.287
Conscientious	0.332	0.150	0.029*
Emotional stability	0.552	0.135	0.000*
Openness	-0.061	0.151	0.686
constant	5.339	1.072	0.000

Note: The dependent variable is the capability index. Significant differences are indicated by an asterisk.
R2 = 0.32; N= 154

Table 13: Descriptive statistics for capability index by interest group

	Mean	Std Dev	Minimum	Maximum	p-value
Gender					
Male	12.53	2.41	5.50	17.75	
Female	12.40	2.62	3.00	17.25	0.761
Age					
Under 40	12.50	2.50	3.00	17.75	
40 to 60	12.30	2.65	4.50	17.25	
Over 60	12.70	2.42	6.50	16.00	0.772
Deprivation					
deciles 1 to 6	13.45	1.79	8.50	16.50	
deciles 7 to 9	12.88	2.43	4.50	17.75	
decile 10	11.92	2.66	3.00	17.25	0.006*
Income					
less than £10k	10.73	2.70	4.50	14.75	
£10k to £19k	11.85	2.66	3.00	17.25	
£20k to £40k	13.25	1.95	7.50	16.50	
more than £40k	13.94	1.54	10.50	17.75	<0.001*

Note: Significant differences are indicated by an asterisk.

Table 14: Multiple regression results

	Coefficient	Std error	p-value
Gender			
Female	0.066	0.395	0.868
Age			
40 to 60	0.304	0.416	0.467
Over 60	1.134	0.626	0.072
Deprivation			
deciles 7 to 9	-0.100	0.578	0.863
decile 10	-0.549	0.542	0.313
Income			
£10k to £19k	1.080	0.527	0.042*
£20k to £40k	2.599	0.531	0.000*
more than £40k	3.239	0.574	0.000*

Note: males, those under 40 years old, those residing in decile 1 to 6 areas, and those earning less than £10,000 per year are the reference categories. The dependent variable is the capability index. Significant differences are indicated by an asterisk.
N= 155, R^2=0.258

Table 15: Which do interviewees value more: capability [C] or functioning [F]?

Interviewee	Adequately nourished	Expressing views	Love, care & support	Planning of one's own life	Influencing decisions affecting local area
1	C	C	C	C	F
2	C	C	F	F	C
3	C	C	C	F	C
4	C	C	F	C	C
5	F	C	F	F	C
6	C	C	F	C	F
7	F	C	C	F	C
8	C	C	C	C	C
9	C	C	C	C	C
10	C	C	C	C	C
11	F	F	F	F	C
12	F	C	C	C	C
13	C	C	C	C	C
14	F	C	C	C	C
15	C	C	F	C	C
16	C	C	NOT SURE	C	C
17	C	C	F	BOTH	C
18	C	F	C	F	F

Figure 1: Relationship between EQ5D and Global Quality of Life

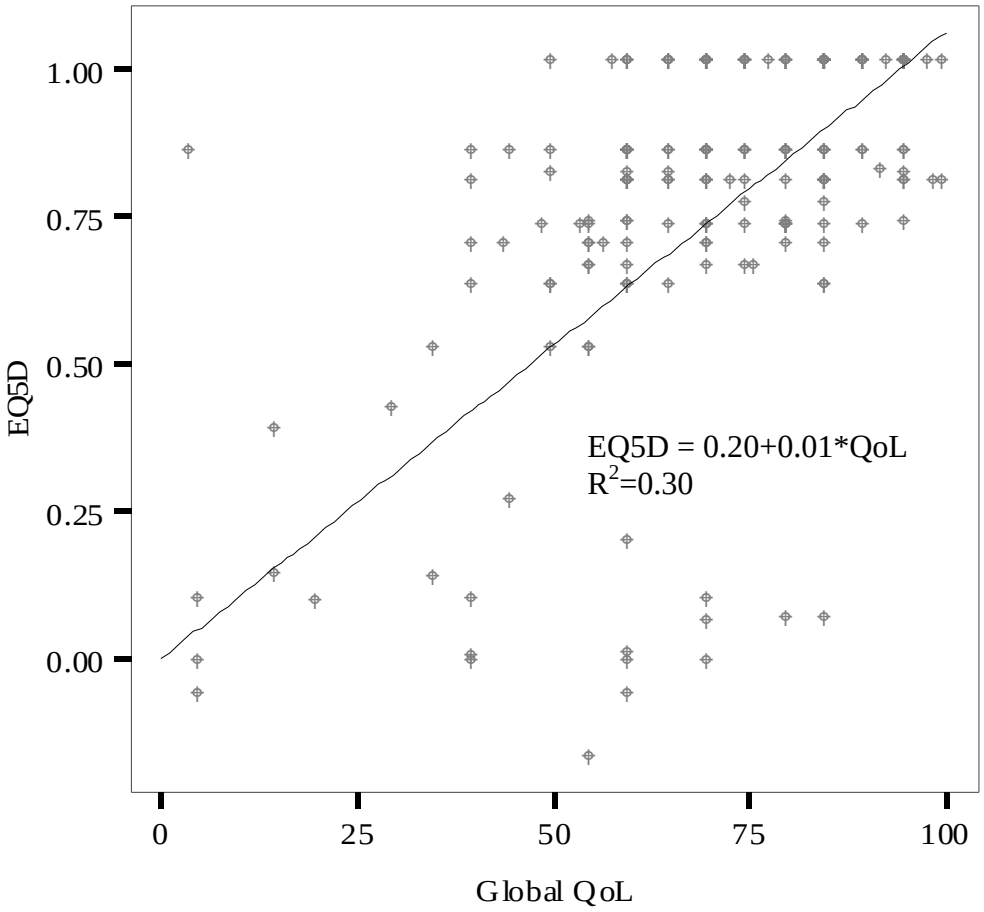


Figure 2: Until what age do you expect to live, given your family history, dietary habits, lifestyle and health status?

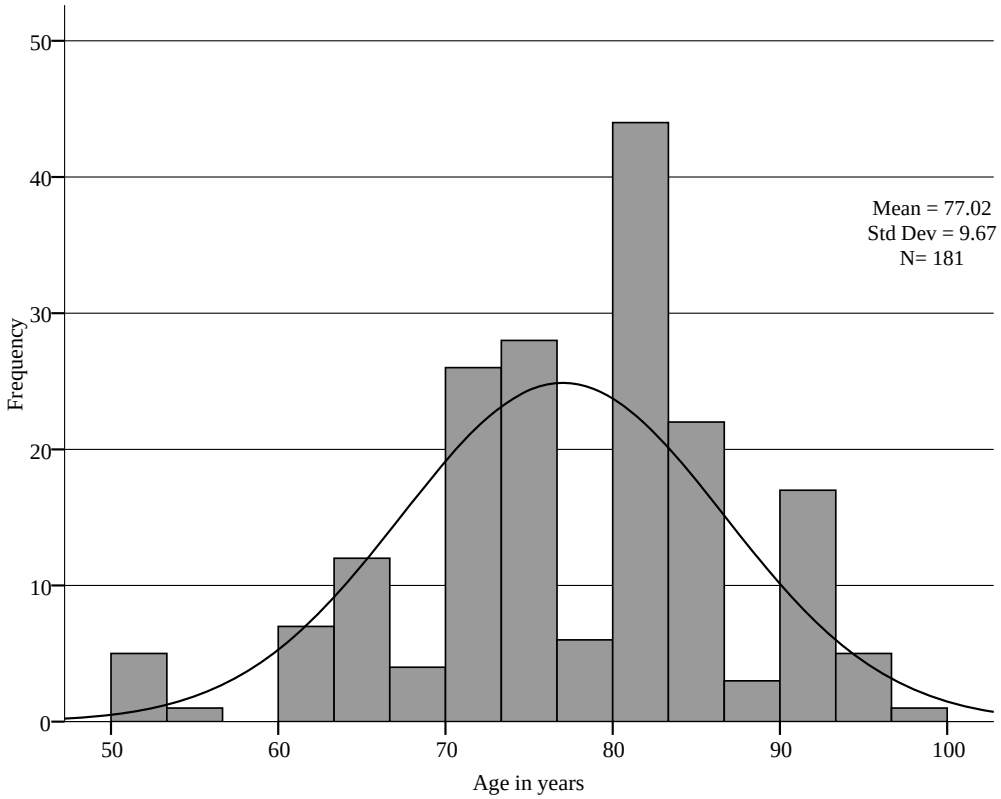


Figure 3: Until what age do you expect to live, given your family history, dietary habits, lifestyle and health status? (Standardised measure - deviations)

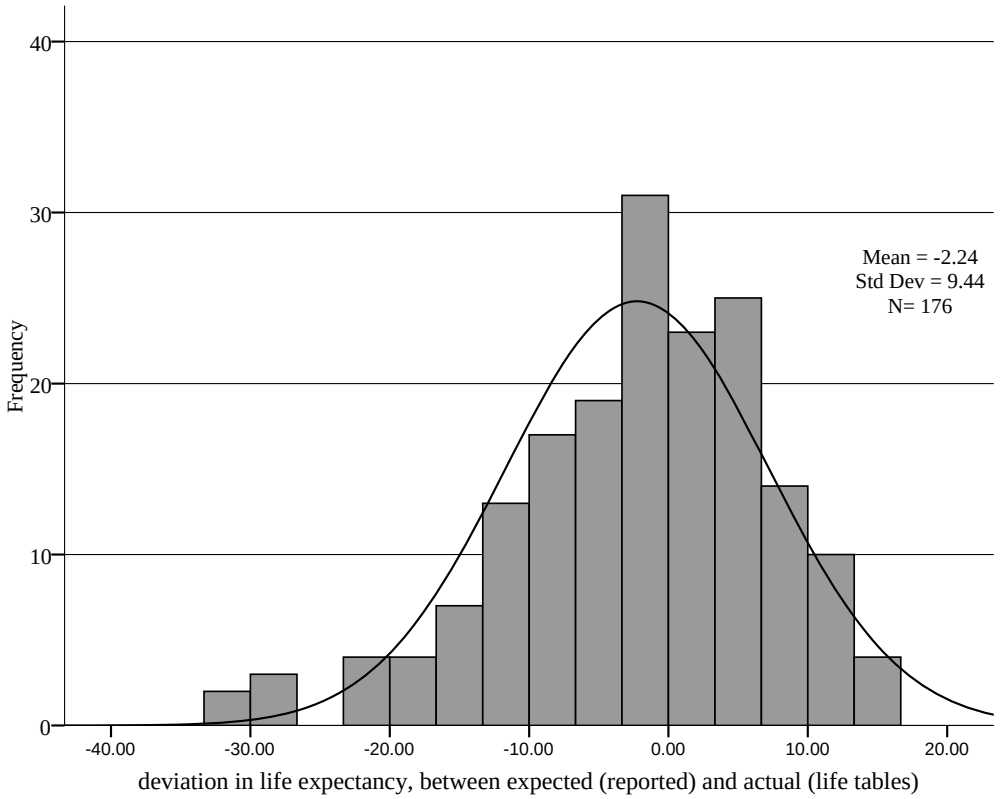


Figure 4: Does your health in any way limit your daily activities compared to most people of your age?

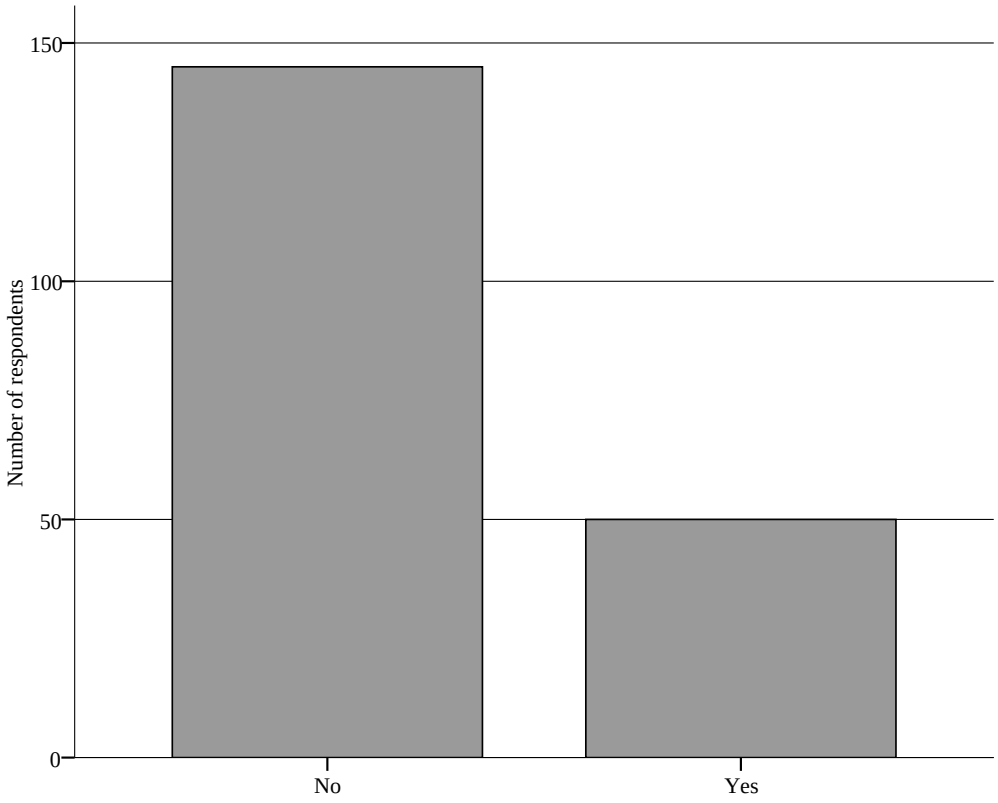


Figure 5: How suitable or unsuitable is your accommodation for your current needs?

