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Research Report No 481

Analysis of the choices and constraints questions on the Families and Children Study

John D'Souza, Anne Conolly and Susan Purdon

A report of research carried out by the National Centre for Social Research on behalf of the Department for Work and Pensions

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The Authors

John D'Souza is a Senior Survey Statistician in the Survey Methods Unit at NatCen. He has particular research interests in sampling theory, and the statistical analysis of complex surveys.

Anne Conolly is a Researcher in the Quantitative Research Department at NatCen. She is currently working on the ninth wave of the Families and Children Study and has particular interest in welfare research.

Susan Purdon is a Quantitative Methods Advisor in the Survey Methods Unit at NatCen. She is a statistician by profession, with particular research interests in survey sampling methods, complex survey design and evaluation methodology.

Glossary of terms

Couple family	A family with a dependent child(ren) that was headed by one natural or adoptive parent, and a partner.
Dependent children	Children aged 16 years or younger, or 17 or 18 years and in full-time education.
Equivalised income	The equivalisation of income is the process by which total income is adjusted for family size (number of family members) and composition (number of parents and number and age of children).
FACS	The acronym used to describe the Families and Children Study.
Family	Comprises two generations of people; at least one dependent child and at least one adult who is responsible for this child.
Lone father	A male lone parent.
Lone mother	A female lone parent.
Lone parent family	A family with dependent children that was headed by one natural or adoptive parent only. Lone parents may be male or female.

Mother

Used to refer to the person who took part in the main FACS interview. This person was usually the family's 'mother figure' – an adult with the main responsibility for looking after the children in the family. In the vast majority of couple families this person was female. In lone-parent families this person was either the lone mother or the lone father.

Not working

No work (i.e. working zero hours).

Partner

The person with whom the mother shares a home.

Table conventions

In this report the following conventions are used:

Base	The unweighted count of the base is presented.
0	Percentage value is greater than 0, but less than 0.5, which is rounded down.
[]	Figures are based on less than 25 cases and should be treated with caution.
-	A dash in a table where a percent figure is expected indicates that there were no responses in the category.

Summary

Background

In recent years a number of Government surveys have attempted to capture maternal concerns around moving off benefits and into work using a 'barriers to work' approach. Under this model, the 'barriers' were seen as a series of hurdles that mothers have to cross before work becomes an option. In practice, even **if** the concept was correct (and there is evidence that it wasn't), there was evidence that changing the method of asking the barriers questions on surveys significantly altered the estimates obtained.

In 2005 Department for Work and Pensions (DWP) commissioned a study to develop a new set of survey questions that would better capture the complexities of decision-making around work for lone parents¹. That study proposed a new approach where survey respondents would be asked a series of questions about their attitudes towards work and parenting, and with these questions then being followed by a card-sort exercise. This exercise involves respondents sorting a large number of cards (19 were recommended), each with a statement relating to work or parenting, into three piles: 'big factor', 'smaller factor', and 'not a factor'. Although the study focused on lone parents not in work, the report suggested that a similar approach could be used for mothers in couple families and for those who have recently returned to work.

The report of the study acknowledged that the analysis of data from a card-sort exercise would not be straightforward. One of the main intentions of the exercise was to allow mothers to consider factors **jointly** rather than in isolation from each other, so the analysis would also need to consider the factors **jointly**. The analysis approach proposed for the new question set was Latent Class Analysis (LCA) but with the suggestion that this be tested on real data before a final recommendation was made. The card-sort exercise was subsequently used on Wave 8 of the longitudinal Families and Children Study (FACS) data which gave

¹ Collins, D., Gray, M., Purdon, S. and McGee, A. (2006) *Lone parents and work: developing new survey measures of the choices and constraints*. DWP Working Paper No. 34.

the opportunity for that testing. The exercise covered both working mothers who had entered or returned to work in the previous year as well as non-working mothers, and couple mothers as well as lone mothers. The sample sizes generated were 1,304 non-working mothers and 279 working mothers.

This report is a follow-up to the 2005 report, and aims to do two things: Firstly we have tested that LCA is a reasonable analysis approach for the card-sort data and generates plausible and meaningful latent classes. And secondly, having derived the latent classes, we have presented tabular data on the characteristics of the classes in terms of attitudes and demographics.

The analysis undertaken

The aim of the analysis was to address two key descriptive analysis questions.

- 1** In terms of the factors that influence decisions around work, are there discrete groups or clusters of parents (such that, within a group parents identify a similar sub-set of factors, and with different groups identifying different sets of factors)?
- 2** Are characteristics and attitudes of parents related to cluster membership? That is, do identifiable sub-groups of parents tend to identify similar sets of 'big factors'?

The first of these questions was addressed using LCA. This is a statistical technique for analysing relationships in categorical data. The analysis divides individual cases in a dataset (in this instance 'cases' are FACS respondents) into discrete non-overlapping groups or 'latent² classes'. Essentially, a model is fitted that (a) identifies the number of latent classes in the data, and (b) generates probabilities, per respondent, of their being in each class (one probability per class). An individual is then assigned to the class for which they have the highest probability.

The second question was addressed by examining whether the latent classes derived differed in terms of the underlying attitudes of the mothers in each class and in terms of their socio-demographic characteristics.

The data on attitudes was taken from the series of 32 questions asked of mothers before they began the card-sort exercise. To reduce this to manageable proportions this data was firstly factor analysed, giving 10 underlying 'latent factors'.

The LCA suggested that, within the card-sort exercise, there were around six distinct groups, or clusters, of non-working mothers and four clusters of working mothers. Rather than label them numerically (cluster one, cluster two etc.) each cluster was given a label, the label being an attempt to summarise the characteristics of the mothers in the cluster.

² The classes are latent in the sense that they are present but not directly captured by the survey.

The clusters

Non-working mothers

For non-working mothers the LCA generated six clusters, the characteristics of each of the six being:

Cluster one – Job concerns

Mothers in the 'job concerns' cluster were likely to be concerned about a lack of suitable job opportunities, finding suitable affordable childcare and whether they would be financially better off in work. They were less likely to be concerned about wanting to look after their children themselves or to have personal or family problems. They were particularly likely to identify factors relating to work as 'most important' to them.

On attitudes to parenting and work this cluster were not particularly distinct, but they scored lower than average on attitudes to parenting (a high score meaning that the mother thought their children should be looked after at home) and higher than average on attitudes around 'work as a positive influence'.

In terms of socio-demographic factors, mothers in the 'job concerns' cluster were more likely than average to be younger mothers (aged under 25), have a low income, hold GCSE or equivalent qualifications and to be lone mothers.

Cluster two – Carer by choice

Mothers in the 'carer by choice' cluster were highly likely to report wanting to look after their children themselves as being a 'big factor' for not working. They were less likely than those in other clusters to report a lack of suitable job opportunities, financial concerns or health problems as factors in their decision not to work. Almost all mothers in this cluster identified their 'most important' factor as being child-related.

On attitudes. this group were particularly likely to say that children should be looked after at home by their mother, and to disagree that '*having almost any job is better than being unemployed*'.

Mothers in this cluster were more likely than others to be part of a couple family, to have young children, be buying their home with a mortgage, have a high household income, hold a degree-level qualification and have a partner who works at least 16 hours per week.

Cluster three – Few constraints

Mothers in the 'few constraints' cluster identified very few factors as being constraints to work. For every card in the card-sort exercise, a higher than average proportion of mothers from this group placed the card in the 'not a factor' pile. In particular mothers from this group were less likely than others to worry about not having enough time with their children or to have financial worries. Almost half of those in this cluster identified no 'big' factors at all.

On attitudes, this group scored particularly low on the 'parenting' factor (suggesting that these mothers do not believe that children need to be looked after at home by their mothers), but also disagreed with the view that there are strong societal pressures on mothers to work.

Respondents in the 'few constraints' cluster were more likely to be older mothers, have older children and fewer dependent children. They were also more likely to have worked in the last year and be in a couple family.

Cluster four – Childcare combined with financial concerns

Mothers in this cluster reported that wanting to look after their children was a 'big factor' for not working (similarly to the 'carer by choice' cluster). However, mothers in this group also had a number of other concerns, such as finding suitable affordable childcare, a perceived lack of suitable job opportunities and doubts about the financial benefits of working.

In terms of attitudes, this group shared similar high scores as the 'carer by choice' group on the parenting factor, but in contrast, tended to think that society expects mothers to work.

This group were likely to be younger mothers, have more than one dependent child, have younger children and have GCSE or equivalent qualifications.

Cluster five – Many constraints (including health problems)

Mothers in the 'many constraints' cluster were likely to report many of the issues presented on the cards as being a 'big factor' for not wanting or being able to work. They were especially likely to report that a lack of qualifications or experience, low confidence, personal or family problems and health conditions were 'big factors'. On attitudes, this group were particularly likely to think that society expects mothers to work.

The 'many constraints' cluster were more likely to be lone mothers, living in socially rented accommodation, have a low household income, have no academic qualifications and have a disabled person in the family.

Cluster six – Health problem

Mothers in cluster six were the most likely to place the statement '*I have difficulties due to my health condition or disability*' in the 'big factor' pile. They were also likely to have concerns about low confidence and a lack of qualifications and experience. They did not, on average, express a strong desire to care for their children at home themselves.

On attitudes, mothers in this group had low average scores on the parenting factor and high average scores on the 'work at any cost' and 'work as positive influence' factors (suggesting that this group would like to work, and see work as valuable but face problems with doing so).

Mothers in this cluster were particularly likely to live in a family with at least one disabled adult. They tended to be older mothers with older children and were more likely to only have one dependent child. They were also more likely to be lone mothers, live in socially rented accommodation, have a low income and have no academic qualifications. Almost a third had not worked in the last ten years.

Working mothers

For mothers who had entered or returned to work within the year previous to the FACS interview, the LCA generated four clusters:

Cluster one – Few constraints

Mothers in cluster one placed very few statements in the 'big factor' pile. In particular mothers in cluster one were less likely than other mothers to worry about their children being unhappy whilst they were at work, financial problems or work stress. Mothers in this cluster scored differently to others on a 'societal expectations' factor, suggesting that these parents do not perceive society as exerting pressure on mothers to work.

A comparison between the attitude scores for this 'few constraints' group with the 'few constraints' group of non-working mothers show them to be very similar. This perhaps means that the two clusters are made up of very similar mothers – certainly they are also similar in terms of their socio-demographic characteristics.

To summarise this group on their socio-demographic characteristics, they are more likely than other working mothers to be part of a couple family, to be buying their home with a mortgage, hold a degree-level qualification and have a partner who works at least 16 hours per week.

Cluster two – Concerns for children

Mothers in cluster two were more likely than other working mothers to report that they were concerned that they didn't have enough time with their children. They were also likely to report that the stress of combining work and family life was a 'big factor' in making it difficult to stay in work.

Mothers in this cluster were more likely to be younger, lone mothers, living in socially rented accommodation, and with a low household income.

Cluster three – (Moderate) childcare and financial concerns

Mothers in cluster three reported few statements as 'big factors' making it difficult to stay in work but were more likely than others groups to place statements in the 'smaller factor' pile. In particular, they were likely to say that being worried about not having enough time with their children was a 'smaller factor' and financial worries were also a 'smaller factor'. In other words, they have concerns, but they are not 'big' concerns.

This cluster were more likely to be older mothers with one dependent child. They were more likely to be in the highest two income quintiles.

Cluster four – Many constraints

Mothers in cluster four were likely to report **most** things as being a 'big factor' for making it difficult to stay in work. They were especially likely to report that a lack of suitable, affordable childcare, financial worries, work pressure and health conditions were 'big factors'.

This group of mothers also had a particularly high mean score of a 'work at any cost' attitudinal factor (higher in fact than any other group including the non-working mothers) suggesting that this group may be in work because they feel they have to be. In terms of their attitudes more generally, they share a lot in common with the 'health problem' cluster of non-working mothers.

The 'many constraints' cluster were more likely than the other working mother clusters to be lone parents with younger children, live in socially rented accommodation, have no academic qualifications and have a disabled person in the family. In this respect they are also similar to the non-working mothers 'health problem' cluster.

Conclusions

The analysis suggest two broad conclusions:

Firstly, LCA appears to be a very useful tool for describing and summarising the complex data structure that the card-sort exercise generates. It is a sensible default descriptive analysis approach for the card-sort data.

Secondly, the clusters that the analysis generates are sufficiently easy to characterise, and sufficiently distinct, that it is plausible that the analysis can be used as a starting point for generating policy interventions and/or marketing strategies that are cluster specific.

1 Introduction and overview

The 2006/07 questionnaire for the FACS Wave 8 included a new series of questions on the factors that influence whether or not parents choose to work (or look for work). This included a series of attitudinal questions followed by a card-sort exercise. For the card-sort exercise parents were asked to sort through a set of either 18 or 19³ cards, each with a single statement relating to choices and constraints in relation to work and childcare, and to place these cards into three piles labelled 'big factor', 'smaller factor' and 'not a factor'. Two groups of mothers (or mother-figures) were asked to complete the card-sort exercise: mothers not in work at the time of the FACS interview (who were asked to sort 19 cards) and mothers who had entered or returned to work during the year before the interview (who were asked to sort 18 cards). The development of the cards for lone parents not in work is described in Collins *et al.*⁴.

The objective of the card-sort exercise was to allow mothers to consider their choices and constraints in relation to childcare and work. Although the card-sort exercise was developed for non-working lone parents, Collins *et al.* recommend a comparable set of questions for lone parents who had recently returned to work. In FACS, the exercise was given to both these groups and was also extended to include couple mothers. The sample sizes generated were 1,304 non-working mothers and 279 working mothers.

The rationale for improving understanding of these choices and constraints is to inform Government policy around work for mothers. The Government has set a target of raising the employment rate to 80 per cent of the working-age population⁵. If this target is to be met, one area where substantial change is required is the employment rate among mothers, in particular lone mothers. Although over

³ The exact number differed by whether or not a respondent was in work.

