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CONSUMER INFLUENCE ON PRODUCT LIFE

AN EXPLORATIVE STUDY

Sian Marie Evans

A thesis submitted in partial fulfilment of the requirements of Sheffield Hallam University for the degree of Doctor of Philosophy

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Abstract

In recent years the sustainability of consumption levels within industrialised countries has been increasingly challenged. The contribution of consumption to escalating volumes of waste and pollution coupled with the threat of resource scarcity and exhaustion, have lead to global political consensus concerning the requirement to tackle this critical issue. The optimisation of product life has been identified as one of several strategies that could be employed to resolve these problems. The focus of the majority of studies relating to product life spans concern issues of production and economics, such as technical durability and the effect of market structures. Scant attention has been paid to consequent consumption. This thesis investigates consumers' influence on product life across the consumption cycle, using Sheffield as a case study. It represents the first exploration in the UK of its type.

The thesis draws together the many disparate pieces of relevant research identified during the literature review to construct a new comprehensive conceptual framework for exploring the consumption life cycle of products from the consumer perspective. This framework was then used to structure the collection of data, which encompassed a combination of mail surveys and semi-structured interviews. The data collected were used to evaluate how different patterns of consumption across acquisition, ownership and disposal influence the service life of three domestic products, including everyday footwear, big kitchen appliances and upholstered chairs. This included the development of a new methodology for measuring consumer optimisation of product life. The research also sought explanations for differences in patterns of consumption and consequent variations in service life.

The results reveal substantial differences in the patterns of consumption both between categories of product and across the different stages of the consumption process. They indicate that the service lives of everyday footwear and upholstered chairs are notably more susceptible to consumer influence than large kitchen appliances, and that people are more optimising of product life spans in disposal than in acquisition or ownership.

The findings demonstrate that a wide range of factors affect consumers' influence on product life spans, which were classified under the headings; personal, social / situational and product characteristics. The research discovered that the nature and influence of factors is highly complex. A large combination of factors operates simultaneously, they are dynamic over time, and the strength of their impact fluctuates on the basis of interdependencies within the system, and in response to external signals.

On the basis of the research findings, the main barriers to consumer optimisation of product life spans were evaluated and their implications and possible solutions were discussed. This thesis demonstrates that consumers play a critical role in the life span of domestic products and that their inclusion in policies to tackle sustainable consumption is imperative.

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CHAPTER 1 - INTRODUCTION

1.1 The importance of sustainable consumption

Over the last fifty years there has been substantial growth in product ownership. This trend has been instigated by increasing affluence and associated with increased product diversity, shortening cycles of fashion and rapid technological change (Packard, 1960; OECD, 1982; Bayus, 1988; Kostecki, 1998). The benefits of unprecedented expansion in consumption are widely accepted, but the ability to continue this path indefinitely has been increasingly challenged.

Unsustainable patterns of consumption and production in industrialised countries have been identified as the principal agents of the escalating environmental degradation of the world's environment (UNCED, 1992; UN, 2002). The negative consequences of the continuous and expanding growth in consumption include; the rapid depletion of the natural resource base, declining air and water quality, land contamination and the creation of excessive waste (Redclift, 1996; UNDP, 1998). Recognition of this damage has led to the emergence of a global political consensus that more sustainable consumption patterns are required (UNGASS, 1997; OECD, 1998; UN 2002). In 1997, the UN concluded that unless greater action was taken to achieve this, the next quarter century was likely to witness declining standards of living and rising levels of conflict.

One of the popular approaches advocated for achieving more sustainable patterns of production and consumption, is to increase 'eco-efficiency', i.e. to improve the efficiency of global production, thereby reducing resource use, and simultaneously enhancing living standards (Schmidt-Bleek, 1993; Weizacker et al, 1998). Many people have expressed concern that this strategy, in isolation, is insufficient, and that more substantial changes are required in patterns of consumer demand (Hansen and Schrader, 1997; Heiskanen and Pantzar, 1997; Cooper, 1998). Several methods have been proposed for encouraging reduced consumption, which encapsulate both these themes. They include the alteration of the product service mix (e.g. Giarini and Stahel, 1993) and the optimisation of product life spans (e.g. Cooper, 1998; Kostecki, 1998), which forms the substantive focus of this thesis.

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1.2   The optimisation of product life spans

Over the past decade there has been increasing academic research exploring the potential of optimisation of product life as a strategy for environmental protection (Stahel and Jackson, 1993; Heiskanen, 1996; van Hinte, 1997 and Kostecki 1998). Within the context of policies for waste management, optimisation is an attractive option as it moves the agenda beyond recycling to resource reduction and reuse (Cooper, 1994a).

In his seminal paper, Cooper (1994a) defines optimal life as the length of time that a product can function effectively prior to its environmental cost exceeding the environmental gain that could be achieved by its replacement. It is important, therefore, that the optimisation of product life spans is clearly distinguished from maximisation, which involves the extension of product life per se.

The body of research underpinning the study of optimisation of product life spans is relatively underdeveloped and can be traced to several different disciplinary sources. These include the study of:
- The economics of durability in various market structures and in relation to various modes of business operation (e.g. see Bulow, 1986; Mann, 1992 and Goering and Read, 1995).
- Product life cycles from the business perspective, examining the management of product evolution through from design and introduction to eventual abandonment (e.g. see Rink and Swan, 1979; Magnan et al, 1999).
- Product life trends and analysis from a social and environmental perspective (e.g. see Packard, 1960; Cooper, 1994a and b; Heiskanen, 1996; van Hinte, 1997)

The first and second categories were largely discounted in the context of this thesis, as they do not consider the influence of the consumer.

Historically, concerns that products were not achieving their potential life spans can be traced back to the late 1950s, catalysed by several publications examining concerns about the growth of planned obsolescence (Mayer, 1959; Stewart, 1959; Packard, 1960) (i.e. the deliberate reduction of technical life of products during the design process in order to sustain sales). Consequent investigations of planned obsolescence have challenged manufacturers, accusing them of designing products with lower technical

lives than could be achieved, impeding repair and disassembly, and failing to stock parts for appropriate lengths of time (Packard, 1960; OECD, 1982; Papanek, 1985 and Giarini and Stahel, 1989).

Responsibility for product life has, therefore, principally been considered the remit of producers, hence they have been targeted most frequently for providing solutions. This is reflected in both the volume of academic work that focuses on production aspects of product life, and in current regulatory practices. For example, there has been considerable interest in the potential for enhanced product design to reduce environmental impacts (e.g. Mackenzie, 1991; Fiksel, 1997) and to enhance durability (van Hinte, 1997). In addition, environmental policy is moving towards product centred solutions, which encompass considerations during design and manufacture of the whole life cycle of the product (Oosterhuis et al, 1996). These solutions imply that design life is the key determinant of product life.

The study of product life has also revealed the influence of relative obsolescence (e.g. OECD, 1982; Hunkin, 1988; Pantzar, 1992; Cooper and Mayers, 2000) (i.e. the replacement of products prior to technical failure on the basis of dissatisfaction or changing needs). It is suggested that consumers increasingly indulge in behaviour that is reducing the service life of products, although there is only limited empirical evidence for this argument. A synthesis of findings from predominantly small-scale, exploratory studies (many of which concern electrical products) suggests that consumers often behave in ways that curtail the life span of products during acquisition, ownership and disposal (Wilkie and Dickson, 1985; Stahel, 1986; Uusitalo, 1986; Hunkin, 1988; Harrell and McConocha, 1992; Mann, 1992; Cooper, 1994b; Cooper and Mayers, 2000). They propose that consumers often replace functional products in response to fashion and technological change, are price sensitive even at the expense of quality, and have lowered their expectations of product life. In addition, the studies suggest that many consumers fail to undertake regular maintenance of products, dismiss repair options, and ignore creative strategies of re-use that would exploit the remaining utility and residual value of products prior to final disposal. It appears, therefore, that consumers have a significant role in determining product longevity and consequent waste generation.

At present, exploration of the possible reasons for such behaviour is limited. Speculative investigations have developed tentative theories which ascribe this to economic and lifestyle factors. For example, Cooper (1994a) and Stahel (1986) have compared the low cost of replacement against the high cost of repair. Linder (1970) and Schor (1992) indicate that increasingly harried lifestyles are leading to an insidious cycle of work and spend, in which there is less time available to carry out maintenance and organise repairs.

These trends suggest that any attempt at promoting increased longevity through eco-design will be ineffectual; if consumers do not act to optimise fully the utility that products offer and if barriers to optimisation of product life by consumers are not recognised and addressed.

The focus of the majority of studies identified is on negative influences that prematurely curtail products' service lives. Few papers have considered the antithesis, that is, the consumers' influence in optimising product lives. Examples include work on consumption restraint (e.g. Shchryar et al, 2001) and conservation (Granzin and Olsen, 1991; De Young, 1996). It is not known whether those people who deliberately participate in some consumption activities that have environmental benefits, have embraced patterns of consumption that optimise product life.

In order to progress towards sustainable consumption and production, the influence of consumer behaviour upon product life spans and the factors affecting this, need to be better understood. It is this issue that the thesis will address.

1.3   Studying consumers' influence on product life

This investigation addresses consumers' influence on product life in the context of sustainability, and the work is, therefore, primarily rooted within the disciplinary field of environmental studies. However, the research on sustainable consumption linking environmental impacts with consumption behaviour is in its infancy (Cooper, 1998). It is widely recognised that environmental issues are complex hybrid problems requiring inputs from several disciplines (Heiskanen and Pantzar, 1997). This thesis, therefore, incorporates insights from several academic perspectives.

In addition to environmental studies of consumption (e.g. Ölander and Thøgersen, 1995), the disciplinary perspectives that frame and contribute to this thesis include;

- The economic psychology of durability (e.g. Antonides, 1990)
- Marketing and consumer research, particularly research on integrative consumption processes (e.g. Boyd and McConocha, 1996; Antonides and van Raaij,1998) and replacement behaviour (e.g. Bayus, 1988)
- The sociology of consumption (e.g. Miller, 1995)
- The social psychology of consumption (e.g. Dittmar, 1992)

Much of the research relating specifically to consumer behaviour has been completed in the marketing tradition and focused on the acquisition of products, assessing patterns of choice, search and brand evaluation. Significant attention has also been paid to the communication of meaning through consumption (e.g. Veblen, 1925; Douglas and Isherwood, 1979; Miller, 1987; Belk, 1988, Holt, 1995). In contrast, investigations of the routines of everyday product use and care have been less comprehensive and processes of disposition have received only sporadic consideration (Nicosia and Mayer, 1976; Jacoby et al 1977; Hanson, 1980; Harrell and McConocha, 1992; Roster, 2001).

Overall, the majority of research identified typically sought to understand how products are bought, used, maintained or discarded, rather than being concerned with the entire life span. Several recent publications have urged for more integrative analysis of the consumption process incorporating acquisition, ownership and disposal, in the wider context of consumer research (Boyd and McConocha, 1996; Antonides and van Raaij, 1998), in sustainable consumption research (Heiskanen and Pantzar, 1997) and in relation to the study of the consumers' influence on product life cycles (Kostecki, 1998; Cooper and Mayers, 2000). Within the latter, it has been recognised that although the design specification and consumer priorities at purchase are the primary determinants of product life spans, consumer behaviour during use and disposal also exert an influence. However, a theoretical framework for exploring life cycles approaches to consumption in the context of environmental sustainability has not yet been clearly established.

Incomplete knowledge of the consumption process as a whole inhibits a full understanding of underlying meanings and motives of consumer behaviour. If a strategy of product life optimisation is to be adopted as a means of achieving more sustainable

consumption, it is essential that a life cycle approach to consumption is adopted. The thesis, therefore, employs a life cycle approach.

1.4   The research problem

Collectively the studies outlined above suggest that consumers have a critical role in determining product longevity and consequent waste generation. However, much of the research addressing the consumers' influence on product life has been isolated to one or two stages of the consumption process. Hence,

→   A new conceptual framework is required for exploring the consumers' influence on product life using an integrative approach, encompassing acquisition, ownership and disposal.

In addition, the research reviewed has not identified or classified those activities that a consumer undertakes that may influence product life across acquisition, ownership and disposal. Consequently,

→   A new taxonomy is needed that identifies and classifies activities that constitute the consumers' influence on product life across the consumption process.

Patterns of the consumers' influence across the consumption process are unknown. It is suggested that different patterns of consumption in acquisition, ownership and disposal may serve to extend or shorten product life. Individuals, therefore, may consistently extend or shorten product life, or they may make a mixture of choices that are inconsistent in terms of their impact on product life. Thus,

→   A new instrument is required to measure the relative optimisation of different patterns of consumption in order to examine consistency in individual patterns of consumption across the consumption process.

There is a paucity of research exploring the factors that affect consumers' influence on product life, or explanations for differences in patterns of optimisation across the consumption process. For example, it is not known whether consumers' attitudes and behaviour with regard to the optimisation of product life are consistent.

→ New knowledge is necessary concerning the factors affecting consumers' influence on product life to understand the barriers to the optimisation of product life and more sustainable consumption of products.

The majority of research identified relates to the life spans of electrical goods. This limits understanding of trends and influences on product life for other product categories. Furthermore, Heiskanen (1996) suggests that strategies of product life extension are most contentious for resource using products. Thus,

→ The study of a broader range of products is required.

The research will contribute to a fuller understanding of the consumers' influence on product life spans across the consumption life cycle. The rationale for the research is, therefore, broader than the need for more sustainable consumption, and can be justified even without this explicit ethical debate.

1.5   Aims and objectives

The principal aims of this thesis are:

To identify how different patterns of consumption across acquisition, ownership and disposal influence the service life of domestic products, and to seek explanations for differences in patterns of consumption and consequent variations in service life.

The thesis endeavours to provide one of the first exploratory studies of the consumers' influence on product life within the UK. To guide the development of the research, an extensive review of the literature within the field of product life and its wider context will be undertaken and key research concepts defined and their interaction examined. These will be used to build a conceptual framework for structuring the investigation. The research aims to provide a comprehensive understanding of the underlying reasons and motives for the patterns of consumption that people adopt. It aims to penetrate and explore the complex interactions, tacit processes, and beliefs and values that underpin and shape the relationships between consumers and product life, identifying barriers to more sustainable consumption of products. Exploring consistency between intentions and patterns of consumption adopted will reveal areas of complexity and sources of

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conflict, enabling further understanding of constraints upon product life optimisation. The research will also examine whether consumers who have previously integrated some environmental activities into their lifestyle are more likely to optimise their products' service lives.

The thesis aims are structured into the following specific objectives:

To examine how different patterns of consumption across acquisition, ownership and disposal influence the service life of domestic products, in particular to:

a) Describe how current patterns of consumption across acquisition, ownership and disposal influence the service life of three categories of domestic product.

b) Classify consumers according to shared patterns of consumption that influence service life for the three stages of consumption and for three categories of product.

c) Examine how consistent consumers are in their patterns of consumption across acquisition, ownership and disposal for the three categories of domestic product.

To seek explanations for differences in patterns of consumption and consequent variations in service life, in particular to:

a) Investigate whether those consumers who share similar patterns of consumption are affected by particular demographic, socio-economic or environmental factors.

b) Explore whether consumer intentions regarding product life are concordant with the patterns of consumption that they employ.

c) Identify factors affecting the patterns of consumption selected across the different stages of consumption and between different types of product.

d) Examine factors affecting consistency between patterns of consumption selected across the different stages of consumption and between different types of product.

e) Explore factors affecting consistency between consumer intentions regarding product life and the patterns of consumption selected.

To ascertain the thesis' contribution to knowledge, in particular to:

a) Present a summary of barriers to consumer optimisation of product life.

b) Discuss the implications of the research findings to interested parties.

c) Evaluate the strengths and weaknesses of the conceptual framework devised for exploring the consumers' influence on product life.

1.6 Chapter development

The thesis contains seven chapters, sequenced in a systematic manner. The first of these chapters identified the rationale underpinning the research, placing the work in the wider context of the sustainable consumption debate. It highlighted several critical gaps in current knowledge and outlined the aims and objectives chosen to resolve these.

Chapter two provides a critical review of the literature that shapes the thesis. This encompasses the intellectual traditions to which the study links, the historic context of concerns regarding consumption and sustainability, the issue of product life and the controversy of responsibility, and an examination of the consumers' influence on product life across the consumption process. The chapter concludes that a new conceptual framework is required for structuring the research.

Chapter three defines each of the key research concepts and outlines the development of a conceptual framework for exploring the consumers' influence on product life. In addition, it establishes the scope of the research, including reflections on the issue of product specificity. The chapter ends with a summary discussion of the fundamental gaps in our existing understanding of the consumers' influence on product life spans.

Chapter four outlines the research methodology, providing details of the series of decisions and actions regarding the translation of the broad research questions into an effective and viable programme of research. This includes discussion of the research design, reviewing available methods and techniques and justifying the choices made. It continues with a description of the implementation of the research instruments and the preparation and evaluation of the resulting data.

Chapters five and six describe and analyse the data collected. The findings are then discussed in the context of relevant research identified in chapters two and three, and their contribution to knowledge in this field is evaluated.

The final chapter of the thesis draws together and discusses the key findings of the research in the context of the aims and objectives described in chapter one. This includes the summation of barriers to consumer optimisation of product life, followed by a discussion of their implications for a variety of interested parties. This chapter also

includes an evaluation of the conceptual framework and the research process, addressing the limitations of the thesis and identifying requirements for further work in this field. The chapter concludes with a discussion of options for future research.

CHAPTER 2 - LITERATURE REVIEW

2.1   Introduction

This chapter aims to locate the research problem in a tradition of theory and related research, building a framework within which the research is situated and identifying areas of knowledge that the study intends to expand. In addition, it aims to review and critique previous research that relates to the general research question, demonstrating clearly the specific area that has not been adequately explored. This process helps establish the significance of the research for academia, policy and practice.

The chapter is divided into three main sections (see figure 2.1). The first situates the study in the ongoing research discourse identifying the 'specific intellectual traditions to which the study links' as advised by Marshall and Rossman (1999 p23). The second examines the research context providing a suitable starting point for the subsequent review of literature on product life, which is followed by an exploration of the specific issue of product life and consumer behaviour. The final section summarises the research problem and identifies the fundamental gaps in our existing understanding of the impacts of consumer behaviour upon product life, thus providing the justification for the research. The review process illuminates the key issues and assists the construction of the conceptual model in chapter three.

Figure 2.1 Structure of the literature review

Stage 1 - Context	→	Establishes academic and world context *(s2.2, 2.3)*
Stage 2 - Review	→	Appraises relevant research *(s2.4, 2.5)*
Stage 3 - Justification	→	Exposes critical gaps in current understanding *(2.6)*
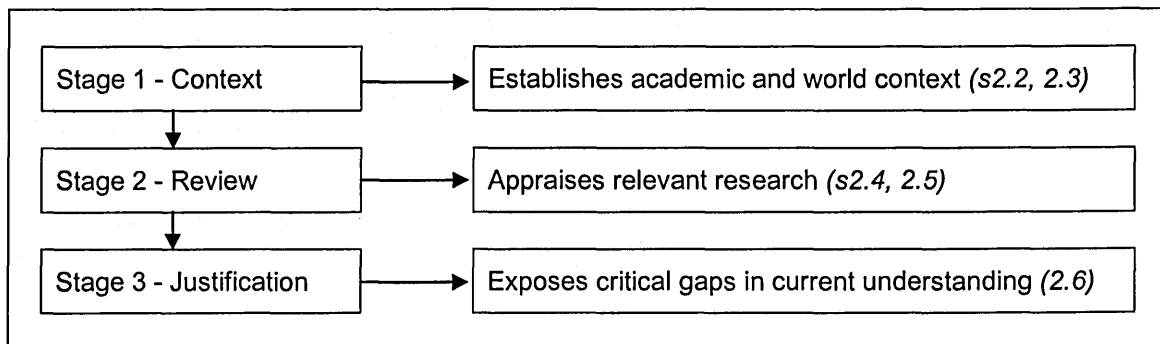
2.2 Disciplinary approach

This section reviews the intellectual traditions that guide the study. The research problem encompasses two central themes, product longevity and consumption. The disciplinary foundations underpinning research conducted within each of these domains are explored and the academic perspectives most suited for framing this research question are chosen.

2.2.1 Academic insights on product life

The body of research specifically addressing product life is underdeveloped, attracting sporadic academic attention across five decades. The research available falls into several categories.

The first is concerned with the economics of durability in various market structures and in relation to various modes of business operation. Over time a comprehensive body of knowledge has evolved, frameworks of durability and reliability have been investigated, modelled and critiqued, and theories of obsolescence proposed (for example, see Stone and Rowe, 1960; Bulow, 1986; Mann, 1992, Goering and Read, 1995). Much of this research has centred on the degrees of competition, and in many cases the definition of durability has been limited to one of technical durability, i.e. the life span a product is designed to achieve. This approach ignores the impact of the consumption process and has, therefore, been excluded from the study.

Product life cycles have also been explored from the business perspective of product planning strategy. This research examines manufacturing companies' management of product evolution through from design and introduction to eventual decline, see Rink and Swan (1979) or Magnan et al (1999). These offer useful empirical indication of rates of adoption of innovations and trends in life cycle times. They are also informative to the product life debate in their study of the process of decline and why products as a whole become obsolete. This body of research fails to recognise the explicit role of consumer behaviour on product life cycles, thereby impeding their contribution to this research. Concerns regarding the limitations of the product life cycle approach have also been raised by Antonides and van Raaij (1998), who suggest that an understanding of the lifespan of products also requires knowledge of consumption life cycles, which

focus on pre-purchase activities such as problem recognition and search, followed by purchase, use and disposal.

Social and environmental academic perspectives structure the final category of research on product life. Early research in this area can be traced back to the 1950's with the investigation of business dependence on planned obsolescence (Mayer, 1959; Stewart. 1959). Over time with the advent of concerns for resource depletion and waste, investigations have encompassed discussion of the implications of short product life from an environmental angle (Packard, 1960; Papanek, 1985). Over the past decade academics and policy makers have expressed increasing interest in the potential of extending product life as part of a range of activities for tackling environmental problems (Cooper, 1994a; Heiskanen, 1996; van Hinte, 1997). 'The durable use of consumer products: new options for business and consumption' edited by Kostecki (1998) has begun the process of drawing together the findings of this research to build a coherent research agenda on product life.

Despite providing a platform upon which to build the research, on the whole the consumers' influence on product life has been paid relatively little attention. In the context of this research problem it is, therefore, necessary to draw on research, ideas and methods from the domain of consumption more generally.

2.2.2 Academic insights on consumption

There are many ways of conceiving consumption and framing it within a research environment (Campbell, 1998). Historically the subject has been explored using varied perspectives, with a number of academic disciplines extending across the spectrum of social sciences contributing to our understanding of consumers and consumption, including economics, marketing, cultural studies, sociology, psychology, anthropology, and philosophy (Lang and Gabriel, 1995; Miller, 1995; Jackson, 2004). The study of consumer behaviour and consumption is, therefore, diverse and multi-disciplinary. This section attempts to summarise this vast literature, illuminating ideas and theories that have relevance to this research question.

Within the discipline of economics research is categorised under the two headings of macroeconomics (which explores national aggregate spending), and microeconomics (which examines individual purchases). The process of acquisition forms the dominant

focus of both. Economic theory has come under attack for its dependence on the assumption that consumers are rational actors, its interpretation of consumption in terms of markets rather than consumer behaviour and its failure to protect the environment (Holbrook, 1987; Daly, 1996; van den Bergh et al, 2000). The need to consider externalities of production and consumption led to the development of environmental economics, which recognises and attempts to resolve the limits of traditional economic models and theory (e.g. Pearce, 1976). However, overall economic theory was considered to be of limited use to this research.

Historically research in the field of marketing has been commercially driven focusing on understanding the consumer at the point of pre-acquisition and acquisition to provide information that will facilitate increased consumption (see Firat, 2001). This has led to the development of complex theory at the micro level, for example, product selection, brand choice, repeat purchase and information search (Rassuli and Harrell, 1990). The neutrality of the research agenda for marketing is contentious. The narrow and predominantly economic focus has been criticised for its insularity, leading to the formation of macro marketing and the evolution of social and environmental marketing inquiry (Goldberg et al, 1997, MacFadyen et al, 1999; Peattie, 1992 and 1999).

The discipline of consumer research evolved from the study of marketing. Early research in this field was, therefore, also dominated by the study of acquisition. During the late 1970s and the1980s a number of papers were published which called for the extension of the parameters of this field to include use and disposal (Jacoby et al, 1977; Hanson, 1980) and to embrace more intangible aspects of consumption such as services, ideas and events (Holbrook and Hirschman, 1982). In the late 1980s this need to address the ontology of consumer research reached a hiatus, with several academics calling for clarification and consensus regarding what constitutes consumer research (Holbrook, 1987; Levy 1992). In response there has been a drive to transform the way consumption is studied through the growth of new consumer research, which recognises the need to study consumption in its entirety. Proponents of this approach include Antonides and van Raaij (1998) and Bagozzi et al (2002).

Over time consumer research has developed an increasingly sophisticated understanding of consumption behaviour. In particular, a large number of models of consumer behaviour have evolved that demonstrate the complexity and breadth of factors that

influence consumption processes. These have progressively illuminated the many determinants of consumer behaviour and the nature of their interrelationships. Many of these models have focused on understanding behaviour through an exploration of individuals' internal processes and characteristics. Examples include; models of the relationship between attitude and behaviour (Ajzen, 1988) and models of the influence of personal values on behaviour (Schwartz, 1977). Other models have focused on the impacts on individual behaviour of external processes and stimuli such as social norms and incentives (e.g. Geller, 1982). More recently integrative models of consumer behaviour have been developed that incorporate external and internal elements, for example Ölander and Thøgersen (1995) Stern (2000) and Bagozzi et al (2002). Jackson (2005) provides a detailed overview of these various models of consumer behaviour.

Within sociology, the works of several classical and contemporary theorists refer to the sociological dimensions of consumption. Examples include Veblen's theory of conspicuous consumption (1925), Simmel's investigation of fashion and money (1957) and Baudrillard's examinations of post modernity. The majority of studies consider the social context of product usage, focusing on consumption as a means of identity construction and communication. Despite such endeavours, Campbell (1995) argues that the history of the sociology of consumption was, until recently, slow to progress.

The discipline of social psychology has an established literature exploring the meanings of possessions (e.g. Douglas and Isherwood, 1979; Csikszentmihalyi and Rochberg-Halton, 1981; McCracken, 1986; Belk, 1988; Dittmar, 1992; Richins, 1994; van Hinte, 1997, Baumann, 1998). This work focuses on the consumers' relationships with the products in their possession and the role of goods in fulfilling social and cultural identity needs. It proposes a consumer society 'in which the individual consumer is locked into a continual process of constructing and reconstructing personal identity in the context of a continually renegotiated universe of social and cultural symbols' (Jackson, 2004 p15). However, much of the research within social psychology has focused on extraordinary consumption, such as exploring attachments to favourite things (Wallendorf and Arnould, 1988), and the disposal of special possessions by the elderly (Price et al, 2000). Within this field, the more mundane aspects of consumption such as patterns of use, repair, maintenance and disposal of products have been mostly overlooked (Campbell, 1995; Warde, 1997).