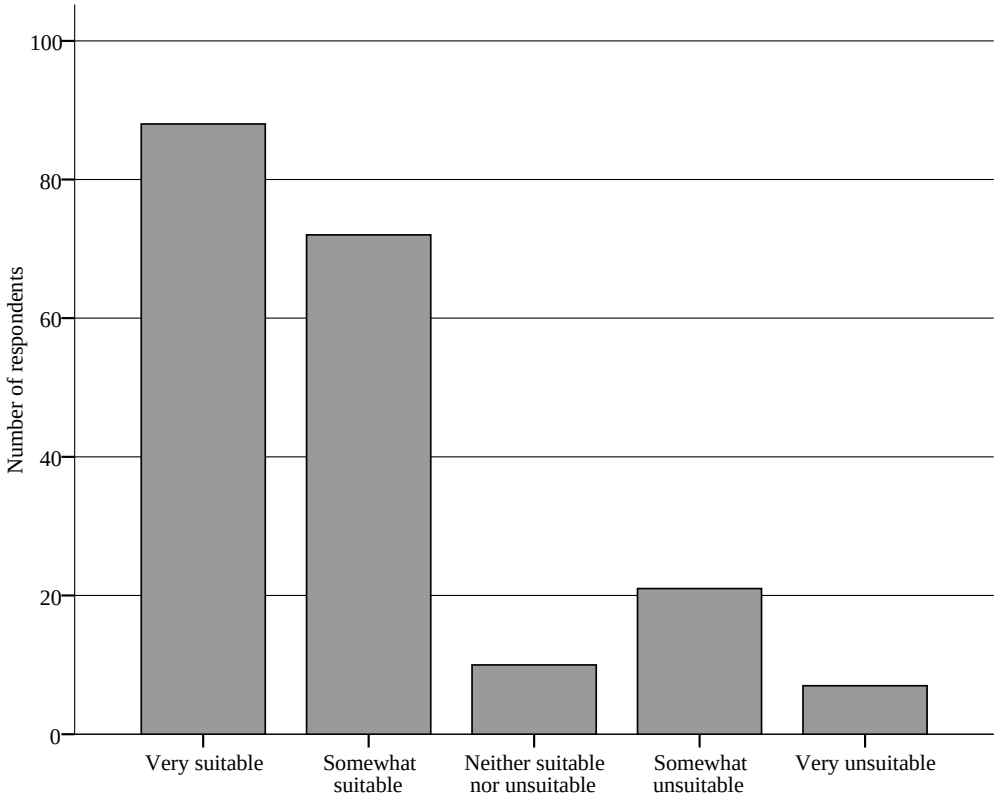


Figure 6: Please indicate how safe you feel walking alone in the area near your home

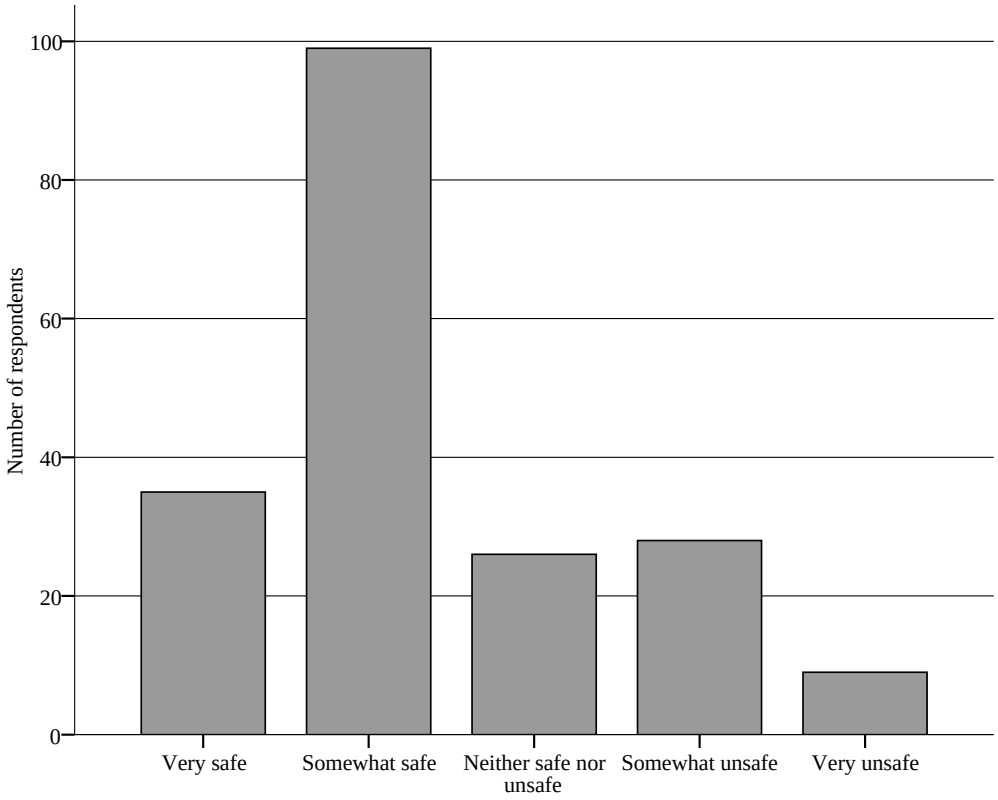


Figure 7: Please indicate how likely you believe it to be that you will be assaulted in the future (including sexual and domestic assault)?

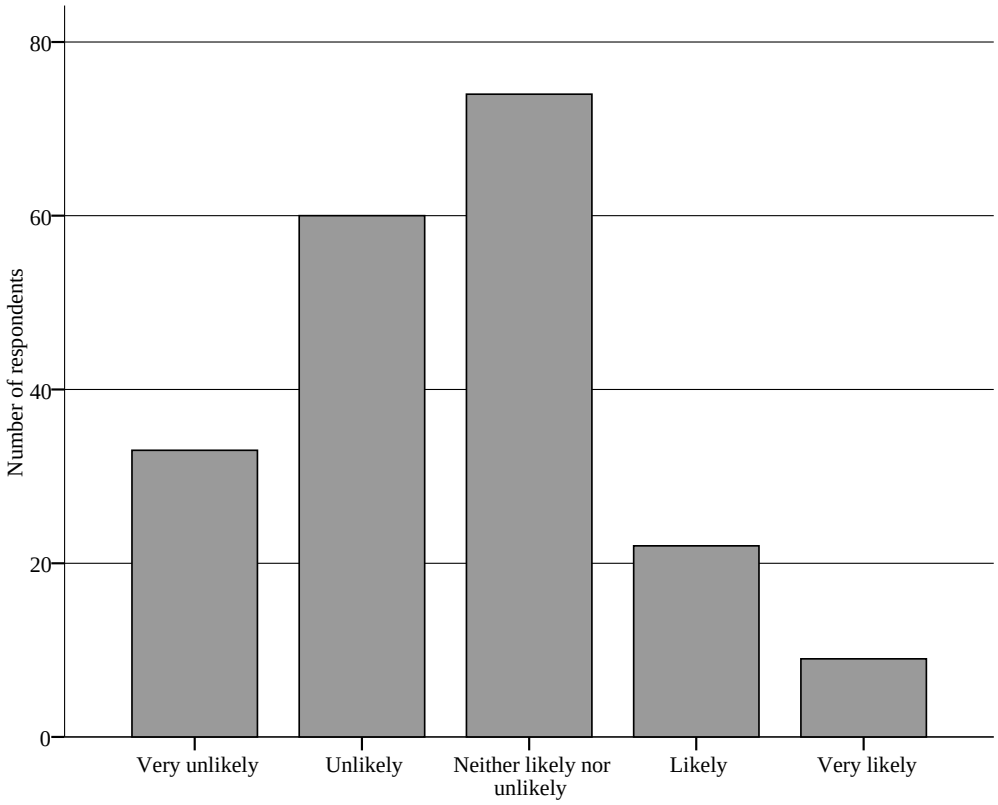


Figure 8: I am free to express my views, including political and religious views

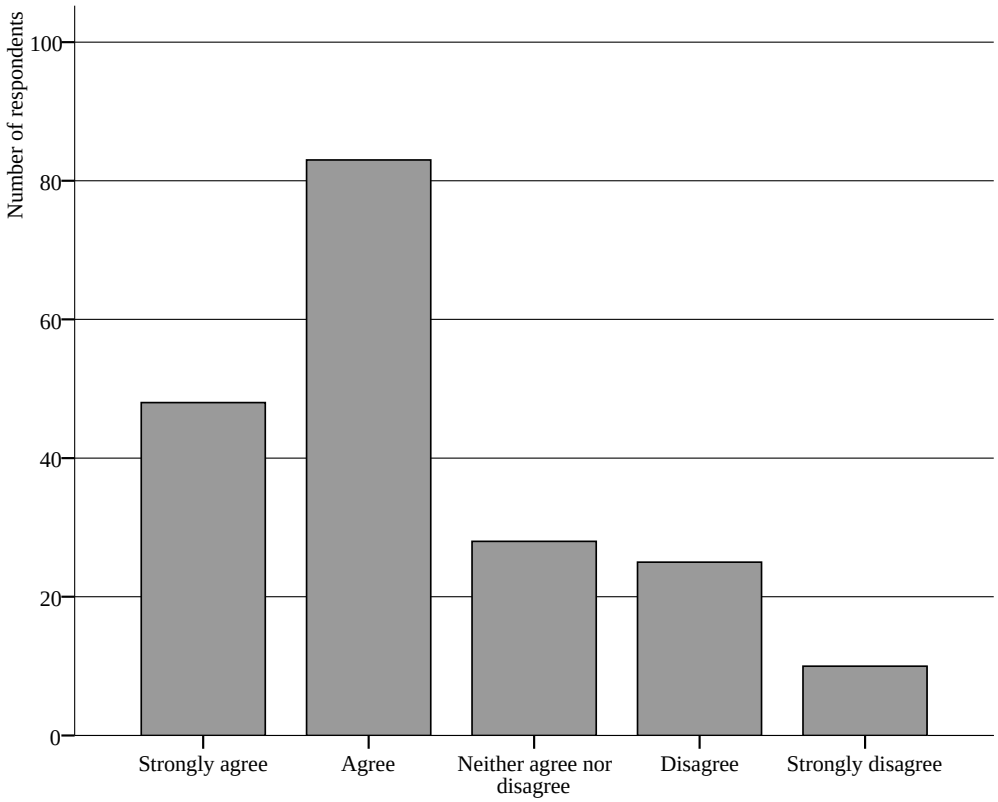


Figure 9: I am free to use my imagination and to express myself creatively

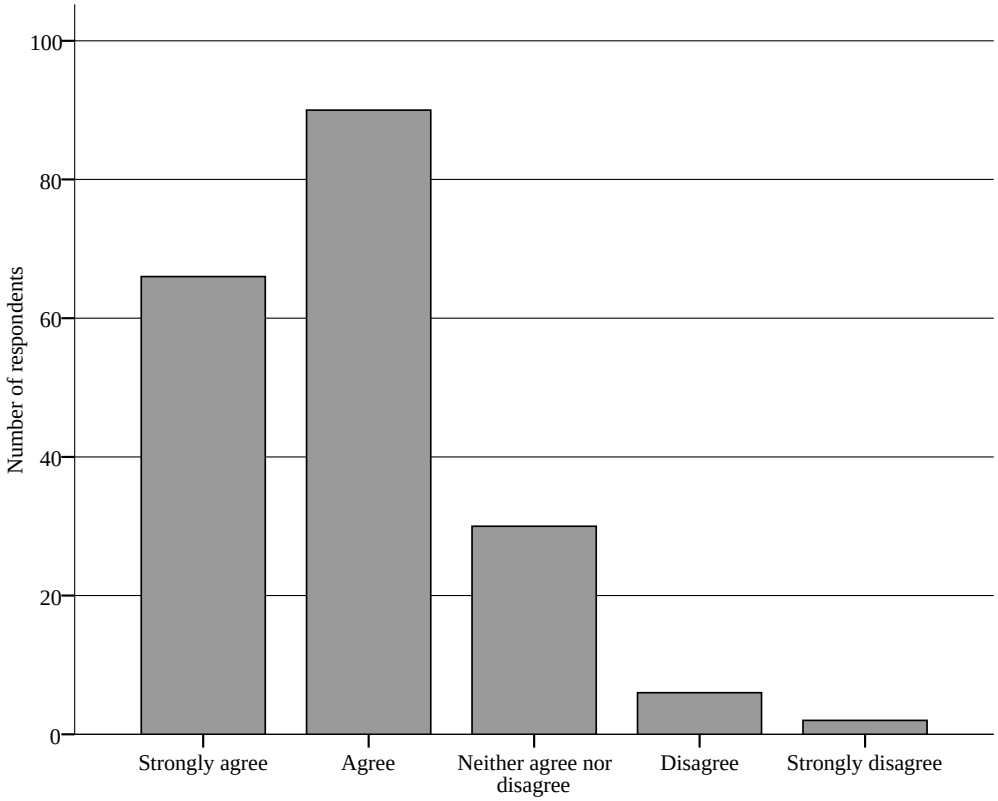


Figure 10: At present how easy or difficult do you find it to enjoy the love care and support of your immediate family?

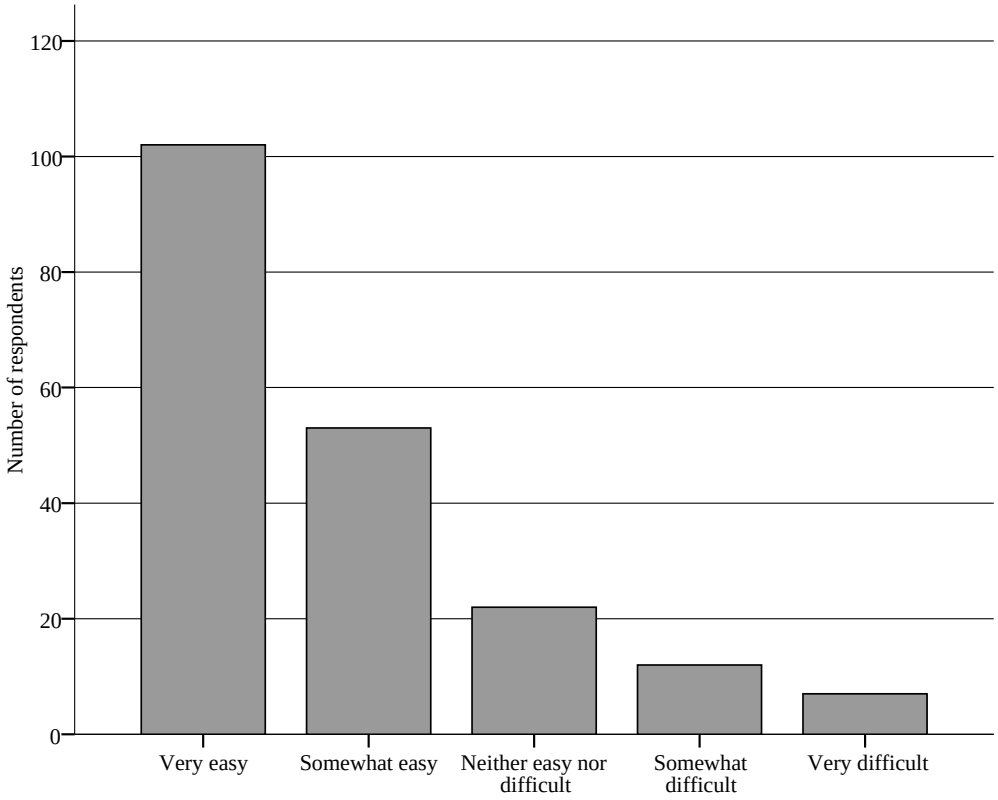


Figure 11: In the past 4 weeks, how often have you lost much sleep over worry?