⁴ Collins, D., Gray, M., Purdon, S. and McGee, A. (2006) *Lone parents and work: developing new survey measures of the choices and constraints*. DWP Working Paper No. 34.

⁵ DWP (2006) *A New Deal for Welfare; Empowering People to Work*. HMSO; London.

the last ten years there has been a steady increase in the employment rate for lone parents and it is now at an all time high of 57 per cent, the Government would like to see this raised to 70 per cent by 2010, bringing it in line with the current rate for partnered mothers.

Moving more lone parents into work is not only important for meeting employment rate targets but is also intrinsically linked to the Government's pledge to eradicate child poverty by 2020. There is now a wealth of evidence showing that children who live in workless households have an exceptionally high risk of experiencing income poverty⁶ and material deprivation⁷. Understanding the choices and constraints that parents face when making decisions about work is imperative if policy is to be effective.

In recommending the card-sort exercise, NatCen acknowledged that the analysis of the data from this section of the interview would not be straightforward: given that the intention of the exercise was to allow parents to consider factors **jointly** rather than in isolation from each other, the analysis would also need to consider the factors **jointly**. The analysis approach proposed for the new question set was LCA but with the suggestion that this be tested on real data before a final recommendation was made. This report gives the details of out testing of LCA on data collected using Wave 8 FACS data.

Essentially we have attempted two things in this report. Firstly we have tested that LCA is a reasonable analysis approach for the card-sort data and generates plausible and meaningful latent classes. And secondly, having derived the latent classes, we have presented tabular data on the characteristics of the classes in terms of attitudes and demographics.

Chapter 2 of the report gives an overview of the analysis undertaken, with the technical details of the LCA being given in Chapter 4. The long section in between these two (Chapter 3) gives the descriptive analysis of the results from the LCA.

⁶ DWP (2006) *Opportunity for All: Eighth Annual Report*. HMSO; London.

⁷ Lyon, N., Barnes, M. and Sweiry, D. (2006) *Families with Children in Britain: findings from the 2004 FACS*. DWP Research Report No. 340.

2 A summary of the analysis undertaken

2.1 The rationale for the approach

As noted already, it is not immediately apparent as to what the most appropriate descriptive analysis approach for card-sort data is. However, the earlier report (Collins *et al.*) identified two key **descriptive** analysis questions that would need to be tackled:

- 1** In terms of the factors that influence decisions around work, are there discrete groups or classes of parents (such that, within a group parents identify a similar sub-set of factors, and with different groups identifying different sets of factors)?
- 2** Are characteristics and attitudes of parents related to group membership? That is, do identifiable sub-groups of parents tend to identify similar sets of 'big factors'?

Although there are a number of ways these questions could be addressed, one analysis approach that seemed particularly suited to addressing the first question was LCA.

LCA is a statistical technique for analysing relationships in categorical data (whether the categories be nominal (that is, unordered) or ordinal. The analysis divides individual cases in a dataset (in this instance 'cases' are FACS respondents) into discrete non-overlapping groups or 'latent classes'. Essentially, a model is fitted that (a) identifies the number of latent classes in the data, and (b) generates probabilities, per respondent, of their being in each class (one probability per class). An individual is then assigned to the class for which they have the highest probability.

Texts on LCA describe it as analogous both to cluster analysis⁸ and to factor analysis⁹. The analogy with cluster analysis is clear: essentially, both cluster and LCA are a means of identifying sub-groups of individuals. The analogy with factor analysis lies in the fact that both LCA and factor analysis are means of reducing data: but whereas factor analysis reduces a set of variables into a smaller set of continuous variables, LCA reduces a set of variables into a single categorical variable (that is, class membership).

There appear to be two main advantages of LCA in the current setting over either factor or cluster analysis:

Firstly, LCA can be used with ordinal data, whereas both factor and cluster analysis use continuous data (with binary data being treated as continuous by many researchers). For the card-sort exercise parents are asked to sort statements into 'big factor', 'smaller factor', 'not a factor' categories, and it is clear that analysis that handles the natural ordering in these categories is preferable. (Note that an analysis that combined any of the two categories could, in principle, adopt an analysis approach that handled binary data (such as cluster analysis), but there would be no obvious advantages in switching from LCA to cluster analysis beyond software issues.)

Secondly, unlike cluster analysis, LCA generates a parameterised model of class membership. These parameters allow the relationship between the original set of variables (i.e. the card-sort responses) and the final latent classes to be formally traced. In particular it is possible to say why a respondent is in one class rather than another, and what the members of a class have in common. This also has advantages if the card-sort exercise is to be repeated in a new survey (either a different wave of FACS or a different survey). For instance, the parameter estimates can be used to assign the mothers in the new survey to the clusters found here. In other words, once latent classes are found it is possible to assume that the same latent classes exist in the new survey and then to assign the mothers from the new survey to these classes without having to re-do the analysis. This could be particularly useful if the sample size in the new survey is too small to enable a new LCA model to be fitted.

Assuming that the LCA is fruitful, a second key analysis question is whether it is possible to shed light on why parents fall into particular latent classes. A natural way to approach this is to explore whether the characteristics of parents (such as age of children, previous work experience, etc.) are associated with membership of particular latent classes. This is equivalent to asking whether parents with particular

⁸ See Section 9.5 of Bartholomew, D.J., Steele, F., Moustaki, I., and Galbraith, J. (2002) *The Analysis and Interpretation of Multivariate Data for Social Scientists*. Chapman & Hall/CRC.

⁹ Chapters 7 and 9 of Bartholomew, D.J., Steele, F., Moustaki, I., and Galbraith, J. (2002) *The Analysis and Interpretation of Multivariate Data for Social Scientists*. Chapman & Hall/CRC.

characteristics tend to identify a similar set of factors that affect decisions around work. In this report we have tackled this using simple cross-tabular analysis.

Beyond this there is the question of how to relate attitudinal questions to class membership. A series of 32 attitudinal questions were asked of parents prior to the card-sort exercise that, between them, were designed to capture parents' attitudes, values and beliefs about parenting, work and childcare. The rationale for including these questions was that attitudes to parenting, work and childcare act as context against which parents will make decisions around work¹⁰. The responses to these questions were measured on an ordinal agree/disagree scale.

In principle it would be possible to analyse each attitudinal statement against the LCA class membership separately, but this would involve analysis of 32 separate variables. Rather than do this, we have reduced the dataset from the attitude questions into just 10 'latent attitudinal variables' using factor analysis. Note that in the Collins report it was suggested that either factor analysis or Latent Trait Analysis (LTA) could be used here, but the software package we used for the LCA only allowed for LTA that would generate at most three latent factors. Since standard factor analysis (see Section 3.1.3) identified many more than three latent factors, we took the decision to use the standard approach (even though this meant assuming that the ordinal response categories can be treated as generating continuous data).

2.2 The Latent Class Analysis

The Wave 8 FACS data gives a sample size of 1,304 mothers (or lone fathers) who were not in work at the time of the interview (excluding any who said they had no intention of working in the next few years) and who completed 'card-sort A'. Nearly all (97 per cent) of those eligible to complete card-sort A did so. The main reasons for not completing the exercise were problems understanding the task and having to tend to children during the interview.

The exercise consisted of 19 cards/statements as shown in Table 2.1 which mothers were asked to sort into three piles: statements they considered to be a 'big factor'; statements they considered to be a 'smaller factor' and those they considered 'not a factor'.

¹⁰ The Collins *et al.* report concluded '*In general terms, we would recommend that any survey attempting to look at the factors influencing lone parents' decisions about work and parenting should include questions that attempt to capture such attitudes and beliefs. These questions should, ideally, be asked prior to questions that seek to identify choices and constraints around going (back) to work. This is because questions on attitudes and beliefs will provide a context within which respondents can think about choices and constraints and allow lone parents to express views on parenting, permitting respondents who are not thinking about or interested in going back to work to articulate these feelings.*'

Table 2.1 List of statements used in card-sort A

My child/children wouldn't like me to work
 My parent/parents wouldn't like it if I worked
 I would have problems with transport to and from work
 There are few suitable job opportunities in the local area
 I have difficulties due to my health condition or disability
 My confidence is low at the moment
 I want to look after my child/children myself or at home
 I care for someone who has a health condition, disability or behavioural difficulties
 I am worried I will not have enough time with my child/children
 I haven't got the qualifications or experience to get the kind of job I would want
 My husband/partner/ex-partner would not like it if I worked
 I am not sure I would be financially better off in work
 There isn't enough suitable, affordable childcare around here
 I would need a job where I could take time off at short notice to look after my child/children
 Employers aren't very family-friendly
 My family or close friends are not able, or live too far away, to provide childcare
 I am not prepared to leave my child/children in the care of anyone other than my family or close friends while I work
 I am concerned about leaving the security of benefits
 I have personal or family troubles that need to be sorted out

The LCA of the results from this data identified there to be somewhere between five and seven distinct clusters of parents in the data. We have chosen to present data on the six cluster solution for two reasons:

- (a) all of the six seemed to be distinct (so adopting a five-cluster solution seemed sub-optimal); and
- (b) the seven cluster solution gave a sample size in one cluster that was simply too small for separate analysis.

Section 4.3.2 gives the technical details of how the number of clusters was decided on.

As described in Chapter 3, the six clusters appeared to be distinct enough for us to give labels to:

Cluster one: Job concerns;

Cluster two: Carers by choice;

Cluster three: Few constraints;

Cluster four: Childcare combined with financial concerns;

Cluster five: Many constraints;

Cluster six: Health problem.

The second card-sort exercise, carried out amongst 279 mothers (or lone fathers) who had entered or returned to work in the previous year, consisted of 18 statements. In this instance the parent was asked to identify the factors that affect whether or not they can stay in work. Again, nearly all eligible respondents completed the card-sort exercise (95%); the main reasons for not doing so were literacy problems and tending to children during the interview. The statements are given in Table 2.2.

Table 2.2 List of statements used in card-sort B

My child/children don't like me working
My parent/parents don't like me working
I hadn't anticipated all the extra things I would need to spend money on now that I'm in work
I have problems with transport to and from work
I find it stressful combining work and family life
I have difficulties working due to my health condition or disability
My confidence has taken a knock since I started work
I am not enjoying working as much as I thought I would
I am worried I do not have enough time with my child/children
There is a lot of pressure in my present job to work longer hours, stay late or do overtime
My husband/partner/ex-partner does not like me working
I am not sure that I am better off financially in work
There isn't enough suitable, affordable childcare around here
My employer is not very family-friendly
My child/children are not happy in childcare while I'm at work
I am finding it difficult to adjust to having money coming in every month rather than every week
I can't see this job going anywhere, there are no promotion prospects

For this group of parents the LCA identified four (reasonably distinct) clusters:

Cluster one: Few constraints;

Cluster two: Concerns for children;

Cluster three: (Moderate) Childcare and financial concerns;

Cluster four: Many constraints.

Unlike the cluster solution for the non-workers, these four clusters appear to lie on a continuum, with cluster one being the mothers with fewest constraints to staying in work, followed by cluster three, cluster two and then cluster four.

The details of the clusters, how they relate to attitudes, and how they differ in terms of the demographic characteristics of their member are all described in Chapter 3.

2.3 Factor analysis of the attitude questions

Factor analysis of the 32 attitude questions that preceded the card-sort exercise generated a total of 10 latent factors. The questions are listed in the tables of Section 3.1.3 (Tables 3.5-3.7). Some of the derived factors were harder to interpret than others, but labels were nevertheless imposed so that the relationship between these factors and the latent classes is made clearer:

Factor 1: Parenting;

Factor 2: Work at any cost;

Factor 3: Societal expectations;

Factor 4: Work as positive influence;

Factor 5: Role of benefits;

Factor 6: Non-parental childcare;

Factor 7: Trading off work and parental childcare;

Factor 8: Partner attitudes;

Factor 9: Partner influence;

Factor 10: Parental influence.

3 The latent clusters, their relationship to attitudes and the demographic characteristics of their members

This chapter describes the clusters generated from the LCA that were briefly introduced above. The chapter is divided into two main sub-sections: Firstly we look at the choices and constraints faced by mothers who were not in work at the time of the interview (Section 3.1). We then turn to the second card-sort exercise covering those mothers who had returned to work at some point in the year before the interview (Section 3.2).

Within each of the two main sub-sections we have divided the chapter into three parts. Firstly, the responses to the card-sort exercise are considered (that is, how does cluster membership relate to the originating statements). This is followed by an examination of how the parents in each cluster differ in terms of their underlying attitudes towards work and childcare. Finally the socio-demographic characteristics of mothers in each cluster are considered.

3.1 Card-sort A: Mothers who are not in work

'Non-working mothers' are defined in FACS as those who were working zero hours per week, excluding those who were either in full-time education or who had retired. The card-sort exercise was not asked of non-working mothers who reported that they would not like to work in the next few years, that they did not think that they would work in the next few years and that they had not thought about returning to work at all. In other words the exercise was restricted to mothers who considered work in the next few years to be a possibility.

3.1.1 The card-sort exercise

Respondents were given a set of 19 cards each with a statement giving a potential reason for not wanting or being able to work at the time of the interview. Respondents were asked to think about their current situation and sort the cards into three piles; 'big factors', 'smaller factors' and 'not a factor'.

As was noted above, LCA of the data was carried out in order to identify clusters of respondents who placed the cards in similar ways. Six clusters emerged for non-working mothers.

In order to give some indication of how the clusters relate to the original statements on the cards, the following three tables show responses to the card-sort exercise for each of the six clusters. (The statements have been divided into three groups, and shown on three different tables, partly for reasons of space, but also because identifying patterns of responses becomes rather easier.)

Note that we have not given the clusters their labels in these three tables. The labels were derived as a means of summarising the distributions found in these tables so are used only in subsequent sections.