Many of these limitations extend into the field of cultural studies. However, an exception is the diverse investigations undertaken within the domain of 'material culture studies', which use material objects as primary data to examine the *'beliefs-values, ideas, attitudes, and assumptions of a particular community or society at a given time... (they study) culture through artefacts'* (Prown, 1982 p1). Generally, cultural theorists argue that individual lifestyle/value approaches are inadequate, maintaining that greater insight can be derived from a collective and historically contextual exploration of consumer behaviour (e.g. Holt, 1997).

Within the domain of environmental studies, the evolution of academic research exploring the environmental impacts of consumer behaviour can be traced to the 1970s. Many earlier studies focused on identification of demographic factors that characterised the environmentally active person (e.g. see van Liere and Dunlap, 1980). Over time it was recognised that in order to steer consumers towards environmentally favourable actions there was a need to understand better the motivations and determinants of behaviour. This research is described in greater detail in section 3.2.6. The majority of investigations undertaken focused on consumer behaviour in relation to single issue concerns; for example, energy conservation (e.g. Becker et al, 1981; Neuman, 1986) and the purchase or discard of non durables (e.g. Vining & Ebreo, 1992). A common finding within such research was the inconsistencies arising between stated attitude and behaviour (e.g. Scott and Fern, 1994).

This led to investigations of such conflicts using the 'attitude-intention-behaviour' paradigm to identify and assess the factors which inhibit consumers from behaving in accordance with their attitudes. Much of this work was summarised by Ölander and Thøgersen (1995), who used this alongside theories of consumer behaviour developed in consumer research, for example Ajzen's 'Theory of Planned Behaviour' (1988), Triandis' 'Subjective Culture Model' (1977) and Bagozzi and Warshaw's 'Theory of Trying' (1990) to build a generic framework for understanding consumer behaviour in the context of environmental issues.

During the late 1990s understanding the consumer and consumption behaviour has been increasingly recognised as a critical requirement of the quest for more sustainable development (Jacobs and Røpke, 1999; Jackson, 2004). This has catalysed the development of environmentally oriented research and theory that engages more fully

with the broader literature on consumption and conceptualises the enormous complexities that underlie consumption issues (e.g. Spaargaren and Vilet, 2000; Stern, 2000; Dolan, 2002; Jackson, 2005). Research has drawn attention to the need for greater recognition and study of the influence of habit (Bamberg and Schmidt, 2003), emotion (Steg et al, 2001) and moral beliefs on pro-environmental consumption. In addition, it has highlighted the importance of exploring ordinary and inconspicuous consumption, exposing the possibility that consumers are locked into prevailing patterns of consumption by a combination of convenience, habit, social norms and institutional contexts (e.g. Shove and Warde, 1997; Sanne, 2002; Shove, 2003).

Applications of models of consumer behaviour within the domain of product life research are scarce.

2.2.3 Anticipated disciplinary framework

The reviews of the different academic contributions to this research field illuminate the necessity to take a multidisciplinary approach to answer this research problem. This investigation addresses product life and consumption primarily on the grounds of sustainability and environmental studies. The research on sustainable consumption linking environmental impacts with consumption behaviour is in its infancy (Cooper, 1998) but is fast growing (Jackson, 2005). It is widely recognised that environmental issues are complex hybrid problems requiring inputs from several disciplines (Heiskanen and Pantzar, 1997). It is, therefore, pertinent to explore and incorporate insights from several disciplinary perspectives into this research, drawing on their strengths and learning from their limitations.

2.3   Research Context

This section explores the research setting. It establishes the historic context of the product life debate, charting the development of mass consumption culture and outlining associated transformations in social expectations. It then outlines the nature of contemporary concerns regarding these changes.

2.3.1 Historic context

The rise and development of mass consumption has been explored in detail by a number of academics in recent years (e.g. Bocock, 1993; Brewer and Porter, 1993; Goodwin et

al, 1997). Droge et al (1993) highlight three key characteristics of mass consumption culture. The first is the radical division between activities associated with production and consumption, leading to acquisitions via exchange rather than self production. The second is the production and sale of large volumes of standardised mass produced goods to a mass of people which requires that wealth and purchasing power are diffused relatively broadly in society. The third characteristic involves the ceaseless introduction of new products and services.

The factors contributing to the rise of mass consumption society are subject to debate. Some single out the importance of religious changes, specifically the role of puritan movements in providing the capital that catalysed the industrial revolution (e.g. Bocock, 1993). Others identify a range of co-dependent driving forces underpinning consumption growth including the increasing division of labour, urbanisation, industrialisation, competition, use of fossil fuels and the appropriation of resources from the South (Røpke, 1999).

It is widely agreed that the move towards mass consumption culture has been characterised by a series of significant transformations in design and production (Pantzar, 1992; Cooper, 1994a). These transformations include; an increased ability to mass produce homogeneous goods and the development of new cheaper synthetic materials, such as plastics, which have enabled considerable changes in the structural composition of products and lowered costs. In addition, research and innovation (e.g. the advent of electronics) have led to a much greater diversity of products, designed to carry out increasingly specialised tasks.

Over time the decline in product costs within industrialised countries led to their becoming available to a wider range of income groups and the stock of both durable and non-durable products in the average home escalated rapidly during the post war era. By 1992, 99% of households owned at least one refrigerator and one television and over 80% of households had a telephone, washing machine and a freezer (Central Statistical Office, 1993). Table 2.1 displays further increases in consumer durable ownership over the last decade.

In their research investigating prospects for household appliances Cooper and Mayers (2000) identified that the mean number of household electrical appliance stocked by

households in the UK was 27. On the basis of their findings they estimate that the rate of product ownership (by number of products owned) increased by around 60% between 1993 and 1998.

Table 2.1 Consumer durable ownership 1990 to 2000-01

	% households with durable goods		
	1990	**1995/6**	**2000/1***
Washing machine	86	91	92
Tumble dryer	-	50	53
Dish washer	-	20	25
Microwave	-	70	84
Telephone	87	92	93
Video recorder	61	79	87
CD player	-	51	77

* Based on weighted data and including children's expenditure
-- Data not available

Source: ONS, 2002

With the growth of mass consumption there have been huge advances in the standard and quality of life for the majority of industrialised populations. However, despite the record levels of product ownership now attained, evidence suggests that consumer dissatisfaction is rising and consumption expectations are now greater than ever (Lansley, 1994).

A number of researchers have explored factors underlying peoples' mounting expectations. Olshavsky (1980) argues that improved communication, rising consumer affluence and the generation of artificial needs by more sophisticated marketing and advertising have been instrumental in escalating the rate of product adoption and raising social expectations. The accelerating rate at which products evolve from being a 'necessity' to a 'luxury' has also been implicated as a catalyst of aspiration (Kilbourne et al, 1997). Other trends identified by Shove and Warde (1998) include increasing consumer desire to test, try and match new products and services and the gradual raising of 'normal' standards through the manipulation of consumers' needs to manage extreme and unlikely risks (for example, buying excessively large refrigerators to avoid food shortage). Increased consumption has also been associated with wider access to fashions coupled with an ever expanding range of product categories subject to its vagaries (e.g. kitchen utensils, electrical appliances, sports equipment and spectacles).

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Changes in lifestyle have also been pivotal in modifying patterns of consumption. Mounting stress resulting from real and perceived time famine has increased the consumption of convenience products and labour saving devices (Schor, 1992; Warde et al, 1998). In addition, system complexity encourages the continuation of this trajectory. As physical infrastructure (transport, water, electricity etc.) and production and consumption frameworks (international purchasing and distribution, advertising, marketing etc.) have developed, their mutual interaction has resulted in a society locked into prevailing production and consumption patterns. Heiskanen and Pantzar (1997) highlight the importance of understanding consumption systems as a whole.

Further expansion of global mass consumption is forecast (OECD, 1998). Countries that are currently less developed will aspire to the same standard of living as industrialised nations. Whilst social trends within developed societies may escalate levels of consumption further. Examples of such trends include the increasing number of single person households (due to divorce, decline in marriage, death of a spouse etc) each consuming almost the equivalent of former shared households, and the growing numbers of retired and elderly people with disposable income and an abundance of leisure time. The UK DOE (1995) projected that the number of households in England would increase by 23% between 1996 and 2016, forming an additional 4.4 million households.

2.3.2 Contemporary concerns - critiques of consumer culture

The rise of the consumer society has facilitated significant increases in the quality of life of the populations of the industrialised world. Initially, the ideal of continuous economic growth through mass consumption remained relatively unquestioned. It was only with the escalation of the mass consumer culture and its intensity over time that the more negative impacts of the consumer lifestyle became apparent and the sustainability of consumption patterns was challenged (Durning, 1992; Droge et al, 1993). Critiques of consumer culture fall into two categories; environmental and socio-economic.

Environmental

Few comprehensive environmental critiques of consumption have been written, key exceptions include papers by Droge et al, 1993 and Cohen, 1998. Durning (1992; p58) identifies this issue as '*the neglected variable in the global environmental equation*'.

The negative impacts of mass production (and indirectly consumption) were first highlighted in the 1970s in which the problems of growing waste and resource depletion were given particular attention (e.g. Meadows and Meadows, 1974). During the 1980s attention focused on the pollution created by the processes of production, use and disposal of products and consequent implications for long-term human health such as their influence on degenerative and dietary diseases. By the 1990s environmental critiques had begun to explicitly address consumption at the practical and philosophical level (e.g. Hansen and Schrader, 1997). The intensity of concerns regarding the threat of non renewable resource scarcity and exhaustion has declined but deterioration in environmental quality resulting from pollution and waste continue to elicit global political concern (Cooper, 1994b, UNEP 1999). The UK alone creates 28 million tonnes of municipal waste a year which is forecast to grow at a rate of 3% per year (Strategy Unit, 2002).

Socio-Economic

Research has observed how consumption is increasingly moving from functional purposes towards becoming an elaborate means of identity construction and symbolism, used to express values and indicate affiliation with a particular group or lifestyle (e.g. Dittmar, 1992; Heiskanen and Pantzar, 1997). Kilbourne et al (1997) maintain that this results in a situation which they term 'hyper-consumption', in which the division between needs and wants becomes progressively blurred. The process of artificially expanding what are deemed necessities is considered imperative to sustain the system of production (Galbraith, 1958). Hence, the social construction of consumer desire is pivotal to the modern economy (Thompson and Holt, 1997). Socio-economic critiques of the mass consumption in capitalist systems highlight how saturated markets force marketing strategies encouraging the rapid exchange of products through fashion, novelty and disposability in order to maintain the system. Csikszentmihalyi (2000 p271) concludes that 'it is the imperative to produce that is dictating the need to consume'.

The prevailing focus on material wealth and material growth in economics is reflected in the assumptions of mainstream economic models (Reisch, 2000). There are considerable negative social costs of viewing time as a factor of production. Non stop society leads to acceleration and intensification of consumption and harried lifestyles (Linder, 1970, Schor, 1992). In order to save time it is argued that consumers buy new rather than repair (Cooper, 1994a), limit information search, rely on invalid indicators

of quality such as price and brand (Burchardt, 2001) and invest in time saving appliances which frequently and ironically take up more time. Other cultural transitions include loss of home repair skills, rejection of thrift, ever increasing demand for cheaper products and increased relative obsolescence (e.g. Packard, 1960).

The growth of mass consumption has provoked changes in the social fabric and challenged traditional structures of work, the family and religion. Social interaction has been displaced by increasingly individual lifestyles. Hirsch (1976) explored dissatisfaction and stress from over consumption, arguing it was related to the pursuit of increasingly scarce positional goods due to mass production. Impulse buying and lack of consumption restraint have been associated with feelings of guilt, anxiety, frustration, loss of control, financial hardships and domestic problems (Rook, 1987; O'Guinn and Faber, 1989) and have considerable psychological consequences (loss of self, alienation, apathy etc.).

Social critiques of consumption do not argue against consumption per se. It is recognised in most literature that the rites and rituals of consumption have an important role in structuring everyday life (Campbell, 1995) and in meeting our higher needs (Csikszentmihalyi, 2000). It is the nature of how these needs are being met through material intensive consumption, which has been targeted. Studies show that beyond a low threshold material well-being does not correlate with subjective well-being (Inglehart, 1996; Csikszentmihalyi, 1999).

At a more philosophical level, McGregor (1998) expresses concern that the direct experience of the consumer is now too far removed geographically and consciously from the processes of production and distribution so that externalities of their consumption remain concealed. Many household products in daily use are imported from poorer countries with less stringent social and environmental regulations, but consumers are detached from any exploitation of labour or degradation of the environment that is beyond their individual psyche. This detachment from production and its associated impacts is argued to have led consumers to have a parochial individualist perspective instead of a global holistic one. This has evoked concern and rising debate on consumption versus citizenship and the belief that people need to consider themselves as citizens before consumers (e.g. Lang and Gabriel, 1995; Hansen and Schrader, 1997). Borgman (2000) provides further insights in a moral critique of

consumption. With few exceptions (e.g. Vitell et al, 2001) research on consumer ethics has focused on the ethics of production and their implications for consumption choices rather than the ethics of consumers or consumption per se.

The environmental and socio-economic consequences of consumption need intensive international scrutiny in the light of the significant escalation in levels of future consumption predicted. There is some speculation that dematerialisation will occur as a consequence of a cultural transition in the form of movement towards post material values (Inglehart, 1990). The move to post materialism in the 1970s heralded the arrival of environmental ideas such as deliberately denied materialism, voluntary simplicity and responsible consumption (Fisk, 1973; Elgin, 1981; Prothero, 1990). The advent of the green consumer during the 1980s was also indicative of growing recognition of the importance of consumption to the environmental debate. The philosophy of green consumption was, however, criticised as it allowed consumers to side step the important contribution to be gained from consuming less (Irvine, 1989). That is, 'we can not consume ourselves out of an over-consumption problem' (Kilbourne, 1995). Other indicators hinting at the advent of a post material culture include transformations in lifestyle such as consumption restraint (Shchryar et al, 2001) anti consumption attitudes (Zavestoski, 2002) and downshifting (i.e. reducing working hours to improve quality of life) (Cooper, 1998). Evidence that a real shift is underway however remains insubstantial (Lansley, 1994).

The need to tackle the negative social and environmental consequences of consumption encouraged the emergence of the sustainable consumption debate (McGregor, 1998).

2.3.3   Sustainable consumption - the search for solutions

'Sustainable consumption' is a theoretical concept which has transpired in response to the growing concern regarding the deleterious environmental and social consequences of expanding mass consumption and continuous high level economic growth. The phrase was popularised through the 1992 Earth Summit, which identified it as the future strategy for tackling the consumption issue. Principle 8 in Rio declaration and chapter four of Rio Document, Agenda 21, both set out need for changes in consumption patterns towards sustainability.

Defining sustainable consumption

The format, characteristics, and implications of sustainable consumption have been explored at a number of international conferences and by numerous non-governmental organisations and academics. This process is still in its infancy and there is little consensus regarding what constitutes an exact definition of sustainable consumption and how it can be achieved (Manoochehri, 2002).

Within this research sustainable consumption is defined as;

'patterns of consumption through which the purchase and use of goods and services meets people's basic needs while minimising any environmental degradation.'

(Cooper, 1998)

This, like most interpretations of sustainable consumption within the literature, stimulates debate. Most critically, it raises the controversial issue of what constitutes 'people's basic needs'. The discourse on needs is fraught with conflicts and complexities (Jackson et al, 2004). In brief, current understanding is structured upon several noteworthy theories including; the hierarchical ordering of needs devised by Maslow (1954, 1968), the two dimensional matrices of needs forwarded by Galtung (1980) and Mallmann (1980) and most recently the more comprehensive categorisation of needs and satisfiers, favoured in this thesis, proposed by Max Neef (1991, 1992).

A key question raised by the objective of sustainable consumption is whether increased resource efficiency is sufficient to achieve this goal, or if a simultaneous reduction in consumption is required. This remains divisive. Such concerns have led to the development of techniques to measure environmental impacts, e.g. materials flow analysis used to calculate ecological footprints. Proponents of 'eco-efficiency' propose that it is possible to improve the efficiency of global productivity to four times the current level, which would allow resource use to halve whilst simultaneously allowing living standards to double (Weizacker et al, 1998). Other proposals estimate a ten fold improvement in efficiency is required to achieve this target (Schmidt-Bleek, 1993). Within these frameworks it is essential to give comprehensive consideration of possible rebound effects. Many are doubtful that the efficiency gains will be enough arguing that growth and rebound will exceed advances on the basis of efficiency (e.g. Reisch, 2000).

This has driven other academics to argue that sustainable consumption may not be achieved unless eco-efficiency is accompanied by substantial changes in the patterns of consumer demand (Heiskanen and Pantzar, 1997; Cooper, 1998) and significant moves towards more sufficient values and lifestyles. Including getting the same welfare out of fewer goods and services (Carley and Spapens, 1998), avoiding those products which add little to welfare (Lintott, 1998), and to the development of new models and theories of desirable behaviour (e.g. Hansen and Schrader, 1997, UNEP, 1999, Reisch, 2000).

A crucial problem which inhibits the progress of sustainable consumption research concerns the lack of coherent data on the environmental and social sustainability of different patterns and levels of consumer demand. Several projects have responded to the demand for empirical measures of the environmental impact of consumption. They include; Material Intensity per Service Unit (MIPS) (Schmidt-Bleek, 1993), 'ecological footprints' (Wackernagel and Rees, 1996) and 'environmental space' (MacLaren et al, 1998). Attempts to create similar empirical measures of social impacts of consumption are underway (e.g. social accounting in Hockerts, 2001).

System complexity and potential rebound effects make it imperative that the social, environmental and economic implications of strategies for sustainable consumption are researched and understood.

Implementing sustainable consumption

The environmental consequences of mass consumption have created contention regarding the future viability of continued economic growth (Douthwaite, 1992). There have been proposals which advocate a slow down of the economy, known as steady state economics (Daly, 1992), an economic process which some argue is inevitable and imminent (Fleming, 1994 and 1998). There are a number of critics of steady state economics who castigate the pursuit of low growth as a policy goal. Both North (1995) and Beckerman (1995) argue that global future well being is reliant on sophisticated technological advances, and that this and environmental quality are dependent on consumption and greater growth.

The sustainable consumption construct encapsulates the waste management hierarchy (reduce, reuse and recycle) and incorporates the twin themes of eco-efficiency and consumption change discussed above. There are several methods available by which the

first and most effective option of the waste hierarchy, reducing the quantity of discarded goods can be achieved. They include:

- altering the product service mix in order to improve resource efficiency (e.g. Giarini and Stahel, 1993; Jackson, 1996; Oosterhuis et al, 1996; Schrader, 1996; Rocchi, 1997; Elsen, 1997; White, Stoughton and Feng, 1999), some caution is required because sustainability benefits are not inherent and product service systems must be designed for sustainabiliy (Cooper and Evans, 2000)
- reducing consumer desire, through changing social structures and advocating citizenship rather than consumership (Hansen and Schrader, 1997).
- optimising product life spans (Cooper, 1998; Kostecki, 1998)

The latter is perhaps the more practical option and provides the foundation for this research. Over the past decade research interest in the environmental potential of the strategy of optimisation of product life has grown (Stahel and Jackson, 1993; Cooper, 1994; Heiskanen, 1996; van Hinte, 1997 and Kostecki 1998).

2.4   Exploring product life

This section explores the concept of product life. It provides key definitions, a description of the historical evolution of the product life debate, an overview of the potential of product life optimisation as an environmental strategy and a discussion of the distribution of responsibility for product life across the production and consumption framework.

2.4.1   The 'product life' construct

Different product categories are by their nature susceptible to varied product lives. The two main product sub categories are non-durables and durables. The focus of this research is directed at durable products.

Product life can be defined in several ways, table 2.2 outlines a number of proposed definitions that have been identified in the literature. These are used throughout this thesis to clarify the discussion. It is inevitable that perceptions of what constitutes an optimal life, will vary according to who is making the decision, producer, consumer or public policy maker (Kostecki, 1998).

Table 2.2 Provisional categories of product life

Technical life	The life-span that the product is designed to achieve
Economic life	The maximum length of time the product can be used until its total costs (over complete life-cycle) exceed those of purchasing a new one. This is time relative and, therefore, it can not be determined at the time of purchase
Actual life in use	The actual life-span of the product in use before final discard (even if it would continue to function effectively)
Psychological life	The perceived life-span of a product from the perspective of the individual consumer. This is influenced by their personal preferences, values and attitudes, and more widely by socio-cultural factors
Replacement life	The period of ownership by the first owner
Service life	The product's total life in use from the point of sale to the point of discard
Optimal life	The length of time that a product can function effectively prior to its environmental cost exceeding the environmental gain that could be achieved by its replacement
Sources: Packard,1960; Ruffin and Tippett, 1975; Cooper, 1994a; Heiskanen, 1996; Granberg, 1997.	

Obsolescence is the term used to define some form of curtailment of product life. Several forms of obsolescence are identified in the literature; there is some contention with regards to definition (Cooper, 2004). Those selected for use within this study are outlined in table 2.3.

Table 2.3 Forms of obsolescence

(1) PLANNED	Deliberate reduction of technical life of products during the design process in order to sustain sales
(2) ABSOLUTE	Occurs when goods fail to function on a technical basis, related to product quality, design, inferior materials, production processes, to inadequate care in use and maintenance
(3) RELATIVE	A) Obsolescence through *dissatisfaction*
	occurs when improvements in new products (functions / technology) occurs due to changes in styling and fashion occurs due to economics - relative cost of new product in relation to effectiveness of current product occurs due to changes in symbolic significance (ability to meet abstract needs).
	B) Obsolescence through *change in consumer needs*
	occurs due to changing life circumstances occurs when changes in complementary goods cause incompatibility
Sources: Mayer, 1959; Packard, 1960; Kollman, 1992; Heiskanen, 1996; Granberg, 1997; Kostecki, 1998; Cooper, 2004.	

2.4.2 History of the product life debate

The history of the debate on product life and durability can be traced back to the late 1950s and the publication of a controversial paper in the Harvard Business Review containing the revelation that the majority of American business executives were

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concerned that the economy was over reliant on superficial product styling changes (Stewart, 1959). This supported the criticism that manufacturers were deliberately introducing superficial modifications to their 'new' products as opposed to waiting till they had developed real quality improvements. The theme of planned obsolescence was introduced into lay culture with popularised texts such as Packard's 'The Waste Makers' (1960) and to a lesser extent in Tofflers' (1970) 'Future Shock'. Over time concerns regarding planned obsolescence have grown. Manufacturers have been challenged with suggestions that products are designed with lower technical lives than could be achieved, impeding repair and disassembly and failing to stock parts for appropriate lengths of time (Packard, 1960; OECD, 1982; Papanek, 1985 and Giarini and Stahel, 1989).

Furthermore, consumers are suspected of having gradually reduced their expectations of product life for various product groups and thus psychological product life is believed to have undergone simultaneous decline (Cooper, 1994a). It is suggested, therefore, that actual life in use for many products has been increasingly curtailed.

Empirical evidence to support claims of a trend towards products with shorter life spans is sparse, limited by both geography and the types of product investigated (mostly electrical goods). The earliest research estimating service life was conducted in the US within the discipline of home economics, this work focused on discerning the service life of appliances for the purpose of long term household budgeting (Jaeger and Pennock (1957). Pennock and Jaeger published further work in 1964, expanding the number of durable household products investigated. They found that the service life of five durable household items actually rose over research period (1-3 years). This was a comprehensive study based on 17,500 US households. Ruffin and Tippett (1975) followed up their work and used the same method to determine the service life of seven types of household appliance. No significant differences were found between service lives of appliances observed since the previous studies. However, they did identify a trend in data indicating a shortening service life of products acquired that had been acquired pre-used.

During the late 1970s further research on service life expectancy was conducted in a project encompassing five Nordic countries. In the summary paper, Dahl (1980) notes that considerable decreases were found in the service life expectancy of vacuum

cleaners and washing machines over a five year period. This decline is linked to the impacts of technological progress in designs during this time, such as improved suction.

Concerns regarding declining product life are confirmed to some extent by work exploring product life cycles, which offers useful empirical indication of rates of adoption of innovations and trends in life cycle times. In 1980, research by Olshavsky indicated an overall decrease in the time frame of product life cycles (Olshavsky, 1980).

A further comprehensive study of product life was published by the OECD in 1982. The work drew attention to the complexity of trends in product durability and length of useful life. Their key findings included that there are considerable differences in product retention times across different countries and that there are substantial variations in average useful life by product type. It was also reported that the majority of manufacturers acknowledged that it was feasible to increase the technical life of most products but this design criterion was not pursued because of other competing variables such as fashion, technology change and efficiency (OECD, 1982).

Following this report the 1980s saw the publication of a number of papers investigating the role of relative obsolescence in declining product life. Box (1981) examined product life trends by product type in the US, showing that different products were susceptible to different forms of obsolescence. It was found that whilst washing machines were susceptible to obsolescence due to product failure, televisions, refrigerators and furniture were more prone to obsolescence due to dissatisfaction.

The growing importance of relative obsolescence was reinforced in Wilkie and Dickson's study of laundry and refrigeration appliances in the US (1985). This research revealed that complete appliance failure prompted only 36% of new purchases. Of the remainder, 24% were replacing an existing appliance that needed some repair, 26% cited a residential move or other change in circumstance and 14% were replacing appliances that were working well. Research by Bayus (1988) indicated that relative obsolescence was equally pervasive for televisions.

Similar findings were reported in a UK study of civic amenity sites (Hunkin, 1988). The investigation discovered that a quarter of discarded appliances were still in working order and that a further quarter only required minor repairs to re-function effectively.

The significant role of relative obsolescence in industrialised societies was further highlighted in a comparison of product life between developed and developing countries which revealed a negative relationship between product life and increasing material living standards (Pantzar, 1992).

Concerns regarding planned technical obsolescence re-emerged during the 1990s. Research conducted in the UK during 1990 identified that the durability of products such as kettles, irons and vacuum cleaners were decreasing (Department of Energy, 1990). Fairlie (1992) attributes this to over-reliance of government policy on recycling which he argues gives manufacturers leeway to avoid improving durability, and provides an implicit justification for reducing product life. It has also been highlighted that the distinction between durables and non-durables has become increasingly blurred, with a growing trend towards previously durable products becoming 'disposable' (Cooper, 1994a). Schofield (2002) illuminates the case in the computer printer market where lowering prices are creating a situation in which it is becoming more economically viable to buy a new printer than purchase a new print cartridge for an existing model.

Pantzar (1992) argues that despite growth in the depth of variety of products (i.e. number of alternatives within a product group); that differences are increasingly superficial, being aesthetic rather than technical. He reasons that industries tend to favour minor modifications to products, as it makes greater economic sense for them to make efficient use of production capacity. The problem that faces researchers is that to judge what constitutes a real product improvement as opposed to a superficial one is subjective (Conn, 1977). This makes it impossible to define a socially optimal pace of product introductions and, therefore, difficult to assess empirically the role of manufacturers in supporting relative obsolescence.

This issue has been raised within the field of fashion theory, Sproles (1981 pi 21) commented that lack of understanding of how '*consumers identify and mentally process the existence of new styles'* and '*how much change is required before an object is perceived as different to its predecessors'* were critical limitations as '*consumers perceptions determine the minimum and maximum boundaries of change acceptable at any one time*'.

During the 1990s a number of key theoretical papers on product life were published including those of Cooper (1994a), Heiskanen (1996), van Hinte (1997) and Kostecki (1998). In synopsis these have established; the requirement for optimisation of product life, the conditions under which such a strategy can engender environmental benefits and the potential benefits that could be achieved from pursuing this as a business strategy.