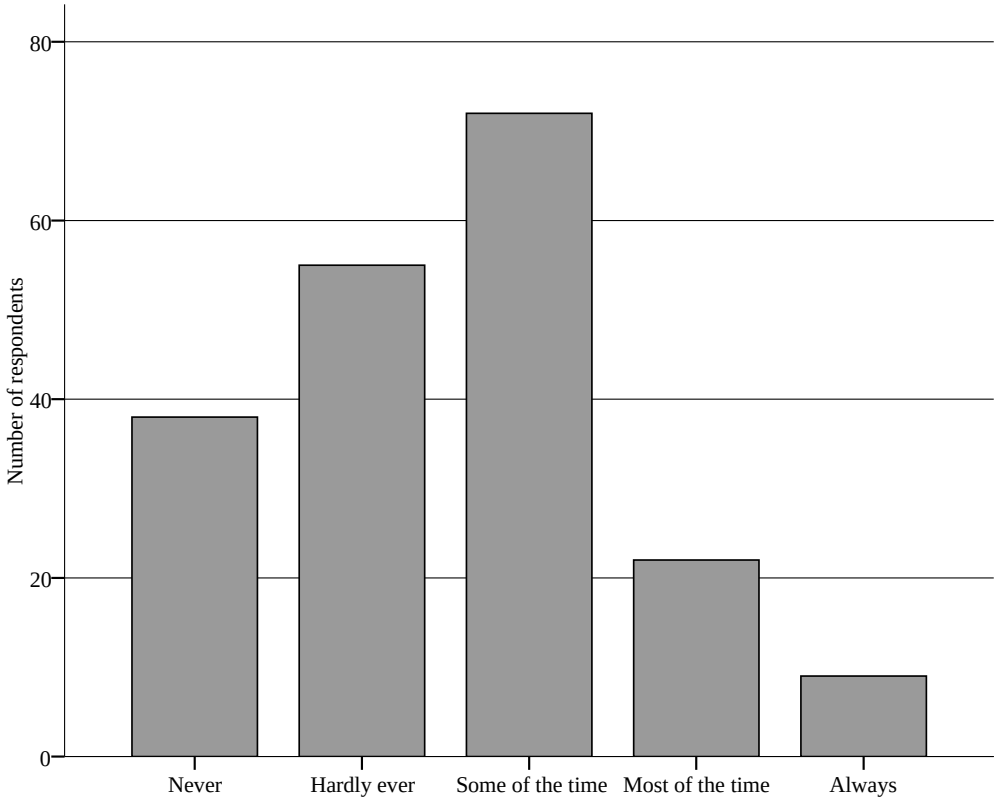


Figure 12: I am free to decide for myself how to live my life

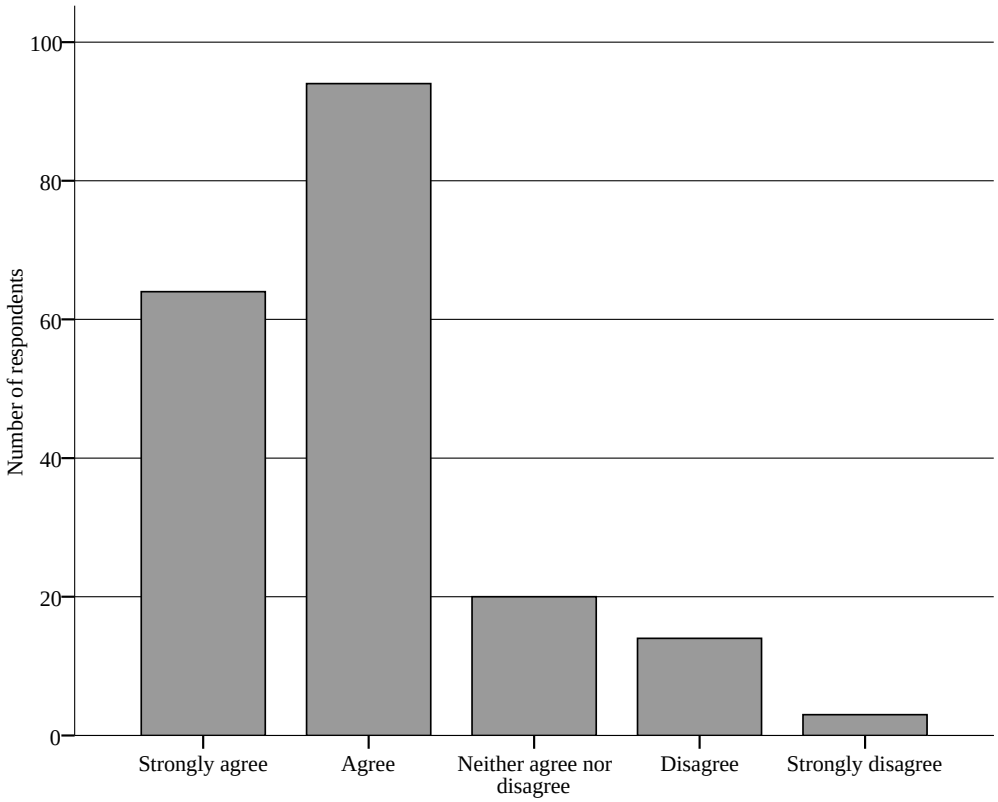


Figure 13: I respect, value and appreciate people around me

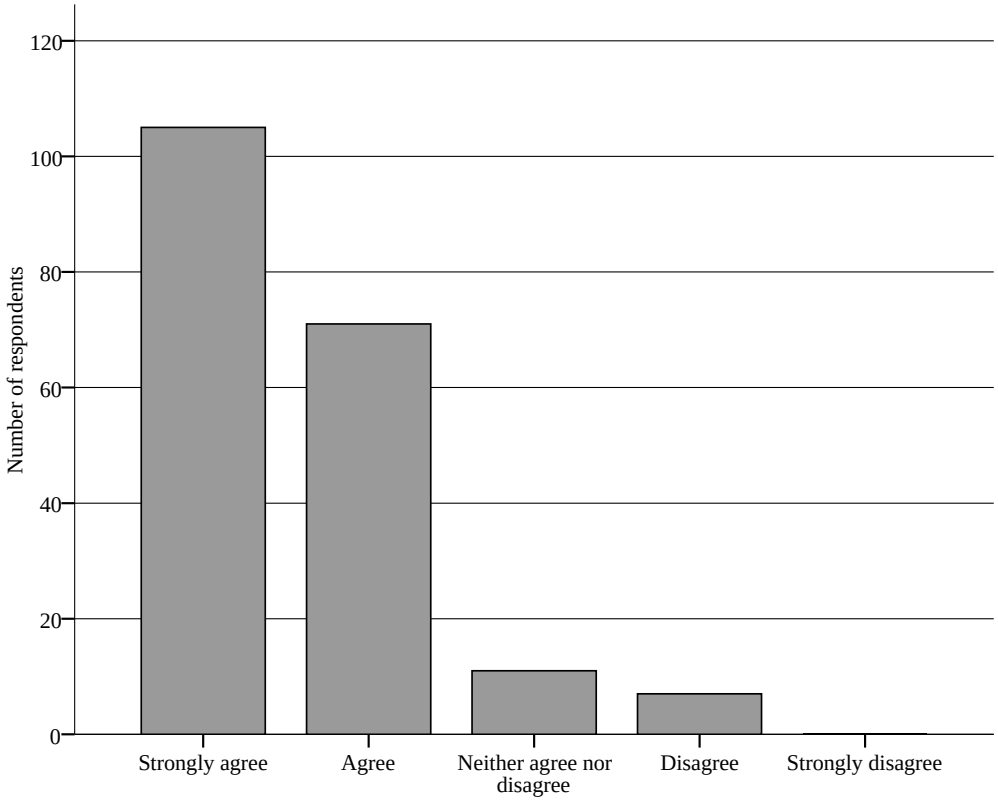


Figure 14: Are you able to meet socially with friends, relatives or work colleagues?

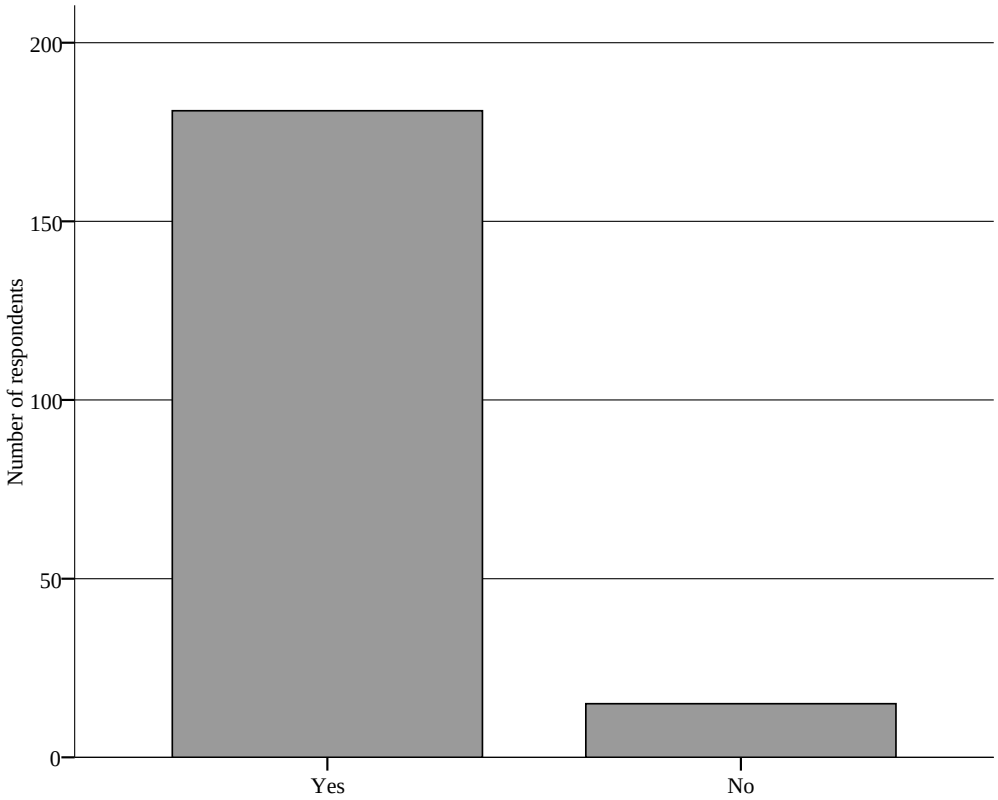


Figure 15: Outside any employment, in your everyday life, how likely do you think it is that you will experience discrimination

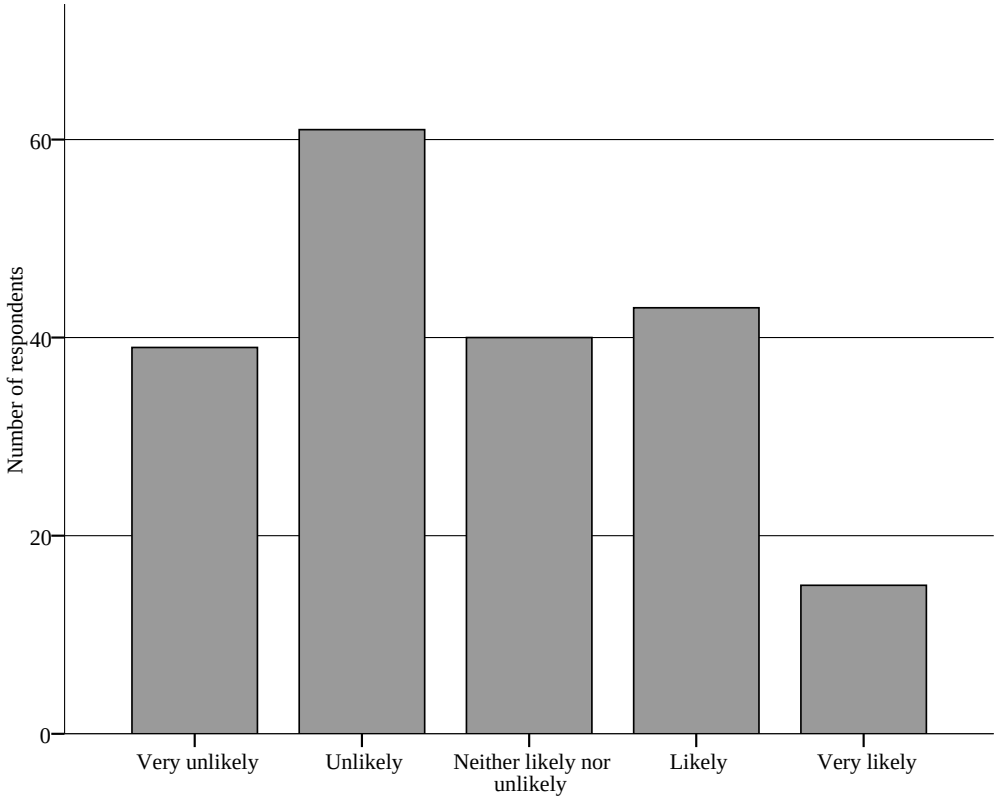


Figure 16: I am able to appreciate and value plants, animals and the world of nature

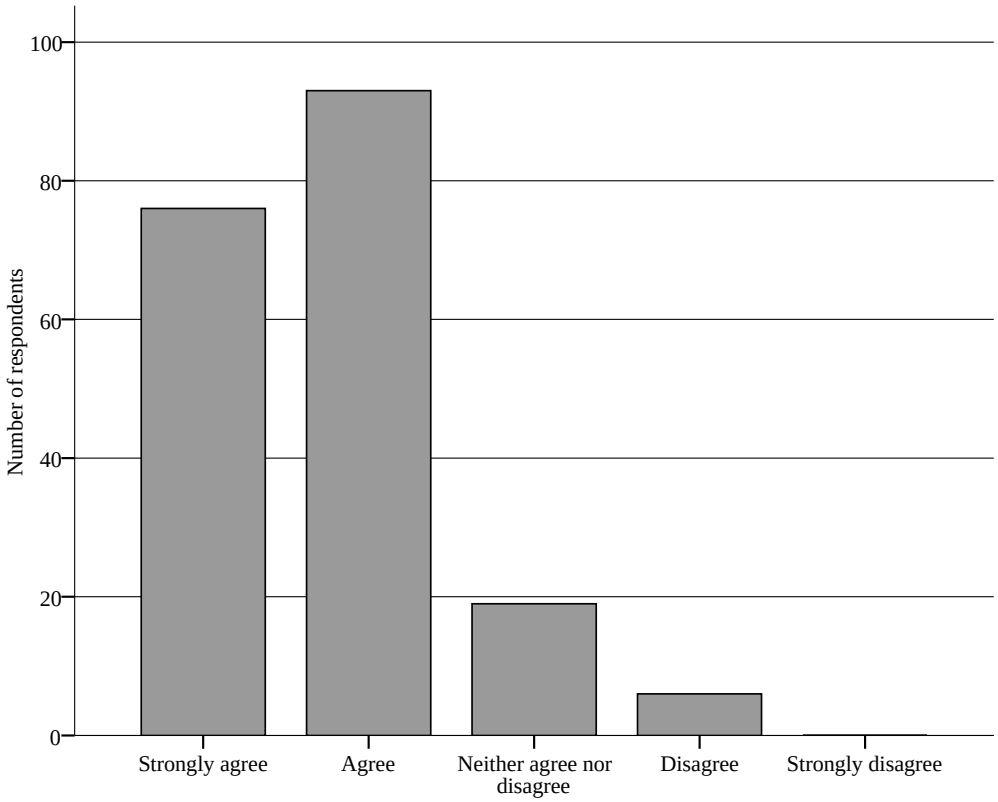


Figure 17: In the past 4 weeks, how often have you been able to enjoy your recreational activities?