Table 3.1 covers the statements that reflect concerns about **children and childcare**.

Table 3.1 Response to statements regarding children and childcare, by cluster

Statement	Response	Cluster						Total %
		1 %	2 %	3 %	4 %	5 %	6 %	
My child/children wouldn't like me to work	Big factor	3	39	-	38	19	6	18
	Smaller factor	31	20	11	37	24	7	24
	Not a factor	66	41	89	25	57	87	58
I want to look after my child/children myself or at home	Big factor	19	93	9	91	37	-	47
	Smaller factor	54	5	23	9	39	2	25
	Not a factor	26	1	68	-	24	98	27
I am worried I will not have enough time with my child/ren	Big factor	18	68	1	92	25	4	38
	Smaller factor	54	23	23	4	52	12	31
	Not a factor	28	10	76	4	23	84	31
There isn't enough suitable, affordable childcare around here	Big factor	31	10	5	36	30	2	20
	Smaller factor	30	14	10	49	29	-	24
	Not a factor	39	77	85	15	41	98	56

Continued

Table 3.1 Continued

Statement	Response	Cluster						Total %
		1 %	2 %	3 %	4 %	5 %	6 %	
My family or close friends are not able, or live too far away, to provide childcare	Big factor	29	21	3	44	33	-	24
	Smaller factor	21	14	8	27	27	5	18
	Not a factor	51	65	89	29	39	95	59
I am not prepared to leave my child/ren in the care of anyone other than my family or close friends while I work	Big factor	23	61	14	56	43	2	37
	Smaller factor	24	12	15	30	30	7	20
	Not a factor	54	27	71	14	27	90	43
<i>Base</i>		<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work.

- Parents in clusters two and four were consistently more likely to place statements about children and childcare into the ‘big factor’ pile than were the parents in the other four clusters. For example, over 90 per cent of mothers from both cluster two and cluster four identified the statement ‘*I want to look after my children myself or at home*’ as a ‘big factor’ for not wanting or being able to work. This compares to just 47 per cent of all non-working mothers who undertook the card-sort exercise (Table 3.1).
- Parents in cluster one and cluster four were the most likely to say that a lack of suitable, affordable childcare was a ‘big factor’ (31 per cent and 36 per cent, respectively, compared to 20 per cent for all non-working mothers, Table 3.1).
- Parents in clusters three and six were particularly **unlikely** to identify childcare and parenting factors as being factors in their decisions about work.

Table 3.2 looks at the response to statements that referred to choices and constraints about **work**.

Table 3.2 Response to statements regarding work, by cluster

Statement	Response	Cluster						Total %
		1 %	2 %	3 %	4 %	5 %	6 %	
I would have problems with transport to and from work	Big factor	9	4	1	12	26	13	9
	Smaller factor	21	7	11	40	26	16	19
	Not a factor	69	89	88	49	48	71	72
There are few suitable job opportunities in the local area	Big factor	47	14	6	43	39	49	31
	Smaller factor	36	27	39	39	38	22	34
	Not a factor	18	59	56	19	23	29	35
My confidence is low at the moment	Big factor	7	4	2	29	60	41	17
	Smaller factor	26	16	14	20	31	30	21
	Not a factor	67	80	84	52	9	29	62
I haven't got the qualifications or experience to get the kind of job I would want	Big factor	32	14	7	36	55	37	27
	Smaller factor	28	21	24	36	25	27	27
	Not a factor	40	65	69	28	19	36	46
I would need a job where I could take time off at short notice to look after my child/ren	Big factor	62	58	16	91	62	11	54
	Smaller factor	34	27	32	9	27	10	26
	Not a factor	4	15	52	-	11	80	20
Employers aren't very family-friendly	Big factor	24	18	-	44	33	7	22
	Smaller factor	44	27	20	43	35	12	33
	Not a factor	32	54	80	13	33	81	46
<i>Base</i>		<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work.

- Almost half of parents in cluster one (47 per cent) and cluster six (49 per cent) reported that a lack of suitable job opportunities was a 'big factor' for them compared to less than a third of all non-working mothers (31 per cent) (Table 3.2).
- Parents in cluster five were more likely to place all of these work-related statements in the 'big factor' pile compared to all non-working mothers. For example, six in ten mothers from cluster five (60 per cent) said that low confidence was a 'big factor' whereas less than two in ten of all non-working mothers (17 per cent) reported this (Table 3.2).

Table 3.3 consists of the remaining statements which, between them, cover a variety of constraints to working including financial, health and personal difficulties.

Table 3.3 Response to other statements, by cluster

Statement	Response	Cluster						Total %
		1 %	2 %	3 %	4 %	5 %	6 %	
I am not sure I would be financially better off in work	Big factor	41	12	5	58	51	28	31
	Smaller factor	39	29	21	33	34	34	32
	Not a factor	20	59	74	10	15	39	38
I am concerned about leaving the security of benefits	Big factor	9	2	2	22	29	10	10
	Smaller factor	22	4	6	23	49	20	18
	Not a factor	94	92	55	22	70	71	
I have personal or family troubles that need to be sorted out	Big factor	4	5	4	13	51	17	12
	Smaller factor	7	3	9	11	32	13	10
	Not a factor	89	92	87	76	17	70	78
I have difficulties due to my health condition or disability	Big factor	4	4	4	10	46	47	13
	Smaller factor	5	1	8	10	21	5	7
	Not a factor	91	95	88	80	33	48	80
I care for someone who has a health condition, disability or behavioural difficulties	Big factor	9	8	8	9	27	6	11
	Smaller factor	2	2	4	6	19	4	5
	Not a factor	89	89	88	86	55	90	84
My husband/partner/ex-partner would not like it if I worked	Big factor	1	4	1	2	12	4	3
	Smaller factor	4	12	4	15	12	-	8
	Not a factor	95	84	94	83	76	96	88
My parent/parents wouldn't like me to work	Big factor	1	2	-	5	11	5	3
	Smaller factor	3	8	1	16	12	-	7
	Not a factor	96	90	99	80	77	95	90
Base		340	314	218	199	150	83	1,304

Mothers not in work.

- As in the previous table, mothers in cluster five were more likely to report each of the statements in this table as a 'big factor' for not wanting or being able to work than all non-working mothers. In particular, over half of mothers in cluster five placed 'I have personal or family troubles that need to be sorted out' in the 'big factor' pile compared to 12 per cent of non-working mothers (Table 3.3).

- Respondents in cluster four were particularly likely to state that financial problems were a factor in not wanting or being able to work. Only one in ten mothers in cluster four placed the statement *'I am not sure I would be financially better off in work'* in the 'not a factor' pile. This is compared to 38 per cent of all non-working mothers (Table 3.3).
- Almost half of the mothers in cluster six placed the statement *'I have difficulties due to my health condition or disability'* in the 'big factor' pile compared to 13 per cent of all non-working mothers (Table 3.3).

Summary of the six clusters

Based on these tables we have summarised each cluster as below, giving each cluster a short title which is helpful for later tables.

Cluster one – Job concerns

Mothers in cluster one were likely to be concerned about a lack of suitable job opportunities, finding suitable affordable childcare and whether they would be financially better off in work. They were less likely to be concerned about wanting to look after their children themselves or to have personal or family problems.

Cluster two – Carer by choice

Mothers in cluster two were highly likely to report that wanting to look after their children themselves was a 'big factor' for not working. They were less likely to report a lack of suitable job opportunities, financial concerns or health problems as factors in their decision not to work.

Cluster three – Few constraints

Mothers in cluster three identified very few factors as being constraints to work. For every statement a higher proportion of mothers from cluster three placed the card in the 'not a factor' pile than all non-working mothers. In particular mothers in cluster three were less likely to worry about not having enough time with their children or have financial worries compared to all non-working mothers.

Cluster four – Childcare combined with financial concerns

Mothers in cluster four reported that wanting to look after their children was a 'big factor' for not working (similarly to cluster two). However, cluster four mothers also had a number of other concerns, such as finding suitable affordable childcare, a perceived lack of suitable job opportunities and doubts about the financial benefits of working.

Cluster five – Many constraints (including health problems)

Mothers in cluster five were likely to report most of the issues presented as being a 'big factor' for not wanting or being able to work. They were especially likely to report that a lack of qualifications or experience, low confidence, personal or family problems and health conditions were 'big factors'.

Cluster six – Health problem

Mothers in cluster six are rather harder to categorise, but were the most likely to place the statement '*I have difficulties due to my health condition or disability*' in the 'big factor' pile. They were also likely to have concerns about low confidence and a lack of qualifications and experience. They did not, on average, express a strong desire to care for their children at home themselves. Although not true for all the mothers in the cluster we have labelled this cluster 'health problem'.

It is worth noting at this point that this summarising of the clusters is fairly subjective and we do not claim that all mothers in the clusters are identical in terms of how they dealt with the card-sort exercise. Although LCA *aims* to generate clusters that are homogeneous (so that all mothers within each cluster respond to the card-sort exercise in the same way), the fact that there a very large number (19) statements to take into account means that generating true homogeneity is inevitably impossible. (Few if any mothers will sort the 19 in identical ways.) The six clusters generated are, we believe, **reasonably** homogenous, but it is perhaps more accurate to say that there are real differences **between** the groups rather than to claim similarity **within** them. With a much larger sample size LCA would probably have allowed us to generate a solution with more clusters, so that some of the heterogeneity within the clusters would be reduced.

3.1.2 The most important factor

As part of the card-sort exercise, respondents who identified more than one statement as being a 'big factor' were asked to say which was the **most** important factor. For those who only put one card in the 'big factor' pile this was taken as the most important factor. Table 3.4 shows the percentage of respondents from each cluster who said a statement was their most important factor. To a very large extent the pattern of percentages shown on this table verifies the interpretation of the clusters above.

For example:

- those in the 'job concerns' cluster were particularly likely to identify factors relating to work as 'most important';
- almost all those in the 'carer by choice' cluster identified their most important factor as being child-related;
- almost half of those in the 'few constraints' cluster identified no big factors at all;
- for the 'childcare and financial concerns' cluster parents predominantly identified wanting to look after their children as the 'most important' factor, but some identified work issues as most important;
- for the 'many constraints' cluster there was (as would be expected) far more variation in the factors identified as 'most important';
- the 'health problem' cluster of parents is split between those identifying health as the most important factor and those identifying few job opportunities or low confidence.

Table 3.4 Most important factor, by cluster

Statement	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
My child/ren wouldn't like me to work	1	5	-	5	2	3	3
My parent/parents wouldn't like it if I worked	-	-	-	-	1	-	0
I would have problems with transport to and from work	3	0	1	-	1	1	1
There are few suitable job opportunities in the local area	8	1	4	2	4	16	5
I have difficulties due to my health condition or disability	2	2	4	1	20	32	6
My confidence is low at the moment	1		0	2	8	9	2
I want to look after my child/children myself or at home	8	53	8	37	6	-	22
I care for someone who has a health condition, disability or behavioural difficulties	6	4	7	2	10	4	5
I am worried I will not have enough time with my child/ren	7	9	0	14	1	-	6
I haven't got the qualifications or experience to get the kind of job I would want	11	2	5	2	11	20	7
My husband/partner/ex-partner would not like it if I worked	-	0	1	-	1	-	0
I am not sure I would be financially better off in work	16	0	3	12	13	4	8
There isn't enough suitable, affordable childcare around here	4	1	1	2	1	-	2
I would need a job where I could take time off at short notice to look after my child/ren	19	9	8	6	6	3	10
Employers aren't very family-friendly	2	-	-	2	2	1	1
My family or close friends are not able, or live too far away, to provide childcare	3	1	2	2	1	-	2
I am not prepared to leave my child/children in the care of anyone other than my family or close friends while I work	5	10	7	9	4	1	7
I am concerned about leaving the security of benefits	1	0	0	1	4	1	1
I have personal or family troubles that need to be sorted out	1	1	2	1	6	3	2
Nothing was a 'big factor'	2	-	45	-	1	3	9
Total	100	100	100	100	100	100	100
<i>Base</i>	<i>315</i>	<i>294</i>	<i>211</i>	<i>177</i>	<i>141</i>	<i>79</i>	<i>1,217</i>

Mothers not in work.

3.1.3 Factor analysis of the attitude questions

Before starting the card-sort exercise respondents were asked to answer a series of attitudinal questions relating to work and childcare¹¹. In order to identify the underlying latent factors that were shaping responses to these attitudinal questions, and to reduce the data to a more reasonable number of variables for analysis, this data has been factor analysed.

For some of the attitudinal questions (on partners and parents), in addition to the standard five-point agree-disagree scale, there was an option for respondents to say that the statement was not applicable to their situation. So not all mothers answered all the questions. For this reason three separate factor analyses were carried out; the first looking at those questions that were applicable to all respondents, the second looking at attitudes shaped by partners and ex-partners, and the third on attitudes shaped by parents.

The following three tables show structure matrices for each of the three factor analyses. The figures in the table represent the correlation between the derived factor and the original attitude statement; a positive correlation indicating that agreement with the statement is associated with a positive factor score and a negative correlation indicating that disagreement with the statement is associated with a positive factor score.

High correlations (both positive and negative) have been emboldened in order to make the table easier to read. The factor analysis has been carried out just once for both the card-sort exercise groups: non-working mothers and mothers who returned to work in the last year (on the grounds that we would not expect the underlying latent factors to differ for these two groups).

Table 3.5 gives the results from the factor analysis of the 25 attitudinal questions answered by all parents who went on to the card-sort exercise. The factor analysis, carried out in SPSS and using direct oblimin rotation¹², identified seven latent variables overall, although some of these factors seem harder to interpret than

¹¹ Since these types of questions could potentially provoke socially desirable responses, parents were asked to answer these questions using a self-completion questionnaire.

¹² This is a nonorthogonal rotation.

others. Between them the seven factors explained 54 per cent of the total variance¹³.