At a practical level two UK studies were identified that have contributed to understanding of product life in the 1990s. The first was an investigation of the disposal of bulky household waste, which evaluated the condition of unwanted items (Anderson, 1999). The project revealed that around 77% of upholstered furniture, and 60% of appliances disposed at civic amenity sites could be repaired or refurbished. The second was a study by Cooper and Mayers (2000) that provided the first comprehensive insights regarding the age of current and recently discarded household appliances, and the comparative roles of different forms of obsolescence prompting their disposal. Prior to this, estimates of age (used for waste volume forecasts in waste management research) were calculated on the basis of estimated life span data, derived from sales volumes and market saturation levels. Such estimates were acknowledged as unreliable as they failed to address what was happening to products not necessarily entering the waste stream (i.e. they concealed product reuse).

The issue of repair is fundamental to the product life debate. However, very little data are available on trends in the frequency and distribution of repairs, across product type, time or space. Exceptions include a US survey conducted by Ziebarth (1992), a report by Consumers International (1998) and more recently a comprehensive survey of just over a thousand independent repairers in the UK, conducted by the Office of Fair Trading (2002). It appears generally accepted that there has been an overall decline in repairs and this is frequently linked to costs of repairs relative to the price of products themselves. The environmental merits and limitations of repair have been overlooked.

The acquisition of pre-used products and the disposal of products for re-use are also important aspects of the product life debate. Again there is little research available. Work on pre-used products has covered the economics of second hand markets (e.g. Scitovsky, 1994 and Stroeker and Antonides, 1997), the sociology of buying used goods (e.g. McRobbie, 1989; Gregson and Crewe, 1997 and 1998) and business aspects of

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charity shops (Horne and Broadbridge, 1995 and Horne, 1998). Aspects of these papers infer the extension of product life through the redistribution of used goods, but this is rarely explicitly stated. The environmental merits and limitations of used goods markets have also been neglected.

Concerns about obsolescence and reducing life spans have also been expressed within other parts of modern society. For example, there has been steady academic interest relating to obsolescence within the built environment since the 1970's. Examples include, Nutt et al's (1976) study of obsolescence in housing; Pugh's (1991) research relating to the refurbishment of shopping centres; Lemer's (1996) study of obsolescence within infrastructures and Gann and Barlow's (1996) report which incorporated findings on the decline in the functional lifespan of office buildings.

In summary, the historical rise of the product life debate is arbitrary, with sporadic research encompassing the measurement of both technical and service life (using various techniques) and the examination of the relative roles of planned and relative obsolescence, for an array of different products in a number of different locations. The haphazard nature of this work impedes the cross comparison of data, and prevents the ability to draw conclusions regarding historical, geographical or product trends. Occasionally the data provided is also insufficient, for example service life data are often reported as an average figure without a measure of standard deviation to indicate the measure of spread. Despite these difficulties the evidence suggests that the current life of many durable products is not optimal.

2.4.3   Product life optimisation as an environmental strategy

The optimisation of product life involves a balance between the benefits and drawbacks of increasing durability or length of ownership, rather than the implementation of durability or extended use without consideration of its consequences (Cooper, 1994a).

The failure of products to achieve optimal life has important environmental repercussions. The manufacture and distribution of every new product requires significant amounts of raw materials, energy and supporting resources, and generates varied forms of pollution and waste. The more frequent the rate of product replacement the greater the burden that is exerted on future resource utility and pollution sinks. At

the end of consumption chain, more frequent product replacement leads to greater volumes of waste (Jackson, 1996).

As discussed above, although predictions regarding resource exhaustion (e.g. Meadows and Meadows, 1974) were found to be over cautious, there is still a global requirement to reduce material consumption (Cooper, 1994a). In their analysis of material flows the World Resources Institute (2000 p41) reported that despite advances in technology and economic restructuring leading to '*significant decoupling between rates of economic growth and material throughput*', overall reductions in waste volume and resource use had not been achieved. They concluded that policies accelerating the trend towards dematerialisation were required. The issues of enhanced greenhouse effect and the growing number of other environmental pollution problems being identified form additional key reasons for reducing the rapid turnover of products and aiming to optimise product life.

There have been a number of theoretical examinations of the potential of increased durability and product life extension as strategies for tackling the reduction of material and energy flows and reducing pollution. The first seminal paper exploring the relationship between product lifetime and materials and energy flows was written by Conn (1977), who concluded that it is fraught with complications. The OECD (1982) reported significant primary materials savings to be gained from strategies of resources recovery and product life extension. In their work Stahel (1986) and Stahel and Jackson (1993) have proposed an elaborate self replenishing system '*that minimises matter and energy flow, and environmental deterioration without restricting economic growth or social and technical progress*' (Stahel, 1986 p185). Their system contains a series of possible life extension activities cascading from product reuse to component life extension. They conclude that under specified conditions there is a role for extending product life as a strategy for environmental management.

The environmental merits and limitations of increasing durability were also considered by Sirkin and Houten (1994) in their cascade chain theory and by Ayres and Ayres (1996) in their work on closing the materials cycle. Sparse research was identified that empirically tested the theories proposed by these papers or that specifically measured the environmental impacts of declining product life.

During the 1990s the number of publications addressing the environmental merits of product life extension has risen and the debate has moved forward, catalysed by the publication of Agenda 21 (UNCED, 1992) which promoted it as a strategy for achieving sustainable consumption. Most of this research is critical of earlier work. Cooper (1994a) argues that the lack of evidence and hard data surrounding the product life issue make it 'wrong to focus the debate on product durability around historical trends' (p25). Those participating in the emergent debate conclude that historical trends are somewhat irrelevant, highlighting the importance of orienting ourselves to the future and what can be done to optimise product life now (Stahel, 1986; Durning, 1992; Cooper, 1994a). Product life is, therefore, a salient environmental issue, which sustainable consumption research needs to address. It is important to understand how and why variations in product life occur, in order to identify and implement plausible solutions.

The proposition of extending product life has not gone unquestioned. Conn (1977) identifies a number of implications that need consideration;

- the ratio of resource needs of a more durable product over its life time against those of a less durable product
- any changes in peoples' consumption patterns arising as a consequence of increased life span (frequency and/or magnitude)
- the possibility of substitution effects, arising from any potential savings that accompany extended product life
- the possible slow down in technological progress and introduction of more resource efficient alternatives
- that processes or materials used for increasing durability may cause greater environmental impacts.

Fears have been expressed that moves to extend product life may lead to increased inefficiency in energy consumption. Several recent papers support early replacement of old appliances on efficiency grounds (e.g. Haase, 2000 and Pew, 2000). In her research Heiskanen (1996) discusses the trade-off between efficiency and life extension on the basis of environmental merit for four durable sub-groups. Her work indicates that products using resources to function are most vulnerable to the trade off between durability and efficiency in the use phase. This emphasises the need to promote product life optimisation rather than maximisation.

Manufacturers have also contended that a policy of product life extension hinders innovation and creativity, thus preventing other environmental improvements. For example Fishman et al (1993) argue that obsolescence is the engine of technological progress. In addition, concerns have been raised that increasing product life may cause a decline in production, which may lead to unemployment and inflation (DeBell and Dardis, 1979), The OECD (1982) report that this is an oversimplification of possible effects.

Furthermore, there is also an undercurrent of more deep seated concerns. The strategy of product life extension is politically volatile, as it conflicts with the perceived need for continuous diversification and modification of product lines which supports the expanding industrialised economy. For businesses to remain competitive, they have to be innovative and introduce new product ranges (or imitate new product ranges) (Kostecki, 1998). This volatility has led to the large emphasis on recycling rather than reuse or reduction in government policy relating to environmental protection (Fairlie, 1992). The need for products to become obsolete may be seen as an inevitable consequence of the consumer economy. It is these perceptual barriers which represent the key challenge to product life extension (Heiskanen, 1996).

2.4.4   Discourse on product life responsibility

From a historical angle, much of the discourse on product life responsibility focuses on producers. This highlights the technical life span of products, in particular, the 'design' and 'introduction' phases, placing accountability firmly at the stage of production. Criticism is frequently directed at producers regarding planned obsolescence and declining product life, but this shadows the more complex and contentious issue of relative obsolescence.

It is arguable that manufacturers employ strategies of technical and relative obsolescence at the design phase as a response to consumer demand and behaviour. They may purposefully pursue low cost objectives, rather than durability, in order to keep prices competitive and because it is known that products are likely to be replaced which would make it irrational to use durable materials and designs (Heiskanen, 1996). Mayer (1959 p80) argues that planned obsolescence is not planned but occurs *'because business men react to changing conditions'*, i.e. competition with other producers. Furthermore Kostecki (1998 p11) argues that *'durable design usually leads to higher*

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manufacturing costs and few companies know how to turn these costs into a profitable investment.'

Within much of the literature the consumer is treated sympathetically. Kollman (1992) observes how consumers are restricted to the choices that manufacturers make available. This argument is reinforced by Heiskanen (1996) who indicates that consumers are limited by market supply and systemic constraints. Heiskanen and Pantzar (1997) believe that in most cases ordinary consumers are simply unaware of the impact of their consumption on the environment.

This situation is exacerbated by the lack of information available to consumers at the point of purchase regarding the technical durability of products. At present, consumers must estimate product life on the subjective basis of brand quality or previous experience. The hypothesis that price is indicative of quality is disputed (Burchardt, 2001). Sproles (1977) found that a positive price-quality association could only be inferred for 51% of the five product categories analysed. This gap in consumer information was further confirmed in a longitudinal study of price quality relations by Dardis and Gieser (1980). Furthermore it is often difficult for consumers to calculate and compare relative transaction costs at acquisition (Kollman, 1992).

Scandinavian research revealed that consumers rank durability as the most important characteristic of a product (Heiskanen, 1996). This supports the proposal that consumers require more information (Cooper, 1994b). Comparable with the findings of a National Consumer Council's survey (1989) in which consumers expressed desire for more information, Cooper and Mayers (2000) found that nearly three quarters of the UK population considered information on accurate data on expected life span to be extremely or very important. The majority (54%) considered the information currently available less than adequate. This reflects contemporary problems with environmental information more generally (OECD, 2002). Cooper and Mayers (2000) revealed a relatively even split in consumer attitudes to product life, 50% considered that appliances last as long as they would like them to, 45% that they did not last as long as they would like them to and 5% had no opinion, indicating that just under half of the UK population would probably favour a strategy of extending product life. This implies that there is considerable untapped market potential for more durable goods.

Even with knowledge, consumers who wish to buy more durable products may still be inhibited from doing so however by high initial outlay costs or the relatively high internal discount rate.

There is little information available regarding the consumers' influence on product life, yet increasing evidence of relative obsolescence, as outlined above, suggests that it is unrealistic to concentrate the debate simply around manufacturers. It is evident that the issues underpinning product life are more complex than simple-manufacturing solutions can address. Heiskanen and Pantzar (1997 p409) report that the problem with modern society is that *'knowledge and responsibility are so diffused among economic actors that no one really feels responsible'*. It is thus difficult to tease out the relative roles of consumers and producers.

One of the first attempts to distinguish between the responsibilities of manufacturers and consumers was proposed by Conn (1977) (see table 2.4.).

Within the UK government draft consultation paper 'Consumer Products and the Environment' the influence of consumer purchase choices on a product's life cycle was acknowledged (DETR, 1998), see figure 2.2. It was also acknowledged that there was *'scope for environmental gain through the choices made by consumers in the way they actually use a product and how they dispose of it'* (p10). However, no further information was given.

It can be seen that product life has also been judged the responsibility of producers within the sphere of law, as demonstrated by the comprehensive regulatory framework for consumer protection e.g. labelling, quality standards and statutory guarantees. In the past environmental regulation and pollution abatement was similarly focused on producers and through new regulations such as the European WEEE Directive and Integrated Product Policies, a large proportion of responsibility is still placed squarely with the producer (Oosterhuis et al, 1996; Scholl, 1996). Consumers have free reign over product usage, while the environmental costs of misuse or neglect are externalised. Hansen and Schrader (1997) provide a detailed a critique of the power of consumer sovereignty.

Table 2.4 Relative responsibilities of manufacturers and consumers for product life spans

Factors over which manufacturers generally have control:

- The technical design life of the product (affecting its potential reliability, its reparability, and its potential ultimate lifetime)

- The degree of quality control and testing

- The marketing strategy (advertising, stylistic obsolescence, provision of information to consumers about projected durability, etc.)

- The availability and pricing of spare parts

Factors over which consumers generally have control:

- The decision to purchase (which is likely to be influenced by the range and prices of available new and used products, the availability and accuracy of information about these products and anticipated changes in the consumers' needs, the availability and cost of credit etc.)

- Their treatment of the product in use (whether it is heavily or lightly used, whether it is treated roughly, whether it is regularly maintained etc.)

- Their decision to repair or discard (which is likely to depend on the availability and cost of trustworthy repair services, spare parts etc.)

- Their use of second-hand market (which is likely to depend on the availability of an appropriate market , the transaction costs involved, etc., as well as on the costs associated with alternative methods of disposal).

Source: Conn, 1977.

Figure 2.2 Influence of consumers on a product during its life cycle

Source: DETR, 1998.
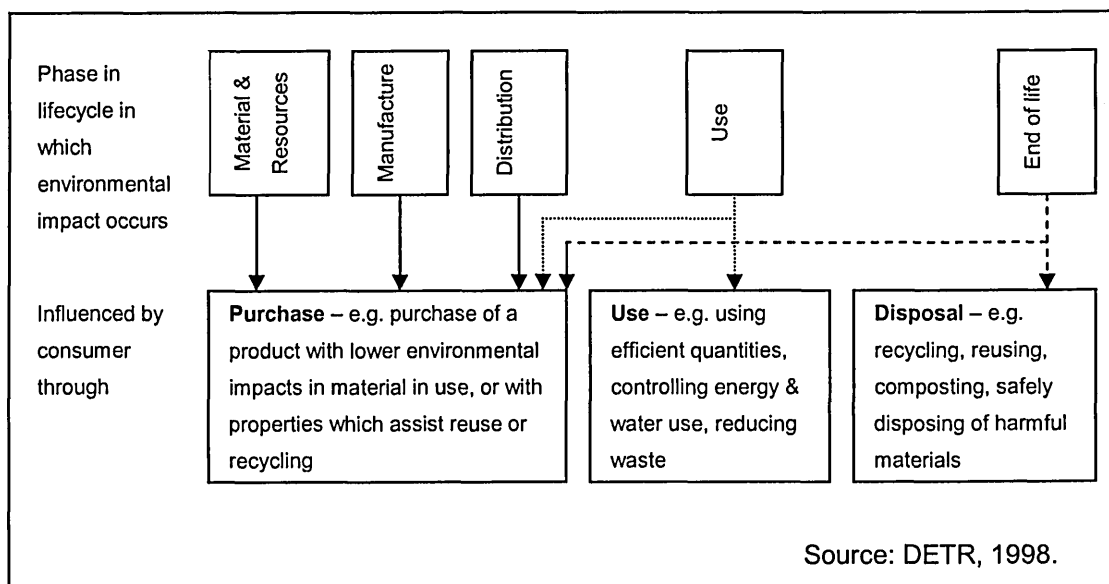
To omit the contribution of the consumer to reduced product life is, therefore, inappropriate. The view postulated in theoretical studies on the economics of durability of consumers as utility maximising, perfectly rational and in possession of all the necessary information is flawed. It is unlikely that consumers maximise utility over the total duration of a product's life in a calculated fashion (Stahel, 1986). There is increasing concern that consumers are replacing functioning and reparable products (McLaren et al, 1998). Research suggests that product replacement is frequently influenced by styling, new features, concern for hygiene and the advertisement of goods rather than technical failure, hence consumers are increasingly responsible for prematurely cutting short the life-span of products (Packard, 1960; OECD, 1982).

This indicates that consumers are motivated by more than simple economic cost / benefit considerations. Reflecting the broader principle of environmental research that it is *'both relevant and important to study the pre-requisites of individual consumer behaviour'* (Ölander and Thøgersen,1995 p347). This demonstrates the need to heighten understanding of the consumers' influence on product life and consider the sensitivity of consumers to wider socio-cultural forces. The effects of regulation such as Extended Producer Responsibility with the potential to encourage products designed with increased life span are diminished if consumers dispose of them prior to failure.

The fact that only recently have 'users' of products been considered as playing important role in product life debate has impeded current understanding of this concept. With the exception of Cooper and Mayers (2000) no statistically significant or detailed research on behaviour relating to the use or disposal of household products was found (and this study is restricted to electrical products). Their research supports the view that design alone does not determine product life. They conclude that product lives are dependent on large number of factors involving both producers and consumers across the life span and that *'further research was required to understand how household behaviour through the product life cycle from acquisition through to disposal affects product life'* (Cooper and Mayers, 2000 p21).

2.5   Product life and consumers

This section examines the significance of consumers' contribution to the product life debate. It explores the limited research on the consumers' influence on product life,

identifying current trends. Furthermore, it addresses the issue of explanation and causality examining factors affecting consumers' influence on product life.

2.5.1 The consumers' influence on product life

Research exploring the relationship between consumers and life span of household goods is scarce. The review of literature revealed that there is no single comprehensive study of the consumers' role in determining product life. The focus of the majority of studies identified is on negative influences that prematurely curtail products' service lives. Few papers have considered their antithesis (i.e. the consumers' influence in optimising product lives), examples include work on consumption restraint (e.g. Shchryar et al, 2001) and conservation (Granzin and Olsen, 1991; De Young, 1996).

Structured under the headings of each stage of the consumption process, the following sections draw together the disparate pieces of research exploring the consumers' influence on product life.

Acquisition

Evidence based on small or convenience samples or speculation (e.g. Wilkie and Dickson, 1985; Hunkin, 1988; Cooper, 1994b) suggests that consumers influence product life in acquisition by

- acquiring products impulsively and then not using them (Rook, 1987, Trocchia and Janda, 2002)
- failing to carry out comprehensive search undertaking little information-seeking behaviour and not consulting independent information sources
- rejecting second hand products (Cooper and Mayers, 2000)
- buying new replacement products because of modifications to style and function (e.g. Dahl, 1980)
- lowering their expectations of product life and accepting products of inferior quality
- accepting disposable products in replacement of their durable counterparts (Cooper, 1994a)
- valuing other attributes above durability such as cost, novelty, compatibility and fashion (Kostecki, 1998)
- ignoring life cycle costs e.g. energy efficiency (DeBell and Dardis, 1979; Kollman, 1992)
- cutting short the life span of products that were acquired used (Pennock and Jaeger, 1964)

Ownership

Evidence based on small or convenience samples or speculation (e.g. Stahel, 1986; Uusitalo, 1986; Harrell and McConocha, 1992; Mann, 1992) suggests that consumers influence product life in ownership by

- neglecting maintenance which leads to premature failure
- not taking action when dissatisfied with a poor quality product (Day and Ash, 1978)
- failing to follow instructions carefully
- being ignorant of repair costs (Alder and Hlavacek, 1976)
- being unaware of the hidden costs of use (Kollman, 1992)
- failing to consider repair before replacement (Wilkie and Dickson, 1985; Cooper and Mayers, 2000)
- failing to learn or use home skills and crafts to optimise product life
- storing unwanted goods, the life of which could be optimised by others
- failing to find more creative strategies of product re-use that would facilitate the 'remaining utility and residual value within products to be exploited prior to final disposal' (Cooper and Mayers, 2000 p18)

Warde and Shove (1998) argue that the lack of understanding of the habits and conventions which influence the ways that products are used leaves '*a real gap in our understanding of environmentally significant forms and practices of consumption*' (p10). It is, therefore, important that the profile of the use phase is raised within the environmental study of consumption.

Disposal

Evidence based on small or convenience samples or speculation (e.g. Jacoby et al, 1977; DeBell and Dardis 1979; Hanson, 1980; Hunkin, 1988; Harrell and McConocha, 1992) suggests that consumers influence product life in disposal by

- disposing of functioning products due to relative obsolescence (e.g. DeBell and Dardis, 1979; Dahl, 1980; Box, 1983)
- disposing of products as "ultimate waste" rather than using other routes of disposal
- failing to find more creative strategies of product re-use

This overview reveals that much of the research undertaken in this field is theoretical and based on speculation and assumption. Where field investigations have been conducted these are primarily descriptive, focusing on isolated stages of consumption, or certain aspects of the product life debate, such the extent of different form of

consumer obsolescence. This work has provided summary figures, such as x number of refrigerators discarded still functioned. There is a scarcity of empirical data concerning the consumers' influence across the entire consumption cycle (i.e. acquisition, ownership and disposal).

2.5.2 Factors affecting consumers' influence on product life

The processes and reasoning underlying consumer behaviour and decisions that influence product life have to a large extent been ignored. Even when demographic information has been collected this was not always explored in relation to consumption trends data e.g. DeBell and Dardis (1979). During the literature review a number of factors were identified across disparate pieces of research that were considered to affect the consumers' influence on product life in acquisition, ownership and disposal. These are summarised below. Again the majority of the research identified is based on small or convenience samples or speculation.

Individual drivers

- Several studies (e.g. Pennock and Jaeger, 1964; Dahl, 1980; Cooper and Mayers (2000) have explored the relationship between demographics and the consumers' influence on product life but findings are not conclusive.
- Individual susceptibility to the desire for change has been linked to the rate of relative obsolescence (van Hinte, 1997).

Situational drivers

- Cost of new products relative to costs of repair is triggering the decline in repair work (Adler and Hvlacek, 1976; Stahel, 1986; Cooper, 1994a; Consumers International, 1998).
- Household income affects ability to pay for higher quality more durable product, the volume of used goods in the home and relative obsolescence (Cooper and Mayer, 2000). Higher per capita income has been linked to reduced consumer concern for product quality retention (Kostecki, 1998).
- Perceived risks were identified as influencing several trends. For example products were stored in the event that they may be needed in the future (Cooper and Mayer, 2000).

Cultural drivers

- Cultural beliefs, that the new is better than the old, and that progress demands change, support the pervasiveness of relative obsolescence (Mayer, 1959).

- Increasingly harried lifestyles and time constraints have been linked to a number of trends associated with declining product life, such as reduced maintenance (Schor, 1992; Kostecki, 1998).

- People are argued to be attaching less value to caring for products (Knapper and Cropley, 1982).

- Older or reused goods are increasingly seen as a measure of poverty rather than indicators of a person's resourcefulness or good husbandry (Stahel, 1986).

Product drivers

- Attributes of products have also been linked to the trends in consumers' influence on product life, such as their ability to age with dignity (van Hinte, 1997).

- The declining reparability of products has also been highlighted along with issues relating to availability of spare parts (Conn, 1977).

- The rate of technological innovation and new product introduction that render products obsolete or incompatible (Kostecki, 1998)

When drawn together these pieces of research provide a limited rudimentary overview of possible factors affecting consumers' influence on product life.

This overview of research has identified that at this time there is no suitable framework for studying the issue of product life from the consumer perspective. This requires further attention before the research aims and objectives can be addressed. It also highlights the requirement for an integrative consumption life cycle approach encompassing acquisition, ownership and disposal.

2.6   Summarising the research issue

In this chapter the literature underpinning the research issue of the consumers' influence on product life and the context in which it exists have been described. In summary, this process has illuminated that there are escalating concerns regarding the deleterious environmental and social impacts of current and forecast levels of global consumption. One of the strategies identified for alleviating the growing pressure on natural resources and achieving more sustainable consumption is the extension of product life.

Responsibility for product life has traditionally been seen as the remit of producers, however increasing evidence suggests that consumers exert considerable influence on the service life of products across the consumption cycle. Current understanding of consumers' influence on product service life and what affects it are limited. It is agreed that greater knowledge is required (Kostecki, 1998; Cooper and Mayers, 2000) and that this has substantial implications for a large number of parties across the whole of the product life cycle.

In summary, to increase the sustainability of current consumption patterns it is necessary to illuminate the constraints upon more sustainable consumption of products. The research addresses part of this requirement by building an understanding of the real and perceived barriers to consumer optimisation of product life (Objective 3). To achieve an understanding of the barriers to the optimisation of product life it is necessary to identify explanations for differences in patterns of consumption and consequent variations in service life (Objective 2). The identification of such explanations requires knowledge of how different patterns of consumption across acquisition, ownership and disposal affect service life (Objective 1).

In addition, the review has revealed that no suitable conceptual framework currently exists that encompasses all of the relevant factors for examining this issue. The construction of a new detailed conceptual framework is, therefore, required. Maxwell (1996 p25) describes the conceptual framework as '*the system of concepts, assumptions, expectations, beliefs, and theories that supports and informs your research*'. Such a framework provides valuable support to the research process, establishing the structure within which the research questions are bound and facilitating the logical translation of theory into a viable study. It is useful for conceptualising the relationships between different aspects of the research and setting the parameters within which the work is set. The development of the conceptual framework for this research is outlined in chapter 3.

CHAPTER 3 – CONCEPTUAL FRAMEWORK

3.1 Introduction

The previous chapter has demonstrated that there is a paucity of research examining the consumers' influence on product life. This thesis seeks to provide the first comprehensive study of the role of the consumer in determining product life across the whole of the consumption process (i.e. acquisition, ownership and disposal). In addition, in the light of the problems posed by unsustainable patterns of consumption and the potentially critical role of the consumer, it aims to identify the factors affecting consumers' influence on product life. This chapter describes the progression from this abstract set of aims and objectives to the development of the specific conceptual framework of this research. It highlights and justifies the decisions that underpinned this process, guided by the intellectual traditions identified in the previous chapter.

Figure 3.1 Structure of conceptual framework development

Stage 1 - Identify	→	Specify key research concepts *(s3.2)*
Stage 2 - Define	→	Review literature, define concepts *(s3.2)*
Stage 3 - Framework	→	Formulate new conceptual framework *(s3.3)*
Stage 4 - Scope	→	Delineate parameters of the thesis *(s3.4)*
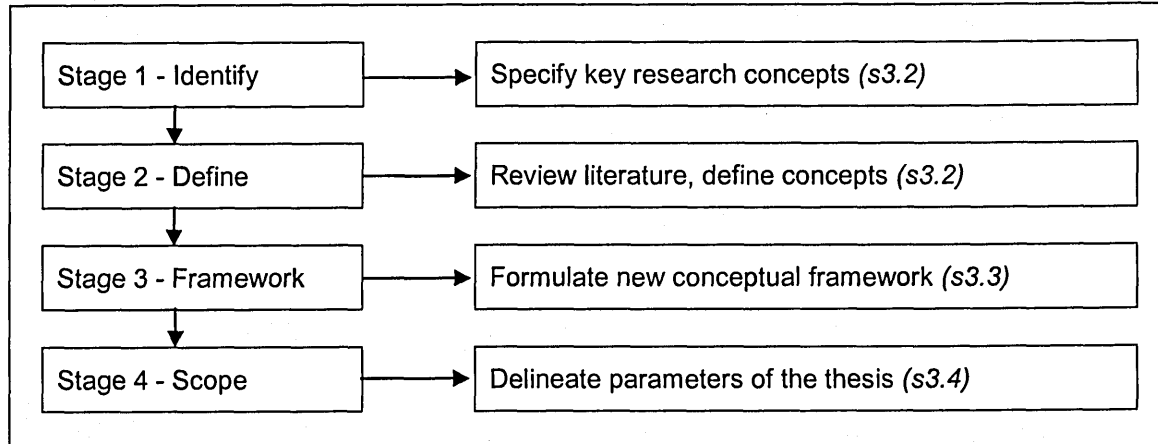
The chapter is divided into several sections (see figure 3.1). In 3.2 the key research concepts are identified and defined, substantiated where possible from previous research. Section 3.3 outlines the process of formulating the conceptual framework for the research problem, delineating and justifying each of the steps undertaken and presenting the final version. Section 3.4 establishes the scope of the research, examining decision making within the context of product specificity. It includes a review of the

available literature for each of the selected product groups. The chapter is summarised in 3.5.