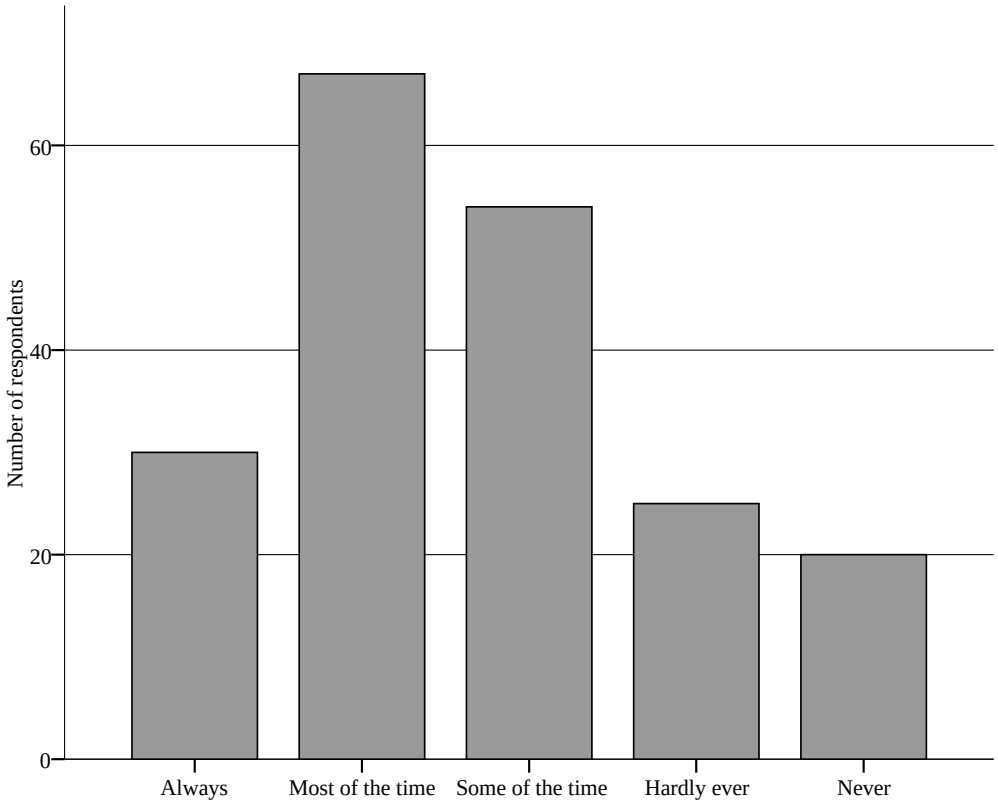


Figure 18: I am able to influence decisions affecting my local area

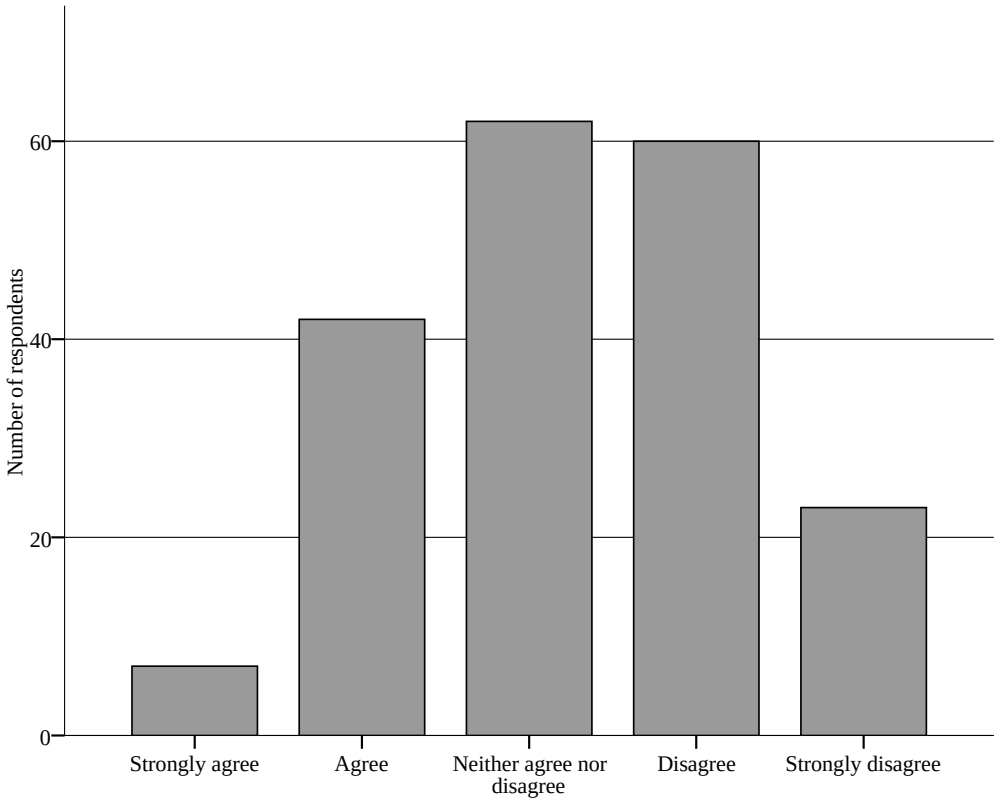


Figure 19: Which of these applies to your home?

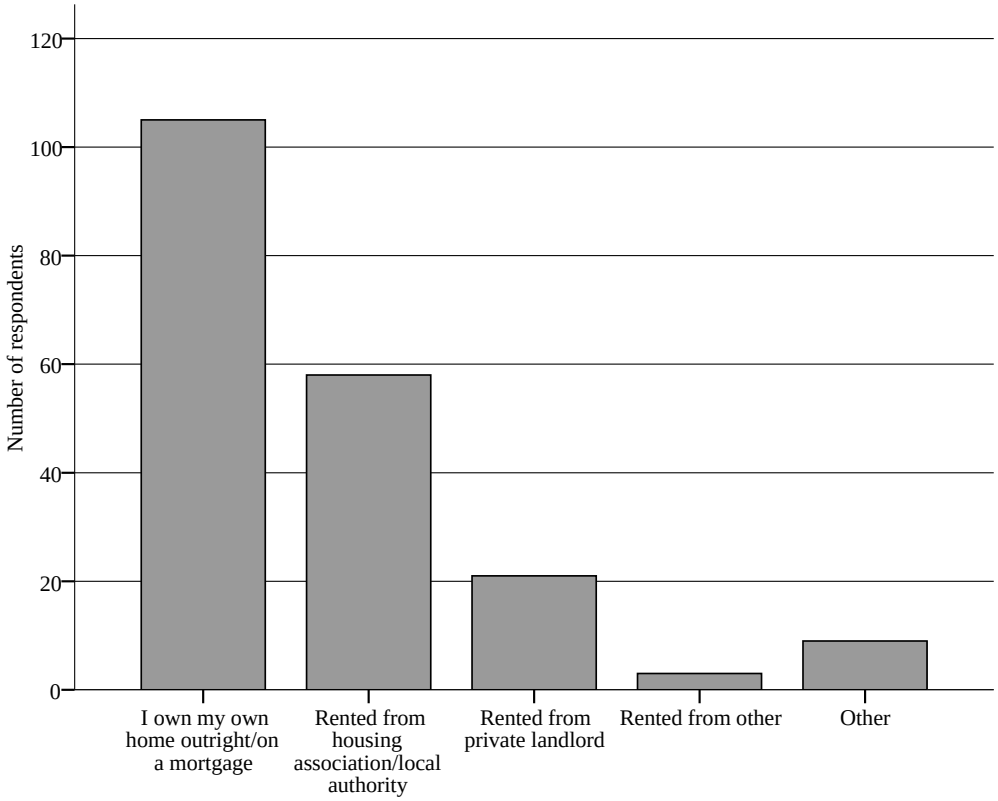


Figure 20: Not brought home because?

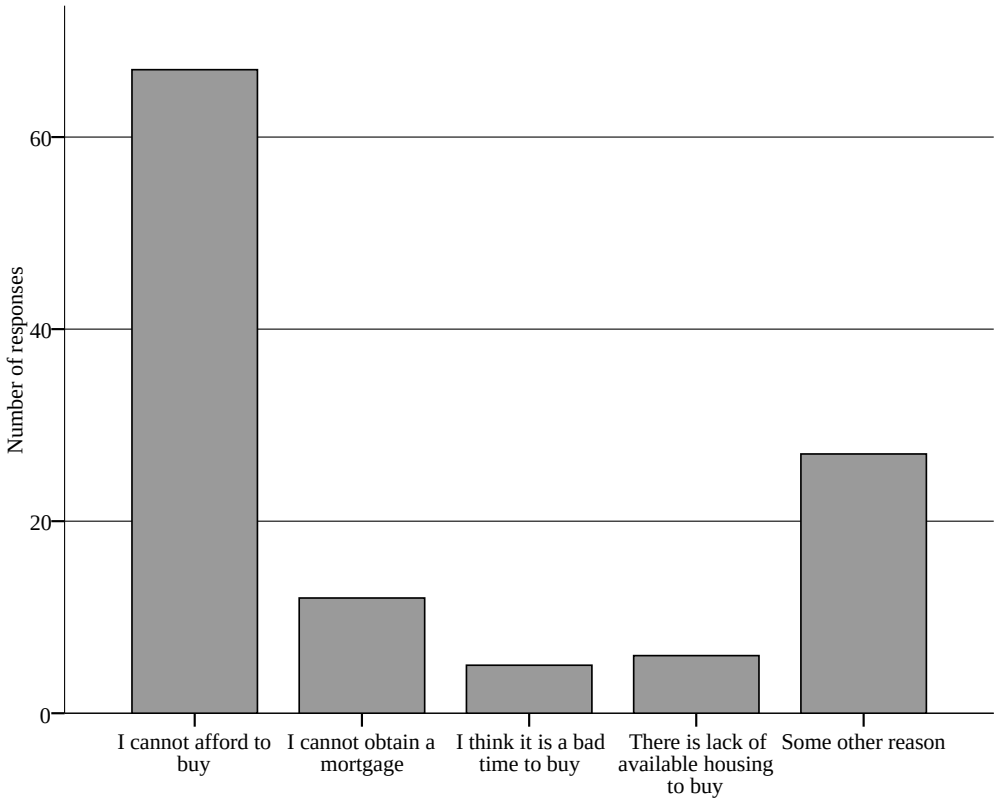


Figure 21: In your current or any future employment, how likely do you think it is that you will experience discrimination