Table 3.5 Structure matrix of factors underlying attitudes to work and parenting

Attitude statement	Factor						
	1	2	3	4	5	6	7
Being a parent is the most responsible job you can have	0.1	0.1	-0.2	0.1	-0.2	-0.1	-0.6
If you live on social security benefits, everyone looks down on you	0.0	0.3	-0.6	0.1	-0.1	-0.1	0.1
Once you've got a job, it's important to hang on to it, even if you don't really like it	0.0	0.8	-0.2	0.1	-0.1	0.0	0.1
Having almost any job is better than being unemployed	0.1	0.8	-0.1	0.2	0.0	0.0	0.1
Having a job is the best way for me to be an independent person	-0.1	0.6	-0.2	0.5	0.0	-0.3	0.2
If you work when your children are little you will miss out on seeing them grow and develop	0.6	0.0	-0.4	-0.1	0.1	-0.1	-0.2
I have always thought I would work	-0.2	0.2	-0.2	0.5	0.0	-0.4	0.1
The Government expects all lone parents to work	0.1	0.2	-0.5	0.1	-0.4	-0.2	0.1
Working for pay is more fulfilling than looking after the home and family	-0.2	0.3	-0.1	0.3	-0.1	-0.2	0.6
Most of my closest friends think mums should stay at home and look after their children	0.4	0.2	-0.3	-0.3	-0.2	0.3	0.3
A person must have a job to feel a full member of society	0.0	0.4	-0.4	0.3	0.0	-0.1	0.5
It's not possible to put your children first and work	0.4	0.1	-0.5	-0.1	0.2	0.0	0.1
My job is to look after the home and family	0.6	0.1	-0.1	-0.2	-0.1	0.3	-0.2
Children under five are happiest being looked after by their parents	0.7	0.1	-0.3	0.0	0.0	-0.2	0.0

Continued

¹³ Percentage of variance explained by each factor:

Factor	% of variance	Cumulative %
1	18.7	18.7
2	12.4	31.1
3	5.4	36.5
4	5.0	41.5
5	4.6	46.1
6	4.2	50.3
7	4.0	54.4

Table 3.5 Continued

Attitude statement	Factor						
	1	2	3	4	5	6	7
Children benefit from being looked after by other people	-0.3	0.0	-0.1	0.3	0.1	0.7	0.1
Working mums provide positive role models for their children	-0.2	0.2	-0.1	0.7	0.0	0.1	0.2
Combining work and family brings more problems than benefits	0.4	0.0	-0.5	-0.3	0.0	0.1	0.0
Working mothers have the best of both worlds	-0.2	0.2	0.2	0.6	-0.2	0.1	0.4
A job is all right, but I really want to be with my children at home	0.7	0.0	-0.1	-0.3	-0.1	0.2	-0.2
It's always better if the parent can look after the child themselves	0.8	0.0	-0.2	-0.1	-0.1	-0.1	-0.1
Stay-at-home mums are not valued by society	0.3	0.0	-0.6	0.1	-0.1	0.2	-0.1
I always thought that if I had children I would stay at home and look after them	0.7	0.0	-0.1	-0.2	-0.1	0.3	-0.1
No one should ever feel badly about claiming social security benefits	0.1	0.0	0.0	0.0	-0.8	0.0	-0.1
Children do best if their mum stays home to look after them	0.8	0.0	-0.2	-0.2	0.0	-0.1	0.0
Most of my closest friends think mums should go out to work if they want to	-0.1	0.1	0.0	0.6	0.0	0.0	-0.2

Mothers not in work or who had returned to work.

- The first factor very clearly represents attitudes to parental care of children, a positive score reflecting the belief that parents should look after children at home themselves. Factor 1 is very highly positively correlated with the statement *'children do best if their mum stays home to look after them'* (Table 3.5).
- The second factor reflects attitudes to work as a necessity (that is, regardless of the type of job) and correlates positively with the statement *'having almost any job is better than being unemployed'* (Table 3.5).
- Factor 3 appears to indicate a disagreement with the statements regarding societal expectations (e.g. there is a negative correlation between Factor 3 and statements such as *'if you live on Social Security Benefits, everyone looks down on you'* and *'stay-at-home mums are not valued by society'*) (Table 3.5).
- Factor 4 reflects positive attitudes towards work, but not, as in the case of Factor 2, work at any cost. Factor 4 correlates highly and positively with the statement *'working mums provide positive role models for their children and working mothers have the best of both worlds'* (Table 3.5).
- Factors 5 to 7 are rather more difficult to interpret. But Factor 5 has a high **negative** correlation with the statement *'no one should ever feel badly about claiming social security benefits'* suggesting that this factor represents a negative attitude towards benefit claimants (Table 3.5).

- Factor 6 reflects attitudes towards non-parental childcare. It correlates highly and positively with the statement '*children benefit from being looked after by other people*' (Table 3.5).
- Factor 7 correlates positively with the statement '*working for pay is more fulfilling than looking after the home and family*' and negatively with the statement '*being a parent is the most responsible job you can have*'. This seems to represent an attitude that values work over parental childcare (Table 3.5).

Table 3.6 gives a short-hand label for each of the factors and, to help with the interpretation, shows the statement that each factor is most highly correlated with.

Table 3.6 Factor 1-7 labels

Factor	Label	Correlates highly with statement
1	Parenting	Children do best if their mum stays home to look after them (positively correlated)
2	Work at any cost	Having almost any job is better than being unemployed (positively correlated)
3	Societal expectations (+ve score=disagree that society expects mothers to work)	If you live on social security benefits, everyone looks down on you (negatively correlated)
4	Work as positive influence	Working mums provide positive role models for their children (positively correlated)
5	Role of benefits	No one should ever feel badly about claiming social security benefits (negatively correlated)
6	Non-parental childcare	Children benefit from being looked after by other people (positively correlated)
7	Trading off work and parental childcare	Working for pay is more fulfilling than looking after the home and family (positively correlated)

Our second factor analysis is based on the four questions asked of mothers with partners or **involved** ex-partners (as defined by the parent). This factor analysis identified two factors (see Table 3.7), the first of which appears to reflect the degree to which the partner has views on work and childcare (even if those views are apparently contradictory¹⁴), and the second reflecting the degree to which those views are taken into account. Between them the two factors explained 60 per cent of the total variance¹⁵.

Table 3.7 Structure matrix of factors underlying attitudes to work – attitudes about partners and ex-partner

Attitude statement	Factor	
	8	9
My partner/ex-partner thinks I should spend more time with the children	0.7	0.1
My partner/ex-partner thinks I should work	0.7	-0.2
My partner/ex-partner would not like it if I had a paid job	0.6	0.4
I pay a lot of attention to what my partner/ex-partner thinks about how I bring up my children	0.0	0.9

Mothers not in work or who had returned to work.

- Factor 8 has high positive correlations with statements regarding (ex) partner's attitudes towards work, but **not** with the statement that says '*I pay a lot of attention to what my partner/ex-partner thinks about how I bring up my children*' (Table 3.7). This factor seems to show discrepancies between the partner's and respondent's attitudes to work and childcare.
- Factor 9 has a high positive correlation with the statement '*I pay a lot of attention to what my partner/ex-partner thinks about how I bring up my children*' (Table 3.7).

¹⁴ There is a surprising positive correlation between partner attitudes to work and to childcare.

¹⁵ Percentage of variance explained by each factor:

Factor	% of variance	Cumulative %
8	33.4	33.4
9	26.5	59.9

We have labelled Factors 8 and 9 as follows (Table 3.8):

Table 3.8 Factor 8-9 labels

Factor	Label	Correlates highly with statement
8	Partner attitudes	My (ex-) partner thinks I should spend more time with the children (positive correlation)
		and
		My (ex-) partner thinks I should work (positive correlation)
9	Partner influence	I pay a lot of attention to what my partner/ ex-partner thinks about how I bring up my children (positive correlation)

Finally, the third factor analysis is based on the two questions about parental attitudes to childcare and generates just one factor (Table 3.9). This factor explained 54 per cent of the total variance.

Table 3.9 Structure matrix of factors underlying attitudes to work – attitudes about parents

Attitude statement	Factor
	10
I pay a lot of attention to what my parents think about how I bring up my children	0.7
My mother thinks I should spend more time with my children	0.8

Mothers not in work or who had returned to work.

We have labelled Factor 10 as follows (Table 3.10):

Table 3.10 Factor 10 label

Factor	Label	Correlates highly with statement
10	Partner influence	My mother thinks I should spend more time with my children (positive correlation)

3.1.4 The relationship between attitudes and the LCA clusters

Having identified the 10 attitudinal latent factors, we now turn to the relationship between these ten factors and the six clusters from the LCA for non-working mothers. Table 3.11 shows the mean factor score for respondents in each of the six clusters. If attitudes are related to cluster membership, one would expect the average (mean) factor scores to vary between clusters in meaningful ways (as indeed they do). Large positive or negative means have been emboldened.

Table 3.11 Mean factor score by cluster

	Cluster					
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem
	Mean	Mean	Mean	Mean	Mean	Mean
Parenting	-0.32	0.38	-0.61	0.47	0.02	-0.63
Work at any cost	-0.02	-0.35	-0.02	0.06	0.20	0.27
Societal expectations	0.02	-0.05	0.27	-0.33	-0.53	-0.08
Work as positive influence	0.24	-0.22	0.24	-0.14	0.27	0.38
Role of benefits	0.06	0.16	0.10	-0.18	-0.01	-0.18
Non-parental childcare	0.04	0.19	-0.17	0.07	-0.08	-0.53
Trading off work and parental childcare	0.07	-0.34	0.07	-0.11	0.10	0.32
Partner attitudes	0.00	-0.28	-0.18	0.03	0.22	0.33
Partner influence	-0.29	0.17	-0.28	-0.11	0.01	-0.21
Parental influence	-0.08	-0.10	-0.26	0.07	0.19	0.01
<i>Base</i>	<i>340</i>	<i>313</i>	<i>218</i>	<i>199</i>	<i>149</i>	<i>83</i>

Mothers not in work.

- As would be expected the ‘carer by choice and childcare and financial concerns’ clusters have high average scores for the parenting factor. Parents in the final cluster, ‘health problem’, score particularly low on this factor (Table 3.11).
- The ‘work at any cost’ factor has the lowest mean score for the ‘carer by choice’ cluster and highest mean score for the ‘health problems’ cluster (Table 3.11).
- The ‘work as positive influence’ factor has a high score for the ‘many constraints’ cluster and the ‘health problem’ cluster and a low score for the ‘carer by choice and childcare and financial concerns’ clusters (Table 3.11).
- The ‘carer by choice’ cluster have the highest mean score for ‘partner influence’ suggesting that they are most likely to pay attention to their partners child-rearing views. At the same time they have a low mean score on partner attitudes which suggests their partners are in agreement with them on childcare and work (Table 3.11).

3.1.5 Socio-demographic characteristics of mothers by cluster

In this section we look at the socio-demographic features of the mothers in each of the six LCA clusters, the expectation being that membership of each cluster is associated with factors such as family type, the age and number of the children,

the age of the mother and so on. This is partly presented as of interest in its own right. But also, if the relationship between socio-demographics and the clusters follows expectation, then this helps to validate the LCA clustering. So the analysis has both a substantive and methodological role.

Starting with family type, Table 3.12 shows the percentage of lone parents (mothers and fathers) and couples by cluster.

Table 3.12 Family type, by cluster

Family type	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
Lone mother	47	22	36	45	58	58	41
Lone father	1	1	3	-	1	5	1
Couple	51	77	61	55	41	37	58
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work.

- Mothers in the 'many constraints' cluster and 'health problem' cluster were the most likely to be lone mothers (both 58 per cent compared to 41 per cent of all non-working mothers, Table 3.12).
- Over three-quarters (77 per cent) of mothers in the 'carer by choice' cluster were part of a couple family compared to 58 per cent of all non-working mothers (Table 3.12).

Table 3.13 Age of youngest child, by cluster

Age of youngest child	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
0-4 years	69	75	53	74	49	16	63
5-10 years	23	19	24	24	34	23	24
11-15 years	8	5	19	2	14	47	11
16-18 years	1	1	4	-	3	14	2
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work

- Mothers in the 'carer by choice' cluster and 'childcare and financial concerns' cluster were most likely to have very young children. Three-quarters of mothers in these clusters had a child aged between 0-4 years old (75 per cent and 74 per cent, respectively) compared to 63 per cent of all non-working mothers (Table 3.13).
- Mothers in the 'health problem' cluster were far more likely than average to have a youngest child aged between 11 and 15 years old (47 per cent compared to 11 per cent of all non-working mothers) or between 16 to 18 years old (14 per cent compared to two per cent of all non-working mothers) (Table 3.13).
- Mothers in the 'few constraints' cluster were also more likely to have older children, though not to the same extent as the 'health problem' cluster (see Table 3.13).

Table 3.14 Number of dependent children, by cluster

Number of dependent Children	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
1	37	32	42	33	37	66	38
2	43	43	34	41	41	19	39
3	12	17	16	19	15	13	15
4+	8	7	8	8	7	1	7
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work.

- The relationship with the number of children is less stark. But two-thirds (66 per cent) of mothers in the 'health problem' cluster only had one dependent child, compared to 38 per cent of all non-working mothers (Table 3.14).

Table 3.15 Age of mother, by cluster

Age of mother	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
Under 25	25	15	12	21	21	8	18
25-29	17	15	14	21	13	5	15
30-34	21	21	18	24	21	11	20
35-39	19	27	22	23	16	25	22
40-44	11	15	17	10	17	25	14
45 plus	6	7	16	2	11	25	9
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work.

- There is some relationship between cluster membership and age. Mothers in the 'job concerns' cluster were younger than average (25 per cent being under 25 compared to 18 per cent of all non-working mothers, Table 3.15).
- In contrast, mothers in the 'health problems' cluster were most likely to be 45 years or older (25 per cent compared to nine per cent of all non-working mothers, Table 3.15).