3.2   Defining the key research concepts

The review of existing research concluded that before the study proceeded it was necessary to construct a new conceptual framework specific to the research problem. In line with recommended best practice, the first stage of developing the new framework involved identifying and then defining the key concepts upon which the thesis is built (Maxwell, 1996; Vaus, 1996). Concepts are tools for summarising sets of ideas, behaviours, attitudes and characteristics that are considered to have something in common. Concepts do not have fixed meaning and therefore have to be defined in the context of the research (Vaus, 1996, p48).

On the basis of chapters one and two, two clusters of concepts were identified. The first cluster offers short definitions of relatively simple concepts, including
- o   Product life
- o   Domestic products

The second cluster is far more complex, involving the evolution of existing theoretical models, including
- o   The consumption process
- o   Consumers' influence on product life
- o   Classifying consumers' influence on product life
- o   Factors affecting consumers' influence on product life

Each of these concepts are defined and discussed below. The process of definition involved reviewing existing academic and lay terms and interpretations and then choosing one, or a mixture of several, and justifying the choices made. Where relevant literature was not available a number of self defined interpretations were developed and corroborated using informal interviews and focus groups with colleagues. Several of the concepts are extensive, and are therefore broken down into multiple component parts.

3.2.1 Product life

As discussed in section 2.4.1, there are varied definitions of product life within past research from different disciplinary sources. This research employs the concept of a product's 'service life', defined by Cooper (1994a) as *'the product's total life in use from the point of sale to the point of discard'* (p4). This is modified slightly with the additional detail that this concept is per specific owner or household i.e. recognising that a product can have multiple service lives with several owners.

3.2.2 Domestic products

The final concept within the first cluster to require clarification for inclusion within the research framework is domestic products. The research is based on 'ordinary consumption', exploring patterns of consumption decisions and behaviour for everyday objects, it therefore excludes products given as gifts or prizes which may take on additional significance. The choice of products forms part of the limits of the thesis. The rationale and method of selecting products for investigation is discussed in section 3.4 and a review of the chosen products is provided in 3.5.

3.2.3 The consumption process

The thesis aims to examine the consumers' influence on product life across the whole of the consumption process. It is necessary, therefore, to clearly define the consumption process and its constituent parts. Consumption is defined within the Chambers English dictionary as 'the act or process of consuming or using up'. Within this research the process of consumption is explored from the individual consumer's perspective, following the lifecycle of a product from its acquisition, through use and ultimately to disposal.

There are several comprehensive models or frameworks for studying the entire consumption process. One of the earliest models identified was the Inventory Ownership Cycle (IOC) developed by Boyd and McConocha (1996). Their model, illustrated in figure 3.2, applied research from the field of industrial logistics to establish a framework for studying household consumption processes. This forms the underlying structure for this research.

Figure 3.2 Consumer Household Logistics System

Model Stages → Pre-acquisition | Acquisition | Physical Possession | Disposition

Consumer Activities → Decision Making | Take Title → Storage → Disposal → Usage

Single arrows indicate movement or transport of goods

Boyd & McConocha (1996)
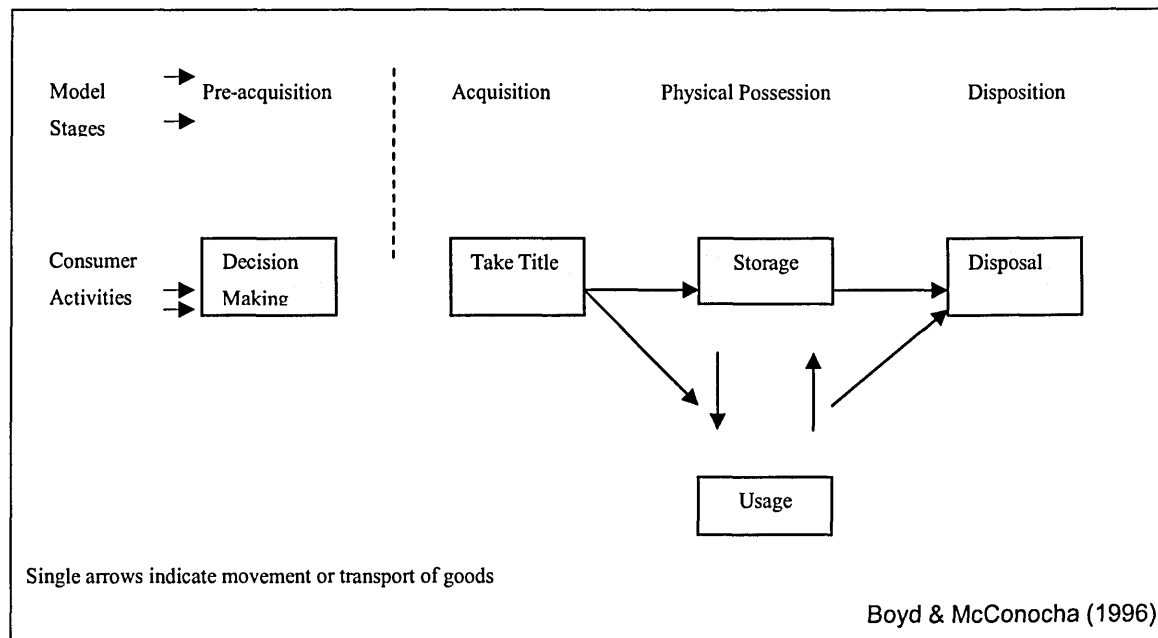
The model of the consumption life cycle, incorporating acquisition, ownership and disposal advanced by Antonides and van Raaij (1998) and the stages in the useful life of a product (which incorporates the consumption life cycle) outlined by Kostecki (1998) were also influential in structuring this concept. More recently work by Bagozzi et al (2002) has highlighted the importance of studying acquisition, use and disposal of products, services and practices within the domain of consumer behaviour.

Despite few models encompassing the consumption life cycle as a whole, the individual stages of consumption have been defined and modelled independently by numerous researchers. These frameworks are predominantly highly detailed and void of any temporal element. These studies have been used within this research to supplement Boyd and McConocha's IOC.

The terms used to describe each of the stages of consumption and their individual components are outlined below along with discussion of how they are interpreted within the context of this research.

Acquisition

Boyd and McConocha's pre-acquisition and acquisition phases are discussed in this thesis under the umbrella of acquisition. Acquisition incorporates a composite of all the decisions and actions accompanying the process of taking title of a product including

- problem recognition
- search
- evaluation of alternatives and preference formation
- intention
- action

The sequence of these decisions and actions may not be linear and may not incorporate all the aspects identified. Substantial research has been undertaken to understand acquisition within several disciplines, particularly marketing (Kotler, 1991).

The work of Srinivasan (1990), DeBell and Dardis (1979), (Kotler, 1991) and Antonides and van Raaij (1998) and a number of Mintel reports (1998, 1999a, b and c) were particularly helpful in informing concept development for this stage of consumption. Their work is synthesised here to a simplified level to give a definition and an overview of each of the components identified.

- Problem recognition

The basis of any volitional decision to consume involves an initial recognition of a problem based upon a need or want. This leads to a question of whether to buy or rent. The transformation from awareness of a problem to a reaction is temporally complex. In the event of an impulse purchase the process is instantaneous whilst on other occasions the decision to act on the problem may never be made. These extremes have received particular interest in the literature, e.g. research on impulsive behaviour (e.g. Rook, 1987) and research on restraint (e.g. Gould et al, 1997 and Shchryar et al, 2001).

- Search

Once the decision is taken to react to the need or want, a process of search is then employed to identify the desired product. Search involves the pursuit of information upon which a consumer bases the decision of which product to buy and where to buy it. Wilkie and Dickson (1985) argue that it is difficult to specify exactly what consumer information search means. Various measures used in past research include:
- number of brands considered
- number of stores shopped
- number of information sources used

- types of information sources used; friends and family, independent consumer reports marketing information sources (e.g. advertising) and direct inspection
- total purchase consideration time
- an index incorporating all or some of these (e.g. DeBell and Dardis (1979))

There is a significant body of research on consumer information search, with work based upon psychology, economics and consumer information processing. Srinivasan (1990) provides a comprehensive review of empirical studies. Past research has dedicated effort to developing typologies of consumer information search; most include aspects of environment, situation and consumer characteristics. Search is often included in models of consumer information processing (Schmidt and Spreng, 1996).

    o   Evaluation of alternatives and preference formation

The process of search generally reveals a range of options from which consumers select a choice based upon their preferences. The process of evaluation of alternatives is based upon a set of criteria. Criteria may be formed both before and during the search process. In their research De Bell and Dardis (1979) explore preference formation through the examination of reasons for appliance brand and store choice. They also examine major product features considered. The assessment and prioritisation of desirable product attributes by consumers is used frequently in market research.

Much of the research addressing environmentally responsible purchase practices has been limited to the evaluation of products designed for improved environmental performance, such as increased energy efficiency. This work often considers the evaluation of products that are non durable, such as packaging, disposable items and consumables (used up - washing powders etc.).

    o   Intention

Once the preferred product has been identified the consumer is said to have intention. The translation of intention to behaviour has been investigated by many academics (e.g. Azjen, 1988 and 1991). There are large numbers of studies that address the failure of a positive attitude or intention to be translated into action, across several disciplines. Within the study of environment and consumption, Ölander and Thøgersen (1995) propose the 'Motivation-Ability-Opportunity' Model for understanding factors that moderate or impede the link between attitude and action.

o   Action

The act of acquisition involves actually purchasing, ordering or agreeing to accept a product. Products may be bought new or used. Data on acquisitions of new goods is available but for used goods is scarce.

It is necessary to acknowledge that certain modes of acquisition bypass or significantly modify the components identified above, which is why the term acquisition is employed as opposed to buying. For example, products may be received as gifts (new or used), rented or borrowed temporarily.

In addition, it is important to acknowledge that the action may be tempered by the nature of the product. It could be that this is the first product of its kind to be bought i.e. a new product, a replacement for a similar or identical product that has been disposed of, or a duplicate product.

The components of acquisition to be incorporated into this research and the options available within each are summarised in table 3.1.

Table 3.1 Components of acquisition

COMPONENTS OF ACQUISITION	OPTIONS AVAILABLE	FURTHER OPTIONS
Problem recognition	Respond to need / want	New, replacement or duplicate product
	Ignore need / want	
Search	Planned	From comprehensive literature review to simple product comparison
	Impulsive	
Criteria formation	Product related	Aesthetics, brand, build, cost, functions
	Other	Circumstances, value added services
Acquire product (mode)	Buy new or used	Rent or buy
	Receive new or used	Receive or borrow

Ownership

Boyd and McConocha's stage of physical possession is described within this research as 'ownership' (subsumes rental). This stage of consumption involves the exchange of products between usage and storage and includes maintenance requirements.

Ownership incorporates a composite of all the decisions and actions accompanying the period of owning a product including

- o product usage
- o product storage
- o product maintenance
- o product evaluation
- o problem recognition and reaction

As discussed in the literature review little attention has been given to consumer interaction with their possessions.

> *'We know very little about what individuals actually do with the goods they purchase, let alone about the time spent in maintenance, repair or even disposal.' (Campbell, 1995 p108)*

Boyd and McConocha (1996) delineated some aspects of possession but their study overlooked the progression from ownership to disposal. Research by Oakley (1977), Gregson and Crewe (1997), Granberg (1997), Roster (2001) and others is used to supplement the IOC in defining this concept. A simple definition and overview of each of the components identified are outlined below.

o Product usage

Usage occurs when the product is 'contributing to household well being, whether functional or aesthetic' (Boyd and McConocha, 1996). Most studies incorporating this component are sociological and have generally viewed usage from the perspective of the meanings of possessions and their higher order functions, rather than exploring how, where and when they are used from a practical perspective. For example, Livingstone (1992) explored how the use of technological domestic goods in the home is construed in terms of family interactions and Holt (1995) devised an abstract typology of consumption practices (e.g. for integration, experience etc.).

o Product storage

Product storage occurs when the product is not in use. Few studies explicitly investigating the storage of domestic goods were identified. Some aspects of how, when and why consumers store products has been included in work by Jacoby et al. (1977), Boyd and McConocha (1996) and Cooper and Mayers (2000). Their work illustrated the temporal complexities of storage, with short and long term storage decisions for

functioning and non-functioning products. It also highlighted the importance of real and perceived product characteristics to storage decisions.

o   Product maintenance

Within this research product maintenance is defined as activity that helps restore or retain product quality and usefulness, and facilitates continued product use. Maintenance may be undertaken on a routine basis or reactively as and when the consumer decides it is necessary. Boyd and McConocha (1996) divide maintenance into two sections, physical actions such as cleaning, and the collation and retention of paperwork. Within this research, the physical actions section is broken down into two further sub-headings, general maintenance (e.g. cleaning and following care procedures) and rejuvenation activities (e.g. repair, restoration and reuse).

Previous investigations of product maintenance are limited. Oakley (1977) conducted one of the earliest pieces of research relating to maintenance in her sociological examination of housework. The results, however, related to higher level meanings rather than a practical discussion of maintenance activities. Knapper and Cropley (1982) investigated Canadian attitudes towards the care and maintenance of property but the work was not product specific or about activities actually undertaken. McCracken (1986) referred to possession and grooming rituals that consumers employ but details were not comprehensive.

Analyses of rejuvenation activities (i.e. repair, restoration and reuse) are rare. Research exploring strategies of reuse of products within the home by the original owner are particularly scarce. Only one comprehensive study of reuse was identified in the literature review and this Mexican study was confined to consumable rather than durable household goods (Corral-Verdugo, 1996). With minor exceptions studies of re-use by others has also generally received little research interest (Scitovsky, 1994, Gregson and Crewe, 1997). Empirical studies that have incorporated analyses of repair are limited to electrical household products e.g. Adler and Hlavacek (1976), Ziebarth (1992) and Cooper and Mayers (2000). Rejuvenation activities are discussed further in the section on 'problem recognition and reaction'.

o Product evaluation

Once acquired, a product will be subject to periodic evaluations of its usefulness. The practices of assessing product quality and appraising product satisfaction during the total use phase have only recently received academic attention (Granberg, 1997; Fournier and Mick, 1999; Roster 2001). Prior to this, most studies on satisfaction were based upon the first few weeks of ownership (post-purchase dissonance). Fournier and Mick (1999 p17) highlighted the dynamic nature of satisfaction over time and the complexity of product evaluation concluding satisfaction was

> 'a context dependent process consisting of a multi-model, multi-modal blend of motivations, cognitions, emotions and meanings, embedded in sociocultural settings that transforms during progressive and regressive consumer product interactions'.

Their research was still confined to the relatively early stages of ownership (eight months after their initial acquisition).

Granberg (1997 p33) proposed the theory of consumers undertaking quality evaluation over time he argued that

> 'The life of a product hinges on a continuous process of re-evaluating its overall quality in relation to itself (absolute obsolescence) and in relation to other products (relative obsolescence) and that this process is accomplished by the user/owner of the product'.

No practical research, however, was undertaken with consumers to explore or test this theory.

Roster's qualitative study of dispossession (2001) outlines the importance of 'on going value and performance assessment' to eventual product detachment and consequent disposal. Other research on disposal has touched upon this when examining prompts to disposal but these relate to discarded items and not the decisions that led to products being retained.

o Problem recognition and reaction

Problem recognition occurs when the process of product evaluation identifies an issue. The consequent reaction will involve either action to redress the issue or to product disposal. There is considerable variety in possible problems and consequent reactions. Problem recognition will generally occur as a product evolves from being functional to becoming obsolete.

Ownership is considered within this research to involve a gradual change between two phases. The first is a functional phase in which a product is in a state where it is able to function effectively when required. This may include periods of time when the product is not in use but is ready for use. This contrasts with the second obsolete phase of ownership when a product is evaluated as being in a state where it is unable to fulfil its function effectively. This includes more than the product's technical ability to function (fitness). A product may also be considered to be in this obsolete phase when it is

- unable to fulfil its fashion function (despite operating effectively, changes in fashions reduce its functionality to the consumer)

- unable to continue to satisfy the consumers' technical needs (despite it operating effectively changes in technology reduce its functionality to the consumer)

- unable to function due to changes in the consumers' circumstances which make the product 'inappropriate' in some way (e.g. life stage changes make prams obsolete)

(Heiskanen, 1996, Cooper, 1994a)

The reaction aspect of this process may lead back to storage or rejuvenation activities (repair, reuse, update) or forwards to disposal. Boyd and McConocha's model does not recognise this pre-disposition decision making and action phase mediating the transition from ownership to disposal. No empirical research was identified that specifically addresses this.

The components of ownership to be incorporated into this research and the options available within each are summarised in table 3.2.

Table 3.2 Components of ownership

COMPONENTS OF OWNERSHIP		OPTIONS AVAILABLE
Product usage		Functional & / or aesthetic, regular / seldom
Product storage		Easy / limited access
Product maintenance		Routine / re-active
Product evaluation		Functional &/or aesthetic &/or symbolic
Problem recognition and reaction	Product broken	Repair, reuse, store or dispose
	Product obsolete	Repair, reuse, update, store or dispose

In addition, there are higher level psychological processes taking place during the ownership phase that may influence consumer actions such as product attachment. The changing higher level meanings of products over time have been linked to the process of moving from ownership to disposal. The literature on attachment and the meanings

of possessions to consumers is more abundant than work on the practical aspects of ownership (e.g. see Wallendorf and Arnould, 1988; Dittmar, 1992; van Hinte, 1997). This work is discussed further in section 3.2.5.

Disposal

Boyd and McConocha's stage of 'disposition' is described within this research as simply 'disposal'. Disposal involves terminating ownership and thereby getting 'rid' of or relinquishing possession of a product. It incorporates a composite of all the decisions and actions accompanying the disposal decision including

- o problem recognition
- o evaluation of alternatives and preference formation
- o intention
- o action

Although not receiving the considerable attention devoted to acquisition, academic interest in exploring and understanding the act of disposal is increasing. Research by Jacoby et al (1977), DeBell and Dardis (1979), Hanson (1980) and more recent work by Antonides (1990), Taylor and Todd (1995a and b) and Roster (2001) were helpful in informing the components of disposal. A simple definition and overview of each of the components identified are outlined below.

- o Problem recognition

As discussed in the previous section, during ownership a product undergoes a process of periodic evaluation. When a problem is identified remedial actions may be pursued or a decision may be made to dispose of the product. Current academic understanding of what prompts disposal and when and why is limited.

One of the earliest pieces of field research exploring underlying reasons for disposition choices was undertaken by Burke et al (1978). Their work examined demographic and psychographic profiles relating to different disposal tendencies. Following this there is a considerable gap in published research until Harrell and McConocha (1992) who undertook an investigation of the influence of personal factors on disposition choice. Their research indicated significant relationships between demographic data (gender, age, marital status, and education) across a range of different disposal decisions. In addition, it revealed that disposition choices were underpinned by a variety of

rationales. The roles of relative and absolute obsolescence as prompts to disposal of electrical household products were explored by Cooper and Mayers (2000).

The issue of problem recognition prior to disposal was given extensive consideration in Roster's (2001) qualitative study of dispossession. The research proposed a model identifying dispossession as a sequential process and not a single decision. The study identified three factors indicating the start of the process named detachment, which may take place over a lengthy time period:

- Distancing behaviour e.g. storage, hierarchical down grades, neglect
- Critical events e.g. major life transition, relative obsolescence
- On going value and performance assessment

This was followed by a process of severance, in which the consumer may perform a range of rituals to divest the product of its personal meanings, such as cleaning. It was suggested that this may also involve taking steps to ensure the future protection of the product by finding someone else who needs and will value it. The final stage of dispossession was argued to involve the process of reflection, assessment and finally closure.

o   Evaluation of alternatives and preference formation

The practical choices made on where and how to dispose of products are more widely discussed in the literature than prompts to disposal. Early research focused on providing taxonomies of possible actions once the decision to dispose had been made and outlining possible disposal routes (e.g. Jacoby et al, 1977; DeBell and Dardis, 1979; Hanson, 1980). The donor decision process relating to charity shops has been explored by Hibbert and Horne (1996 and 1997).

Large empirical studies of waste streams and disposal choices are rare. In the past there has been a reliance on waste statistics from estimates and government statistics. Recent exceptions include work by Cooper and Mayers (2000) that provided the first statistics on disposal routes, based on household reports, for electrical products. Their research indicated that the selection of disposal route was significantly different across product type dependent on size of product and its residual value.

The components of disposal to be incorporated into this research and the options available within each are summarised in table 3.3. Unintentional disposal through loss or theft may also occur, but is not given further consideration within this research.

Table 3.3 Components of disposal

COMPONENTS OF DISPOSAL	OPTIONS AVAILABLE
Product evaluation and selection of disposal method	Sell/Swap e.g. family, friends, auction, car boot
	Pass along e.g. family, friends, neighbour
	Donate e.g. charitable organisation
	Recycle
	Throw away e.g. public / private waste bin, illegal dump

On the basis of the above findings, figure 3.3, the framework of the consumption process, was designed. It is based on the IOC but is expanded to include the other relevant research identified. It indicates the stages of consumption and the various components of each process. The placement of the components of acquisition is shown in the diagram as a linear progression. This process is more complex than portrayed and on some occasions alternative sequences are likely. Within the ownership phase, storage, usage and maintenance are combined within one box as these occur simultaneously they are surrounded by the loop of product evaluation which leads to identification of problems, which may lead to rejuvenation and the product being put back into use, or, alternatively to disposal. This may also lead to search for a new product. Where disposal is chosen, numerous options are available.

3.2.4 Consumers' influence on product life

This research aims to investigate the consumer's role in determining product life across the whole of the consumption process. Chapter two concluded that there was no existing definition or taxonomy of the consumers' influence on product life across acquisition, ownership and disposal within current academic literature. It was necessary, therefore, to devise these specifically for this research. This section outlines the techniques used to formulate a definition and taxonomy, exploring and justifying the decisions of what to include and what to omit.

Fig 3.3 Framework of the consumption process
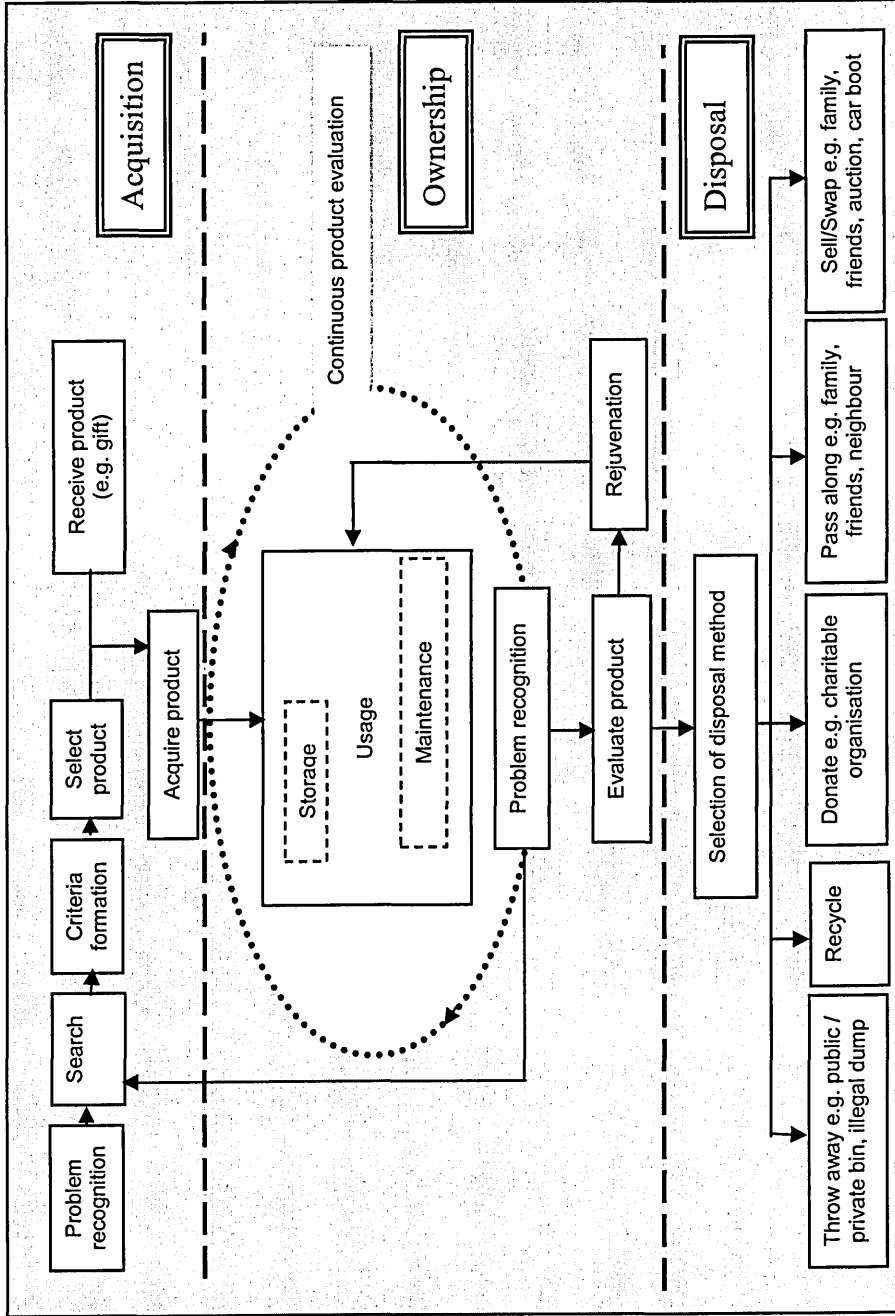
Source: Based on references cited in section 3.2.3

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The first stage of formulating the definition and taxonomy involved reviewing the available literature and identifying aspects of consumers' involvement in the consumption process that may influence product life. Despite theoretical agreement that consumers make decisions that influence the service life of products across acquisition, ownership and disposal (e.g. Heiskanen, 1996 p25), available research supporting this was minimal and fragmented.

Aspects of contributory activities within acquisition, use and disposal have been identified and classified within several projects, such as Conn (1977) and De Bell and Dardis's (1979) and Kostecki (1998). More generally waste research has developed taxonomies of disposal behaviour, the consequences of which have a direct bearing on product life (e.g. Hanson, 1980). In other work several strategies for product life extension have been identified, such as reuse, repair and reconditioning (e.g. Cooper, 1994a) but the degree of consumer involvement in such strategies and their effectiveness remains unclear. The replacement decision is acknowledged as a critical part of consumers' influence on product life, but the primary driver behind most research identified in this field was the desire to understand repeat sales and implications for product life were incidental (e.g. Bayus, 1988).

The majority of research exploring resource conservation from the consumer perspective was found to give scant attention to conservation activities relating to household products (and as a consequence product life). Much of this work focused on consumables such as energy and water. Where durables were considered e.g. in studies by Pickett et al (1993) and Granzin and Olsen (1991) the contentious indicator of whether waste products were donated for reuse was adopted. This is problematic as it could be argued that a conserving consumer would find ways to reuse their own products rather than passing them on for reuse by others.