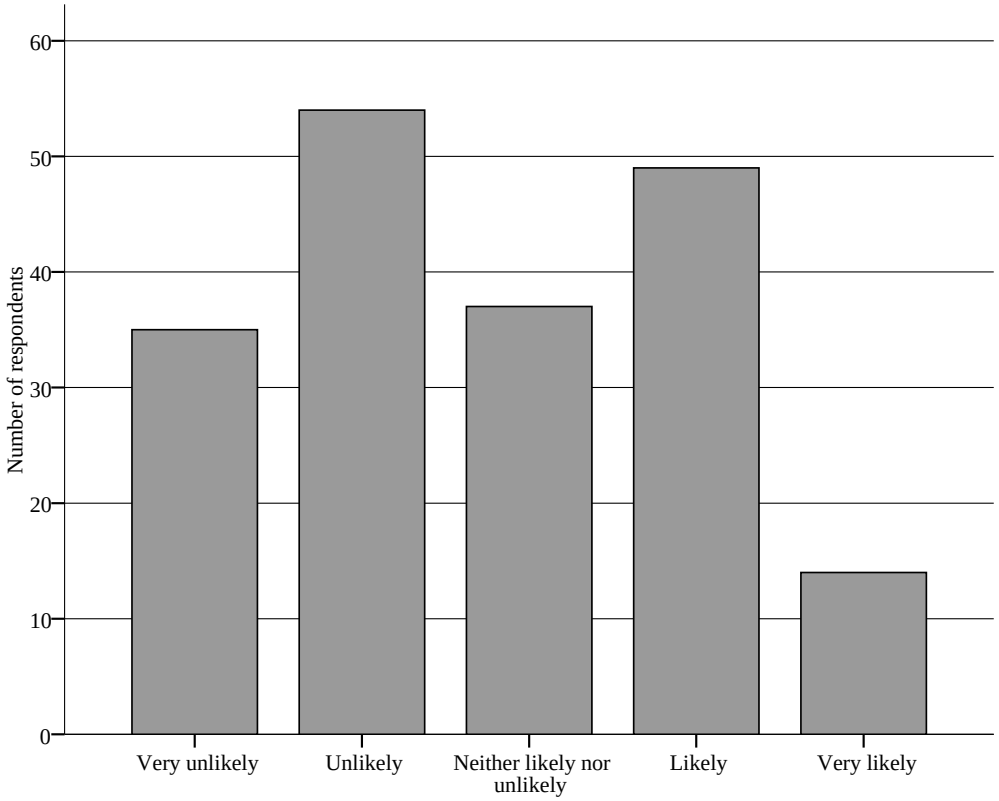


Figure 22(a): Histogram of deviations in life expectancy for males

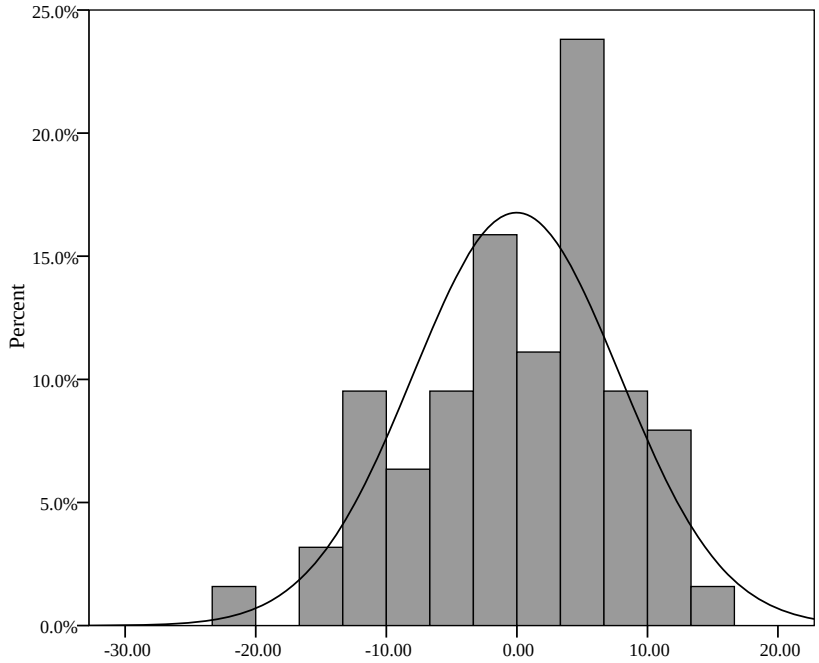


Figure 22(b): Histogram of deviations in life expectancy for females

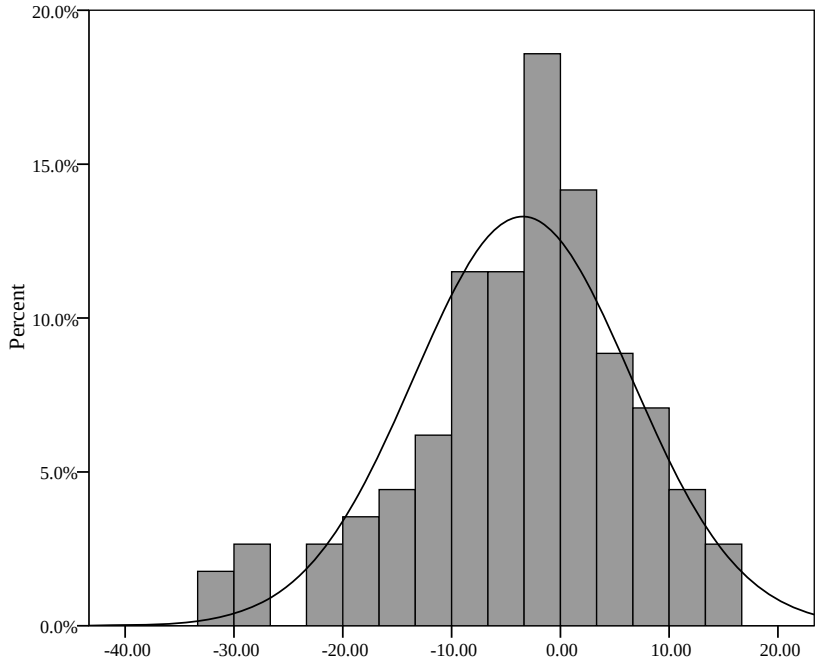


Figure 23: Likelihood of assault and gender

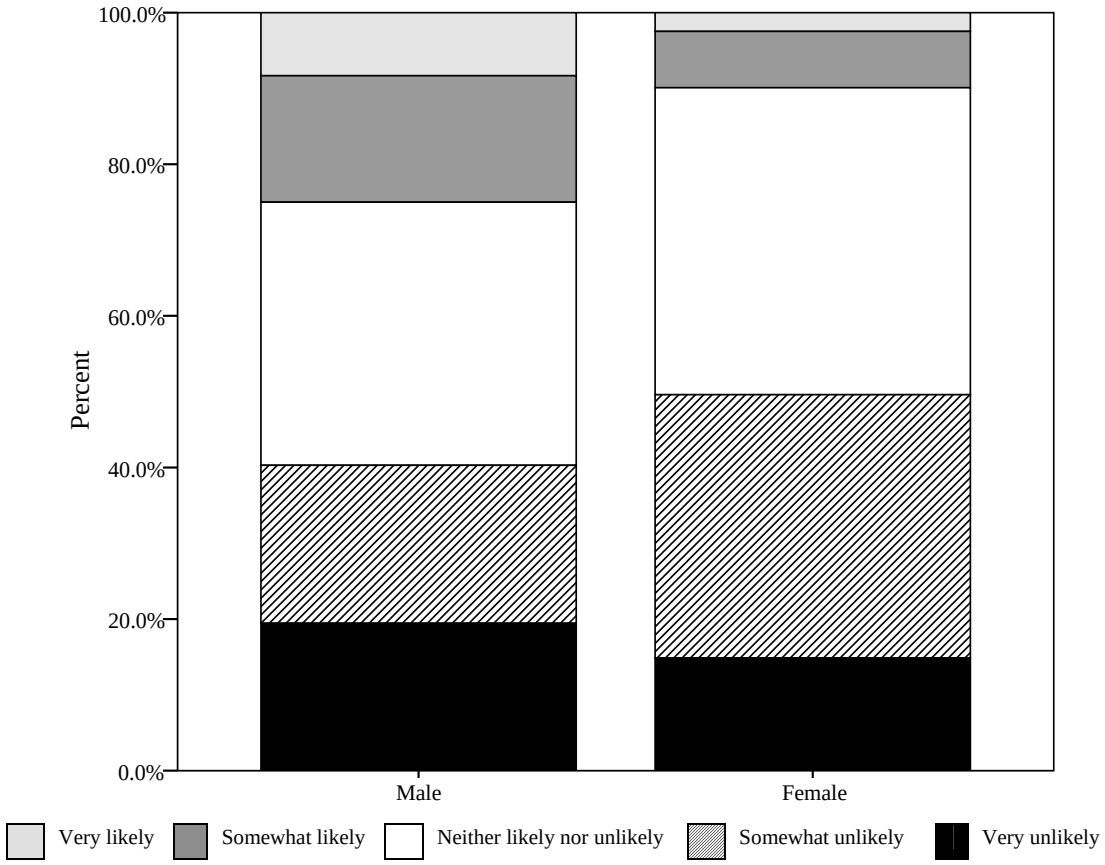


Figure 24: Daily activities by age group

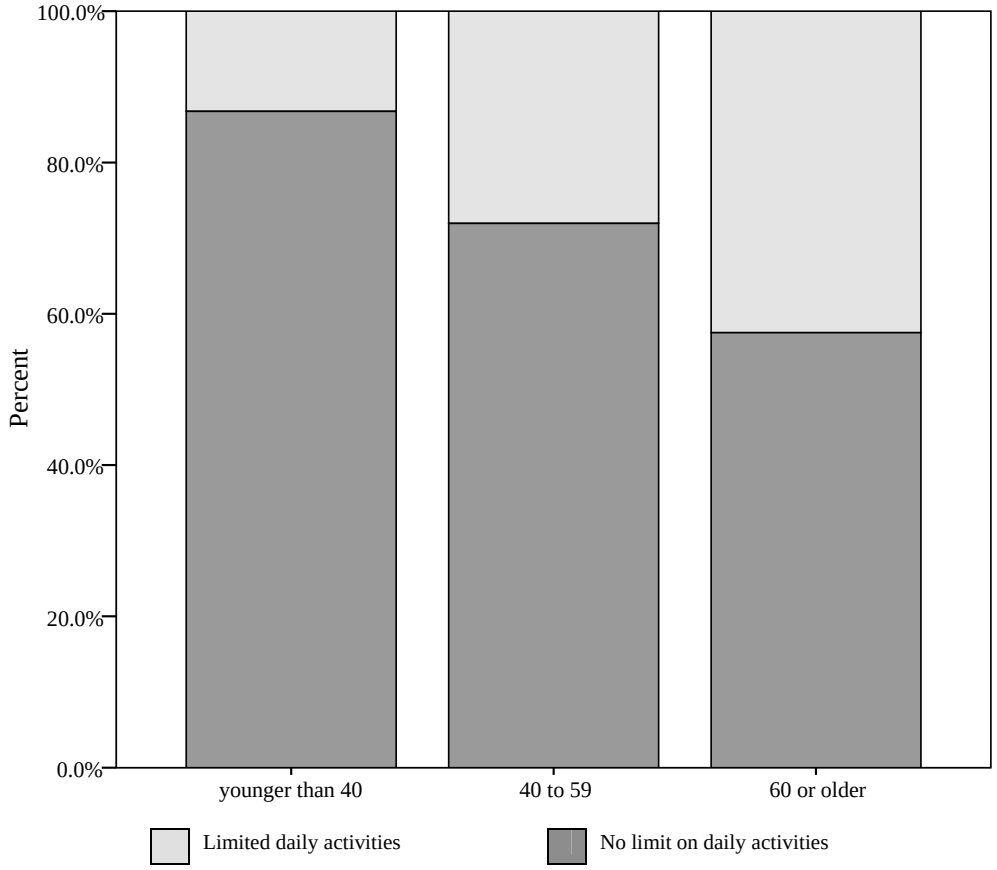


Figure 25: Discrimination by age group