Table 3.16 Housing tenure, by cluster

Housing tenure	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
Owned outright	5	8	7	3	1	7	6
Mortgage	26	49	39	30	19	17	33
Shared ownership	1	0	-	1	-	-	0
Social tenant	47	29	34	44	61	57	42
Private tenant	19	11	18	21	17	19	17
Other arrangement	2	2	1	2	2	-	2
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work

- Over half (57 per cent) of the mothers in the 'carer by choice' cluster are owner occupiers compared to just 40 per cent of all non-working mothers (Table 3.16).
- Mothers in the 'many constraints' cluster and 'health problem' cluster were particularly likely to live in social rented accommodation (61 per cent and 57 per cent, respectively) (Table 3.16).

Table 3.17 Equivalised household income quintiles¹⁶, by cluster

Household income	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	
Lowest income quintile	48	28	36	43	52	55	41
Second quintile	26	20	26	27	33	30	26
Third quintile	13	24	19	19	12	5	17
Fourth quintile	8	13	10	6	3	6	9
Highest income quintile	4	15	9	5	-	4	7
Base	340	314	218	199	150	83	1,304

Mothers not in work.

- There is also a relationship between cluster membership and household income. Over half of mothers in the 'many constraints' cluster (52 per cent) and the 'health problem' cluster (55 per cent) were in the lowest income quintile compared to two-fifths (41 per cent) of all non-working mothers (Table 3.17).
- In contrast mothers in the 'carer by choice' cluster were twice as likely to be in the highest income quintile than all non-working mothers (15 per cent compared to seven per cent, Table 3.17).

Table 3.18 Disability in the family cluster

Disability in the family	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	
No adult or child has a disability	56	63	54	56	27	41	53
One or more child/ren have disability, no adult has disability	16	12	11	11	9	8	12

Continued

¹⁶ Equivalised income quintiles were calculated for all families with children, therefore, there is an unequal proportion of respondents in each of the five quintiles for this base.

Table 3.18 Continued

Disability in the family	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
One or more adult/s have disability, no child has disability	18	17	22	20	33	33	21
At least one adult and one child have disability	11	8	12	13	31	18	13
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work.

- One-third (33 per cent) of mothers in the ‘many constraints’ cluster and ‘health problem’ cluster lived in a family where one or more adult had a disability and no child had a disability. This compared to a fifth (21 per cent) of all non-working families (Table 3.18).
- In addition to this, 31 per cent of mothers in the ‘many constraints’ cluster lived in a family where at least one adult and one child have a disability (compared to 13 per cent of all non-working families (Table 3.18).

Table 3.19 Academic qualifications, by cluster

Academic qualifications	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
None	18	13	22	21	35	34	21
GCSE grade D-G and equivalent	20	13	21	26	23	13	19
GCSE grade A-C and equivalent	38	35	31	35	31	34	35
A-level and equivalent	11	16	11	9	5	12	11
Degree or higher	10	21	13	10	5	5	12
Other academic qualification	2	2	1	1	1	2	2
<i>Base</i>	<i>338</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,302</i>

Mothers not in work.

- The relationship with qualifications is similar to that for income and tenure. A fifth (21 per cent) of mothers in the 'carer by choice' cluster had a degree-level qualification or higher compared to just 12 per cent of all non-working mothers and five per cent of mothers in the 'many constraints' cluster (Table 3.19).
- In contrast, over a third of mothers in the 'many constraints' cluster (35 per cent) and 'health problem' cluster (34 per cent) reported having no academic qualifications (Table 3.19).

Table 3.20 Time since mother was last in work, by cluster

Duration since last worked	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
In last 12 months	18	15	20	18	10	18	17
In the last 1 to 2 years	11	15	15	8	9	5	11
In the last 2 to 5 years	23	24	19	30	29	25	25
In the last 5 to 10 years	21	21	17	20	15	16	19
More than 10 years ago	12	14	15	13	21	29	15
Never worked	15	11	14	12	15	7	13
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work.

- Mothers in the 'carer by choice' cluster and 'few constraints' cluster were more likely to have worked in the last 1 to 2 years (both 15 per cent) compared to all non-working mothers (11 per cent) and those in the 'health problem' cluster (five per cent) (Table 3.20).
- Mothers in the 'health problem' cluster were particularly likely to have not worked for more than ten years (29 per cent compared to 15 per cent of all non-working mothers, Table 3.20).

Table 3.21 Partner work status, by cluster

Partner work status	Cluster						Total
	Job concerns	Carer by choice	Few constraints	Childcare and financial concerns	Many constraints	Health problem	
	%	%	%	%	%	%	%
Partner working 16+ hours/week	41	72	52	43	23	25	47
Partner not working 16+ hours/week	10	6	9	12	18	12	10
Lone parent	49	23	39	45	59	63	42
<i>Base</i>	<i>340</i>	<i>314</i>	<i>218</i>	<i>199</i>	<i>150</i>	<i>83</i>	<i>1,304</i>

Mothers not in work

- Finally, nearly three-quarters (72 per cent) of mothers in the ‘carer by choice’ cluster had a partner who worked 16 or more hours per week compared to less than half (47 per cent) of all non-working mothers and less than a quarter (23 per cent) of those in the ‘many constraints’ cluster (Table 3.21).
- Having a partner who did not work 16 or more hours a week was most common for the ‘many constraints’ cluster (18 per cent compared to ten per cent of all non-working mothers, Table 3.21).

3.1.6 Summary of the clusters

In this section the characteristics of the mothers (or mother-figures) in each of the clusters is summarised.

Cluster one – Job concerns

Mothers in the ‘job concerns’ cluster were likely to be concerned about a lack of suitable job opportunities, finding suitable affordable childcare and whether they would be financially better off in work. They were less likely to be concerned about wanting to look after their children themselves or to have personal or family problems. They were particularly likely to identify factors relating to work as ‘most important’ to them.

On attitudes, this cluster were not particularly distinct, but they scored lower than average on attitudes to parenting and higher than average on attitudes around work as a positive influence.

In terms of socio-demographic factors, mothers in the 'job concerns' cluster were more likely than average to be younger mothers (aged under 25), have a low income, hold GCSE or equivalent qualifications and be lone mothers.

Cluster two – Carer by choice

Mothers in the 'carer by choice' cluster were highly likely to report wanting to look after their children themselves as being a 'big factor' for not working. They were less likely than those in other clusters to report a lack of suitable job opportunities, financial concerns or health problems as factors in their decision not to work. Almost all mothers in this cluster identified their 'most important' factor as being child-related.

On attitudes, this group had particularly high scores on the 'parenting' factor and particularly low scores on the 'work at any cost' factor.

Mothers in this cluster were more likely than others to be part of a couple family, to have young children, be buying their home with a mortgage, have a high household income, hold a degree-level qualification and have a partner who works at least 16 hours per week.

Cluster three – Few constraints

Mothers in the 'few constraints' cluster identified very few factors as being constraints to work. For every card in the card-sort exercise a higher than average proportion of mothers from this group placed the card in the 'not a factor' pile. In particular mothers from this group were less likely to worry about not having enough time with their children or to have financial worries compared to all non-working mothers. Almost half of those in this cluster identified no big factors at all.

On attitudes, this group scored particularly low on the 'parenting' factor but high on 'societal expectations', suggesting that they did not view there to be strong societal pressures on mothers to work.

Respondents in the 'few constraints' cluster were more likely to be older mothers, have older children and fewer dependent children. They were also more likely to have worked in the last year and be in a couple family.

Cluster four – Childcare combined with financial concerns

Mothers in this cluster reported that wanting to look after their children was a 'big factor' for not working (similarly to the 'carer by choice' cluster). However, mothers in this group also had a number of other concerns, such as finding suitable affordable childcare, a perceived lack of suitable job opportunities and doubts about the financial benefits of working.

In terms of attitudes, this group shared similar high scores as the 'carer by choice' group on the parenting factor, but in contrast, this group tended to think that society expects mothers to work.

This group were likely to be younger mothers, have more than one dependent child, have younger children and have GCSE or equivalent qualifications.

Cluster five – Many constraints (including health problems)

Mothers in the 'many constraints' cluster were likely to report many of the issues presented on the cards as being a 'big factor' for not wanting or being able to work. They were especially likely to report that a lack of qualifications or experience, low confidence, personal or family problems and health conditions were 'big factors'. On attitudes, this group were particularly likely to think that society expects mothers to work.

The 'many constraints' cluster were more likely to be lone mothers, living in socially rented accommodation, have a low household income, have no academic qualifications and have a disability in the family.

Cluster six – Health problem

Mothers in cluster six were the most likely to place the statement '*I have difficulties due to my health condition or disability*' in the 'big factor' pile. They were also likely to have concerns about low confidence and a lack of qualifications and experience. They did not, on average, express a strong desire to care for their children at home themselves.

On attitudes, mothers in this group had low average scores on the parenting factor and high average scores on the '*work at any cost*' and '*work as positive influence*' factors (suggesting that this group would like to work, and see work as valuable but face problems with doing so).

Mothers in this cluster were particularly likely to live in a family where at least one adult has a disability. They tended to be older mothers with older children and were more likely to only have one dependent child. They were also more likely to be lone mothers, live in socially rented accommodation, have a low income and have no academic qualifications. Almost a third had not worked in the last ten years.

3.2 Card-sort B: Mothers who had returned to work

In this section we repeat the analysis of the previous section but now for mothers who had returned to work at some point in the year preceding the interview. The longitudinal design of the FACS enabled the identification of mothers who had returned to work since their last interview (one year previously). Mothers working any hours (i.e. greater than zero) and who had been a non-worker (i.e. working zero hours) in the previous year were asked to complete a separate card-sort exercise which differed to the one given to non-working mothers.

3.2.1 The card-sort exercise

Mothers in this group were given a set of 18 cards. In this instance, the mother was asked to identify the factors that affect whether or not she can **stay** in work. Respondents were asked to think about their current situation and, as in the card-sort A exercise, sort the cards into three groups; 'big factors', 'smaller factors' and things that were 'not a factor'.

Again, LCA was used to identify patterns in the way different respondents placed the cards. Distinct groups of respondents were identified, with, in this instance four clusters emerging.

The following three tables show responses to the card-sort exercise for each of the four clusters. Note that the sample size for cluster four is very small so any percentages for this group should be treated as indicative of trends only.

As in Section 3.1.1, we have not given the clusters their labels in these three tables. The labels were derived as a result of this tabular analysis so are used only in subsequent sections.

Table 3.19 covers the statements that reflect concerns about **children and childcare**.

Table 3.22 Response to statements regarding children and childcare, by cluster

Statement		Cluster				Total %
		1 %	2 %	3 %	4 %	
My child/children don't like me working	Big factor	4	23	-	31	10
	Smaller factor	8	23	35	58	23
	Not a factor	88	54	65	12	66
I am worried I do not have enough time with my child/ren	Big factor	3	43	12	62	21
	Smaller factor	9	20	53	35	25
	Not a factor	88	36	35	4	54
There isn't enough suitable, affordable childcare around here	Big factor	-	15	9	65	12
	Smaller factor	1	5	29	27	11
	Not a factor	99	80	62	8	76
My child/ren are not happy in childcare while I'm at work	Big factor	-	11	-	42	7
	Smaller factor	-	8	9	31	7
	Not a factor	100	81	91	27	86
I'm not confident my childcare arrangements will continue	Big factor	5	8	3	38	9
	Smaller factor	4	8	22	54	14
	Not a factor	91	84	75	8	77
<i>Base</i>		111	74	68	26	279

Mothers who had returned to work.

- Mothers in cluster one consistently placed statements about children and childcare in the ‘not a factor’ pile. For example, 99 per cent of cluster one said that a lack of suitable, affordable childcare was ‘not a factor’ and all (100%) of cluster one put the statement ‘*my child/ren are not happy in childcare while I’m at work*’ in the ‘not a factor’ pile (Table 3.22).
- In contrast, cluster four were far more likely to say that these statements were a ‘big factor’. Two-thirds (65 per cent) of cluster four said that a lack of suitable, affordable childcare was a ‘big factor’ making it difficult to stay in work (Table 3.22).
- Cluster two were twice as likely to say that they were concerned that they didn’t have enough time with their children compared to all mothers who had returned to work (43 per cent compared to 21 per cent said this was a ‘big factor’, Table 3.22).
- Cluster three were not as concerned about childcare issues as clusters two and four, but not as confident as those in cluster one. The cluster three group were more likely to place statements in the ‘smaller factor’ pile. For example, over half (53 per cent) of cluster three placed the statement ‘*I am worried I do not have enough time with my child/ren*’ in the ‘smaller factor’ pile compared to a quarter (25 per cent) overall (Table 3.22).

Table 3.23 looks at the response to statements that referred to choices and constraints about **work**.

Table 3.23 Response to statements regarding work, by cluster

Statement		Cluster				Total %
		1 %	2 %	3 %	4 %	
I have problems with transport to and from work	Big factor	-	5	3	38	6
	Smaller factor	4	11	7	38	10
	Not a factor	96	84	90	23	85
I find it stressful combining work and family life	Big factor	1	38	13	62	19
	Smaller factor	23	31	60	31	35
	Not a factor	77	31	26	8	46
My confidence has taken a knock since I started work	Big factor	-	9	-	15	4
	Smaller factor	2	8	-	31	6
	Not a factor	98	82	100	54	90
I am not enjoying work as much as I thought I would	Big factor	1	14	-	27	6
	Smaller factor	3	34	3	38	14
	Not a factor	96	53	97	35	79

Continued

Table 3.23 Continued

Statement		Cluster				Total %
		1 %	2 %	3 %	4 %	
There is a lot of pressure in my present job to work long hours, stay late or do overtime	Big factor	-	19	6	58	12
	Smaller factor	8	12	32	15	16
	Not a factor	92	69	62	27	72
My employer is not very family-friendly	Big factor	-	24	-	27	9
	Smaller factor	-	4	13	35	8
	Not a factor	100	72	87	38	84
I can't see this job going anywhere, there are no promotion prospects	Big factor	2	16	-	31	8
	Smaller factor	12	28	21	35	20
	Not a factor	86	55	79	35	72
<i>Base</i>		<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- As in the previous table, mothers in cluster one were more likely to place all the statements in the 'not a factor' pile whereas cluster four are more likely to place statements in the 'big factor' pile (Table 3.23).
- Mothers in clusters two and three fall between these extremes, those in cluster three being similar to the 'no problem' cluster one group, but identifying a few stresses around combining work and family life, and those in cluster two finding work rather more difficult, but less so than the cluster four parents (Table 3.23).