The minimal research available to inform the development of the concept of 'consumers' influence on product life' led to an investigation of how other concepts within the field of environment and consumer behaviour had been explored and defined, such as green shopping. In recent years a growing recognition of the consumer's contribution to environmental problems has led to a substantial increase in the volume of research applying consumer theory to consumption related environmental problems (Ölander and Thøgersen, 1995). Unfortunately the distinctions between these studies

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and this research limited their usefulness. Firstly, many previous studies explored single action issues, such as recycling, that were not as complex as the consumers' influence on product life (e.g. see Vining and Ebreo, 1990). Secondly, for most projects that tackled multiple action issues, such as green consumption, the choice of actions representative of that concept were more obvious (National Consumer Council, 1998).

On the basis of the review, the decision was taken to use the consumption process as a framework to structure the concept of consumers' influence on product life across each of the three stages of consumption. A combination of techniques were employed to elaborate the concept including the review of literature, brain storming with other academics in the field of consumer research, focus group work and informal interviews with colleagues.

The working definition of the 'consumers' influence on product life' used within the research was finalised as 'the aggregation of factors explicitly related to consumers' direct participation in the consumption process that can influence the service life of products'. It includes all aspects of the consumer's involvement in the consumption process that may serve to lengthen or shorten a product's service life. The consumers' influence on product life is multi-dimensional, incorporating a range of elements such as decision making, skills, emotions, knowledge, and their practical application. The final taxonomy of the 'consumers' influence on product life', developed for use within this research, is summarised below. It is structured using the consumption process outlined in section 3.2.1.

Acquisition

There are a number of factors explicitly related to the consumer's direct participation in the process of acquisition, which may influence a product's service life. The factors identified are summarised in table 3.4; an explanation of each is then provided in the text below.

Table 3.4 Factors influencing product life in acquisition

COMPONENTS OF ACQUISITION	FACTORS INFLUENCING PRODUCT LIFE
Problem recognition	Prompt (i.e. timing of acquisition)
Search	Search process (e.g. impulse / researched) Source
Criteria formation	Product requirements (e.g. fashion / long life expectancy)
Acquire product (mode)	Product life anticipation

o   Prompt

Acquisition is often initiated as a response to the recognition of a problem. The nature of the problem and the consumer's reaction has important implications for product life. Where acquisition is prompted by changes in fashion or updated functions rather than the failure of an existing product, it is likely that the life span of existing products is cut short by the introduction of the new one. It is also suggested that this increases the likelihood that the new product will be replaced prior to failure. It is acknowledged that the consumer is not always in control of the timing of product acquisition e.g. when a product is received as a gift. Dahl (1980) argues that the replacement decision is the most direct contribution of households to the determination of life in use.

o   Search process

Search is an integral part of acquisition. It is proposed that the nature of the search process and the methods a consumer employs when selecting products is likely to affect a product's subsequent service life. Those consumers who plan a purchase in advance and undertake thorough research to ensure that the selected product meets all their needs are more likely to attain product satisfaction and consequently retain the product for a greater length of time.

The source from which a product is obtained may also affect product life. Borrowing or buying second hand, rather than acquiring a new product, extends product life.

o   Product requirements

The requirements that consumers prioritise when acquiring a product are arguably very important to its consequent service life. For example, prioritising high fashion over durability, or quality above cost, will influence which product is selected and how long it will last.

o   Product life anticipation

Service life may also be affected by the consumer's anticipation of product life at the point of acquisition. The length of time consumers intend to keep a product at acquisition will influence their behaviour towards the product during the ownership phase and ultimately impact upon the product's actual service life.

Ownership

There are a number of factors explicitly related to the consumer's direct participation in the process of ownership, which may influence a product's service life. The factors identified are summarised in table 3.5; an explanation of each is then provided in the text below.

Table 3.5 Factors influencing product life in ownership

COMPONENTS OF OWNERSHIP		FACTORS INFLUENCING PRODUCT LIFE
Usage		Commitment to product care
Storage		Modes of storage
Paper work		Adherence to guidelines / instructions
Maintenance		Regularity of maintenance
Product evaluation		Anticipated future life span / satisfaction
Problem recognition	Product broken	Search / evaluation / use of repair
	Product obsolete	Evaluation / alternative uses - rejuvenation or loan / lend

o Commitment to product care

Whilst a product is in use the consumer's commitment to its care is likely to affect the product's life span. Products treated with care during use will retain more of their original qualities, influencing future service life.

o Modes of storage

The choice of mode of storage for products that are not in use may also influence a product's service life. Proper storage facilitates the retention of product quality and thereby affects potential life span. It is acknowledged that storage is not applicable to all products. Storage is a complex phenomenon within the product life debate; those products infrequently used and stored for long periods benefit from extended service life, but are not necessarily optimised. In such cases there is an increased risk that products succumb to relative obsolescence prior to technical failure.

o Adherence to guidelines / instructions

Adherence to formal guidelines and instructions ensures correct use of a product over its lifetime and may influence product life. It is acknowledged that not all products have official instructions. In addition to formal instructions people have individual rules of use for many products to which they comply, these are used primarily to retain product quality and thereby extend service life.

o   Regularity of maintenance

Undertaking routine maintenance and servicing encourages products to work effectively, which subsequently influences their life span. The nature of these requirements varies according to product type.

o   Anticipated future life span

The process of product evaluation influences retention decisions. Evaluation leads to decisions regarding anticipated future life span, which will ultimately influence how a product is treated and directly influence actual service life.

o   Problem recognition

The reaction to any problem that occurs with a product during the ownership phase has a direct influence on future service life. How a consumer reacts to a product failure or breakage is critical. The degree of search for a solution and how this is consequently evaluated will directly affect residual service life.

Consumer reaction is also crucial when a product is identified as obsolete. Consumers may discard the product, choose to ignore the problem or react to extend service life by undertaking various rejuvenation activities, such as restoration or reuse.

Disposal

There are a number of factors explicitly related to the consumer's direct participation in the process of disposal, which may influence a product's service life. The factors identified are summarised in table 3.6, with an explanation of each in the text below.

Table 3.6 Factors influencing product life in disposal

COMPONENTS OF DISPOSAL	FACTORS INFLUENCING PRODUCT LIFE
Product evaluation and selection of disposal method	Timing (i.e. prompt for disposal e.g. fashions, functions, fitness and hygiene)
	Condition of disposed product (i.e. state of repair)
	Disposal option selected (i.e. landfill, recycle, re-use)

o   Timing

The timing of disposal is critical to consumers' influence on product life. What prompts disposal indicates the value that the consumer places on a product's life span. Disposing of products due to relative obsolescence, as defined in section 2.4, cuts possible service life short.

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o   Condition of disposed product

The condition of the product when the consumer has made the decision to dispose of it reflects the value placed on product life. Those who dispose of products that are not broken beyond repair are not making the most effective use of the services of that product. This is mediated to some extent by the cause, on some occasions disposal may be acceptable, for example where there are changes of circumstance that prevent continued use.

o   Disposal option selected

The disposal option selected is also considered part of consumers' influence on product life. Consumers can choose to dispose of products in ways that extend their life span by passing them on for reuse or reconditioning, recycling them or alternatively choosing an option that disregards any residual life.

On the basis of the above findings, Figure 3.4, a framework of consumers' influence on product life, was assimilated. This is built explicitly upon the consumption framework outlined in section 3.2.3. Those factors identified as forming the concept of the consumers' influence on product life are depicted with a bold outline.

Figure 34 Framework of consumers' influence on product life

Throw away e.g. public / private bin, illegal dump

Recycle

Donate e.g. charitable organisation

Pass along e.g. family, friends, neighbour

Sell/Swap e.g. family, friends, auction, car boot

3.2.5 Classifying consumers' influence on product life

On the basis of the discussion of the consumers' influence on product life (3.2.4) it became apparent that individual consumers make many choices that can influence product life at each stage of the consumption process. Within this thesis it is argued that some consumption choices lead to the lengthening of the service life of products whilst others shorten it. Hence, depending on their choices consumers may consistently lengthen or shorten product life or they may make a combination of choices that are inconsistent in terms of their impact on product life. It is therefore proposed that it is possible to classify consumers on the basis of how their choices influence the service life of products during acquisition, ownership and disposal.

The method of classifying consumers' influence on product life developed for the research is described and justified in detail in section 4.7.1. Within the thesis the term 'optimising' was selected to describe the consumption choices that lengthen service life. Those choices that served to shorten service life were defined as 'non-optimising'. Using the method described in 4.7.1 consumers were classified across a range from 'non-optimising' to 'highly optimising' for each stage of the consumption process and for each product according to the choices made.

The use of the term 'optimising' to describe consumers within this thesis does not incorporate the necessity for consumers to have made rational judgements about the optimal lifespan of products i.e. the trade offs between environmental costs and gains of replacing a product prior to failure[1],[2]. It is proposed within this thesis that consumers' influence on product life can be classified as more or less optimising, regardless of whether or not the ultimate outcome is optimal product life or whether or not such influences are deliberate.

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[1] Within the context of the thesis the possibility of 'optimising' patterns of consumption leading to non-optimal product life only occurs within the category of big kitchen appliances, where the efficiency of new models may make replacement prior to failure the environmentally preferable option. It is argued that reliable evaluations are beyond the capacity of individual consumers and that even academic work in this area e.g. assessing the trade-off between durability and efficiency is still in its formative stages.

[2] Consumer awareness of environmental trade-offs is explored during the qualitative investigation.

The term 'product life extending' and its antithesis 'product life curtailing' were also considered as descriptors for this classification system. However, they were rejected on several counts. The first, that these terms, especially the antithesis 'curtailing' implied a greater sense of deliberateness concerning choices that influence product life. The second that some of the factors explicitly related to consumers' direct participation in the consumption process that can influence the service life of products (identified in section 3.2.4) were not overtly product life extension activities. For example, the circumstances that prompt an acquisition may influence product life, but can not be viewed as extension activities. Finally, the term 'extending' implied a series of distinct activities; it was considered that this did not fully reflect the complexity of the classification process, i.e. that combinations of choices during consumption influence product life.

3.2.6 Factors affecting consumers' influence on product life

This research aims to explore and understand some of the factors affecting consumers' influence on product life. The review of literature (section 2.5.2) revealed that few studies had explored underlying reasons for the varied consumption patterns that lead to differences in the service life of products between consumers. Where related research was found, the factors identified did not form part of a coherent theoretical framework (with the notable exception of studies of waste disposal). It was necessary, therefore, to identify and classify a preliminary list of possible factors affecting consumers' influence on product life specifically for this project. This section describes and justifies the techniques used to achieve this and presents the findings.

The working definition of the concept 'factors affecting consumers' influence on product life' was finalised as 'the aggregation of factors, not explicitly linked to the consumption of a product, which may drive;
a) one consumer to influence product life in a different way to another consumer, or
b) the same consumer to influence product life differently at different stages of the consumption process'.

The identification and classification of these factors took place over several stages. The first stage involved reviewing the literature introduced in section 2.5.2, evaluating both the speculative and tested factors affecting consumers' influence on product life identified. Other literature was also reviewed that did not refer directly to product life,

but was considered of direct relevance to the research. This list of factors identified was considered incomplete and fragmented. In the following stage, therefore, the review was broadened to the identification of factors affecting other types of consumer behaviour with an environmental impact from the field of consumer research. During this process factors were noted that were considered transferable to this thesis. In addition, systems of classification and relevant theoretical frameworks were examined. The final stage involved brainstorming and discussing the initial list of factors with colleagues to produce a preliminary list and classification of factors affecting consumers' influence on product life.

Existing understanding of factors affecting consumers' influence on product life

The review of literature revealed that few studies had identified or explored possible factors affecting consumers' influence on product life. The majority of papers identified were theoretical, based on small convenience samples or observed only one specific aspect of consumption. Furthermore, most did not discuss their findings directly in the context of product life. These determinants are summarised below.

o Consumer characteristics and product retention

A small number of studies were identified that explored the determinants of length of product service life, i.e. the length of ownership. This body of research focused mostly on the role of consumers' demographic and socio-economic characteristics as possible factors affecting the service life.

Several such studies were conducted in the US. Pennock and Jaeger (1964) found some differences in age and gender relating to the service life of cars. They also found that service life was longer where products were personally selected rather than acquired incidentally for example with the purchase of a house. They found no relationship between service life and geographical area (rural farm / rural non farm and urban). They concluded that the lack of findings relating to broad classifiers such as region and urbanisation indicates that future research should focus on more limited classifiers such as family size, income and mobility of the family.

This work was continued by Tippett et al (1978) who sought explanations for variations in service life of appliances using selected characteristics of owner households,

including income, age of head of household and whether the household had moved within 18 months of the survey. Their research indicated a trend over time towards earlier disposal of appliances by younger families and higher income families. Moving house was found to have the greatest impact on shortening product life. Potential explanations for these findings were discussed such as the increased propensity of younger families to move home and their increased intensity of use of appliances. These were speculative and no investigation of underlying rationales was pursued.

Similar work was also undertaken in Nordic countries. A summary of these studies was produced by Dahl (1980) encompassing replacement patterns and service life expectancy of washing machines, vacuum cleaners and cookers. This explored the influence of age, household size and gross household income on service life. Significant findings included increasing service life expectancy with increased age of head of household, 30-40% higher service life expectancy in single person and low income households. Some speculative suggestions are made in explanation of these findings but no further research was conducted.

Income was also shown to influence length of product life in a study undertaken by Cooper and Mayers (2000). They found that lower income households owned significantly fewer products, owned more second hand products and significantly more of the products owned were over 10 years old.

Overall demographic and socio-economic indicators had limited capability of explaining variation in product life between consumers.

o   Ability, attitude and planned acquisition
Liebermann and Ungar (1997) found consumer capability of handling and evaluating life cycle information determined whether life cycle costs were considered during the acquisition process.

Several regular market research publications offer data on consumers' priorities during acquisition of a wide range of products. The determinants of these priorities are less coherently addressed. Cooper and Mayers (2000) found that those with a positive environmental attitude were significantly more likely to purchase premium quality appliances.

o Attachment and product retention

In the book published following the 'Eternally Yours' conference van Hinte (1997) theorised a positive relationship between product attachment and consequent longevity. One of the most comprehensive studies exploring the nature and process of individual attachment to individual products in ownership identified was conducted by Martin (1998). This research investigated attachment from the product angle, examining differences between products in how relationship-prone they were. It identified ten attributes that characterise relationship-prone products. The findings support the relationship between attachment and product longevity discussed by van Hinte (1997), products purchased solely for functional or practical value lost appeal as soon as they became worn out or technically obsolete whilst products with aesthetic qualities, to which attachments were made, were treasured long after functional utility had faded.

o Involvement and satisfaction

Involvement may also influence product longevity. There is some confusion in the literature regarding the concepts of attachment and involvement (e.g. between definitions provided by Richins and Bloch, 1991 and Martin, 1998). Within this research the distinction is made that attachment refers to the relationship between an individual and a specific product, whilst involvement refers to the relationship between an individual and a product group. For illustration, a person with no interest in cars (i.e. low involvement) could have a very strong attachment to a particular one, whilst another person may be very interested in cars (i.e. high involvement) but not necessarily be attached to any particular one.

A further distinction is made between 'situational' involvement, where interest in the product group is aroused by a particular event (e.g. a purchase), and 'enduring' involvement, where interest in the product group is sustained (Richins and Bloch, 1991). Evidence suggest strong links between high situation involvement and high search effort and time, whilst enduring involvement enhances situational involvement and further strengthens the link to high search effort and time. It could be argued that greater involvement will lead to the most appropriate acquisition decision, increasing the chances that a product will fulfil its requirements effectively and therefore be retained longer. Research addressing the relationship between involvement in acquisition and consequent product satisfaction is limited (Westbrook, 1979; Richins

and Bloch, 1991). No research was identified addressing the influence of either types of involvement on consequent patterns of use and disposal. This is indicative of the broad gaps in knowledge relating to linkages between acquisition and ownership.

o   Satisfaction and product retention

Research assessing the influence of satisfaction on product life is rare. Most research on post purchase satisfaction has been dominated by a marketing perspective exploring its impact on consumer repurchase intentions and its consequences for brand loyalty, with analysis of the effects of mediating variables such as complaint resolution (e.g. Halstead and Page, 1992). The majority of these studies address satisfaction in the immediate term at one point in time (Tse et al, 1990). Where exceptions exist and this shortcoming is recognised, the time frame considered is still, in terms of the life span of the product, a very short period after acquisition (e.g. Fournier and Mick, 1999). Furthermore, this type of research often fails to distinguish between product dissatisfaction and product choice dissatisfaction, i.e. whether it was because the product itself failed to meet expectations or whether it was regret concerning their choice. This may have a significant moderating effect.

Satisfaction research has offered no insight as to how consumer dissatisfaction with either product or product choice affects product treatment in use or the timing or motivations for replacement. It has also failed to explore the nature of movement from satisfaction to dissatisfaction over a product's life time. It fails, therefore, to address the impact of satisfaction on product life. A single exception to this is a proposed theory of the movement from satisfaction to dissatisfaction over time via processes of quality re-evaluation proposed by Granberg (1997).

o   Price sensitivity and repair

Several papers explored possible influences upon consumer decision making relating to the repair of household products. These advocated price sensitivity as a major determinant of repair, with the repair decision based on assessment of repair cost versus product replacement cost (e.g. Adler and Hvlacek, 1976; Cooper, 1994a; Stahel, 1986). Cooper and Mayers (2000) indicated that 38% of UK population rarely or never got electrical appliances repaired. Cost was the predominant reason cited (45%) followed by anticipated residual life (13%). Older people, especially those aged 55-64 were significantly more likely to have products repaired.

o Risk and storage

Few papers explored or explained consumer decision making relating to product storage. In their study of household appliances, Cooper and Mayers (2000) found that 40% of respondents had electrical products stored, half of which were still functioning. Focus groups revealed explanations for storage of non functioning products were the outstanding possibility of repair or simply a delay in disposal. Stored functioning items were retained for possible future needs, a risk reduction strategy in the event that a replacement breaks or for passing on to family and friends. Jacoby et al (1977) indicated product type had a strong influence on storage decisions.

o Psychology and restraint

Psychological aspects were found to be influential in work on reduced consumption behaviour by De Young (1996). This drew together the results of nine separate studies to explore the role of 'frugality and resource competence' as a source of intrinsic motivation for participating in conservation behaviour. Some of the indicators selected to measure frugality were of relevance to product life, including degree of satisfaction obtained by: 'keeping something running past its normal life', 'finding ways to use things over and over', 'repairing rather than throwing things away' and 'saving things I might need some day'. The work identified several significant relationships indicating that psychological aspects were important to reduced consumption behaviour.

Research addressing determinants of conservation activities (e.g. product life extension) has been neglected. There are several exceptions including a study by Granzin and Olsen (1991) that found conservation activities, including passing on products for reuse, were linked to interpersonal influence, values and helping. A few relationships with demographic variables were also identified including age, gender, home ownership and number of children.

o Motivations and non consumption

Trocchia and Janda (2002) investigated reasons for non consumption of items purchased and not returned. Their research resulted in a list of primary motivations behind such purchases (e.g. self improvement, impulsive buy, satisfying) coupled with a series of reasons for non-usage (e.g. functional, embarrassment, changes in life situation) and analysed the relationships between the two. Unfortunately the implications of the

research for product life are not clear as the study does not address how long products were retained or how they were subsequently disposed of.

  o Product characteristics and disposal

Aspects of the movement from satisfaction to dissatisfaction were identified in research within the field of social psychology, exploring the meaning of possessions over time and the transition from ownership to disposal (Roster, 2001). This work focused on product characteristics as determinants of disposal. It revealed that disposal occurs when objects inhibit developmental goals (Csikszentmihalyi and Rochberg Halton, 1981). When they fall prey to disuse or neglect (Belk, 1988; Belk et al, 1989 and la Branche, 1973) or fail to represent current or anticipated future self image (Kleine et al, 1995) Several papers that explored the determinants of disposal were quite specialised, for example Price et al (2000) addressed the disposition of special possessions by older consumers, focusing on precipitating events, emotions and decisions associated with disposition.

  o Society / culture and product life

Several researchers implicated stress and time famine induced by modern culture as determinants of declining product life. This work suggests that many of the trends across the consumption process, such as reduced search activity are induced by time constraints within increasingly harried lifestyles (e.g. Schor, 1992). Social stresses were also implicated in research exploring the cause of anti-consumption attitudes (Zavestoski, 2002). The culture of the unquestioned need for change has been raised by van Hinte (1997) as deleterious to product longevity, suggesting that individual susceptibility to the desire for change influences the rate of relative obsolescence. Kostecki (1998) draws attention to the role of fashion and consumer preference for novelty in instigating declining product life.

This review revealed how disparate pieces of research had identified a limited range of factors affecting consumers' influence on product life at different stages of consumption. The lack of a cohesive framework for conceiving this research was evident. This led to the decision to expand the review to explore determinants of consumer behaviour with an environmental impact more generally, to identify other possible factors affecting consumers' influence on product life and to identify a suitable system for classifying this information.

Factors affecting consumer activities that have an environmental impact

Over the past three decades the number of studies identifying and testing the determinants of varied consumer activities that have an environmental impact has grown considerably. For example a significant number of studies have explored the determinants of recycling, composting and green purchasing.

This section reviews this research, identifying those determinants that may be transferable to the study of factors affecting consumers' influence on product life and seeking a suitable framework.

o Demographic and economic variables

Early research within this field focused on the identification of demographic factors that characterised the environmentally active person. Later work continued to use demographic variables in exploring environmental behaviour, alongside more complex considerations. Generally the results of the research indicated that the environmentally active are both historically and geographically variable (Ölander and Thøgersen, 1995).

In their review of the early American literature van Liere and Dunlap (1980) found that only age, education, and political ideology were predictive of environmental attitudes and behaviour, with young, well-educated liberals being most active. However, work by Vining and Ebreo (1990) contradicted this finding older persons were more likely to participate in recycling. The influence of gender, marriage and number of children on environmental activities is generally un-predictive, with minor exceptions (e.g. Neuman (1986) found married couples were committed to energy conservation).

In a number of papers a link was demonstrated between income and environmental behaviour. In general, the higher the income the greater the involvement in recycling (Vining and Ebreo,1990) or energy conservation (van Houwelingen and van Raaij,1989). Similar findings were revealed for class and socio-economic status.

Antil (1984) reviewed five studies examining behavioural patterns of ecologically concerned consumers, these were criticised for having few generalised conclusions due to disparate operation of dependent variables, for sample limitations and for focusing on

specific behaviours making transferability of findings impossible. The work concluded that there was no demographic consistency between ecological behaviours.

It can be seen that there are contrasting interpretations of the relationship between demographics and participation in environmental activities. The usefulness of demographic variables in explaining environmental behaviour has therefore been questioned (Oskamp et al, 1991).

o   Psychological variables
From the mid-eighties onwards, the focus of research moved to the use of psychological and personality variables in the explanation of environmental behaviour.

Much environmental behaviour research has observed the influence of environmental concern on participation in environmental activities. The way that concern is measured varies, and several classifications have been devised (e.g. National Consumer Council, 1998). One of the most comprehensive classifications has been proposed by Bohlen et al (1993), whose index of ecological concern incorporates the three dimensions of environmental knowledge, attitudes and behaviour.

Personal values have been identified as playing an important role in decision making within the environmental domain (e.g. Stern et al, 1993; Grunert and Juhl, 1995, Follows and Jobber, 2000). In their research on waste minimising and recycling behaviour Thøgersen and Grunert-Beckmann (1997) found that values were crucial to understanding environment related behaviour and were functional in attitude formation towards emerging issues within the environmental field, further supported by research by Thøgersen and Ölander (2002). On the other hand, the impact of values on the formation of attitudes and consequent environmentally conscious consumer behaviour has also been researched by Dembkowski and Hamner-Lloyd (1994) and Dembkowski (1998), whose research focuses on explaining an apparent discrepancy between values, attitudes and consequent behaviour.

The judgement regarding perceived costs and benefits has been found to affect participation in environmental activities (Simmons and Widmar, 1990; Pieters, 1991). De Young et al (1993) illuminated the importance of perceived costs and benefits in an experimental study, in which they discovered that when provided with information

concerning both the economic and environmental benefits and reasons for waste reduction activities, consumers significantly altered this behaviour. A number of other perceptions have been found to influence environmental actions. They include perceived consumer effectiveness (Ellen et al, 1991; Schwepker and Cornwell, 1991), perceived level of behavioural control (Taylor and Todd,1995a) and perceived responsibility for the problem and solution (Miller, 1998; Hines et al, 1986). A form of behaviour is more likely to be conducted if consumers perceive themselves to be effective, the behaviour as under their control, or perceives the responsibility as their own rather than belonging to others such as government and industry.

The work on perceived responsibility has revealed that a consumer often feels tension between responsibilities to themselves and their family, and responsibilities as a citizen to society. This conflict frequently leads to consensus of the need to alter behaviour at the collective level, but inhibition to sacrifice personal desires that conflict with this (Miller, 1998; Harwood Group, 1995). At a general level, this can be assessed on the basis of a person's locus of control. Scherhorn (1993) expresses this in terms of autonomy and control orientations. When motivated by self determined goals, consumers are more likely to carry out environmentally responsible behaviour. Those motivated by external stimuli and rewards, expressed through pro-material traits such as a 'passion for goods', are unlikely to accept their ecological responsibility.

Other psychological variables found to influence the conduct of environmental behaviour include having an emotional involvement (e.g. Grob, 1995), past experience and hence familiarity with an environmental behaviour (e.g. Goldenhar and Connell, 1993), faith in the efficacy of others to achieve the desired outcome (Berger and Corbin, 1992), and having the required task knowledge coupled with the applied behavioural skills (Oskamp et al, 1991; Vining and Ebreo, 1990). Simmons and Widmar (1990) discovered that lack of procedural knowledge regarding waste reduction was a significant barrier to adopting this behaviour. Ellen (1994) identified considerable confusion both in knowledge regarding environmental problems and the appropriate environmental behaviour to address this.

Personal attitudes have been shown to have mixed fortune in explaining behaviour. Much of the work in this area has discovered that a person's favourable predisposition towards a form of behaviour is rarely translated into actual action (e.g., Hutton and

Athola, 1991; Thøgersen, 1995). This inconsistency has initiated considerable interest and further work aimed at understanding the possible interacting, moderating and co-determining variables that condition the relationship between attitude and behaviour.

Considerable attention has been given within this field of research to disparities between stated environmental attitudes and consequent participation in environmental activities (Scott and Fern, 1994). Most research accounts are based on the theory of planned behaviour and the consequent theory of reasoned action (Ajzen, 1988, 1991). Ölander and Thøgersen (1995) compiled a comprehensive overview of this work, demonstrating its importance to understanding barriers and opportunities to participation in environmental activities. They recommend '*that an appropriate frame of reference for any study of consumer behaviour with an impact on the environment should include at least three main determinants; motivation, ability and opportunity*' (Ölander and Thøgersen, 1995 p360). These determinants and the accompanying framework titled the 'Motivation-Ability-Opportunity' model were useful in informing the creation of the provisional classification of factors affecting consumers' influence on product life developed for this research.