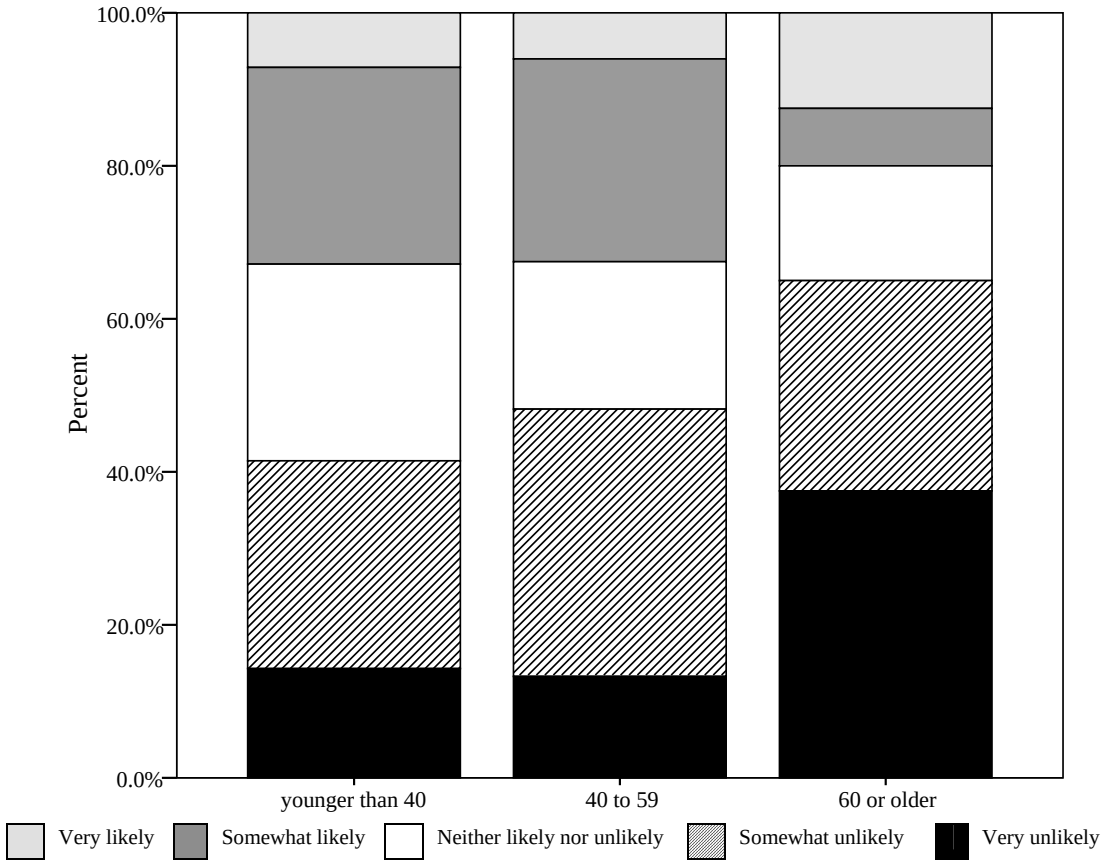


Figure 26: Daily activities by deprivation group

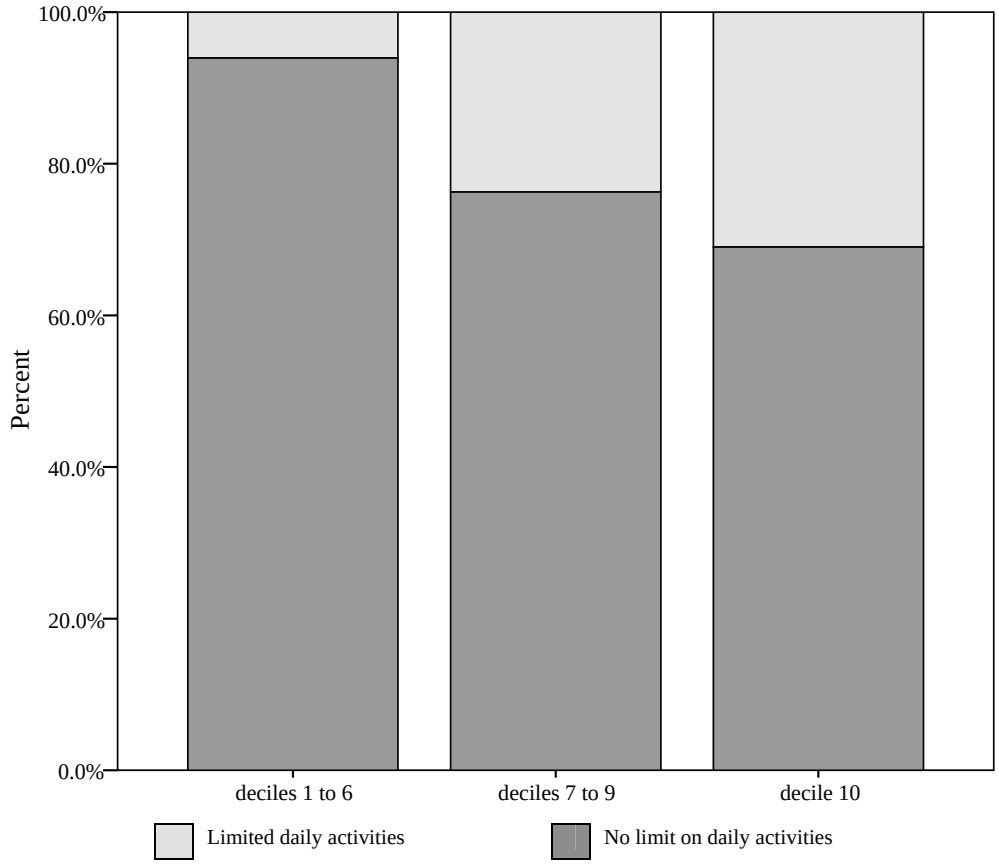


Figure 27: Neighbourhood safety by deprivation group

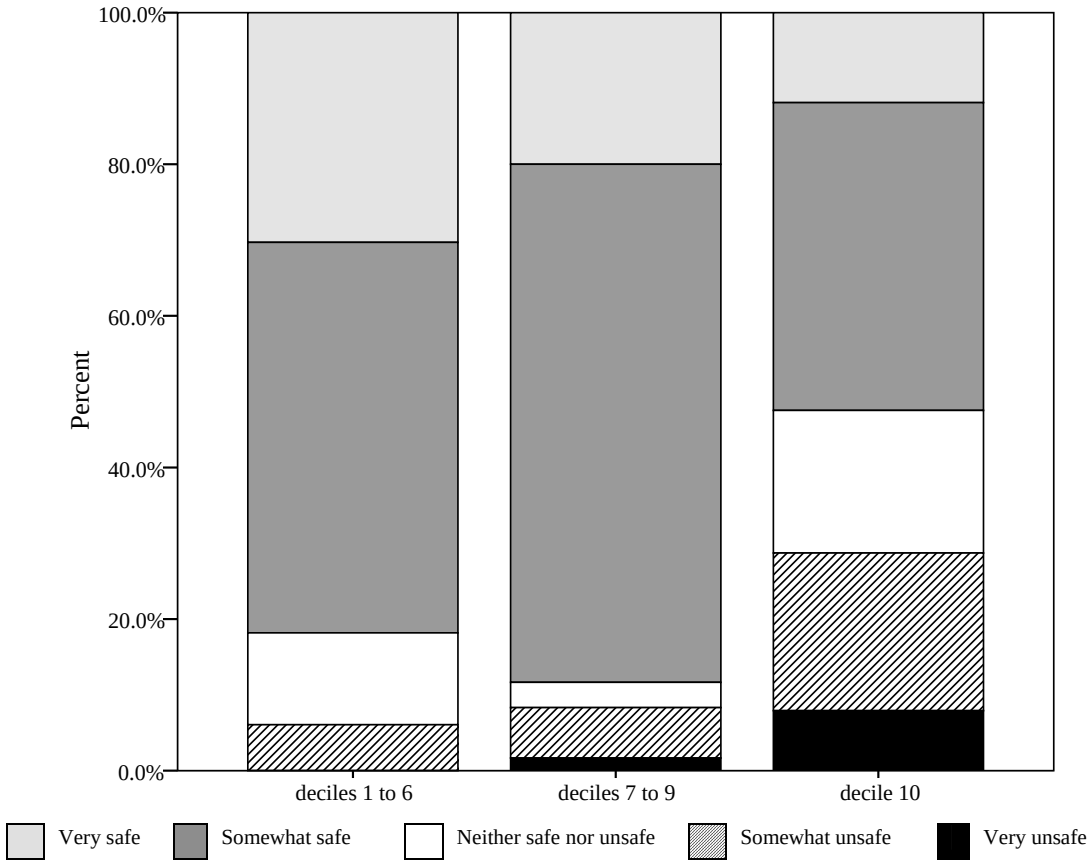


Figure 28: Social networks by deprivation group

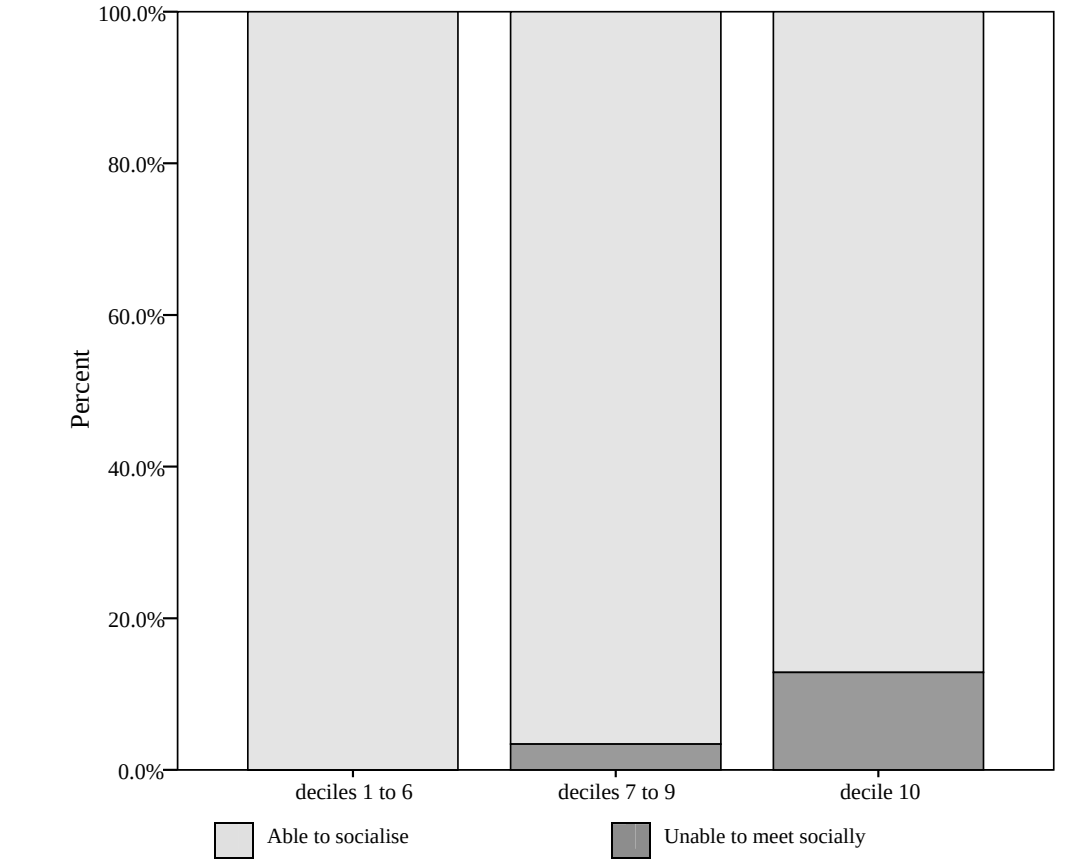


Figure 29: Property ownership by deprivation group

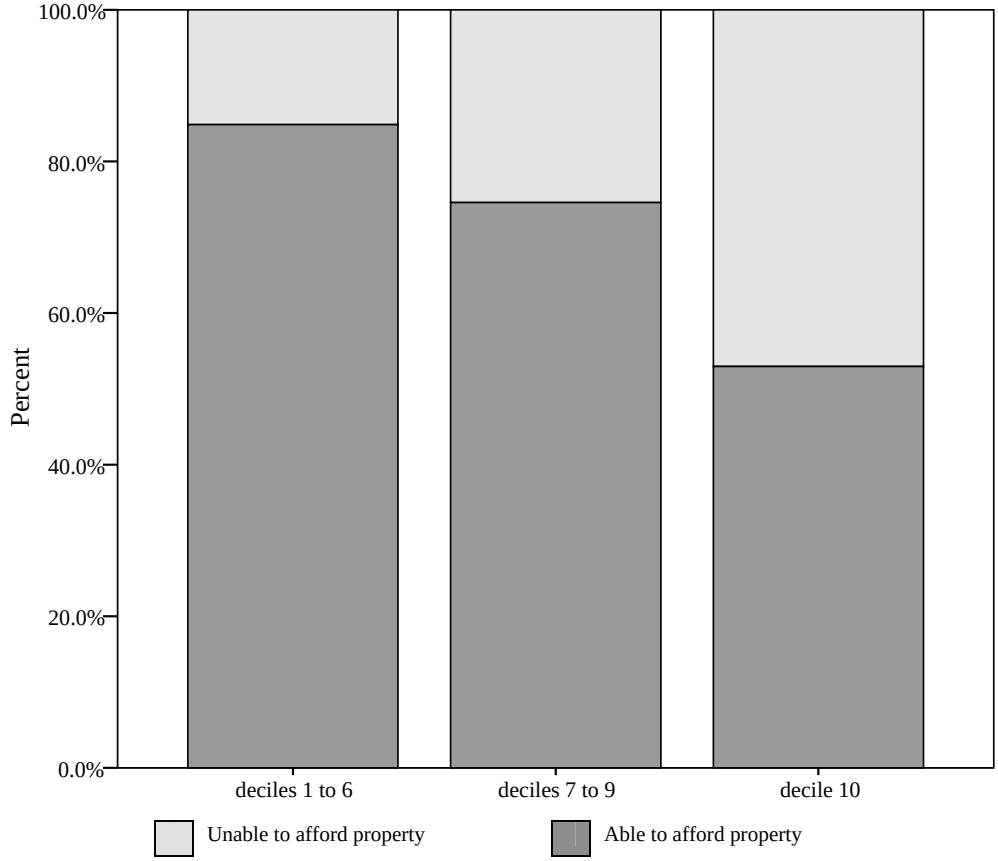
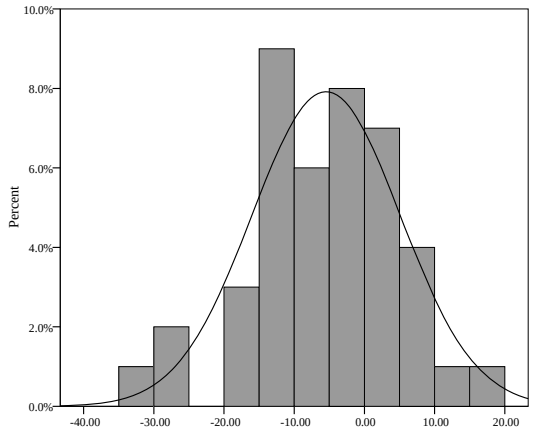
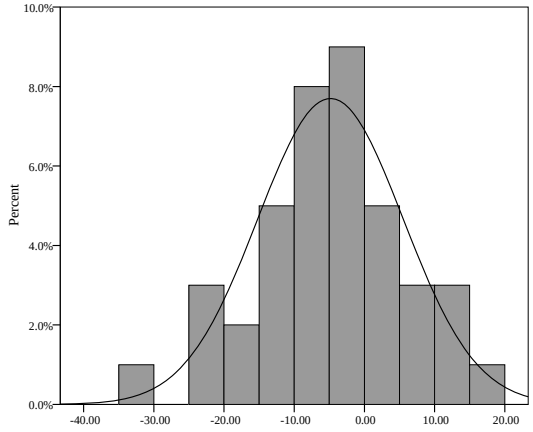