Table 3.24 shows the remaining statements. These cover a variety of constraints to work including financial and health difficulties.

Table 3.24 Response to other statements, by cluster

Statement		Cluster				Total %
		1 %	2 %	3 %	4 %	
I am not sure that I am better off financially in work	Big factor	2	32	12	65	18
	Smaller factor	11	22	35	27	21
	Not a factor	87	46	53	8	61
I hadn't anticipated all the extra things I would need to spend money on now that I'm in work	Big factor	-	24	1	42	11
	Smaller factor	4	24	54	35	24
	Not a factor	96	51	44	23	65

Continued

Table 3.24 Continued

Statement		Cluster				Total %
		1 %	2 %	3 %	4 %	
I am finding it difficult to adjust to having money coming in every month rather than every week	Big factor	-	11	1	15	5
	Smaller factor	-	9	9	35	8
	Not a factor	100	80	90	50	87
I have difficulties working due to my health condition or disability	Big factor	2	9	-	27	6
	Smaller factor	4	8	7	15	7
	Not a factor	95	82	93	58	87
My parent/parents don't like me working	Big factor	2	7	-	-	3
	Smaller factor	2	1	6	31	5
	Not a factor	96	92	94	69	92
My husband/partner/ex-partner does not like me working	Big factor	-	7	1	-	2
	Smaller factor	5	1	-	23	5
	Not a factor	95	92	99	77	93
<i>Base</i>		<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- This shows a broadly similar story to the previous two tables. Parents in cluster one are more likely to place statements in the 'not a factor' pile, whereas cluster four are more likely to place statements in the 'big factor' pile (Table 3.24).
- Mothers in cluster two appear to have financial worries about having returned to work. Over half (54 per cent) of mothers in cluster two placed the statement '*I am not sure that I am better off financially in work*' in either the 'big factor' or 'smaller factor' pile compared to 39 per cent of all mothers who had returned to work (Table 3.24).
- Mothers in cluster four were the most likely to say that they had difficulties working due to their health condition (27 per cent said this was a 'big factor' compared to six per cent of all mothers who had returned to work, Table 3.24).

3.2.2 Summary of the four clusters

Based on these tables we have again summarised each cluster as below, giving each cluster a short title for convenience.

Cluster one – Few constraints

Mothers in cluster one placed very few statements in the 'big factor' pile. For every statement a higher proportion of mothers from cluster one placed the card in the 'not a factor' pile than all mothers who had returned to work. In particular mothers in cluster one were less likely to worrying about their children being unhappy whilst they were at work, financial problems or work stress compared to all mothers who had returned to work.

Cluster two – Concerns for children

Mothers in cluster two were more likely to report that they were concerned that they didn't have enough time with their children than all mothers who had returned to work. They were also likely to report that the stress of combining work and family life was a 'big factor' for making it difficult to stay in work.

Cluster three – (Moderate) Childcare and financial concerns

Mothers in cluster three reported few things as 'big factors' making it difficult to stay in work but were more likely to place statements in the 'smaller factor' pile than any of the other clusters. In particular, they were likely to say that being worried about not having enough time with their children was a 'smaller factor' and financial worries were also a 'smaller factor'.

Cluster four – Many constraints

Mothers in cluster four were likely to report most things as being a 'big factor' for making it difficult to stay in work. They were especially likely to report that a lack of suitable, affordable childcare, financial worries, work pressure and health conditions were 'big factors'.

Unlike the cluster solution for the non-workers, these four clusters appear to lie on a continuum, with cluster one being the mothers with fewest constraints to staying in work, followed by cluster three, cluster two and then cluster four.

3.2.3 The most important factor

Mothers identifying at least one statement as being a 'big factor' were asked to identify which was the **most** important factor. Table 3.25 shows the percentage of respondents from each cluster who said the statement was the most important factor.

Table 3.25 Most important factor, by cluster

Statement	Cluster				Total
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints	
	%	%	%	%	
My child/children don't like me working	4	18	-	5	6
My parent/parents don't like me working	1	2	-	-	1
I hadn't anticipated all the extra things I would need to spend money on now that I'm in work	-	2	1	5	1
I have problems with transport to and from work	-	2	3	5	2
I find it stressful combining work and family life	1	13	12	18	8
I have difficulties working due to my health condition or disability	2	3	-	-	2
My confidence has taken a knock since I started work	-	2	-	5	1
I am not enjoying working as much as I thought I would	1	3	-	-	1
I am worried I do not have enough time with my child/children	3	15	12	14	9
There is a lot of pressure in my present job to work longer hours, stay late or do overtime	-	-	3	9	2
My husband/partner/ex-partner does not like me working	-	-	-	-	-
I am not sure that I am better off financially in work	2	11	6	5	5
There isn't enough suitable, affordable childcare around here	-	5	4	14	3
My employer is not very family-friendly	-	8	-	5	2
My child/children are not happy in childcare while I'm at work	-	2	-	9	1
I am finding it difficult to adjust to having money coming in every month instead of every week	-	-	1	-	0
I can't see this job going anywhere, there are no promotion prospects	2	10	-	5	3
I'm not confident my childcare arrangements will continue	5	3	1	-	3
Nothing was a 'big factor'	81	3	56	5	50
Total	100	100	100	100	100
<i>Base</i>	<i>111</i>	<i>62</i>	<i>68</i>	<i>22</i>	<i>263</i>

Mothers who had returned to work.

- The 'concern for children' cluster were most likely to say that '*my child/children don't like me working*' was the most important factor for making it difficult to stay in work (18 per cent compared to six per cent of all mothers who had returned to work, Table 3.25).
- The '(moderate) childcare and financial concerns' cluster were most likely to say that the stress of combining work and family life or worrying about not having enough time with their children was the most important factor (both 12 per cent, Table 3.25).
- Four-fifths (81 per cent) of the 'few constraints' cluster did not put any statements in the 'big factor' pile compared to half (50 per cent) of all mothers who had returned to work (Table 3.25).

3.2.4 The relationship between attitudes and the LCA clusters

The factor analysis of attitudinal questions (described in Section 3.1.3) included both non-working mothers and mothers who had returned to work in the last year. Table 3.26 shows the relationship between the ten factors identified in that factor analysis and the four LCA clusters for mothers who had returned to work. The table shows the mean factor score for respondents in each of the four clusters. Large positive or negative means have again been emboldened.

Table 3.26 Mean factor score, by cluster

Factor	Cluster			
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints
	Mean	Mean	Mean	Mean
Parenting	-0.59	-0.35	-0.78	-0.53
Work at any cost	-0.14	0.00	-0.12	0.56
Societal expectations	0.38	0.11	0.21	-0.03
Work as positive influence	0.22	0.53	0.60	0.38
Role of benefits	0.32	0.00	0.16	0.19
Non-parental childcare	-0.13	-0.23	-0.22	-0.39
Trading off work and parental childcare	0.04	0.08	0.24	0.18
Partner attitudes	0.01	0.22	0.11	0.82
Partner influence	-0.01	-0.50	-0.32	-0.29
Parental influence	-0.31	-0.12	-0.03	0.01
Base	111	74	68	26

Mothers who had returned to work.

- As would be expected for working mothers, the mean for the parenting factor is low for all the clusters suggesting that working mothers do not consider that children need to be looked after at home by their mothers (Table 3.26).
- In contrast the average scores for the ‘work as positive influence’ factor are positive for all four clusters. (Table 3.26).
- The ‘work at any cost’ factor has the lowest mean score for the ‘few constraints’ cluster and highest mean score for the ‘many constraints’ cluster suggesting that this latter group may be in work because they feel they have to be (Table 3.26).
- Those in the ‘few constraints’ cluster had a particularly high mean score on the ‘societal expectations’ factor, suggesting that these parents do not perceive society as exerting pressure on mothers to work.

3.2.5 Socio-demographic characteristics of clusters

In this section we look at the socio-demographic characteristics of mothers in the four clusters. Note that the sample sizes per group are small, especially for cluster four (*‘many constraints’*), so even though the relationships appear to be plausible, the percentages themselves are not precise and only a few of the differences are statistically significant.

Table 3.27 Family type, by cluster

Family type	Cluster				Total
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints	
	%	%	%	%	
My child/children don't like me working	4	18	-	5	6
Lone mother	17	46	31	38	30
Lone father	2	-	-	-	1
Couple	81	54	69	62	69
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Overall, mothers who had returned to work in the last year were more likely to be part of a couple family (69 per cent, Table 3.27) compared to non-working mothers (where 58 per cent were part of a couple family, see Table 3.12).

- Mothers in the 'concern for children' cluster were more likely to be lone mothers (46 per cent) compared to all mothers who had returned to work (30 per cent) (Table 3.27).
- Eight in ten (81 per cent) of mothers in the 'few constraints' cluster were part of a couple family compared to 69 per cent of all mothers who had returned to work (Table 3.27).

Table 3.28 Age of youngest child, by cluster

Age of youngest child	Cluster				Total %
	Few constraints %	Concern for children %	Childcare and financial concerns %	Many constraints %	
0-4 years	45	50	46	58	48
5-10 years	40	36	34	35	37
11-15 years	10	12	15	4	11
16-18 years	5	1	6	4	4
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Mothers in the 'many constraints' cluster were more likely to have a very young child (58 per cent had a youngest child aged between 0 and 4 years old, compared to 48 per cent of all mothers who had returned to work, Table 3.28). This difference is not, however, statistically significant.

Table 3.29 Number of dependent children

Number of dependent children	Cluster				Total %
	Few constraints %	Concern for children %	Childcare and financial concerns %	Many constraints %	
1	38	39	47	46	41
2	42	46	38	27	41
3	12	12	12	19	13
4+	8	3	3	8	5
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Mothers in the 'many constraints' cluster were more likely to have three or more children compared to the other clusters. For example, 19 per cent of the 'many constraints' cluster had three dependent children compared to 12 per cent of the other three clusters (Table 3.29). Again this difference is not statistically significant.

Table 3.30 Age of mother, by cluster

Age of mother	Cluster				Total
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints	
	%	%	%	%	%
Under 25	9	14	6	12	10
25-29	12	19	9	35	15
30-34	20	16	24	27	20
35-39	30	27	26	12	27
40-44	18	15	21	12	17
45 plus	12	9	15	4	11
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Mothers in the 'many constraints' cluster were, on average, younger than parents in the other clusters (Table 3.30).

Table 3.31 Housing tenure, by cluster

Housing tenure	Cluster				Total
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints	
	%	%	%	%	%
Owned outright	8	3	6	4	6
Mortgage	58	38	46	31	47
Shared ownership	-	1	-	-	0
Social tenant	21	41	28	42	30
Private tenant	12	18	16	19	15
Other arrangement	2	-	4	4	2
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Mothers in the 'few constraints' cluster were more likely to have a mortgage (58 per cent) than any of the other clusters, particularly the 'many constraints' cluster (31 per cent) (Table 3.31).
- Over two-fifths of the 'concern for children' cluster and 'many constraints' cluster were living in socially rented accommodation (41 and 42 per cent, respectively) (Table 3.31).

Table 3.32 Equivalised household income quintiles¹⁷ by cluster

Household income	Cluster				Total
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints	
	%	%	%	%	%
Lowest income quintile	21	31	25	23	25
Second quintile	18	24	21	23	21
Third quintile	23	16	16	31	20
Fourth quintile	20	18	21	15	19
Highest income quintile	18	11	18	8	15
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Mothers in the 'concern for children' cluster were most likely to be in the lowest income quintile (31 per cent) and mothers in the 'few constraints' cluster and 'childcare and financial concerns' cluster were most likely to be in the highest income quintile (both 18 per cent) but the differences are again not statistically significant (Table 3.32).

¹⁷ Equivalised income quintiles were calculated for all families with children, therefore, there is an unequal proportion of respondents in each of the five quintiles for this base.

Table 3.33 Disability in family, by cluster

Disability in family	Cluster				Total
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints	
	%	%	%	%	%
No adult or child has a disability	59	58	53	46	56
One or more children have disability, no adult has disability	14	18	19	23	17
One or more adults have disability, no child has disability	21	12	22	27	19
At least one adult and one child have disability	7	12	6	4	8
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Mothers in the 'many constraints' cluster were the most likely to live in a family with a disabled person (54 per cent compared to 44 per cent overall, Table 3.33) but, again, small sample sizes mean this is not a statistically significant difference.

Table 3.34 Academic qualifications, by cluster

Academic qualifications	Cluster				Total
	Few constraints	Concern for children	Childcare and financial concerns	Many constraints	
	%	%	%	%	%
None	13	16	15	31	16
GCSE grade D-G and equivalent	12	19	18	8	15
GCSE grade A-C and equivalent	40	39	38	35	39
A-level and equivalent	10	11	9	23	11
Degree or higher	22	14	18	4	17
Other academic qualification	5	1	3	-	3
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Mothers in the 'few constraints' cluster were most likely to hold a degree-level qualification or higher (22 per cent) and the 'many constraints' cluster were most likely to have no academic qualifications (31 per cent). But, again, not a statistically significant finding (Table 3.34).