There is little academic insight or understanding of whether those people who have integrated some aspects of environmental protection into their lifestyle, such as green consumption, have embraced reduced consumption behaviour e.g. through the optimisation of product life. One of the few papers exploring this issue was presented by Thøgersen (1999), who examined personal norms and 'spillover' processes in the development of sustainable consumption patterns. This account confirmed a positive spillover effect from recycling to packaging waste prevention; however, a number of other spillover effects were tested and not confirmed. The study concluded that further research was necessary. Balderjahn (1988) and Granzin and Olsen (1991) suggest that each environmental activity has its own predictors, hence it is implausible to identify an overall set of predictors for ecological behaviour as an integrated category.

In summary, the majority of the research to date suggests that psychological variables more successfully explain environmental behaviour than demographics.

o   Social variables

The effect of social influences on individuals' environmental behaviour has also been the subject of considerable investigation (e.g. Balderjahn, 1988; Schwepkar and Cornwell, 1991). The presence of social norms has been found to have a significant impact on both recycling (Aragon-Correa and Llarens-Montes, 1997; Burn, 1991; Wang and Katvez, 1990) and composting behaviour (Taylor and Todd, 1995a).

The significant sources of social norms and influences identified include family and friends (Taylor and Todd, 1995b; Lord, 1994) and mass media (Chan, 1998). In a culture of mass consumption, advertising and fashion also play a significant role in creating social norms and thereby influence consumer behaviour (Galbraith, 1958, Droge et al, 1983).

The family also has a role in the intergenerational transfer of knowledge, skills and resources. Moore-shay (1997) examines the mechanisms and implications of intergenerational transfer using research from three separate studies and calls for more qualitative research for a more comprehensive understanding. Webster and Wright (1999) have shown how intergenerational influence in consumption is moderated by the strength of family relationships, perceived similarity (e.g. in lifestyle) and perceived individual expertise and importantly by the nature of product type.

Research on consumption ethics more generally by Vitell et al (2001) indicated that consumers to a large degree rely on primarily on ethical norms rather than perceived consequences in forming ethical judgements. This demonstrates the wider importance of norms in regulating behavioural choices.

o   Situation variables

The literature additionally reveals a number of situation variables that have been found to influence environmental behaviour. The more appropriate the conditions in terms of time, place and hence convenience, the more likelihood that an environmental behaviour will be carried out (Ölander and Thøgersen, 1995). The majority of the research in this area has addressed the convenience of recycling systems on levels of participation in recycling schemes (Aragon-Correa and Llarens-Montes, 1997; Katvez et al, 1993; Vining and Ebreo, 1990). The importance of convenience has also been highlighted in investigations of green consumer behaviour (Miller, 1998). The

availability and access to relevant and correct information sources is crucial. Poor situation knowledge can inhibit desirable behaviour (Verhallen and Pieters, 1984).

There is some contention regarding the extent to which situation variables may influence environmental behaviour. In their study, Schwepker and Cornwell (1991) found that people living in large cities, purchased significantly more ecologically packaged products than those living in smaller communities. They attributed this to their greater experience of pollution. Rohrschneider (1988), however, found that long-standing favourable environmental pre-disposition and fear of environmental destruction were more important determinants of citizens' attitudes towards the environment than translation of local pollution experience.

o   Object variables

Within environmental research that focuses on behaviour towards particular objects, the characteristics of the objects themselves have been found to influence behaviour. For example, the work on product disposition conducted by Jacoby et al (1977) indicated that product attributes such as type, appearance, state of repair, age, utility and compatibility were all possible sources of influence on disposal behaviour.

The source of objects has been found in experimental research to affect valuation. Loewenstein and Isssacharoff (1994), for example, found that objects obtained by chance were of less value than those obtained by skill. Further work conducted by Strahilevitz and Loewenstein (1998) found that the value and perceived attractiveness of objects increased with ownership. The experiments underpinning both pieces of research were based on a low value product (a mug) and very short intervals of ownership (less than an hour). The method of product acquisition and length of ownership are thus potential factors that affect consumers' influence on product life.

Much market research undertaken on green consumption explores how consumers are influenced by product attributes in purchasing decisions. For example studies of attitudes to energy efficiency of appliances and attitudes to packaging.

Overall, exploring the determinants of varied consumer activities that have an environmental impact has provided much greater insight into the range of possible factors affecting consumers' influence on product life.

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Provisional classification of factors affecting consumers' influence on product life

On the basis of the two stages of literature review discussed above a provisional list of possible multi-dimensional factors and their classification was devised and is presented below. This classification does not claim to be exhaustive but demonstrates the large number of potential influences on consumers' influence on product life. The relationships between these factors and consumers' influence on product life may not necessarily be direct or causal; they may act as mechanisms, forming the links between the cause and its effect. This provisional list has been created to provide a conceptual framework to structure the research. The factors are grouped under three main headings; personal characteristics, social / situational characteristics and product characteristics.

o   Personal characteristics

Personal characteristics are those factors that are intrinsic or 'endogenous' to the individual. These are divided into physical and psychological characteristics. Table 3.7 summarises the possible factors identified for each of these categories.

Table 3.7 Possible factors affecting consumers' influence on product life - personal characteristics

Physical	
demographics	age, gender, income, socio-economic status, educational achievement, ethnicity
Psychological	
attitudes and values	concerns, personal philosophy, religious belief, techno-centric / eco-centric world view, priorities (including environmental consciousness)
intelligence	information collection and processing abilities
motives/goals	sacrifice, control / independence / self reliance, altruism, intrinsic satisfaction, creativity, identity, social cohesion, ritual / habitual, inherent / inter-generational transfer, economic necessity, alienation / frustration, thrift / frugality
needs/wants	lifestyle desires / aspirations
perceptions	perceived lifestyle compatibility - costs and benefits, impact on quality of life, locus of control, sense of responsibility, self reliance, perceived ability to carry out behaviour (self efficacy), perceived consumer effectiveness, perceived complexity / inconvenience
personality	psychological differences, emotional viewpoint, attachment, creativity
skills and knowledge	competencies / abilities / task knowledge / creativity / resourcefulness

o   Social / Situational characteristics

Social / Situational characteristics are those factors that are extrinsic or 'exogenous' to the individual. These are divided into the characteristics of 'culture and society' and 'opportunity ' (based upon context and resources). Table 3.8 displays the possible factors identified for each of these categories.

Table 3.8 Possible factors affecting consumers' influence on product life - social / situational characteristics

Culture & Society	
social norms	influence of family, friends and social networks
popular culture	media, advertising, fashion, education, politics
technology	availability / development of new products / technologies
Opportunity (Context & Resources)	
facilitating conditions	habits, familiarity, past resourceful behaviour, opportunities, task complexity
available resources	cost, time and other resource considerations and physical constraints
task convenience	fit with current lifestyle - relative advantages / disadvantages of undertaking associated tasks

o   Product characteristics

The final set of factors to be identified fit under the heading of product characteristics. Table 3.9 displays the possible factors identified for this category. This category is particularly complex, it is those attributes to a product that are separate to its intrinsic durability that may influence the consumers choices across acquisition, ownership and disposal.

Table 3.9 Possible factors affecting consumers' influence on product life - product characteristics

Object qualities and attributes	appearance, fashion status, state of repair, age, value f(time), technology f(time), utility, compatibility with related products

3.3   Presentation of final conceptual framework

3.3.1   Description

Following the activities outlined in section 3.2 a process of synthesis was undertaken to combine all of the concepts into one overall conceptual framework upon which the research project was established. A simple version of this framework is provided in figure 3.5. A more complex version is then shown in Fig 3.6. They illustrate the hypothesised factors affecting consumers' influence on product life throughout the consumption process.

<u>Figure 3.5 Simplified conceptual framework</u>

Factors   Consumption

| Personal characteristics | → | Choices and Actions
during
Acquisition
Ownership
Disposal | → | **Product's
potential
service life** |

Social / situational characteristics →

Product characteristics →
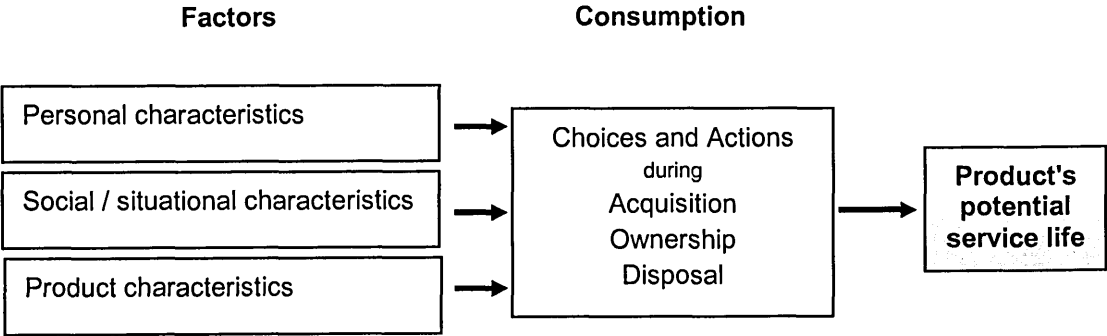
Fig 3.6 Framework for studying the factors affecting consumers' influence on product life

Acquisition

Type of prompt → Degree of search → Product requirements → Acquire product

Anticipated service life

Continuos product evaluation
Anticipated future service life

Mode of storage
Adherence to instructions
Commitment to product care during use
Maintenance & servicing regularity

Ownership

Use of rejuvenation activities

Problem recognition

Product evaluation

Disposal

Type of prompt

Disposal method selected

Condition of product

Sell/Swap e.g. family, friends, auction, car boot

Pass along e.g. family, friends, neighbour

Donate e.g. charitable organisation

Recycle

Throw away e.g. public / private bin, illegal dump

Consumers' influence on product life across A-O-D (optimising - - - - non-optimising)

Individual characteristics
Physical & Psychological

Social / situational characteristics

Product characteristics

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3.4 Product specification

This section discusses decisions taken during the research process about the products selected for investigation. It reviews how the issues of specificity and generalisation were addressed in similar research contexts, identifying various product groups. Through analysing the relative merits and drawbacks of different degrees of specificity and the varied product groups a matrix was developed. Final decisions were then made to minimise error, weakness and bias.

3.4.1 Product type

First, it was necessary to decide how specific the research should be about product type. A review of the existing literature (see appendix 1) identified four main options, cascading from general to more specific.

Products (with no further definition)

Product groups (e.g. durable goods, non durable goods, semi-durable goods)

Product categories (e.g. crockery, soft furnishings, outer garments, small appliances)

Individual products (e.g. watch, dish, sofa, coat, toaster)

Since the research focuses upon real life contexts rather than scenarios or hypothetical situations, the behaviour, decision-making, attitudes and perceptions explored relate to real experiences rather than personal ideals. Previous research has indicated that the type of product may influence behaviour affecting product life (e.g. Box, 1983). It was necessary, therefore, to have some degree of control over this variable to maximise validity when comparing the experiences of different participants. In addition, to achieve the research objectives set out in section 1.4, the decisions relating to product specificity must accommodate comparison across the entire consumption life cycle. The decision making process must consider whether variations in product type at different stages of the consumption process are acceptable.

On the basis of these requirements, options one and two were considered too broad and rejected. They would not provide the detail necessary to draw meaningful conclusions. Other studies have sought to overcome difficulties with generalisation by requesting participants to self-select products within very broad groups. This was rejected within

this project for three reasons. First, research in which the participants self-select specific products has frequently resulted in discussions of favourite products and often relate to exceptional or special consumption experiences e.g. gifts, heirlooms. This may impede research validity, as products gained under these circumstances would be treated differently to more ordinary products used on a daily basis. Second, this does not fully overcome the issue of generalisation and would still not facilitate comparison between participants. Finally, this form of self-selection requires research participants to make additional effort that may affect their willingness to co-operate.

Option four, the use of individual products offers several advantages. Each participant would be discussing the same type of product permitting comparison of like for like both between different participants and for the same participant across different stages of the consumption process. Data reliability would be greater, as participants in the study would be basing their answers on memory recall for specific products. Finally, it would enable a line of questioning tied to the specific product life issues attached to that product, making it easier for participants to engage in.

There are, however, numerous drawbacks of using individual products. The number of people who have ever experienced the entire consumption life cycle of that product may be limited. The life span of some products may make unacceptable demands on memory recall. Even limiting the research to individual products doesn't allow true comparison as form and function of individual products may vary significantly. For example, if the research were to explore watches, the variety available would limit true comparison. Finally, maximising specificity limits the options for generalisation within the analysis and conclusions, restricting the relevance of the thesis to a smaller audience.

The exploration of the relative merits and drawbacks of different options revealed an acceptable compromise, asking participants to select an individual product within a stated product category. The self-selection of products from specific product categories ensures the research has wider applicability as it increases the chance that participants will have completed each stage of the consumption life cycle for at least one of the products. Respondents were able to draw on more recent experiences, increasing the chances of responses based on actual behaviour. This approach recognises the inability to control for the influence of product characteristics absolutely but ensures participants will be thinking about products that fulfil similar functions. This approach precludes

upward generalisation at the product group level. Furthermore, as the specific products selected for discussion at each stage of the consumption process may be different, the accuracy of conclusions concerning consistency may be limited.

3.4.2 Product selection

Secondly, it was necessary to decide which product categories were going to be selected for investigation. This decision was extremely important, as the product groups selected will frame the entire research project providing the boundaries within which the research objectives are to be attained.

In her research Heiskanen (1996) identifies four product groups, each having different merits in the context of product life extension (see table 3.10). Despite the conclusions that products in groups 1 and 2 have better environmental potential for extended product life than 3, greater knowledge is required of consumer behaviour relating to each of these groups to progress the debate on product life.

Table 3.10 Heiskanen's classification by product life extension opportunity

	Product Group	Characteristics from the point of view of the environmental merit of product life extension	Examples
1	Goods that need few resources for maintenance or operation	Chief impacts at production/disposal phase	Furniture, household effects
2	Goods with high maintenance requirements	Impacts from maintenance may be high	Textiles, clothing
3	Goods that require resources to operate	Impacts from use phase (operation) may be high	Motor vehicles, electrical appliances
4	Goods that are part of larger goods requiring resources for operation	Chief impacts at production/disposal phase	Construction materials, car tyres

The decision was made to choose one product category in each of Heiskanen's first three product groups. Three product groups were considered ample to explore the effect of product group on behaviour. The next stage involved deciding the criteria upon which these would be selected. The desirable characteristics were identified through brainstorming and discussions with colleagues and are outlined in table 3.11. Possible product groups were then identified for each of Heiskanen's first three categories. These were plotted on a matrix against the desired characteristics to identify which product

group fulfilled the requirements most effectively. In addition each product was crudely assessed for environmental impact (see appendix 2).

On the basis of this work, the three product groups selected for examination within this research project were everyday footwear, big kitchen appliances and upholstered chairs. Within the research the product group 'everyday footwear' is defined as 'footwear that is worn on a daily basis for ordinary activities' and includes shoes, trainers, sandals, and boots (does not include slippers). The product group 'big kitchen appliances' is defined as 'large electrical appliances that are used mostly in the kitchen' and includes cookers, refrigerators, freezers, and washing machines. The product group 'upholstered chairs' is defined as 'chairs that are covered with fabric' and includes dining chairs, armchairs, sofas, futons and sofa beds.

Table 3.11 Desirable characteristics for product selection

Desirable characteristic	Justification
Everyday / Ordinary	Products must be used for ordinary day to day activities to avoid as much as possible reference to 'special' products that by their nature are treated differently across the consumption process
Widespread ownership	To ensure the relevance of the research to all participants, product groups must not be subject to gender, age or social class divisions
Varied in cost / quality / durability	A wide range of individual products within each product group is necessary to draw distinctions between participants' behaviour
Predisposed to changes in fashions, functions and / or fitness	To explore the influence of changes in fashions, function and / or fitness
Require maintenance or paper-work	To examine participation in care and maintenance procedures and adherence to instructions
Receptive to reuse and feasible to repair	Reuse and repair strategies must be available for each product group to gauge participant involvement in these activities
Open to several disposal options	To analyse disposal behaviour effectively
Significant contribution to waste stream	To ensure the relevance of the research to the waste debate
Suspected variations in service life	To provide insight into the impacts of behaviour on service life
Suspected average life span < 20 years	To maximise the number of respondents who have had the opportunity to experience each stage of the consumption life cycle

3.4.3 Product review

This section incorporates a discussion of how each of the three product categories was defined and provides an overview of the consumption and product life information available for each.

Everyday footwear

Footwear is highly varied in design, function and materials with a large number of potential subdivisions. The majority of people in the UK have multiple pairs suited to different needs. It was necessary to acknowledge this and to try and keep some degree of consistency within the product category to ensure research validity.

The options available include:

define by function (e.g. sports, work)

define by type (e.g. boots, sandals)

define by frequency of use (e.g. daily, occasionally)

The problem with limiting the research to shoes of one particular function was that the choice might not be applicable to all respondents. Furthermore, research objectives were not focused on function. It was decided that the most appropriate choice was a combination of type and frequency of use. This allowed the specification of shoes worn on a frequent basis (avoiding 'special' pairs) and indicated the type of shoe, so checks could be made to ensure internal consistency. Focus group discussions concluded that the term 'everyday footwear' was the clearest option. Product types were identified and finalised using market research reports, e.g. Mintel (1999c).

There is considerable literature on the sociology of fashion and clothing. The exclusive focus of this work has been upon the higher level functions of clothing, such as their role in distinguishing social groups and their use as systems of meaning. The everyday interaction between people and their clothing has received minimal attention, indeed Campbell remarks that 'the more material strand is noticeably missing' (1995, p109).

Consumer reports identify that expenditure on footwear in the UK in 1998 was £4,435m (Mintel, 1999c). Of the respondents surveyed 40% only shopped for footwear when a replacement pair was needed, suggesting that many purchases are induced by forces of relative obsolescence. This indicates a substantial market based on both accumulation

and replacement, however no data was found relating to the life spans of footwear or post purchase activities. The contribution of footwear to volumes of waste generation is unknown.

Big kitchen appliances

The definition and consequent selection of products for the category of big kitchen appliances was more straightforward. Product types were again identified and finalised using market research reports, e.g. Mintel (1999b).

Considerably greater research has been carried out relating to the product life spans of big kitchen appliances than for footwear, this is possibly because of their relative size and contribution to waste streams. Reports on kitchen appliances encompass the consumption life cycle, incorporating acquisition and search (Mintel, 1998), replacement (e.g. Bayus, 1988), repair (e.g. Adler and Hlavacek ,1976; Ziebarth, 1992) and disposal (e.g. Andersen, 1999; Cooper and Mayers, 2000; ICER, 2000).

Recent market research indicates that most consumers (70%) state that the breakdown of a white good was the most likely factor to influence a new purchase (1999b). In addition, large numbers (59%), especially those who are older and more affluent, rank the durability/reliability of kitchen appliances as an important purchase factor (Mintel, 1998). However research by Anderson (1999) and Hunkin (1988) suggests over 30% of appliances are discarded prior to failure, and that many still function or only need basic repairs.

Large kitchen appliances make a considerable contribution to the waste stream. Cooper and Mayers (2000) estimate that around 360,000 tonnes of white appliances were discarded annually between 1993 and 1998. Large household appliances are estimated to make up around 43% of the waste stream by mass (ICER, 2000).

Upholstered chairs

The definition and consequent selection of products for the category of upholstered chairs was again more straightforward. Product types were identified and finalised using market research reports.

Overall upholstered chairs have received scant attention in the debate on product life. Research conducted by Mintel has included aspects of acquisition that may influence product life such as attribute preference. However, no data was found on the incidence of re-upholstering or repairs, or research exploring aspects of maintenance and daily use. The report by Anderson (1999) considers their condition at disposal and provides figures on waste volumes in the Bristol area. This work suggests that large volumes of upholstered chairs are discarded that could be either repaired or reupholstered.

3.5 Chapter summary

This chapter has set out research problem, defining the key concepts, and building a conceptual framework on which to base the research, which includes a taxonomy of consumers' influence on product life across the consumption process and a provisional classification of factors that may affect it. In addition, it has set out the scope of the research, identifying and justifying the specific products chosen for investigation.

The next stage of the research process involves the selection of a suitable research design to address the research aims and objectives, thus moving from the abstract concepts to a point where measurable concrete indicators are developed.

CHAPTER 4 – RESEARCH METHODOLOGY

4.1 Introduction

The aim of this chapter is to describe the process of movement which takes the research from the abstract set of aims and objectives and the conceptual analytical framework outlined in chapters one and three to a research methodology for a practical study. The chapter provides details of the series of decisions and actions regarding the translation of the broad research questions into an effective and viable programme of research. Choices are discussed and justified on the basis of knowledge derived from a review of relevant research. This encompasses methodological issues specific to previous consumer behaviour research and social sciences research methods more generally. The chapter also sets out the programme of research implementation and outlines the processes of data preparation prior to consequent analysis in chapters five and six.

Figure 4.1 Structure of research methodology development

Stage 1 - Review	→	Explore research methodology literature (*s4.2*)
Stage 2 - Structure	→	Structure research and address integrity (*s4.3&4*)
Stage 3 - Design	→	Design research - phase 1 and 2 (*s4.5*)
Stage 4 - Implement	→	Implement research - phase 1 and 2 (*s4.6*)
Stage 5 - Prepare	→	Prepare data for analysis - phase 1 and 2 (*s4.7*)
Stage 6 - Evaluate	→	Examine data and assess bias (*s4.8*)
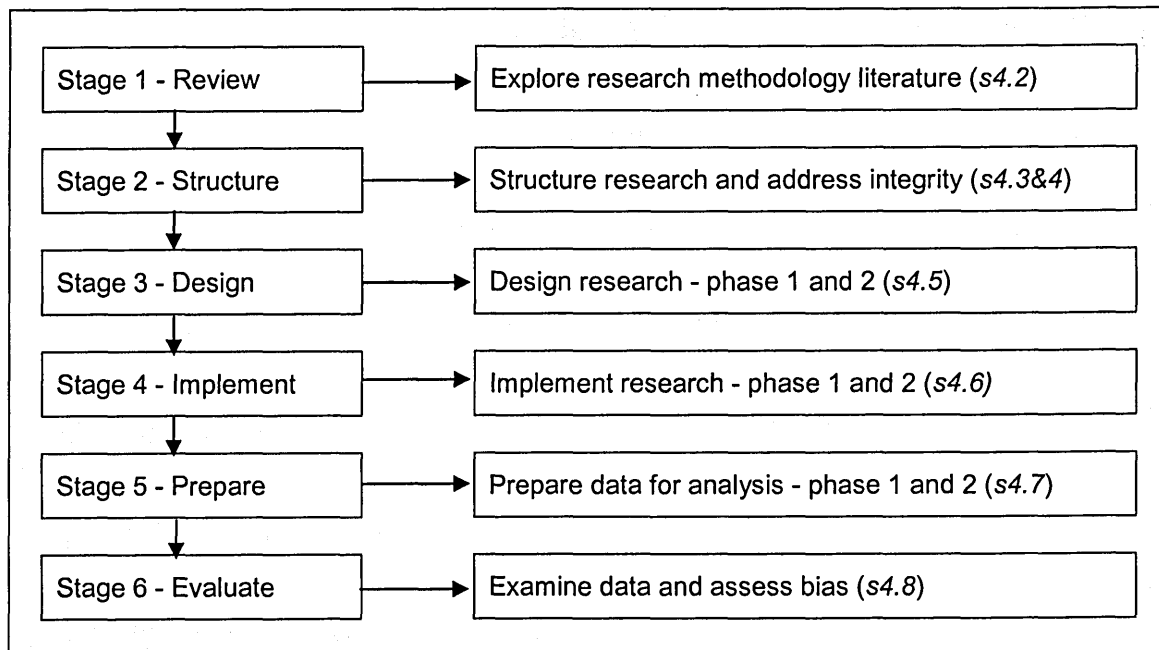
The chapter is divided into a logical sequence of sections (see figure 4.1). The methodological traditions of consumer behaviour research are outlined in section 4.2. The findings of this review are then used in section 4.3 to devise a comprehensive

research strategy. Section 4.4 contemplates matters of research integrity, addressing the critical issues of validity and reliability. Sections 4.5 and 4.6 describe the processes of research design and implementation. Section 4.7 discusses methods of data preparation and section 4.8 evaluates the quality of data obtained. The chapter is summarised in section 4.9.

4.2   Methodology Review

Chapter two revealed that there is minimal research dedicated to examining issues relating to product life. The proportion of this work investigating the consumers' influence was found to be especially sparse. In contrast, substantial research has been conducted in the field of consumer behaviour. Some of this has examined elements of behaviour relating to consumption that may affect product life during acquisition, ownership or disposal, as described in chapter three. This section briefly revisits these studies and explores some of the methodologies employed. In addition, broader social science methodology texts are consulted, for guidance on research design and implementation. The information gathered is then used to formulate a research strategy for this thesis, outlined in section 4.3.

The review indicates that within the epistemological sphere of consumer behaviour there are a number of distinctive methodological approaches to conducting research. It is useful to distinguish this work into two primary categories. The majority of research falls into the first of these categories; it is passive, seeking to explore the nature of events in the real world. In contrast, the second category is evaluative, investigating the influence of particular interventions. This second category, often referred to as motivational research, was not appropriate to the aims and objectives of this project.

Over time the first category of consumer behaviour research has experienced a further division in methodology. This reflects a more widespread breach that has occurred throughout the field of social science, based chiefly on the philosophical assumptions that underpin the research process. The fracturing of methodological work has created two contrasting epistemological viewpoints. To provide a simple summary, the 'positivist' or 'quantitative' approach assumes that the social world can be measured objectively, whilst the 'naturalistic' or 'qualitative' approach maintains that reality is socially constructed, by both those being studied and the researcher. There are examples

of both research approaches being used in consumer behaviour research and within those studies that were found relevant to the consumers' influence on product life.

As discussed in chapter two, historically the influence of marketing in consumer research led to a bias towards understanding patterns of acquisition. The majority of early studies undertaken that explored consumption used quantitative methodologies, such as large-scale surveys, to guide understanding of acquisition. Such quantitative techniques offer the benefit of collecting data that is representative of the study population. With the advent of increasing environmental awareness and concerns about waste, quantitative studies were used to explore patterns and processes of disposal. Many of the quantitative studies examining the environmental dimension of waste focused on classifying consumers' disposal habits. Harrell and McConocha (1992), for example, used a postal survey to collect data and classify the waste disposal tendencies of their sample of 811 participants. Vining and Ebreo (1990) used survey methodology to compare recyclers with non recyclers. Ölander and Thøgersen (1995) provide a comprehensive overview of studies exploring the relationship between attitudes and behaviour that forms the other major focus of research using quantitative techniques to understand consumption.

During the last two decades there have been a rising number of studies using qualitative techniques to explore consumer behaviour in acquisition and disposal. Qualitative research offers a broad, practical and interpretative approach to studying human lives and is especially well suited to the study of complex social phenomenon (Marshall and Rossman, 1999). Through their naturalistic emphasis qualitative methods acknowledge the importance of the participant's frame of reference and resist laboratory and experimental style controls. Examples of qualitative studies of consumption processes that were used in the development of this research include Roster's qualitative study of disposal (2001), Boyd and McConocha's study of the inventory ownership cycle (1996) and Fournier and Mick's study of satisfaction (1999).

There is some contention but a growing number of social scientists subscribe to the view that alternative research traditions are suited to different kinds of research problem.