Figure 30(a): Histogram of deviations in life expectancy for income < £10k



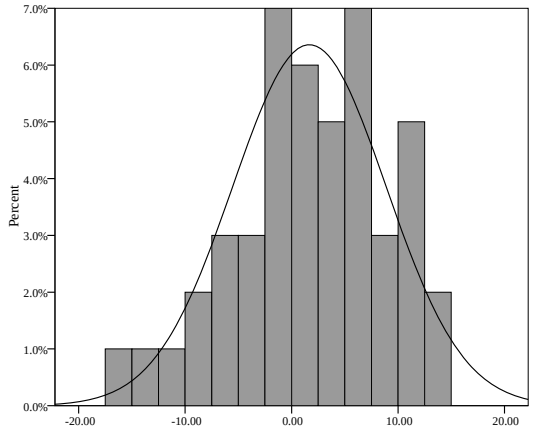
Mean = -5.461
Std Dev = 10.582
N= 42

Figure 30(b): Histogram of deviations in life expectancy for income £10k to £19k



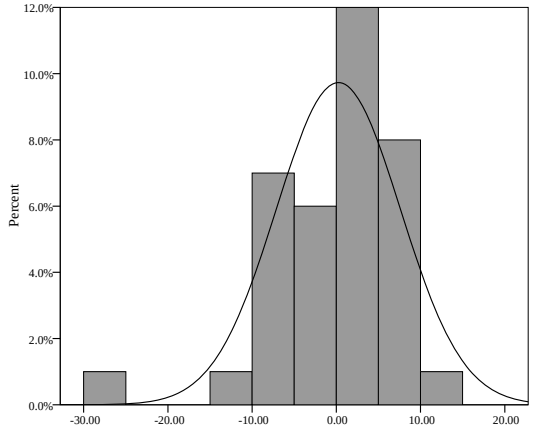
Mean = -4.835
Std Dev = 10.364
N= 40

Figure 30(c): Histogram of deviations in life expectancy for income £20k to £39k



Mean = -1.673
Std Dev = 7.215
N= 46

Figure 30(d): Histogram of deviations in life expectancy for income > £40k



Mean =0.241
Std Dev = 7.380
N= 36

Figure 31: Daily activities and income group

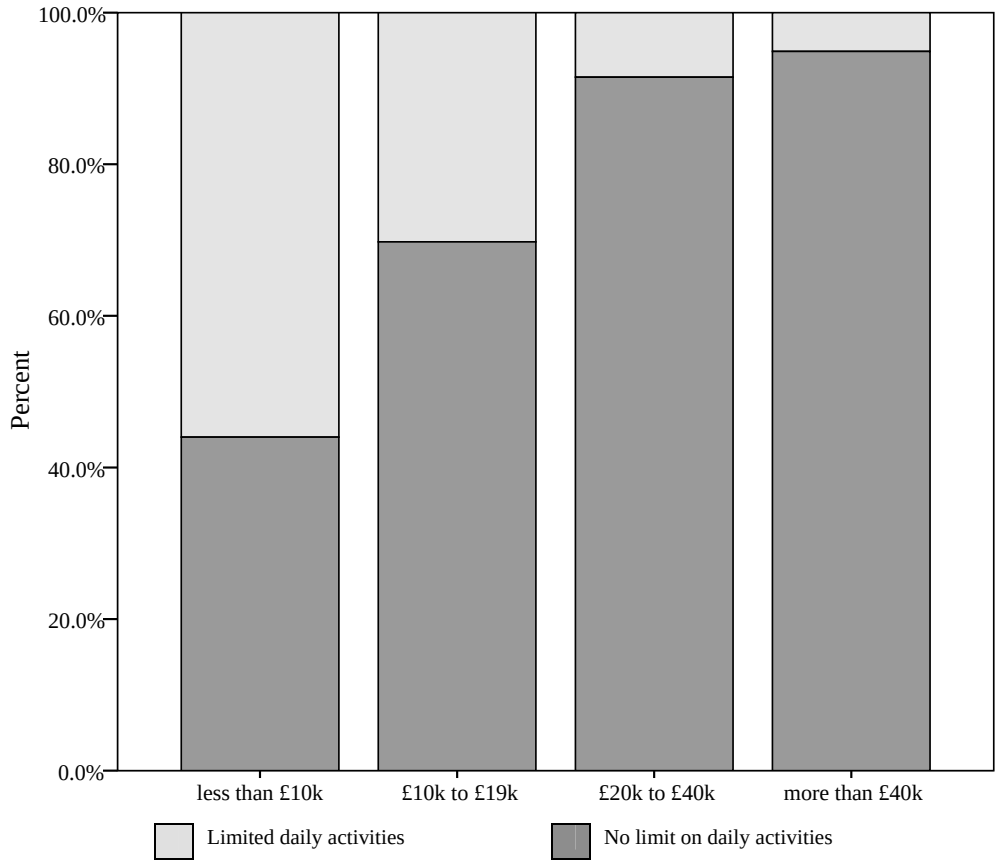


Figure 32: Socialising and income group

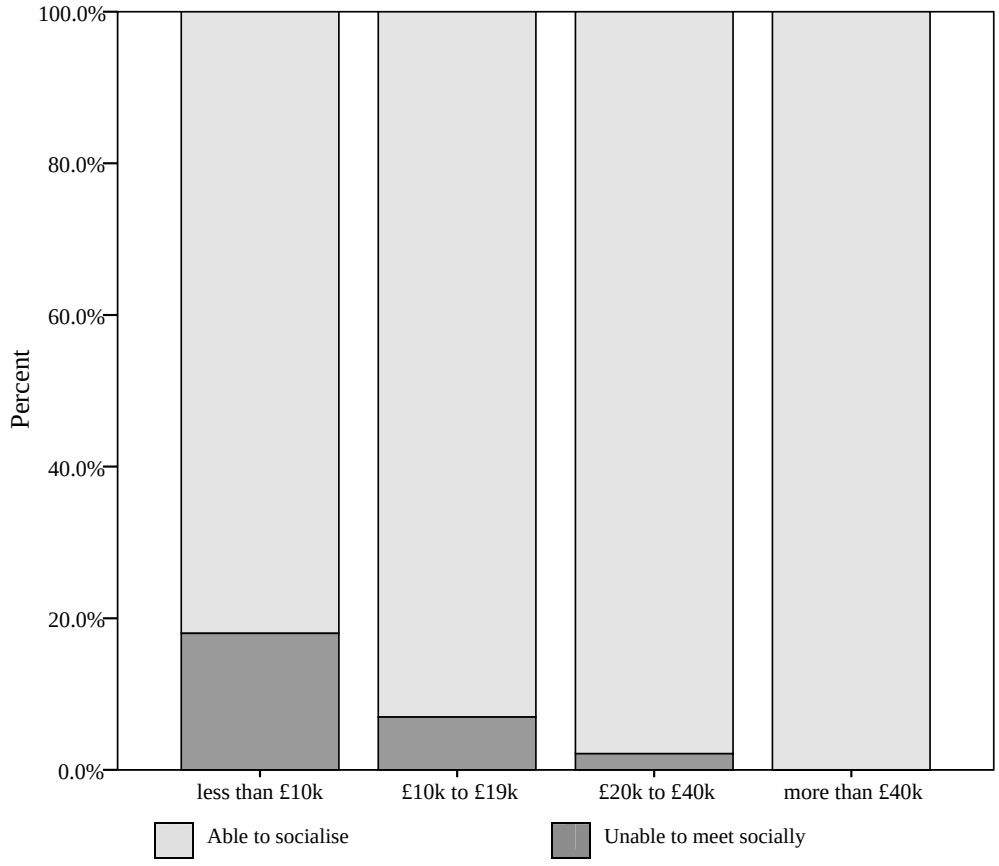


Figure 33: Property ownership and income group

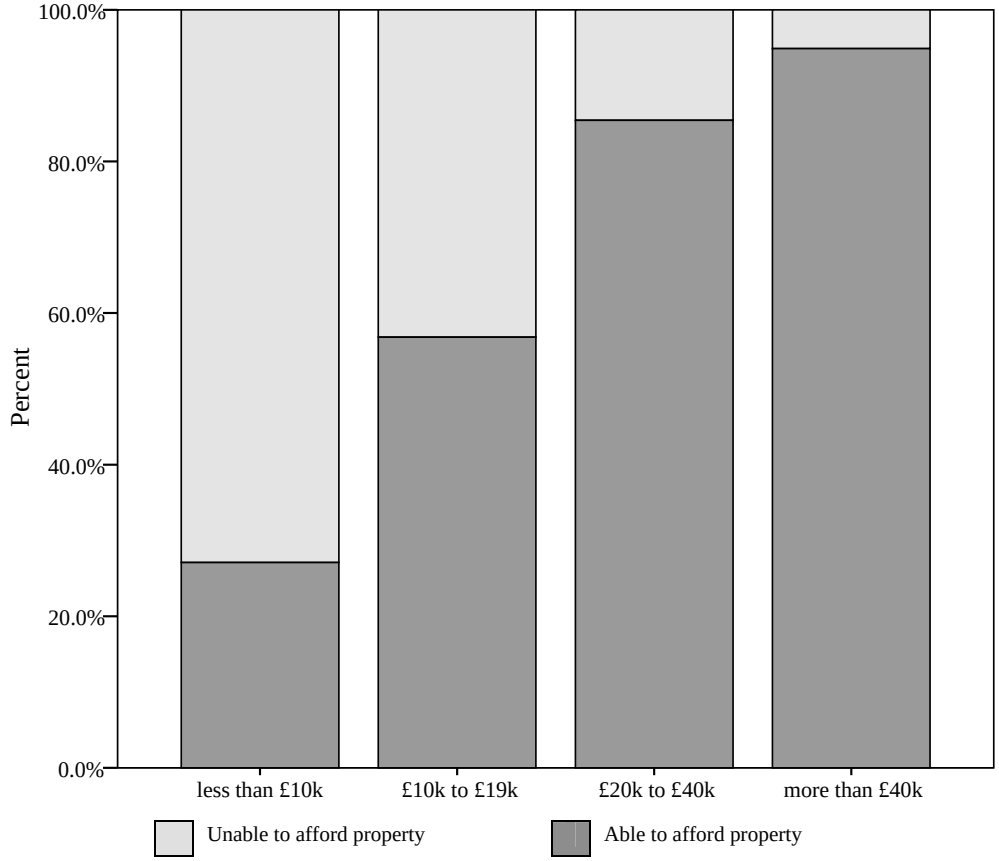


Figure 34: Loss of sleep and income group

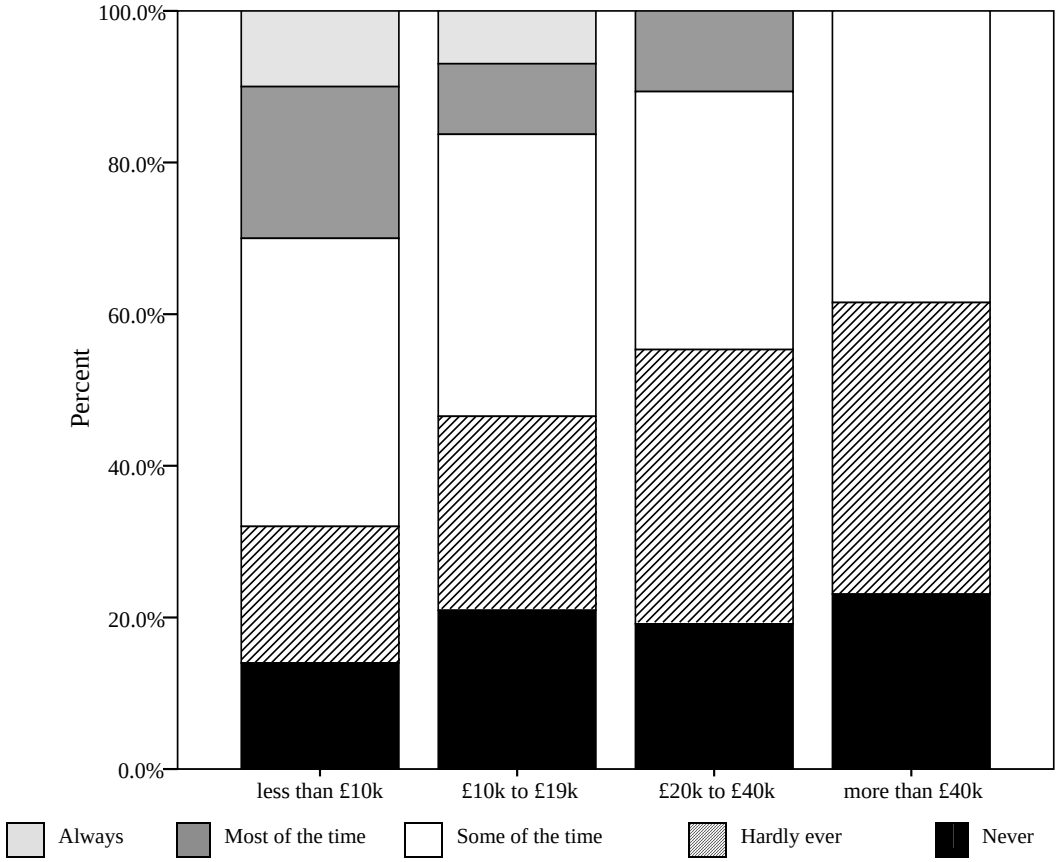


Figure 35: Recreational activities and income group

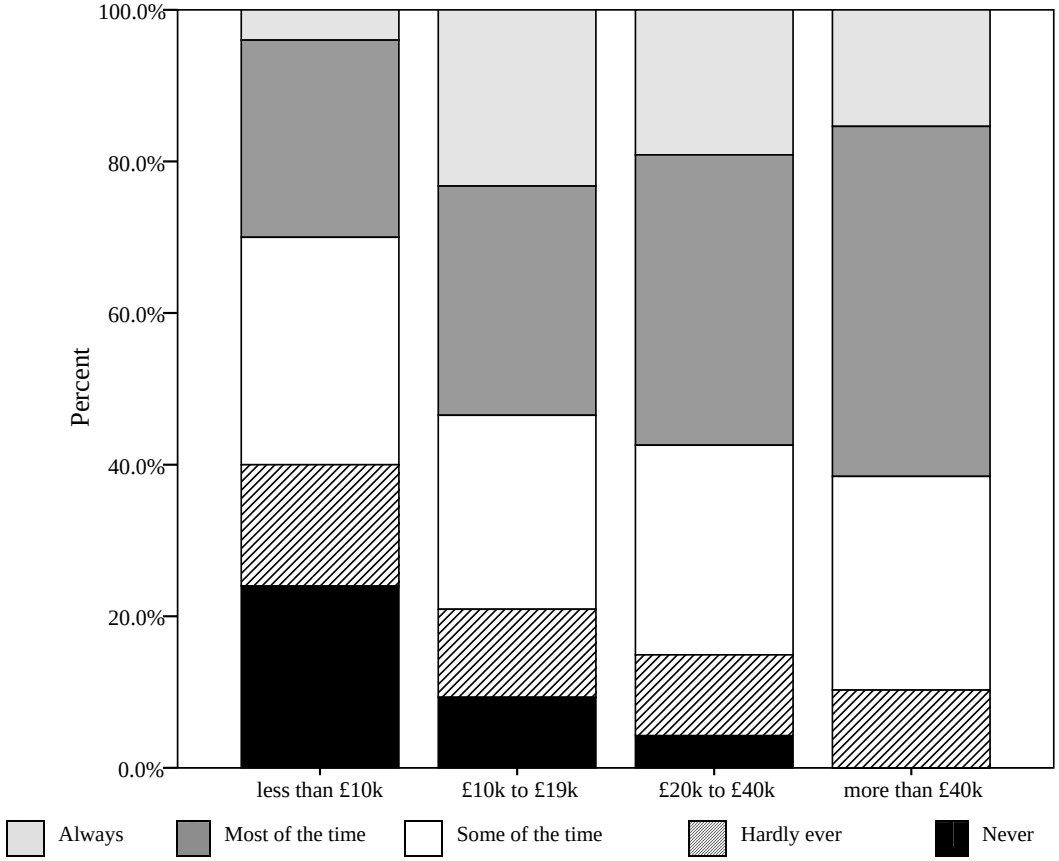


Figure 36: Influence political decisions and income group

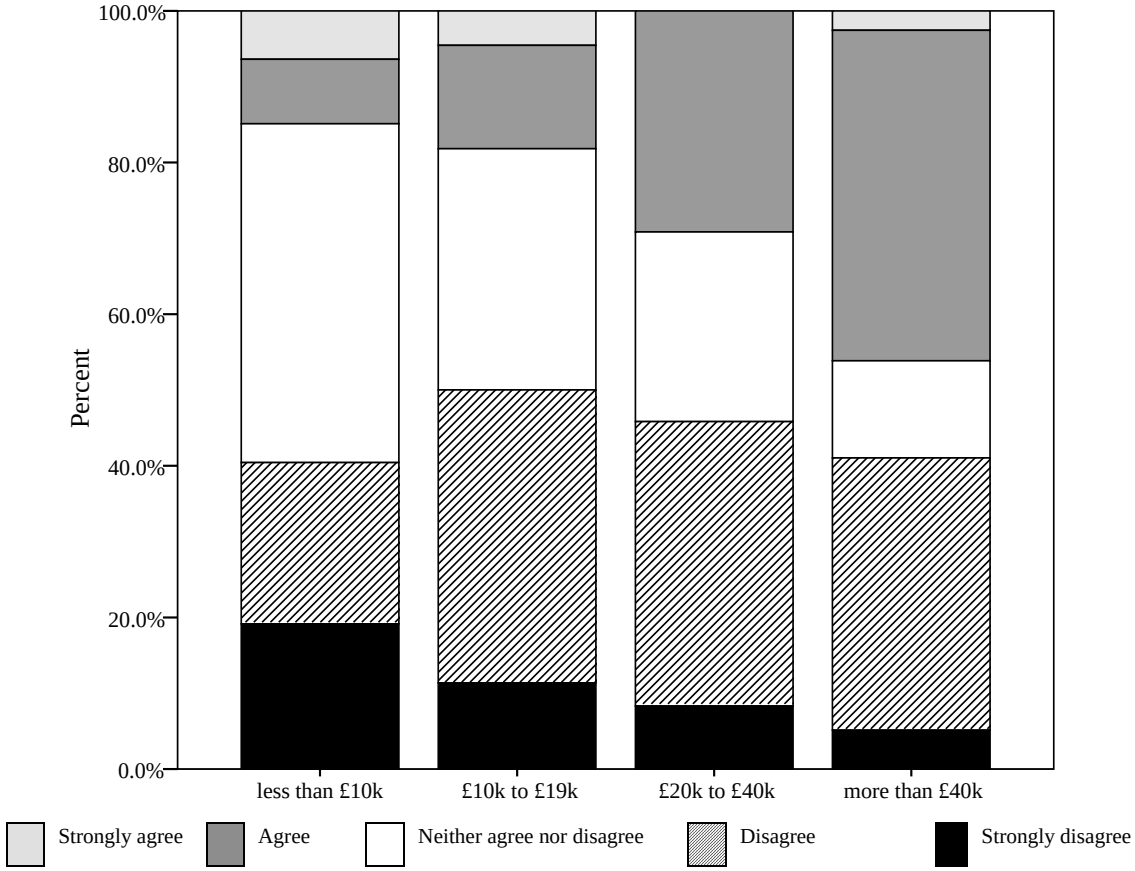


Figure 37: Histogram of capability index

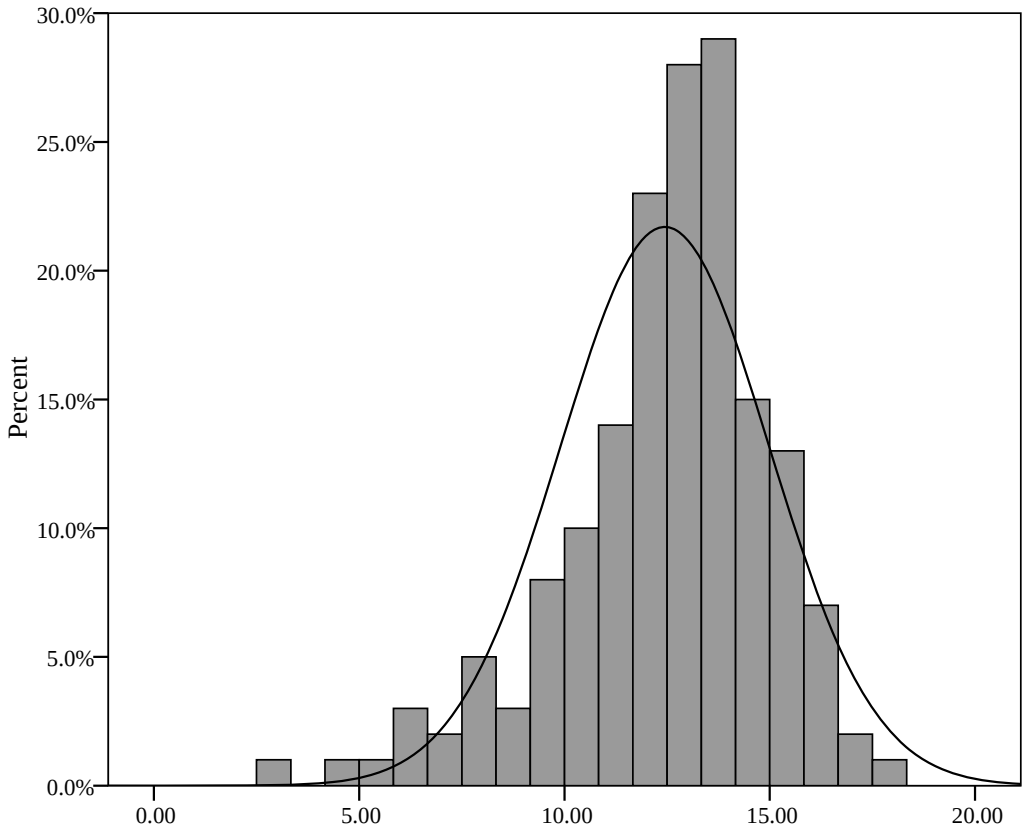


Figure 38: Scatterplot of relationship between EQ5D and capability index

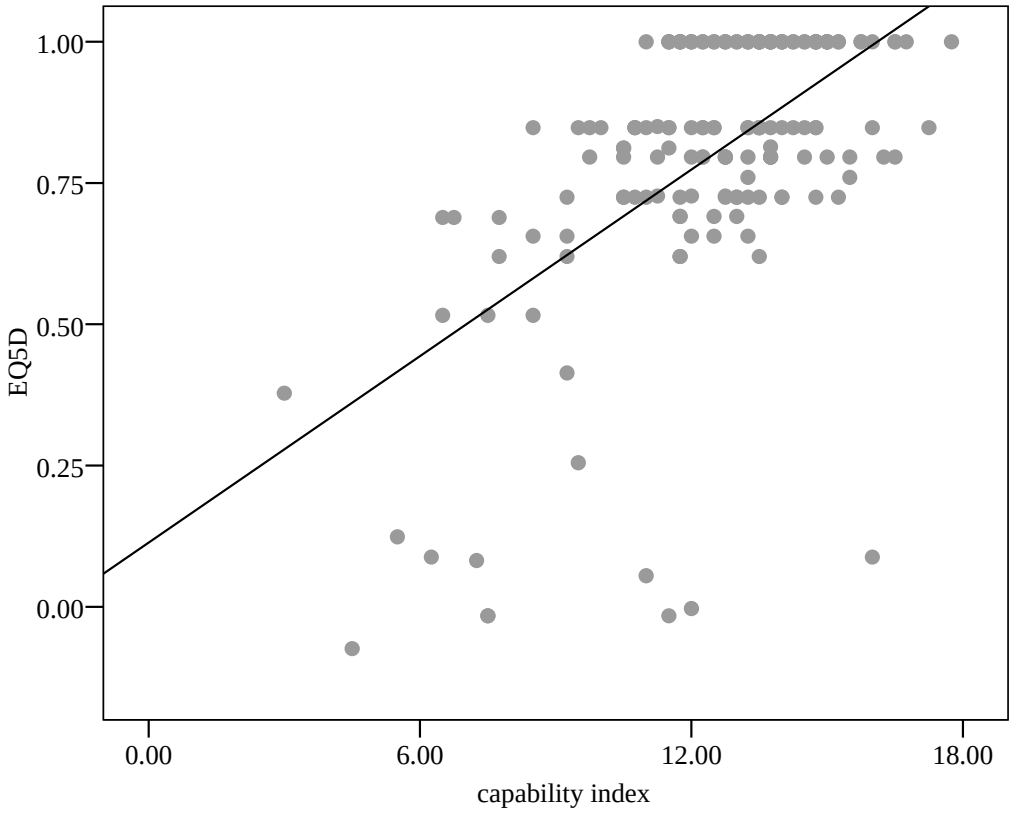
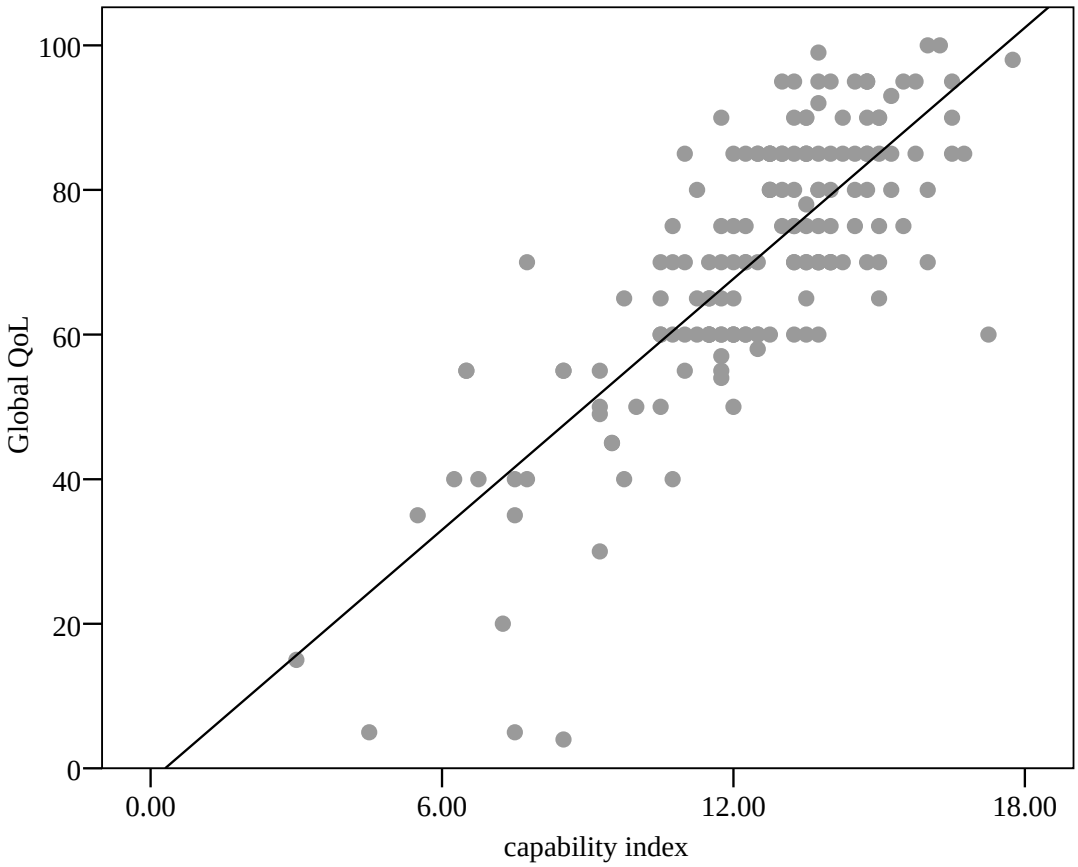
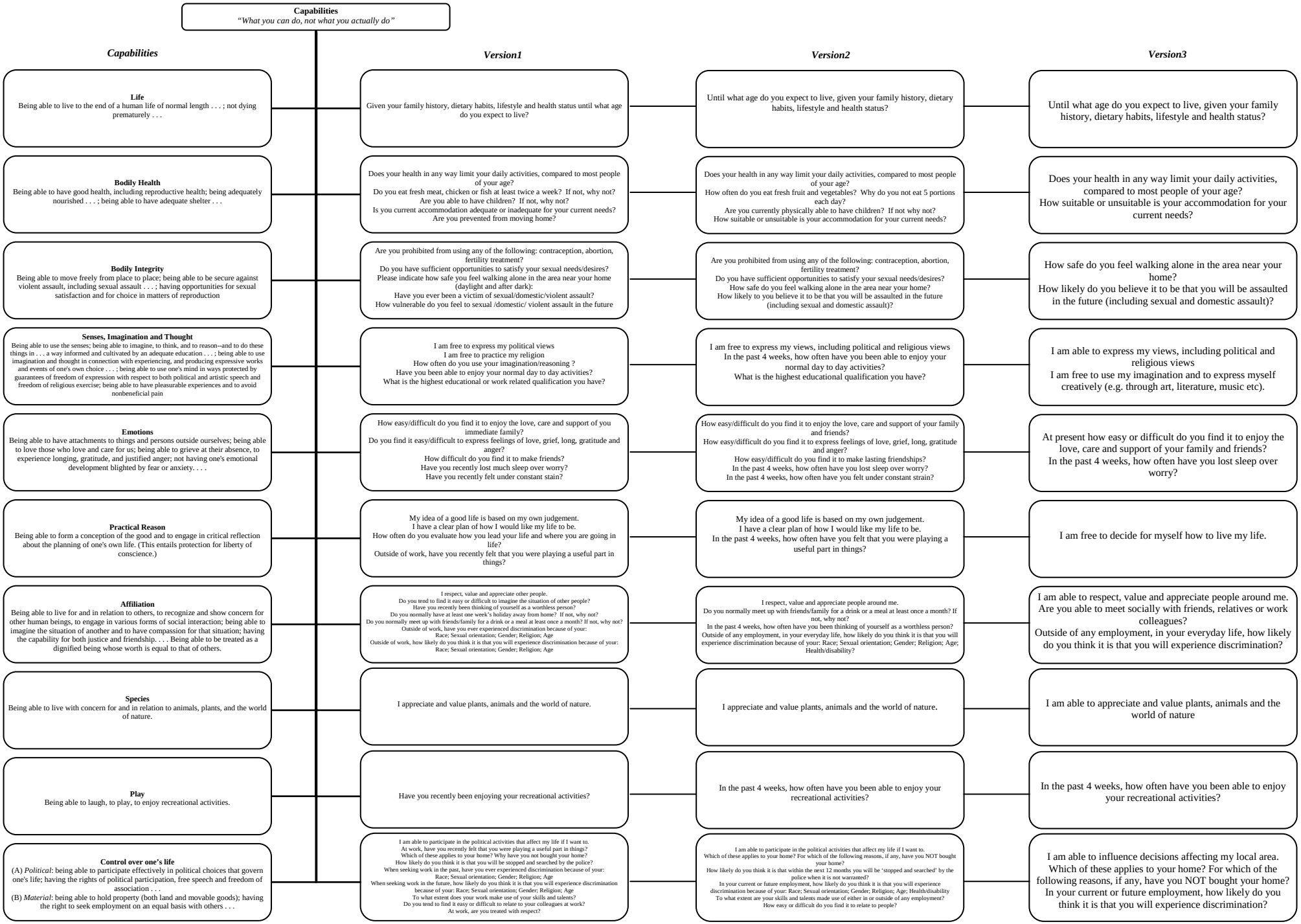


Figure 39: Scatterplot of relationship between QoL and capability index



APPENDIX ONE



MEASURING CAPABILITIES STUDY

Measuring what you <u>can</u> do and not what you <u>actually</u> do

HOW TO ANSWER THIS QUESTIONNAIRE:

There are no right or wrong answers. We are only interested in your own views.

Try to answer every question as a blank answer cannot be used. Most questions ask you to tick a box like this ☑, others ask you to circle a number.

Please only provide one answer, unless the question asks '*Please tick all that apply*', in which case you should tick all that are relevant. If you wish to change your answer, put a large cross through it and clearly mark your preferred answer.

SOURCE OF FUNDING:

This project is funded by the Glasgow Centre for Population Health and your answers will be used for research purposes only.

This questionnaire is anonymous. You do not have to put your name on it and the people who see your answers won't know who you are. If you have any questions about this questionnaire or this study please contact Paula Lorgelly at the address below.

Glasgow Centre for Population Health

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UNIVERSITY of GLASGOW

1. Which of these best applies to you?

[Please tick one]

Working full-time (30 hours or more per week)	1
Working part-time (8 – 29 hours per week)	2
Working part-time (less than 8 hours per week)	3
Full-time student	4
Retired	5
Unemployed	6
Not working for other reasons	7

2. What is your marital status?

[Please tick one]

Married/civil partnership	1
Living as married	2
Separated (after being married/in civil partnership)	3
Divorced/Dissolution of civil partnership	4
Widowed	5
Never married	6

3. How many dependent children do you have – that is children dependent on your income?

[Please circle one number]

None 1 2 3 4 More than 4

4. Which religion, religious denomination or religious body, do you belong to?

[Please tick one]

Buddhist	1	Another religion	10
Church of England	2	None	11
Church of Scotland	3	Prefer not to answer	12
Hindu	4		
Jewish	5		
Muslim	6		
Other Christian	7		
Roman Catholic	8		
Sikh	9		

5. Does your health in any way limit your daily activities, compared to most people of your age?

[Please tick one]

Yes 1 No 2

6. Are you able to meet socially with friends, relatives or work colleagues?

[Please tick one]

Yes 1 No 2

7. At present how easy or difficult do you find it to enjoy the love, care and support of your family and friends?

[Please tick one]

Very easy	Fairly easy	Neither easy nor difficult	Fairly difficult	Very difficult
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

8. In the past 4 weeks, how often have you lost sleep over worry?

[Please tick one]

Always	Most of the time	Some of the time	Hardly ever	Never
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

9. In the past 4 weeks, how often have you been able to enjoy your recreational activities?

[Please tick one]

Always	Most of the time	Some of the time	Hardly ever	Never
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

The next question asks you to think about your life expectancy:

10. Until what age do you expect to live, given your family history, dietary habits, lifestyle and health status?

[Please enter a number] ☐

11. Please indicate how strongly you agree or disagree with the following statements:

[Please tick one box for each statement]

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
'I am able to influence decisions affecting my local area.'	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
'I am free to express my views, including political and religious views.'	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
'I am able to appreciate and value plants, animals and the world of nature.'	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
'I respect, value and appreciate people around me.'	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
'I am free to decide for myself how to live my life.'	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