Table 3.35 Partner work status, by cluster

Partner work status	Cluster				Total %
	Few constraints %	Concern for children %	Childcare and financial concerns %	Many constraints %	
Partner working 16+ hours/week	75	47	63	58	63
Partner not working 16+ hours/week	6	7	6	4	6
Lone parent	19	46	31	38	31
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Three-quarters (75 per cent) of the mothers in the 'few constraints' cluster have a partner who worked 16 or more hours per week (Table 3.35).

Table 3.36 Standard occupational classification (SOC), by cluster

Standard occupational classification	Cluster				Total %
	Few constraints %	Concern for children %	Childcare and financial concerns %	Many constraints %	
Managers and senior officials	5	8	6	8	6
Professional occupations	2	4	7	-	4
Associate professional and technical	7	9	7	4	8
Admin and secretarial	22	12	22	15	19
Skilled trades	3	4	1	4	3
Personal services	22	19	18	19	20
Sales and customer services	12	18	16	23	15
Process, plant and machine operatives	1	-	-	-	0
Elementary occupations	28	26	22	27	26
<i>Base</i>	<i>111</i>	<i>74</i>	<i>68</i>	<i>26</i>	<i>279</i>

Mothers who had returned to work.

- Finally, and in contrast with all the tables shown previously, there is no obvious relationship between SOC and cluster membership.

3.2.6 Summary of the clusters

In this section the characteristics of the mothers (or mother-figures) in each of the clusters is summarised.

Cluster one – Few constraints

Mothers in cluster one placed very few statements in the 'big factor' pile. In particular, mothers in cluster one were less likely to worry about their children being unhappy whilst they were at work, financial problems or work stress compared to all mothers who had returned to work. Mothers in this cluster had a particularly high mean score on the societal expectations factor, suggesting that these parents do not perceived society as exerting pressure on mothers to work.

A comparison between the attitude scores for this 'few constraints' group with the 'few constraints' group of non-working mothers (Table 3.25 compared to Table 3.11) show them to be very similar. This perhaps means that the two clusters are made up of very similar mothers – certainly they are also similar in terms of their socio-demographic characteristics.

To summarise this group on their socio-demographic characteristics, they are more likely than other working mothers to be part of a couple family, to be buying their home with a mortgage, hold a degree-level qualification and have a partner who works at least 16 hours per week.

Cluster two – Concerns for children

Mothers in cluster two were more likely than other working mothers to report that they were concerned that they didn't have enough time with their children. They were also likely to report that the stress of combining work and family life was a 'big factor' in making it difficult to stay in work.

Mothers in this cluster were more likely to be younger, lone mothers, living in socially rented accommodation, and with a low household income.

Cluster three – Childcare and financial concerns

Mothers in cluster three reported few statements as 'big factors' making it difficult to stay in work but were more likely than other groups to place statements in the 'smaller factor' pile. In particular they were likely to say that being worried about not having enough time with their children was a 'smaller factor' and financial worries were also a 'smaller factor'. In other words, they have concerns, but they are not 'big' concerns.

This cluster were more likely to be older mothers with one dependent child. They were more likely to be in the highest two income quintiles.

Cluster four – Many constraints

Mothers in cluster four were likely to report **most** things as being a 'big factor' for making it difficult to stay in work. They were especially likely to report that a lack of suitable, affordable childcare, financial worries, work pressure and health conditions were 'big factors'.

This group of mothers also had a particularly high mean score on the 'work at any cost' attitudinal factor (higher in fact than any other group including the non-working mothers) suggesting that this group may be in work because they feel they have to be. In terms of their attitudes more generally, they share a lot in common with the 'health problem' cluster of non-working mothers.

The 'many constraints' cluster were more likely than the other working mother clusters to be lone parents with younger children, live in socially rented accommodation, have no academic qualifications and have a disability in the family. In this respect they are also similar to the non-working mothers 'health problem' cluster.

4 The details of the Latent Class Analysis

In this chapter we address some of the technical issues involved in the LCA, and how these were dealt with in the analysis of the card-sort data.

4.1 Latent Class Analysis

LCA is a statistical technique that can be used to identify relationships in survey data when respondents' answers to questions are categorical. An LCA divides respondents into groups (or latent classes) on the basis of their answers to a series of questions. The aim is for each class to be reasonably homogeneous, in that every individual in a class is assumed to be similar (in the sense of having the same response probabilities for each question) while respondents in different classes are assumed to be dissimilar.

Applied to the card-sort data, LCA allows us to investigate whether there are discrete groups of parents such that, within a group, parents identify the same set of factors as affecting their reasons for not working (or for staying in work). Once groups such as these are found, the analysis generates a probability for each respondent of their being in each class and assigns them to the class for which they have the highest probability of membership. It will also usually be possible to relate membership of each class with the respondent's answers to each question and thus, describe each class. This is not a straightforward task, but it can be done either by using the output from the LCA programme or by performing a further analysis on the data in another package.

In Section 4.3.2 we describe how the number of classes was identified in the card-sort data. The second task, that of describing the classes by relating membership of each class with the respondents' responses has been discussed in Chapter 3. A possible alternative to LCA is discussed in Section 4.4.

4.2 Latent GOLD

The data were modelled using the package Latent GOLD¹⁸, a software package that can implement several types of latent class models. As well as being able to perform LCA it can be used for discrete-factor analysis (see Section 4.4) and LTA. An advanced version of Latent GOLD which can handle weighting, stratification and clustering of survey data is also available.

A useful feature of Latent GOLD is that it is compatible with packages such as SPSS. In the analysis of the card-sort data we read the data from SPSS, used Latent GOLD to identify the classes, and then exported the results back in to SPSS for further analyses. As a result, we were able to create an SPSS file with variables for:

- the respondent's serial number;
- their responses to each of the card-sort statements (that is, whether the statement was identified as a big, smaller or not a factor);
- the probability assigned to each individual of them being in each class; and
- the class for which they have the highest probability of membership.

A typical analysis involved fitting several models with different numbers of classes. It was then possible to write SPSS syntax to compare different models – for example, to compare a model containing five classes with one containing six. This allowed us to identify the most useful model.

4.3 Modelling card-sort A

4.3.1 Features of the data

LCA can be used to model any data set where response variables are categorical (either nominal or ordinal) which has an underlying nominal latent variable to define latent classes. As card-sort A data consists of 19 ordinal response variables it is amenable to analysis by LCA. Nevertheless, there are certain features of the card-sort data that required particular attention before using LCA:

¹⁸ See the user's guide for a full description: J.K. Vermunt and J. Magidson (2005) Latent GOLD 4.0 User's Guide. Belmont, Massachusetts: Statistical Innovations Inc.

- The FACS data set is sparse. The data consist of 19 questions, each with three possible answers. This gives $3^{19}=1,162,261,467$ possible patterns of answers. There are only 1,353 respondents, so only a small proportion of the possible response patterns can be attained. A consequence of this is that many of the standard test statistics produced by LCA packages to compare a k -cluster model with a $(k+1)$ -cluster model will not be valid and the user should treat the results of these tests with caution¹⁹. Although the sample size is such that standard statistical tests cannot be used to choose **between** models, once a model is chosen, provided the number of clusters is not too large, the sample size is sufficiently large to allow a good description of each cluster.
- The large number of questions used can also cause computational problems if a large number of clusters are fitted. With 19 questions, each with three possible answers, a k -cluster model involves estimating $2*19*k+(k-1)$ parameters. It is possible that the programme will fail to find a solution (or find an incorrect solution) if k is large. Advice on how to guard against this is given in the Latent GOLD technical guide.
- Each variable can be treated as nominal or ordinal. There are obvious attractions in using an analysis that recognises the natural ordering of the categories, so it is natural to treat the data as ordinal. Nevertheless, this approach raises further questions. When specifying the data as ordinal, Latent GOLD's default is to score the middle category of the variables as being mid-way between the other two. This assumption may not reflect how respondents interpreted the categories.
- Some questions are not very useful in distinguishing between classes and could possibly be dropped from the analysis (although we have not done so). To give an extreme example: if some of the questions are unrelated to class membership then including them will introduce noise in any hypothesis test of class membership. Thus, a test designed to detect the existence of discrete classes is not likely to be very powerful. In our analysis we concluded that all of the card statements were to a degree related to class membership, but it is certainly possible that some are not **very** closely related, and including these questions could mean that the standard statistical tests lose some power. (The standard statistical tests have as a null hypothesis that adding an extra class does not improve the goodness-of-fit.) As a result, a routine application of a forward selection procedure, as described below, **could** result in a model with too few classes being accepted.

¹⁹ Latent GOLD calculates a statistic, L2, which is similar to a chi-squared statistic but the help system warns: *'with sparse data, the chi-squared based estimation for the p-value associated with L2 cannot be trusted because these statistics do not follow a chi-squared distribution.'* The reason for this is that chi-squared tests are only valid if expected cell sizes are not small (greater than 5 is a common cut-off point). With a data set as sparse as this many of the expected cell sizes will be far too small to allow use either the standard chi-squared statistic or L2.

- A related point is that some of the questions have only a small number of responses in one of the categories. It would be possible to combine responses for some of the questions into two categories ('big factor' and 'other', or 'is a factor' and 'not a factor') but, again, we chose not to do so because using different approaches with different statements would have made the interpretation of the results more complex.

A consequence of these issues is that analysts should exercise caution when interpreting the statistics produced by the package. P-values of statistical tests may be biased, and where they are accurate they will not always provide a powerful test.

4.3.2 Identifying the number of classes

As part of a LCA we need to identify the number of classes. In practice, it is unlikely that there will be a single 'correct' model so it is usual to consider a range of possible models containing different numbers of classes and choose the most appropriate using some criteria.

A general approach to statistical model fitting is to try to balance the fit and the parsimony of a model – generally, if two models fit a data set equally well the one with fewer parameters will be chosen. Under this principle, in LCA, if a model with $k+1$ classes fits the data just as well as one with k classes the k -class model will be chosen.

LCA software packages such as Latent GOLD provide the analyst with statistics to help in the choice of the correct number of classes in the data. In particular a process analogous to a forward selection procedure in regression modelling is sometimes used. The process starts by fitting a one-class model and then adds a class at a time. A formal hypothesis test can be performed to see if a $k+1$ -class model is an improvement on a k -class model. (The null hypothesis is that the k -class model generates homogeneous classes; the alternative hypothesis is that the $k+1$ -class model gives significantly more homogeneity.) If the test is statistically significant the $k+1$ -class model is considered as being the preferred model. The process continued until adding a class does not lead to a statistically significant improvement.

This procedure can be performed wholly within Latent GOLD. However, there are two objections to this approach when applied to the card-sort data. A technical problem is that mentioned above: the p-values calculated by the package are not valid when analysing a data set as sparse as the card-sort data²⁰. A second problem is that the size of the data set (19 questions) is large enough to mean that the significance tests might not be very powerful. Even when classes display a large difference on one or two questions, the overall significance test will be

²⁰ The Latent GOLD User's Guide suggests dealing with sparse data by calculating a bootstrap p-value. However, on a data set of this size this seems to be computationally intensive. It also does not overcome the second problem.

found to be 'not significant' if the classes are similar on the other questions. In other words, with a very large number of cards/statements it is almost impossible to generate a small number of classes with homogeneity within these classes. Because of this the standard test statistics given by the package are of limited use and other means of testing that the classes are a reasonable summary of the data are needed.

This means that if an automatic selection routine **is** to be used (as we have done), then, rather than choosing a model on the basis of the p-values obtained from a formal hypothesis test, we recommend using an informal assessment. Part of this assessment can be based on a goodness-of-fit measure. A goodness-of-fit measure can be calculated for both the k -class model and the $k+1$ -class model, and the $k+1$ -class model would be chosen if its goodness-of-fit measure is better than that of the k -class model.

Latent GOLD provides several goodness-of-fit statistics to help decide on an appropriate model. Three of these, the Bayesian Information Criterion (BIC), the Akaike Information Criterion (AIC) and the Akaike Information Criterion 3 (AIC3), are shown in the table below for card-sort data A. The fourth is a statistic based on a scoring rule and calculated in SPSS. Definitions of all four are given in Appendix A²¹.

Table 4.1 Latent class models and goodness-of-fit statistics

Number of classes	BIC(LL)	AIC(LL)	AIC3(LL)	SR
1	45103	44905	44943	3968
2	43563	43162	43239	3603
3	42910	42305	42421	3441
4	42825	42017	42172	3256
5	42801	41791	41985	3168
6	42882	41668	41901	3093
7	42950	41533	41805	3054
8	43094	41474	41785	3040

The interpretation of BIC, AIC and AIC3 is that small values correspond to a good fit. On a strict interpretation of these statistics the 'optimal' model suggested by BIC is a five-clusters model. AIC and AIC3 both suggest an eight-cluster model (but both suggest it's not much of an improvement on a seven-cluster model).

²¹ Other methods of evaluating goodness of fit include looking at cell residuals. As mentioned earlier, there are 3¹⁹ cells – far too many to use in a standard residual analysis. An alternative method involving examining two-way or three-way tables of residuals has been used in other surveys (e.g. de Menezes and Bartholomew, 1996, New developments in latent structure analysis applied to social attitudes, *Journal of the Royal Statistical Society*, 159, 213-224). This would be difficult on a data set as large as FACS.

The final column shows the scoring rule statistic described in Appendix A. Its interpretation is that the drop in SR can be used as a guide in the choice of model. A large drop between a k -class and $k+1$ -class model suggests the $k+1$ -class model is preferable; a small drop suggests the k -class model is adequate. The table shows that SR decreases quite sharply when the number of classes is small but levels out after about six or seven classes.