'The general principle is that the research strategy or strategies, and the methods or techniques employed, must be appropriate for the questions you want to answer.'
(Robson, 2002)

Increasingly the relative merits and drawbacks of different approaches are considered in the context of the research problem and decisions made to use one or other. In addition, Dey (1993 p4) argues that there is *'growing recognition that research requires a partnership* (of qualitative and quantitative approaches) *and there is much to be gained from collaboration rather than competition between the different partners'*. This view is reiterated by Newman and Benz (1998 p12) who expound '*Both paradigms exist in the world of inquiry, and together they form an interactive continuum'*. Combined approaches include studies where alternate approaches are used consecutively to explore different aspects of the research question and studies where alternate approaches are used to examine the same research question. The latter is termed 'methodological triangulation' and is used to improve research integrity. An example of research which successfully balanced both approaches was carried out by Cooper and Mayers (2000). This study of the use and disposal of electrical appliances encompassed the quantification of different patterns of consumer behaviour, providing an overview of the current situation at the national level using face to face interviews with a large sample of 802 households. This was accompanied by a qualitative examination of underlying reasons and motivations using five focus groups.

4.3   Research strategy

In line with the findings outlined in section 4.2, the research strategy was selected on the basis of its ability to answer the research question. This section describes the chosen research strategy and justifies the choices made.

A thorough examination of the research aims and objectives revealed that there were principally two components of research requiring data collection. The first component required data to examine *how different patterns of consumption across acquisition, ownership and disposal affect the service life of domestic products*. This descriptive data would provide an overview of what is happening. The second component required data for investigating *explanations for such differences*. This evaluative data would provide understanding of why this was happening.

To fulfil the requirements of the first component of the research a combination of approaches was considered necessary. Qualitative techniques were deemed most appropriate for clarifying the research concepts (as described in chapter three), whilst quantitative techniques were more appropriate for collecting the descriptive data to establish a broad picture of current trends in consumption patterns.

To fulfil the requirements of the second component, for understanding what drives people to consume differently, qualitative techniques were thought most appropriate.

> 'A second role for (qualitative) in-depth studies follows quantitative studies that tell us what is happening or has happened through identifying differences in groups. Interviews with observations within selected groups may be the best way of determining why these differences exist. Such studies provide the opportunity to explore more variables in greater depth with a few subjects, to find out how they are related.' (Black, 2002 p69)

Hence, the decision was taken to use a combination of qualitative and quantitative techniques. The sequence of conducting the research was established upon this basis:

Phase One – Quantitative Investigation

Phase Two – Qualitative Investigation

4.4   Research Integrity

Inherent in all of the texts on social science methodology is the demand for rigorous efforts to maximise research integrity throughout the design process. Within quantitative research the two principle considerations are 'reliability' and 'validity'.

Research 'reliability' concerns the consistency of research findings over time (Black, 2002). It involves reducing error and bias arising from sources such as poorly worded questions, unsatisfactory sampling, using different interviewers and conflicting interpretations when coding (de Vaus, 1996). Many forms of reliability are identified and classified within methodological literature, as well as techniques designed to measure and/or mitigate their impact (for example see Mehrens and Lehmann, 1984). Attempts were made throughout the design of this research to minimise sources of unreliability. Furthermore, as recommended by Black (2002), a report on the final reliability of findings is provided in chapter seven.

Research 'validity' is the *degree to which what is observed or measured is the same as what was purported to be observed or measured'* (Robson, 2002 p553). Many types of validity are

identified and debated within the literature (e.g. see Frankfort- Nachmias and Nachmias, 1996). Particular attention was paid throughout the design process to 'content validity', the assessment of whether the measure of the concept covers the concept's full meaning (de Vaus, 1996). The validity of the findings of this research are summarised in chapter seven.

The relevance of the issues of reliability and validity to qualitative research is limited (Robson, 2002). It is widely recognised that different procedures are needed in this domain for ensuring research integrity (Kirk and Miller, 1986; Newman and Benz 1998). During the design (and consequent analysis) of the qualitative aspects of this research a framework of activities established by Lincoln and Guba (1985) to maximise research credibility was consulted. The steps taken to address credibility are outlined in Table 4.1. A final synopsis of the credibility of the qualitative research is summarised in chapter seven.

Table 4.1 Steps to ensure credibility of qualitative research

- The boundaries of the research were established (identifying and defining the subject of the work, stating clearly its parameters, including setting, population and theoretical framework) (this chapter).
- The transferability of the findings to other situations was described, i.e. its external validity (see chapter seven).
- The 'dependability' of findings was secured, by justifying the process of decisions regarding the continuous refinement of concepts used within the study (throughout).
- The 'confirmability' of the work was obtained, by ensuring the objectivity of the data (rather than the researcher) and providing the complete research record for evaluation or further analysis by others. Bias in interpretation was limited by employing strategies to overcome this (see chapter six and appendices).

(As recommended in Lincoln and Guba 1985)

Research integrity is a fundamental consideration throughout the research design and implementation process, extending further to the analysis and interpretation of results.

4.5   Research Design

'Design is concerned with turning research questions into projects' (Robson, 2002 p79)

This section addresses the development of a suitable research design. On the basis of the chosen research strategy outlined in section 4.3, the design was generated in two phases:

Phase One – Quantitative Investigation

Phase Two – Qualitative Investigation

The detailed design for each phase is outlined in subsections 4.5.1 and 4.5.2. They are set out in the logical flow of decision making that underpinned the design process. This encompasses discussion and justification of selected methods and techniques of data collection and favoured choices for sampling.

4.5.1 *Phase one – research design for quantitative investigation*

Phase one of the research seeks to understand how different patterns of consumption across acquisition, ownership and disposal affect the service life of domestic products. Chapter three has already outlined several decisions that influence the research design process; i.e. the selection of three specific product categories; everyday footwear, big kitchen appliances and upholstered chairs and the identification of components of the consumption process that constitute the concept of the consumers' influence on product life. This section examines further decision making relating to the design process.

Phase one - temporal framework

One of the first and most important decisions regarding the design of the quantitative investigation was the temporal framework in which to carry out the study. The research required data on acquisition, ownership and disposal of all three product categories. It was recognised that the design must accommodate that these occur consecutively over an extended time frame.

The first design considered was a 'panel design' that would follow a sample of consumers through the consumption cycle of the three domestic products. Consumption patterns would be observed and explored using survey techniques. The second two designs were 'cross sectional designs'. The first involved selecting a different sample of respondents for each stage of the consumption cycle and conducting the research in current time. The second relied on the collection of information from one sample of respondents about their patterns of consumption across acquisition, ownership and disposal for all three of the product categories. Within this last option, the research could follow the history of a particular product through acquisition, ownership and disposal or it could allow some variation between products at each of these stages.

The panel design was rejected on the basis of time demands, expense and inevitable attrition (people dropping out). The reliability of this design would have been compromised by consumer familiarity with the research and it is likely that difficulties

would have arisen trying to find a representative sample willing to participate in such an extensive study. Furthermore, the speed of technological and social change may have rendered the results of such a long-term study invalid.

The strength of the first of the two cross sectional designs was that each sample could be selected to ensure immediacy of memory recall. However, to compare consistency in patterns of consumption between stages of the consumption process in the analysis phase the three different samples would have to be matched as closely as possible. In the exploratory context of this research this matching process would present considerable difficulties, involving too many assumptions about the samples characteristics. The second cross sectional design was, therefore, rejected.

The collection of information from one sample of respondents about their patterns of consumption for all three stages and each of the product categories is less expensive, less time intensive and avoids the problems of attrition found in the first design and avoids the inherent assumptions of the second. However, as a result of the sequential nature of the consumption process, a cross sectional design will inevitably lead to the research containing a retrospective element. The problem of data reliability posed by memory recall was reduced to some degree by following the second route and allowing different products within the same product group to be discussed for each stage of consumption. This avoided asking about the history of one product, whose life from acquisition to ultimate disposal may have spanned over twenty years. However, this still presents some reliability issues as it assumes consistency within product categories.

Despite attempts to reduce reliance on long-term memory, it is acknowledged that the research design still contains a retrospective element with implications that the results will reflect perceived rather than actual behaviour. Data reliability will be questioned because the respondents may have forgotten, changed their minds or recognise their own internal inconsistencies (when answering questions about different aspects of the consumption process at the same time) and may fix their answers to correct for this (i.e. reactivity). These limitations are considered throughout the analysis section, whilst accepting that without the resources to observe and question a consumer's actions and motives at every stage of consumption, this will always present a problem.

Phase one - research methods

There are a number of different approaches to data collection that are used within quantitative research, including the case study, the survey and the experiment (de Vaus, 1996). Survey research is particularly popular within the social sciences. Most surveys are used for descriptive purposes (Robson, 2002).

> *'Survey research entails the collection of data on a number of units and usually at a single juncture in time, with a view to collecting systematically a body of quantifiable data in respect of a number of variables which are then examined to discern patterns of association.' (Bryman, 1989 p104)*

Phase one of this investigation required a method that would provide an understanding of current consumption patterns that may affect the service life of domestic products. A survey was considered most appropriate for achieving this.

A number of techniques of data collection are available when conducting survey research, including questionnaires, structured interviews, observation and content analysis (de Vaus, 1996). Questionnaires have been used successfully in previous consumer behaviour research (see section 4.2).

There are numerous ways of administering questionnaires. Within this investigation a postal format was given preference to 'face to face' and telephone interviews or electronically distributed surveys on the basis of the following considerations.

Despite the drawback that postal questionnaires are widely considered the least effective for achieving a successful response rate, the cost of refusal is much lower in terms of time and resources than for face to face interviews (May and Williams, 1997). The progress of face to face interviews is generally slow, hampered by the speed of the process itself and difficulties locating respondents when attempting to find their home (Steeh, 1981). Postal questionnaires are also associated with a slow response, however the resource implications of this are far less, especially when studying a large sample over a wide area. Telephone interviews appear to offer a good compromise for obtaining a satisfactory response rate at reasonable speed. They are less prone to non response by those with physical / mental disabilities and respondents are 'unlikely to hang up' once the interview has commenced (de Vaus, 1996). However, when dealing with questions that are complex and require time for consideration (i.e. where there are numerous possible responses), as in this research, telephone interviews are generally thought the

least suitable, whilst face to face interviews are regarded as best (de Vaus, 1996). In this respect, postal questionnaires are considered satisfactory, especially if complex questions are designed into simple tick box frameworks.

The topic of consumers' influence on product life encompasses a number of 'socially sensitive' issues (e.g. frequency of product cleaning) and includes some actions that may be associated with social stigmas (e.g. buying used items). In addition, other questions raised within the research, such as household income, are considered private. It was recognised that in a personal interview, face to face or over the phone, respondents may feel obliged to provide socially acceptable answers, threatening the reliability of the data obtained (Babbie, 1990; Frankfort-Nachmias and Nachmias, 1996). It was thought that the physical anonymity that the respondent retains in a postal questionnaire would lead to more reliable reporting. However, care was taken to ensure that questions were phrased sensitively to avoid the questionnaire format being too detached.

Additional consideration was taken in the design of the postal questionnaire to issues of reactivity. Whilst respondents are compelled to complete face to face and telephone interviews in the desired order, a mail survey provides ample opportunity for reading the entire questionnaire before commencing. In this research, it was imperative that respondents did not feel obliged to answer in a particular way therefore measures were taken to ensure question neutrality and reduce opportunities for respondents to conceal recognised inconsistencies.

To achieve a representative sample a comprehensive sampling frame was needed. The population under investigation influenced the decision to reject electronic and telephone surveys. Electronic forms of data collection (e.g. Internet) were considered inappropriate as they only reach those people with access to the appropriate technology. Telephone interviews would require a comprehensive sampling frame of telephone numbers. The electoral register provides the names and addresses of the study population but not their telephone numbers. The telephone directory does not contain the entire population, missing those with no phone, mobile phones and ex-directory numbers.

There were no relevant secondary data resources available to use in the main phase of analysis, secondary sources are piecemeal and only useful in placing the study in the broader context.

The postal survey method was, therefore, regarded as the most sensible option in terms of administrative issues including costs, time and practicality, in addition to being the most appropriate to the research topic and population. By recognising the limitations of this instrument, efforts can be made to reduce the drawbacks. For example, techniques can be employed in questionnaire design to overcome a low response rate and minimise bias; these are discussed in section 4.6.

Phase one - sampling decisions

This section describes and justifies how the sample was selected for phase one of this investigation. This includes the choice of location, sampling frame, sample type and size.

- **Location**

The decision was taken to base the research in Sheffield. This step was taken for a number of reasons including the exploratory nature of the study, the convenience of access to respondents for participation in phase two of the research and the ability to partially control certain factors. For example, respondents have access to similar shops, repair markets and routes of disposal thereby controlling for variations in supply. Resource limitations inhibited a nationally representative study.

Situated in South Yorkshire, the city has just over half a million residents (Census of population, 2001). It developed as a working class city prospering during the industrial revolution onwards. Its fortunes wavered with the national demise of manufacturing industries; however, continued growth in the service sector has steadily reversed this trend. The city has a large student population with two universities.

- **Sample frame**

The electoral register for the city of Sheffield was selected as the sampling frame. The registrar's office provided a computer generated random sample from the electoral role. This frame has a number of limitations including; non-registration, unregistered inward and outward migration and mortality. In addition, a household may be represented twice via two individuals of voting age.

The Data Protection Registrar (1998) has compiled a critique of the sale of the electoral role for non-electoral purposes, drawing attention to public rights to privacy. It was decided that in the context of this research the use of the electoral register did not conflict with citizens' rights as the research contains no direct commercial interest, addressees had the freedom to choose whether to respond and those who responded were guaranteed confidentiality.

- **Sample type**

This research investigated the population of the city of Sheffield, of ages 18 years or above, at one point in time during December 2000. To fulfil the requirements of the study a 'probability sampling' technique was used to obtain a representative sample of the population. 'A sample is a subset of the population' and to be representative it must 'mirror the population on key characteristics' so that what is found in the sample reflects what is found in the population within a known margin of error. The sample can only generalise to the population from which it is extracted (de Vaus, 1996).

Non-probability sampling methods were rejected because the research aimed to develop a picture of the activities of the population as a whole and, therefore, the sample needed to be representative in terms of demographics (and socio economic groups). Non-probability techniques such as quota sampling at waste dumps or outside stores would exclude consumers who had not recently bought or disposed a product, or those using alternative routes of acquisition and disposal, thereby masking certain consumption trends. To explore the influence of environmental activity and, in particular, participation in green consumption on the consumers' influence on product life, the option of purposive sampling was considered. This would entail extracting one sample from environmental groups and another sample from the general population for the purpose of comparison. This approach was rejected because members of environmental groups may represent only a small fraction of green consumers.

Probability samples are more likely to produce representative samples and allow the researcher to estimate the sample's accuracy and are, therefore, considered preferable (de Vaus, 1996). Within probability sampling there are numerous separate possibilities, which allow varying degrees of control over the sample (Babbie, 1990). This study used the 'simple random sampling' method, a strategy well suited to a postal questionnaire,

representing a good compromise between expense and precision. Stratified sampling could have helped ensure that each of the geographical areas (wards) was represented within the sample, but this would have added significantly to costs.

- **Sample size**

When deciding on the sample size a number of factors were taken into consideration, as recommended by de Vaus (1996). These included;
- the degree of accuracy required
- the extent of variation in the population in regard to the key characteristics
- the possible size of sub groups within the analysis phase
- the estimated response rate
- the cost / resource implications

The research aimed to obtain statistical results that could lead to 95% confidence that findings fell within 5% of the true population value. The consumers' influence on product life had not been previously measured, so it was difficult to estimate the proportion of respondents who fell into any particular category and, therefore, the research assumed the maximum difference i.e. 50%. To obtain the required sampling error of 5% at 95% confidence whilst taking into account the 50% split required a minimum sample size of 400 (Vaus, 1996, p70).

One direction of analysis anticipated was the exploration of differences between green and non-green consumers with respect to their influence on product life with the possibility for separate analysis. It was necessary, therefore, to ensure that the number of respondents within these subgroups was sufficient to obtain the same level of accuracy. Research by Mintel (1999) indicated that approximately four in ten members of the population were green consumers hence a sample of at least 1000 respondents must be questioned in order to obtain the desired accuracy.

It was also necessary to ensure that the sample was sufficiently large to ensure green and non-green consumers of all ages were represented. This figure was, therefore, doubled to 2000.

The research explores ordinary consumption habits; this does not involve a specialist group with a high level of subject interest. Research of this general nature is especially

vulnerable to poor response rate, as the sample will have little personal affinity. The estimated response rate was no higher than 50%, hence to achieve the desired sample of 2000, and taking account of issues of cost, the questionnaire was sent to 3000 respondents. Increasing the sample used to alleviate the problems of non response may improve the final number of responses but it does not tackle the issue of sample bias. The bias resulting from non-response was acknowledged by comparing the general characteristics of the sample with those of the population and considering differences during analysis.

4.5.2   Phase two - research design for qualitative investigation

The principle aim of phase two of the investigation was to seek explanations for differences in patterns of consumption across acquisition, ownership and disposal that affect the service life of domestic products. This required richly detailed experiential data that could not be generated effectively through the positivist format of a questionnaire. A qualitative investigation was identified as the most appropriate strategy.

Phase two - research methods

There are a large number of different research methods for conducting qualitative investigations. Tesch (1990 p58) identifies over forty approaches to this type of inquiry, classifying them under three basic orientations, 'language', 'descriptive/interpretive' and 'theory-building'. This phase of the research was considered an interpretive inquiry, the aim of which was to provide a detailed picture of peoples' understanding of their actions in relation to the consumption of domestic products and the consequences of this for product life.

Various research techniques are employed within the sphere of interpretive research. A number of criteria were used to select the most appropriate technique for this study. The first was the necessity for self-reporting as the research required the exploration of individual actions, ideas and beliefs. The second was that the method selected should allow for direct contact with participants, as greater intimacy was considered to increase the reliability of information obtained and finally the last criterion was that the chosen technique must fit with time and cost constraints. The technique considered to best meet these criteria was the in-depth interview.

In-depth interviews are most appropriate for capturing a clear understanding of the deeper meanings of an individual's lived experience. The interview process provides participants opportunity to discuss their ideas and beliefs free from interruption, censure or judgement, and is, therefore, generally considered reliable (e.g. Denzin and Lincoln, 1998). Other techniques were either not viable, financially or temporally (e.g. participant observation across the life span of a durable good was implausible), or were not conducive to establishing accurate responses (e.g. it was felt that focus groups would lead to 'socially acceptable' responses).

The structure of in-depth interviews varies significantly between different research investigations. Whilst some are highly structured and allow participants little room to explore their ideas, others are completely unstructured and susceptible to distraction. For the purposes of this research a free form interview with no interference from the interviewer was rejected on the grounds that the respondent may be unfamiliar with thinking openly about the implications of their consumption patterns for product life. Unlike subjects such as crime or taxation, this subject is not in regular public debate, hence some structure was considered necessary.

A highly structured approach using a questionnaire format was deemed inappropriate. The purpose of the interviews was to explore further the meanings and reasons for why people consume as they do. It was suspected that many of the determinants underpinning these activities were not based entirely on purposeful rational decision making. It was considered unlikely that asking people a direct series of questions regarding why they acted in certain ways would elicit as clear a picture as discussing topics and allowing respondents freedom to voice their thoughts.

A semi-structured approach was considered best. It ensured focus within the time limitations whilst simultaneously allowing some freedom of movement between subjects and deviation from a prepared agenda.

Within social sciences research semi-structured in-depth interviews are conducted either 'face to face' or over the telephone. Table 4.2 summarises the relative merits and drawbacks of each. For the needs of this research face to face interviews were considered more appropriate than telephone interviews. Despite the greater difficulties

with logistics and planning, it was anticipated that the quality of the data collected would be more rigorous and offer clearer insights into participants' underlying motives.

Table 4.2 Advantages and disadvantages of different methods of in-depth interviewing

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Face to face interviews

Positives
- More personal. Shows commitment, better for building enthusiasm.
- Easier to put someone at ease. Ability to use positive body language.
- 'Importance' of respondent, increased visibility of the value of their input. Improves their perception of the research.
- Easier to keep respondent on track using non-verbal cues etc.
- Respondent not distracted by other activities.
- Better for probing and finding motives etc.
- Less pressure for quick response, silences work better face to face.

Negatives
- More logistical problems - time, expense.
- Poorer response rate, because of real or perceived barriers, biased to those with free time.
- Respondents may be less inclined to tell the truth when discussing sensitive topics such as cleaning. However, this problem may be equally applicable to a phone interview. It is more likely that these problems would arise from poorly phrased questions.

Telephone interviews

Positives
- Quick and inexpensive.
- Easier for the respondent, as avoids travel and cost.
- Broader and greater response rate, wider availability of people due to increased hours of possible contact and increased convenience.

Negatives
- Respondents are more likely to be distracted by other events or activities. This may lead to shorter and disconnected responses.
- Experience is less personal and anonymity may not necessarily be favoured.
- Technique used frequently for sales and marketing may cause concern and mistrust.
- Telephone conversations tend to be made up of much smaller chunks of conversation than face to face discussions, and are perhaps less suited to exploratory research.
- There is less opportunity for probing or using visual aids and feedback.
- Some people are uncomfortable talking at length on the phone.

Phase two - sampling decisions

This section explores the sampling decisions for phase two of the research.

- **Sample frame**

The sampling frame for phase two of the study was made up of those 191 respondents who had stated that they were willing to participate in further research when completing the questionnaires within phase one.

It was acknowledged that some of these 191 respondents were likely to decline an invitation to participate. Twelve months passed between the phases of data collection resulting in natural attrition from factors such as morbidity, mortality or migration. In addition, the time requirements of a request were considered likely to affect response.

- **Sample type**

Whilst a random sample was appropriate in phase one, this offered no statistical advantage in phase two as the sampling frame was made up only of willing respondents. Miles and Huberman (1994, p28) define a typology of sixteen sampling strategies for qualitative inquiry. These strategies were observed in the context of the original research aims and objectives (outlined in chapter one) and the analyses of data collected in phase one (as per chapter five).

In summary, analyses of data collected in phase one indicated many respondents had complex profiles with considerable inconsistency across patterns of consumption that influence service life for the three stages of consumption and for the three categories of products. It also revealed incongruity between intentions and actions, particularly during ownership. A modest examination of the relationship between possible determinants including demographics, socio-economic status and green consumption and the optimisation of product life indicated little association. The objectives of phase two were to identify factors affecting consistency in patterns of consumption and consistency between intentions and patterns of consumption. This included addressing the shortfall between green and sustainable consumption.

The decision was taken to use a combination of 'typical case' and 'homogeneous' sampling. Interviewees were selected purposively who met specified criterion. Initially 'typical case' respondents were identified as those displaying:

- inconsistency across their consumption profile for one or more products
- inconsistency at one or more stages of the consumption process
- incongruity between intent and action for one or more products
- incongruity between intent and action for one or more stages of the consumption process

To explore further the possible factors affecting inconsistencies it was decided that the sample must also:

- have at least half of those sampled people who had carried out at least two of the environmental activities featured in the questionnaire
- have a satisfactory mix of demographic and socio-economic characteristics

• **Sample size**

The modified sample frame was prepared using the criteria set out above. Eligible respondents were then contacted by telephone and asked to participate in an interview. There were no 'gate keepers' to negotiate with in this context. Accessing interviewees using this technique was considered acceptable. A quota of twenty interviews was set, based on the need to explore the phenomenon sufficiently, balanced with the limitations of time.

4.6   Research implementation

This section explores the processes of research implementation for both the quantitative and qualitative investigations. This encompasses the design, development and testing of the research tools for data collection and their administration.

4.6.1   Phase one - survey implementation

The questionnaire was developed in a series of three stages including initial drafting, the pilot survey and the main survey. This section describes each of these three stages, justifying decisions taken and noting areas of complexity that require consideration during analysis. In addition it outlines the numerous techniques discussed in the methodological literature that were used to enhance survey design, build a positive rapport with the unseen respondent and thereby improve response rates.

Questionnaire development - initial drafting

The section outlines the initial drafting of the questionnaire. This process was guided by a number of key texts including May and Williams (1997), Oppenheim (1992) and de Vaus (1996).

- **Questionnaire content**

The process of questionnaire development began with the clarification of research concepts, as described in chapter three. The consequent translation of the concept of the consumers' influence on product life into specific factors influencing product life that are directly related to product consumption, are outlined in table 4.3 and provided the framework upon which the initial drafting of questions was based.

Table 4.3 Factors influencing product life

Acquisition
- Prompt (i.e. timing of acquisition)
- Search process (e.g. impulse / researched)
- Source
- Product requirements (e.g. fashion / long life expectancy)
- Product life anticipation

Ownership
- Commitment to product care
- Modes of storage
- Adherence to guidelines / instructions
- Regularity of maintenance
- Anticipated future life span / satisfaction
- Search / evaluation / use of repair
- Evaluation / alternative uses - rejuvenation or loan / lend

Disposal
- Timing (i.e. prompt for disposal e.g. fashions, functions, fitness and hygiene)
- Condition of disposed product (i.e. state of repair)
- Disposal option selected (i.e. landfill, recycle, re-use)

(further detail in section 3.2.3)

Initially, a list of questions was drafted examining every one of these factors for each of the three product categories. The length of a survey based on this process was, however, implausible, hence areas of commonality between the questions for the three products were highlighted and questions devised that were able to target each of the three products simultaneously rather than consecutively. This permitted a much shorter questionnaire and avoided excess repetition. On the few occasions where it was possible, relevant questions and responses from other research were used and adapted to enable some cross comparisons (e.g. Box, 1983).

In addition, a set of questions on demographic, socio-economic and environmental characteristics was drafted. This was to be used for addressing the requirement to examine whether the sample was representative of the population and to carry out a preliminary analysis of the possible factors affecting consumers' influence on product life.

A constant process of compromise was in operation during the drafting of the questionnaire, balancing the need for comprehensive measures of the research concepts and the necessity of minimising questionnaire length. Only one measure was used for each of the factors identified that may influence product life. These measures are behavioural rather than attitudinal, but are still susceptible to criticisms regarding ambiguity and reliability. However, the repetition and excessive length that would accompany a design based on multiple measures was considered unacceptable. Efforts were, therefore, taken to maximise reliability through careful question construction. The design and drafting process also incorporated careful consideration of the methods of analysis to be used (discussed in section 4.7.1).

The questions devised required self-reporting, an approach that has been used effectively in similar investigations (see, for example, Cooper and Mayers, 2000). It is necessary to acknowledge that the 'reliability' of self-reporting measures is questionable; principally it may measure perceived rather than actual actions. The extent of dependence on memory recall is also contentious. Alternatives to self-reporting were considered, such as attitudinal research towards general trends or hypothetical scenarios, but these were also susceptible to reliability problems. Questions were included within the survey to measure memory recall to monitor its extent and address concerns.

The questionnaire asked respondents to discuss their individual patterns of consumption. Whilst it was recognised that consumption of at least two of the selected products may be influenced by other people within and beyond the household, the simplification to the individual was considered acceptable for the purposes of this exploratory research. The impacts of household dynamics during consumption were highlighted as issues for examination in phase two of the research.