'I am free to use my imagination and to express myself creatively (e.g. through art, literature, music etc.)'	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

12. Please tell us your postcode (but **don't** write the last <u>two</u> letters):

For example	G	1	2	8	X	X
For example		G	4	9	X	X
					X	X

13. Which of these applies to your home?

[Please tick one]

I own my own home outright/or on a mortgage ..... 1 → **Please go to question 15**

Rented from housing association/local authority 2
Rented from private landlord 3
Rented from other 4
Other 5
Don't know 6
→ **Please go to question 14**

14. For which of the following reasons, if any, have you NOT bought your home?

*[Please tick **ALL** that apply]*

I cannot afford to buy 1
I cannot obtain a mortgage 2
I think it is a bad time to buy 3
There is a lack of available housing to buy 4
Some other reason 5

15. How suitable or unsuitable is your accommodation for your current needs?

[Please tick one]

Very suitable 1 | Fairly suitable 2 | Neither suitable nor unsuitable 3 | Fairly unsuitable 4 | Very unsuitable 5

16. Please indicate how safe you feel walking alone in the area near your home:

[Please tick one]

Very safe 1 | Fairly safe 2 | Neither safe nor unsafe 3 | Fairly unsafe 4 | Very unsafe 5

17. Please indicate how likely you believe it to be that you will be assaulted in the future (including sexual and domestic assault):

[Please tick one]

Very likely 1 | Likely 2 | Neither likely nor unlikely 3 | Unlikely 4 | Very unlikely 5

18. In your CURRENT OR ANY FUTURE employment, how likely do you think it is that you will experience discrimination (e.g. because of your race, gender, religion, sexual orientation, age, or health)?

[Please tick one]

Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

19. OUTSIDE of any employment, in your everyday life, how likely do you think it is that you will experience discrimination (e.g. because of your race, gender, religion, sexual orientation, age, or health)?

[Please tick one]

Very likely	Likely	Neither likely nor unlikely	Unlikely	Very unlikely
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

20. Write any number between 0 and 100 that describes your quality of life: ☐

Global Quality of Life Scale

100	Perfect quality of life
95	Nearly perfect quality of life
90	
85	Very good quality of life
80	
75	
70	Good quality of life
65	
60	Moderately good quality of life
55	
50	
45	
40	Somewhat bad quality of life
35	
30	Bad quality of life
25	
20	
15	Very bad quality of life
10	
5	Extremely bad quality of life
0	No quality of life

21. By placing a tick in one box in each group below, please indicate which statement best describes your own health state today.

[Please do not tick more than one box in each group]

Mobility

I have no problem walking about	1
I have some problems in walking about	2
I am confined to bed	3

Self-Care

I have no problems with self-care	1
I have some problems washing and dressing myself	2
I am unable to wash or dress myself	3

Usual Activities (e.g. work, study, housework, family or leisure activities)

I have no problems with performing my usual activities	1
I have some problems with performing my usual activities	2
I am unable to perform my usual activities	3

Pain/Discomfort

I have no pain or discomfort	1
I have moderate pain or discomfort	2
I have extreme pain or discomfort	3

Anxiety/Depression

I am not anxious or depressed	1
I am moderately anxious or depressed	2
I am extremely anxious or depressed	3

22. To what extent do you agree or disagree with the following statements? You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.

[Please circle a number for each statement]

	Strongly disagree ↓						Strongly agree ↓
Extraverted, enthusiastic	1	2	3	4	5	6	7
Critical, quarrelsome	1	2	3	4	5	6	7
Dependable, self-disciplined	1	2	3	4	5	6	7
Anxious, easily upset	1	2	3	4	5	6	7
Open to new experiences, complex	1	2	3	4	5	6	7
Reserved, quiet	1	2	3	4	5	6	7
Sympathetic, warm	1	2	3	4	5	6	7
Disorganized, careless	1	2	3	4	5	6	7
Calm, emotionally stable	1	2	3	4	5	6	7
Conventional, uncreative	1	2	3	4	5	6	7

23. Gross household income is the combined money income from wages, salaries, benefits or rents and BEFORE tax and contributions to national insurance are deducted.

What is your gross household income?

[Please tick one]

- £0 – nothing ☐ 1
- £1 to £9,999 per year (£1 to £199 per week approx) ☐ 2
- £10,000 to £19,999 per year (£200 to £389 per week approx) ☐ 3
- £20,000 to £29,999 per year (£390 to £574 per week approx) ☐ 4
- £30,000 to £39,999 per year (£575 to £774 per week approx) ☐ 5
- £40,000 to £59, 000 per year (£775 to £1155 per week approx) ☐ 6
- £60,000 or more per year (£1156 per week or more) ☐ 7
- Prefer not to answer ☐ 8
- Don't know ☐ 9

24. What is the highest educational qualification you have?

[Please tick one]

- Postgraduate degree ☐ 1
- First degree ☐ 2
- Higher education below degree ☐ 3
- Highers/A Levels or equivalent ☐ 4
- Standard grades 1-3 / GCSEs or equivalent ☐ 5
- Standard grades 4-7 / CSE or equivalent ☐ 6
- Foreign or other ☐ 7
- No qualification ☐ 8
- Don't know ☐ 9

25. Are you:

[Please tick one]

Male ☐ 1 Female ☐ 2

26. How old are you?

[Please give age in years] ☐

27. To which of these ethnic groups do you consider you belong?

[Please tick one]

- White ☐ 1
- Mixed ethnic group ☐ 2
- Asian or Asian British ☐ 3
- Black or Black British ☐ 4
- Chinese ☐ 5
- Other ethnic group ☐ 6