Thus, an automatic selection method would choose five clusters if BIC was used as the selection criterion, eight clusters if AIC or AIC3 were used, and about six if SR was used. To decide between these options other criteria are needed: the approach we prefer is as follows:

First, Latent GOLD is used to fit models with varying numbers of classes. (For example, we might start by looking at every model from one to eight classes). Goodness-of-fit statistics are then examined for each of the models. Examining these statistics should allow us to rule out certain models as having too poor a fit to be considered, and also give an upper limit for the number of classes that need to be considered. The table above shows that three classes is too poor a fit, and four classes also seems to be too few. On the other hand an eight-class model does not seem to fit the data much better than a seven-class model. On this basis the models containing between five and seven classes should be examined in further detail – though to be safe both the four-class and eight-class models could be considered.

The choice between these should then be made on the basis of several less formal considerations:

- 1** The class sizes should be examined. A statistically significant result need not be important in a practical sense. A model with a large number of classes might result with some very small classes. Although this might be a 'statistically significant' improvement on a simpler model, it often would not be regarded as being a practical improvement.
- 2** The membership probabilities can also be examined. Ideally, each individual would have a fitted probability of 1 of being in one class and probabilities of 0 of being in the others (thus, indicating that we can assign each individual to its class with complete certainty). In practice, the best that can be hoped for is that these probabilities will be close to either 1 and 0. Consequently an examination of these probabilities will aid in the choice of model.
- 3** Where two or more models seem equally good the principle of parsimony suggests the model with fewer classes should be chosen.
- 4** Finally, routines can be written (for example in SPSS) to establish which of these models leads to a sensible definition of classes.

When analysing card-sort A we found there was not much difference between the six-, seven- and eight-factor models. The seven-cluster model gave sample sizes in one class that were too small for analysis so a six-cluster model was

chosen as our working model. Furthermore, a check of the probabilities of cluster membership per respondent revealed that, with the six cluster solution, for 89 per cent of respondents their estimated probability of being in their assigned cluster was 0.6 or more. Which means that in just 11 per cent of cases was there any possibility of ambiguity about their cluster membership. This is evidence that there are very marked differences between the clusters (even though there may still be considerable variation within the clusters).

Using a similar approach a four-cluster solution for the card-sort B data was adopted. In this instance, 93 per cent of respondents had a probability for their assigned cluster of 0.6 or more.

4.3.3 Classifying individuals and describing classes

Once a working model has been chosen the analyst will usually try to relate membership of each class with the respondent's answers to each question and thus, describe each class.

One method of doing this is to examine the parameter estimates obtained by the model. Latent GOLD estimates the probability of membership of each class and the probability associated with each class for its answers to each question. For example, cluster two has a 90 per cent probability of regarding the statement '*I want to look after my child/children myself or at home*' as a 'big factor', whereas cluster one have only a 22 per cent probability. Thus, cluster two will be more associated with concerns about caring for their children than cluster one.

Another method is to examine the responses rather than the parameters. This is the type of analysis described in detail in Chapter 3.

Either of these methods can be used to help describe classes. The first method has the advantage that it does not need to assign individuals to classes (the second method assigns respondents to their modal class and hence, does not take into account the uncertainty concerning class membership). On the other hand, the second method might be preferable as its class labels are based on descriptions of a real sample rather than estimates of parameters (many of which could have quite large standard errors).

4.4 Fitting discrete factors (D-Factors) – a possible alternative analysis approach

We noted earlier that Latent GOLD allows for D-Factor analysis as well as LCA. Given its availability we have looked at whether this approach could be used as an alternative to LCA as a means of dividing mothers into classes, although on balance we think LCA is preferable.

The difference between discrete factor (D-Factor) analysis and LCA is in the nature of the latent variable. Standard LCA assumes the latent variable is nominal with k classes. Each class represents a section of the population with certain characteristics

in common, but there is no natural ordering or relationship between the classes. D-Factor analysis allows for more than one latent variable, and these are ordinal or binary. In this sense D-Factor analysis, as its name suggests, is the discrete version of (continuous) factor analysis, or of the related technique of LTA. It can be used to reduce the dimension of a data set (here reducing 19 dimensions to perhaps as few as two or three). In practice, D-Factor analysis allows for a factor analysis of the 19/18 statements in the card-sort exercise and reduces the 19 to a smaller number of 'latent statements', each of which is categorical.

For example, a simple D-Factor model of the 19 card statements reduced the data to just three binary latent factors. These can then be used to generate eight ($=2^3$) classes, but there is a describable relationship between the classes. Fitted to the card-sort data set we obtained the following class sizes.

Table 4.2 Discrete-factor model of card-sort A

Class	D-Factor 1	D-Factor 2	D-Factor 3	Classes size
1	1	1	1	234
2	1	1	2	285
3	1	2	1	86
4	1	2	2	126
5	2	1	1	277
6	2	1	2	145
7	2	2	1	107
8	2	2	2	93

An advantage of using this D-Factor model rather than LCA is that to interpret the classes we need only try to interpret three factors. Here, a further analysis of the answers showed that a score of 2 on the first factor indicates that the respondent identifies issues around childcare as preventing them from working; a score of two on the second factor indicates that financial and practical concerns (confidence, qualifications, doubts about being financially better off) are the main issues. But the third factor proved harder to interpret.

Thus, the first four classes correspond to people who do not have major issues around childcare while Classes 5 to 8 correspond to people who do have major issues. Classes 1, 2, 5 and 6 correspond to those who did not identify financial and practical concerns as preventing them from working, while Classes 3, 4, 7 and 8 correspond to those who did. This allows us to relate the classes to each other. For example, the people in Classes 2 and 7 are very different in that they identify different issues as preventing them from working; those in Classes 3 and 4 are quite similar.

On balance, although D-Factor can be used to put the data into classes, it seemed to be less useful than the LCA and seemed to over-simplify the real complexity in the data. Certainly our failure to interpret the third factor was a problem. The fact

that Binary D-Factor analysis restricts the number of classes to a power of 2 also feels rather artificial. As a result, we have concluded that standard LCA is a more appropriate tool for the analysis of the card-sort data, and leads to more natural groupings of parents, but would not rule out D-Factor analysis as a useful tool in other contexts.

4.5 Further issues and recommendations

Inevitably, it is not possible to be entirely prescriptive about how the card-sort data should be analysed. We have described several methods for analysing the data. LCA and D-Factor analyses both seem appropriate albeit our preference for LCA, and other analysis methods might also prove useful. Even within LCA it is not possible to set rules: data can be treated as nominal or ordinal, and the classes will not be identical if sub-sets of the cards are excluded. Finally, there is no definitive means of deciding on the optimal number of classes and subjective judgements have to be made.

Given this we have not tried to describe a 'correct' method. However, we note the following:

- The multivariate nature of the data means that simple univariate methods are of limited use for describing and analysing the card-sort data. Nevertheless, an exploratory data analysis, including simple tables of counts, is a useful first step in description and analysis. These tables, as well as being useful in their own right, will also be a useful aid in the data preparation needed to perform LCA. For example, on the basis of these tables the analyst might decide to investigate whether a question should be excluded from the analysis, and which questions (if any) should have some categories combined before analysis.
- LCA seems to be an appropriate method of identifying classes in the card-sort data. D-Factor analysis is worthy of further investigation but it seems less useful in the aim of classifying respondents into discrete classes.
- There is no 'correct' number of classes in LCA so we cannot claim that there is a single method of finding the 'right' number. In practice analysts might need to base their decisions on goodness-of-fit statistics using the method described in Section 4.3.2. On a data set like the card-sort data, strictly automatic selection procedures should be avoided and p-values could be inaccurate.
- Latent GOLD, and other LCA packages, not only assign an individual into a class, they also calculate the individual's probabilities of membership of each class. These probabilities can be used to check the model's classification properties. Ideally each individual should have a probability of close to 1 for the class to which it has been assigned and close to 0 for the other classes. Simple checks will establish whether this is indeed the case and thus, provide another check on the fit of the model.

- As there is flexibility over which method to use, it is important, when reporting, to use statements that are robust to any arbitrary modelling assumptions. For example, with the six-class model, 24 per cent of the sample have been allocated to the '*carers by choice*' cluster, but the statement that 24 per cent of the sample are carers by choice is probably inaccurate. A five- or seven-class model would most likely result in a rather different percentage, because some members of this cluster would be allocated to another cluster. On the other hand results describing the relationship between attitudes/socio-demographics and the **propensity** to be a carer by choice are more likely to be robust to choice of model.
- Similarly, it is wrong to imply that those in one cluster have nothing in common with any of the other clusters. Rather, the cluster they have been assigned to can be thought of as the one they '*most closely*' identify with.

Finally, it is worth briefly considering some of the issues that would be raised if the exercise is to be repeated. First, if the LCA was repeated as part of another survey of mothers, then it is possible that a different numbers of classes will be found, or that the classes will have different descriptions. This is especially likely if the sample size is very different. Furthermore, even if the same broad classes **are** identified their **exact** descriptions will change. This makes comparisons between surveys difficult and researchers should be aware that direct comparisons of percentages will not usually be appropriate. For example, with the six-class model seven per cent of mothers not in work were in the '*health problems*' class. If fewer mothers are found to be in this class in a later survey, or if this class is not found, one would not be able to automatically conclude that there has been a genuine reduction in the proportion of mothers with health problems – it is possible that the number has not changed, but some mothers have been put into a different class.

However, one way around this, would be to assign the mothers in the new survey using the LCA modelled probabilities generated in the analysis presented here. In other words, it would be possible to assume that the same latent classes exist and then to assign the mothers from the new survey to these classes. This would allow for change over time in the size and composition of the clusters to be studied.

The choice between the two approaches – fresh LCA or imposing of the old LCA probabilities on a new dataset – depends on the research question of interest.

These issues of model choice and interpretation of classes mean that LCA is not a straightforward procedure, but the results of the analysis of the FACS Wave 8 data show that it is a useful method of identifying classes in this type of data.

5 Conclusions

Based on the analysis carried out and presented in this report, it seems that two broad conclusions can be drawn:

Firstly, LCA appears to be a very useful tool for describing and summarising the complex data structure that the card-sort exercise generates. Although the relatively small sample sizes available to us means that we cannot hope to unpick and describe all the nuances of the data, and inevitably, within the latent classes or clusters there is variation in how mothers placed the cards, there is nevertheless plenty of evidence that the analysis has successfully managed to capture some very clear differences between the mothers in our sample. Coupled with the fact that LCA effectively reduces the data from 19/18 variables (one per card) to just a single six- or four-group categorical variable, our conclusion is that LCA is a sensible default descriptive analysis approach for the card-sort data.

Secondly, the clusters that the analysis generates (six clusters for non-working mothers and four for working mothers) are sufficiently easy to characterise and sufficiently distinct, that it is plausible that the analysis can be used as a starting point for generating policy interventions and/or marketing strategies that are cluster specific. For instance, a strategy used to increase employment amongst the *'health problem'* cluster might aim to address the fact that, as well as having high levels of health problems, this group have tended to be out of employment for a long time, and have low confidence levels. The best strategy for the *'carer by choice'* group would be very different, and, in practice, this may be the group where all strategies are bound to fail. For those in work, the analysis has identified one, or possibly two groups, who seem to be at particularly high risk of leaving their employment, so some means of identifying and targeting these groups in the population might prove of value.

Finally, because FACS is a longitudinal panel study, if the card-sort exercise is repeated over a number of waves this will open up many more analysis opportunities. In particular it will be possible to test questions such as:

- Does cluster membership change for parents over time? (For example, as children age do mothers change their cluster membership?)
- Does cluster membership for non-working mothers help to predict subsequent work entry?
- Are working mothers who experience the most difficulties at work more likely to move out of work? And if so, what do they subsequently perceive to be their choices and constraints around future work?
- For parents who do enter work, does the initial cluster membership help to predict the difficulties that will be experienced whilst at work?

Addressing these sorts of questions should help further our understanding of how mothers make choices around work, and how these choices affect subsequent outcomes and experiences.

Appendix A

Goodness-of-fit statistics for Latent Class Analysis

In this appendix we define the goodness-of-fit statistics used in this report.

Let N be the number of respondents, and $npar$ the number of parameters. Then, with $\log(L)$ standing for the log-likelihood we can define BIC, AIC and AIC3 as follows:

$$BIC = -2 * \log(L) + (\log(N)) * npar.$$

$$AIC = -2 * \log(L) + 2 * npar.$$

$$AIC3 = -2 * \log(L) + 3 * npar.$$

These statistics measure the fit of the model, while taking into account the number of parameters. Low values of these statistics correspond to good models.

The scoring rule statistic that can be defined to measure how well any model fits binary data. As our variables had three categories, rather than two, we used it on data made binary by combining 'smaller factor' and 'not a factor' responses into one category. It is defined as follows:

Let n_j be the size of class j , and p_{ij} be the proportion of respondents in class j who answer question i by stating that Factor i was a 'big factor'. The question will be useful in distinguishing between classes if either almost the entire class state that it was a 'big factor' or if virtually none of them do – i.e. if p_{ij} is either close to 0 or close to 1. This is equivalent to $p_{ij}(1 - p_{ij})$ being small so the usefulness of the classification can be measured by the sum of the terms

$$SR = \sum_i \sum_j n_j p_{ij}(1 - p_{ij}).$$

A small value will imply the model is a good fit and if adding an additional class leads to a large decrease in this statistic, the model with the additional class can be regarded as an improvement on the simpler model.

Appendix B

FACS definitions

The main respondent/‘mother figure’

In FACS, information about the family is collected principally from one family member – usually the mother or the ‘mother figure’. Often the main respondent is the natural or adoptive mother of the dependent child(ren) who lives with her. However, in some cases she could be the cohabiting partner of the child(ren)’s natural or adoptive father, a grandmother or other female guardian. The intention is for father figures to be interviewed as the main respondent only in cases where there is no female-mother figure present in the family (i.e. for lone fathers). For ease of interpretation the term mother is used to refer to the main respondent in this report. This term is used to relate to the ‘mother figure’ in the family, and therefore, refers to lone fathers in lone parent families headed by a male (unless otherwise specifically stated).