- **Questionnaire structure**

Question ordering is widely recognised as an important element of questionnaire design (May and Williams, 1997). The survey was made up of four distinct sections, covering;
- patterns of acquisition
- patterns of ownership
- patterns of disposal
- demographic and environmental information

Within the first three sections on patterns of consumption the question ordering follows a general pattern beginning with simple questions on product selection and temporal context followed by more complex questions regarding patterns of consumption. A question on product life intent was asked at the close of these sections.

The more mundane section on household questions was placed last to encourage full completion, as discussed by May and Williams (1997 p94). Questions about participation in green consumption were placed amongst other questions about the household. The decision to do this was based on the premise that it would reduce any potential reactivity that may have occurred had these questions been placed in their own distinct section.

In line with recommended best practice, at the end of the survey the respondents were given the opportunity to comment on the questionnaire, providing a chance to vent any grievances or highlight concerns.

- **Question format**

The type of question most predominantly selected for the questionnaire was a multiple-choice pre-coded closed format with an option available to provide a different answer when necessary. This question type helps standardise the administration of the measurement instrument and they are generally easier and faster to complete. The option to provide an alternative answer ensured that the respondent didn't feel compelled to provide an inaccurate response. The closed multiple-choice format was not considered appropriate to explore several components. The prioritisation of requirements in acquisition, and participation in maintenance and rejuvenation activities during ownership, both employed different question types. Such variation is advantageous as it can help maintain respondent interest.

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The format of questions in the section on demographics and environment were designed where possible using formats from previous well known and used research sources (e.g. General Household Survey). The measure of social class is based on new NS-SEC classification (combining data on employment status, type and people management responsibilities). The susceptibility of direct questions on household income to non-response was recognised and other indicators of income were also measured such as vehicle access, type of housing tenure and occupation of the main income earner.

In the case of the environment there has been numerous research projects directed at identifying green consumers (e.g. NCC, 1998). The measurements used to define whether a person is a green consumer are not universal, different studies have created different criteria or incorporated wider aspects of ecological consciousness in addition to purely behavioural measures. A review of these previous measures revealed that quite lengthy and complex question groups were being used to determine green consumption status. These were considered inappropriate for this research because of restrictions on questionnaire length and additional concerns regarding reactivity. A simple measure of green consumption was, therefore, devised exploring participation in one key green activity for each phase of consumption. The activities chosen were buying organic fruit and vegetables, using energy saving light bulbs and recycling paper / glass products.

Most of the questions collected nominal / categorical data, hence analysis is mostly restricted to statistical techniques that are relevant to this data format.

- **Questionnaire presentation**

The presentational aspects of questionnaire design were critical to engaging the respondent and achieving a high response rate. This was deemed especially important due to the general nature of this study. The techniques employed and the connected benefits are outlined in table 4.4.

The front page of the questionnaire was dedicated to providing the respondent with an understanding of the nature of the research, definitions of the products under investigation, guidelines for questionnaire completion and an assurance of confidentiality. This added another page but was considered justified as it encouraged correct completion and strengthened the bond with the respondent.

Table 4.4 Presentational techniques used to boost response rate

Technique	Benefit
Single sided pages	Avoids confusion / omission of whole pages of data
Recommended font, letter size and spacing	Ensures that questions and instructions are clearly visible
Sustain continuity of presentation and phrasing	Improves the flow of questions thereby making completion easier
Provision of contact details	Provides respondent contact opportunity if wanted
Personalised cover letter, identifying addressee and using blue ink signature	Encourages response, illustrates personal commitment
Coloured paper	Attracts attention; especially important due to the general nature of this study

Sources: Vaus (1996); Oppenheim (1992)

The option of incorporating a completion incentive was waived. The literature indicated that there is no consensus on whether financial or material incentives, such as being entered for a prize draw, boosts response rates.

- **Covering letter**

The covering letter was designed in accordance with recommendations provided by de Vaus (1996 p 116). It was printed on coloured paper headed with the university logo. It contained a full explanation of the study's purpose and usefulness, a description of how and why respondents had been selected and an assurance of confidentiality. The system of tracking used on the business reply envelopes was also explained. Business reply envelopes were used despite evidence that suggests using stamps either for outward questionnaires or on reply envelopes positively affects the response rate (e.g. Babbie, 1990). This decision was based on the substantial time requirements and costs of using stamps in a study of this size.

- **Revisions**

Prior to an external pilot survey a number of pre-tests to assess and improve the questionnaire were carried out, including specific question tests, section tests and whole questionnaire tests. The covering letter was also subject to evaluation. These tests were conducted with two different groups, beginning with an informal convenience sample of friends and family, including academics and non-academics, and moving on to formal tests with acquaintances and volunteers. The two most frequently recurring issues were questionnaire length and question order.

Questionnaire development - pilot survey

The full-scale pilot was posted on the 22nd August 2000. This date was later than initially planned but it was considered pertinent to wait and avoid holiday related non-response. It was administered to 300 respondents, 10% of the expected sample size, to test the effectiveness of the questionnaire and the selected method of administration.

In total 58 respondents replied to the pilot questionnaire, a response rate of 19.3% with 5% of these respondents agreeing to participate in further research. The pilot questionnaires were entered into a pre-designed spreadsheet. Basic analysis was undertaken using the social science statistical software SPSS to ensure that data collected was suitable for the anticipated analysis.

An evaluation of the pilot survey indicated two areas of significant concern, the poor response rate and evidence of confusion resulting from question order. A number of steps were taken to ameliorate these problems including:
- amendments to the cover letter to try and convince respondents more effectively of the importance of the research and their role in its success
- sending follow up letters to people who did not respond, politely reminding them to return their questionnaires (this had been rejected initially on the grounds of cost)
- simplification of the front page and clarification of instructions
- placing the section on acquisition at the start of the questionnaire instead of commencing with disposal which was thought to have caused confusion

Questionnaire development - main survey

The amendments to the questionnaire that followed the pilot exercise required time and re-testing using some of the earlier piloting techniques. The final questionnaire and revised covering letter were posted on the 24th November 2000 (see appendix 3). A fortnight after the questionnaire had been posted, 535 complete responses were received. At this point a reminder letter was sent, providing respondents with a new final deadline and reminding them of the importance of their contribution. Respondents were asked to contact the office if they had lost or mislaid the questionnaire and wanted to complete one. The option of sending every respondent a replacement questionnaire was rejected on the grounds of expense. Overall a total of 711 (23.7%) acceptable questionnaires were returned.

4.6.2   Phase two - *interview implementation*

This section examines decisions concerning the implementation of phase two of the investigation. It is split into two sections, the first focuses on the drafting of a suitable script for carrying out the interviews and the second explores issues concerning its subsequent administration.

Interview development

The interview schedule was designed in accordance with the research aims and objectives outlined in chapter one, accommodating insights arising from the analysis of the questionnaire (see chapter five) when appropriate. The development process also adhered to advice provided in a number of key texts on conducting qualitative research.

- Interview length

Patton (1990) argues that the researcher must decide on the degree of'participantness' to be maintained within a study. That is, how much the interviewer will be involved within the interviewee's everyday life. Many qualitative investigations are based on a series of interviews with a relatively small group of respondents. The repeated contact facilitates the development of a good rapport between the interviewer and the interviewee and offers greater opportunity to reveal multiple layers of understanding of the subject matter. Most qualitative texts highlight the critical importance of building a good relationship with the participant within interview work and to demonstrate good interpersonal skills. For example, Marshall and Rossman (1999) stress the importance of being an 'active, patient, and thoughtful listener'.

Unfortunately limitations on both time and resources impeded the use of multiple interviews within this research. The decision was taken to conduct single interviews that would last between forty-five minutes and an hour. This required minimal intrusion but made careful planning of the interview structure even more important, to make the most effective use of the time available and to develop a good rapport by achieving the right balance between formality and familiarity.

- Interview context

Two types of interview arrangement were considered for conducting the interview. The first was a formal interview at the university premises. The second was a less formal version either at the participant's home or another informal location.

The informal interview based at the participant's home would minimise the inconvenience to the respondent (as they would incur no travel costs or waiting time). It would also provide them a secure and, therefore, more comfortable and relaxed setting. The positive effect of this would be to improve opportunities for the participant to answer questions more openly and with reference to context. It would also provide opportunities to record visual information through photographs, providing rich description to accompany the spoken account. The drawback identified with this approach was that respondents might be less likely to participate as this represents a greater invasion of their personal space than an interview at a detached location. It was decided that a neutral location within the city was most appropriate. This reduced exposure to any danger and decreased the mutual need for caution. A café within Sheffield Hallam University was selected as it was less formal than an isolated interview room whilst it still provided the interviewee with confidence regarding the academic nature of the research. This was considered a good compromise.

- **Interview content and structure**

The analysis of the questionnaires revealed considerable inconsistencies in individual profiles across the consumption process and between the different product categories; a limited exploration of explanatory factors including demographic, socio-economic and environmental variables provided little insight. The purpose of the interviews was to *'seek explanations for differences in patterns of consumption and consequent variations in service life'*. In particular they set out to identify:

- factors affecting the patterns of consumption selected across the different stages of consumption and between different types of product
- factors affecting consistency between patterns of consumption selected across the different stages of consumption and between different types of product
- factors affecting consistency between consumer intentions regarding product life and the patterns of consumption selected
- factors affecting the relationship between environmentalism and product life

The interview schedule, therefore, had to be designed to draw out these issues. As discussed earlier an indirect approach was considered most fitting for revealing this information. The decision was made that this should be based on asking the interviewees about the similarities and differences that they perceived in their approach

to the consumption of the three product categories, including acquisition, ownership and disposal. The interview schedule was structured using the same sequencing as the questionnaire. Issues relating environmentalism and product life were again left till the end to avoid problems of reactivity. To ensure that respondents kept their comments as closely as possible to the three-selected product categories, an interview aide was designed which depicted a selection of products within each category. A further aide was used to accompany discussion concerning the nature of movement from dissatisfaction to disposal. Such aides have been used successfully in other research e.g. Cooper and Mayers, 2000. The schedule and two interview aides are located in appendix 4.

The schedule was designed for use as an 'aide memoir' and guide during the interview, providing respondents the flexibility to discuss their ideas freely, whilst retaining some control over the flow of conversation. In-depth interviews explore a few general topics to help reveal participants' views but leave them to frame and structure their response, thereby disclosing the respondent's perspective as they see it, and not as the researcher sees it. A list of more detailed prompts was included in the schedule. This was used to guide participants who diverged to return to relevant subjects and, in difficult interviews, to retain momentum.

The decision was taken to avoid direct reference to the questionnaire, either to compare data or to provide a starting point for discussion. This avoided duplication of results and lengthy discussions of the questionnaire, which would be compounded by the time that had elapsed between the two research phases.

In line with advice provided by Patton (1990), great care was taken in the design of the interview request process and the introduction section of the interview script regarding communication of the research agenda. Whilst it was considered unethical to have a covert agenda, Taylor and Bogdan (1984, p25) advise that it is acceptable to be "truthful but vague" when discussing the purpose of research with participants. The ethical motives for this research are fully acknowledged; it is committed to revealing pathways towards more sustainable consumption by exploring and understanding the factors that affect the consumers' influence on product life. However, these ethical motives were not explicitly stated in the interview request or during the interview's introductory

statement. This was not considered a deceit as direct reference to this may have generated confusion or caused problems with reactivity.

In addition it was necessary to consider language and semantics used in the schedule and letter of request to:

- ensure that they were comprehensible to all, avoiding jargon and acronyms and explaining any unusual terms
- ensure that prompts were phrased so they were not leading nor prone to reactivity
- engage and interest the participant and build a strong rapport.

- **Revisions**

Prior to carrying out the interview sessions the schedule was tested on a convenience sample of several friends. This highlighted a number of issues within the schedule that required consideration, amendment or clarification, including:

- Terminology, for example, when discussing product cleaning and its antithesis
- Flexibility, allowing some deviations whilst not compromising the research focus
- Need for visual aid, to accompany the discussion on processes of dissatisfaction.

The decision was also taken to use an alternate venue at certain times of the day due to high noise levels.

- **Interview reflexivity**

The majority of texts on conducting qualitative research draw attention to the need for the researcher to engage in systematic reflection of their role in the research and to be sensitive to how personal biographies shape their work (e.g. Rossman and Rallis, 1998). This includes consideration of the ethics of the research design and implementation, the impact of the researcher's personal biography and their influence on building relationships (for example, Patton, 1990; Rubin and Rubin, 1995; Marshall and Rossman, 1999). The impacts of the researcher's personal and professional biography on this investigation are considered within chapter eight.

The sensitivity and ethics of conducting research within this subject area are not well documented. However, it was deemed that several aspects of the consumers' influence on product life would require sympathetic handling. Prejudices and stigma are prevalent in society towards poverty and activities associated with resource exclusion. Issues surrounding cleaning are also susceptible to problems with reactivity. It was essential,

therefore, to take considerable care when phrasing questions. In addition, the need to explore inconsistencies in individual patterns of consumption required sensitivity. It was essential to maintaining a good rapport that interviewees did not feel that they were being judged.

In line with elementary research protocols, participants' basic rights regarding informed consent, protection of participant anonymity and well being were met.

Interview administration

Respondents that met the requirements of the sampling frame set out in section 4.5.2 were sent a letter requesting their participation in phase two of the investigation. Each of these respondents was subsequently contacted by telephone and asked whether they could participate. Those agreeing to take part in the research were then sent written confirmation of the agreed time and date accompanied by a short summary of discussion points and a map of the campus that highlighted the meeting point.

Prior to each interview participants were provided with refreshments and efforts were made to put them at ease. During this time the interviewees were given a brief overview of the research and permission to record the discussion was requested. They were also reminded of the confidentiality agreement, and that should they wish, they could stop the interview. Upon completion each interviewee was given a payment of fifteen pounds and offered a copy of the interview transcript.

In total, 18 interviews were conducted between the 24th June and the 17th July 2002 at times convenient to the participant. Interview length ranged between 45 and 90 minutes.

4.7   Data preparation

This section discusses the preparation of data collected during phases 1 and 2 of the investigation. It encompasses a summary of methods used for collating, processing and verifying the raw data, followed by a discussion of coding and other techniques used within the analysis.

4.7.1 Phase one - questionnaire data preparation

There were two main steps of data preparation following the return of questionnaires; 'data entry and verification' and 'data coding and elaboration'.

Data entry and verification

Prior to the return of questionnaires an SPSS spreadsheet was designed and a corresponding code book was developed following guidelines provided by de Vaus (1996) and Babbie (1990).

Each returned questionnaire was processed as follows:

1. A decision was taken regarding the acceptability of the returned questionnaire
2. Acceptable questionnaires were given a unique number, others were discarded
3. Data were entered into the SPSS spreadsheet
4. Where 'other' categories were completed, a note was taken of the response
5. Anomalies arising during data input that may influence analysis were noted
6. Names and addresses of those willing to participate in further research were listed.

When a person did not respond to a question a missing data code was entered. Various types of missing data code were allotted to ensure that different types of missing data could be distinguished during analysis. Three missing data codes were used:

1. Responses missed by accident and unclear responses were coded 0
2. Responses deliberately missed (i.e. when comment given) were coded 88
3. Responses missed because the questions were not applicable were coded 99

'I don't know' was treated as a valid response during the data entry process.

Three types of data cleaning were carried out on the final data set.

1. Valid range check – a check for obscure entries, i.e. where a cell contained data that was not compatible with the available codes
2. Filter check – a check to ensure that respondents were consistent i.e. that they did not combine 'not applicable' responses with 'applicable' responses in any of the three consumption sections.
3. Logic check – whilst entering data, illogical responses were noted and questioned.

In addition, 50 of the processed questionnaires were audited, using re-entry checks, to assess the accuracy of the data entry. Only 8 cells were found to contain incorrect data.

Data coding and elaboration

In addition to the simple nominal coding underlying the inputting of the raw questionnaire data was a series of more elaborate data coding exercises for use in the more complex stages of analysis. In order to classify consumers according to shared patterns of consumption. This section discusses and justifies the rationale underpinning these data coding processes.

CONSUMPTION PROFILE

The descriptive analysis of consumption patterns in acquisition, ownership and disposal was able to provide insights into how consumers influence product life. However it did not summarise this data in a way that could be used to achieve the further objectives of the research, i.e. to compare either

- individual differences in patterns of consumption that influence product life at different stages of consumption, or
- differences between different individuals' patterns of consumption that influence product life at different stages of consumption.

It was, therefore, necessary whilst designing the questionnaire to simultaneously devise a means of summarising the data collected to provide one measure of 'patterns of consumption that influence product life' for each stage of consumption. This summarised measure for the data collected for each stage of the consumption process required careful deliberation. The measure had to take into account that at each stage of consumption;

(a) there was considerable diversity amongst the variables collected,

(b) most variables had to be formatted using nominal data,

(c) there was no linear relationship between the variables,

(d) that items were behavioural rather than attitudinal

Contemplation of these complexities led to the realisation that conventional measurement approaches were not suitable. For example, the conventional means of measuring concepts within social research is to use scales, such as Thurston or Likert to measure response to a set of questions, which provide ranked data that are then statistically analysed, for example using factor analysis tests, to assess concept validity and then to classify respondents. This measurement approach was not suitable to the type of data being collected in this research which is nominal and behavioural.

Other forms of measurement within social science research are based on linear scoring systems where positive responses (both behavioural and / or attitudinal) add cumulatively to give an overall score or index, which can then be used to classify respondents. These types of scoring system weren't considered appropriate for measuring this concept because of the complexity of the product life issue, which meant certain combinations of consumption choices were more optimising than others, rather than each cumulatively adding to overall optimising patterns of consumption.

In non social science research, scoring systems that allocate scores according to a number of criteria (which are not linear) can be identified. For example, an overall score is often calculated for the purposes of comparison in industrial risk assessments and assessments of environmental effects. These scores are often based on a number of independent variables that have to be allocated scores according to a subjective set of criteria. These often have to incorporate consideration that some variables may collectively have greater impact than they do in isolation. However, no evidence of such scoring systems being used within social sciences was identified.

Within this research, three different options were considered for classifying consumers' 'patterns of consumption that influence product life'. They were:

1. Creating a complex spectrum of codes based on multiple sequences of answers to different questions. For example, coding those who disposed of a failed product, which was broken beyond repair, as waste 'x' and those who disposed of a functioning product, which was in good condition, as waste 'y' etc.

2. Devising a means to score individuals according to set criteria and classifying them on this basis. This would recognise that some patterns of consumption were more optimising of product life than others (see chapter three). Scores could be given ranging from a minimum of zero, to a maximum of six, indicating low to high optimising patterns of consumption. This style of scoring would provide ordinal data (measure of relative magnitude) showing the relative degree of optimisation for each stage of consumption.

3. Delineating two simple dichotomous groups based on specified criteria relating to patterns of consumption that influence product life, to distinguish between 'optimisers' and 'non-optimisers'.

The first option was attractive, since it could be used to compare respondents at each stage of the consumption process and would provide the frequencies for various sequences of consumption patterns. However, it would not provide the required data that would facilitate the comparison of individual consistency between different stages of consumption. This limitation was overcome by the second option which enabled both analysis of individual consistency across the consumption stages and cross comparison of respondents. Its drawback was its reliance on judgement of what constitutes more or less optimising patterns of consumption and its use of an entirely different approach to measurement within social science research. This interpretative dilemma was heightened in the final option. Identifying people as optimising or not, was considered too simplistic and this approach was rejected.

The final decision was in favour of the scale of optimisation set out in option two. The use of such a scoring system is novel and therefore contentious. The subjectivity of this procedure was recognised from the outset and efforts were made to improve its credibility through the evolution of a sequence of drafting and revisions on the basis of discussions with academic colleagues and friends.

The following sections outline the design and justification of the processes devised for calculating scores for each stage of the consumption process, as described in option two.

Acquisition

The factors explicitly related to the consumer's participation in acquisition (and pre-acquisition) that can influence the service life of products were identified and discussed in section 3.2.3. The following section identifies the various options available for each of the factors selected for inclusion in the final questionnaire and scores them individually, or in combination with another factor, according to whether they are more or less optimising of product life.

- **Prompt**

There are a huge number of possibilities that may prompt a person to acquire a new product, each of which may be considered more or less optimising than another. When an individual has been prompted by the failure of an existing product, their rationale for acquisition was considered more optimising than someone who has been prompted by

the desire to update with new fashions and technological advances or to react to a special offer.

On some occasions acquisition may be prompted by other changes taking place, for example, house redecoration may make the colour of existing upholstered chairs unsuitable. This type of prompt was titled 'reaction to wants': it was considered less optimising as an existing product was disregarded. On other occasions circumstances may change or a need may arise which is out of the individual's control and makes an acquisition necessary; for example, a medical condition may prompt the acquisition of new shoes. Alternatively it may be the first time that the product has been acquired and, therefore, it is not a replacement decision. This type of prompt was titled 'reactions to needs and external forces'; this rationale was considered optimising for the purposes of this research as circumstances are considered out of the respondent's direct control.

When a respondent stated that they did not know what prompted their acquisition they were removed from the analysis. Examples of 'reactions to wants and needs and external forces' occurring in the research are summarised in appendix 5. The allocation of scores for prompt is summarised in table 4.5.

Table 4.5 Allocation of scores for prompt

Prompt	Score
Product failure (a)	2
Product obsolescence (b, c, d)	0
Reaction to wants	0
Reaction to needs / external forces	2
Don't know	MD (code 88)

MD = Coded as missing data
a,b,c etc. – questionnaire response options

- **Source and search**

The type of search strategy that is undertaken when acquiring a product will be affected by the source of that product. It is proposed, therefore, that the measure of how optimising a person is in their search strategy also depends upon the product's source.

If products were acquired as new (from shop, catalogue or other market), undertaking research prior to shopping was considered most optimising. Comparison of products in the market place was thought less optimising, as advice received is impartial and may exclude certain products. Impulse buys were considered least optimising as the product

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is bought without prior thought, no systematic consideration of needs or attempt to find the product that best meets them. If a respondent who was given a product stated that it was from a shop or catalogue this was considered an illogical combination, as the respondent did not buy it. The small number responding that they 'didn't remember / know how' they searched for the products were discounted. It could be argued that this indicates a lack of involvement and concern. However, acquisition could have occurred as much as 15 years before and it is perhaps unrealistic to expect such people to remember the exact circumstances. These respondents were removed from the analysis as it was deemed unfair to judge whether they had optimised product life on the basis of other answers.

If the source of the product was from the second hand market (either formal or informal) then the search pattern considered most optimising changes. A product acquired from this source was unlikely to be well researched due to limitations of product range and availability. Hence the optimal strategy for respondents acquiring products from this source was for them to compare several products (both are scored optimal). An impulse buy from this source was considered more optimising than a new impulse buy. A person extending the life of an existing product was optimising product life (although there may be exceptions where the product is an old appliance). If the source of the product was from a friend or family then the product could be new or used. Receiving a product from someone does not allow the receiver to search or to prioritise his or her requirements. These respondents are identified with a unique code (77) and identified as missing data in the data set.

If the person did not know or could not remember the source of a product then their answers to the question on search were coded void. The allocation of scores for source and search is summarised in table 4.6.

Table 4.6 Allocation of scores for source and search

Source	Search	Score
New (a, b, market, kitchen design / manufacturer, handmade, work, hospital)	Full research (d*)	2
	Partial research (c)	1
	No research (b**)	0
	Received (a)	X (code 111)
	Don't rem / know (f)	MD (code 88)
Used (c, d, upholsterer)	Full research (d*)	2
	Partial research (c)	2
	No research (b**)	1
	Received (a)	X (code 111)
	Don't rem / know (f)	MD (code 88)
Friend / family (e, other)	Full research (d*)	X (code 111)
	Partial research (c)	X (code 111)
	No research (b**)	X (code 111)
	Received (a)	MD (code 77)
	Don't rem / know (f)	MD (code 88)
Don't rem / know (f)	-	MD (code 88)

MD = Coded as missing data, X = Illogical combination
* Includes other categories - medical / special purpose and repeat purchase
** Includes other categories – special offer / sale buy
a,b,c etc. – questionnaire response options

- **Priority requirements**

In addition to the source and search, consumers' prioritisation of requirements when acquiring the product will also influence its potential life span. Prioritised requirements, therefore, form part of the scoring strategy for acquisition.

Respondents who prioritised 'long life expectancy' as one of their top three requirements were given the greatest score, as this expresses an explicit interest in life span. Those who prioritised more than one requirement associated with long life expectancy were given a moderate score. The requirements considered to reflect this were:

- – 'easy to clean / maintain' (consideration of life span via maintenance requirements)
- – 'easy to repair / restore' (consideration of life span extension activities)
- – 'quality / reliability' (consideration of life span in use phase)
- – 'traditional / timeless style' (consideration of life span via avoidance of obsolescence)

Those who chose only one of these requirements and those not prioritising any of the requirements associated with optimisation were not awarded any points. Respondents stating that they did not choose the product and hence not able to prioritise their requirements, were coded (77), which is labelled as missing data. Knowledge of

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prioritised requirements was considered essential to developing the scoring system, hence cases with missing data for this question were marked as void (88). The allocation of scores for priorities in acquisition is summarised in table 4.7.

Table 4.7 Allocation of scores for priority requirements

Priority	Score
Prioritised long life expectancy in top 3 (LLE) (15)	2
Prioritised >1 req assoc with LLE (3,8,9 or 11)	1
Did not prioritise LLE	0
Did not choose (16)	MD (code 77)
Missing data	MD (code 88)

MD = Coded as missing data
1-16 – questionnaire response options

Following the scoring of each of these components, they were merged to form one measure of 'patterns of consumption that influence product life in acquisition' for each respondent. The merged chart is shown in appendix 5.

Ownership / Use

The factors explicitly related to the consumer's participation in ownership that can influence the service life of products were identified and discussed in section 3.2.3. The following section identifies the various options available for each of the factors selected for inclusion in the final questionnaire and scores them individually, or in combination with another factor, according to whether they are more or less optimising of product life.

- **Treatment and cleaning**

A product's treatment over its lifetime and how it is taken care of were identified as indicators of the owner's overall expectations of product life. For example, people who were indifferent to their products and rarely undertook any cleaning activity were not considered to be acting to maintain the product and were, therefore, not attempting to prolong its life span. In contrast, someone undertaking preventive cleaning or treating products with great care during use would be perceived to be making a clear effort to prolong product life.

Some combinations of extremes appeared illogical, for example indifference to product cleaning coupled with great care. It was possible that the treatment was so careful that

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cleaning was rarely required, but essentially this behaviour was still thought less optimising than undertaking both.

When 'someone else in the household' cleaned the product a unique code (66) was given. Arguably that individual was not acting to optimise product life, but further measures may have been unnecessary if someone else was doing the cleaning. On occasions that respondents were unable to say how the product was cleaned, it implied cleaning was rare or done by somebody else and, as this created uncertainty, the response was treated as missing data (88).

The allocation of scores for treatment and cleaning is summarised in table 4.8.

Table 4.8 Allocation of scores for treatment and cleaning

Treatment	Cleaning	Score
Great Care (c)	Preventive (d)	4
	Reactive (b, c)	3
	Rare (a)	0
Care (b)	Preventive (d)	3
	Reactive (b, c)	2
	Rare (a)	0
Indifferent (a)	Preventive (d)	2
	Reactive (b, c)	1
	Rare (a)	0
All	Someone else in h/h	MD (code 66)
All	Don't remember / know	MD (code 88)

MD = Coded as missing data
a,b,c etc. – questionnaire response options

- **Maintenance and rejuvenation**

Various activities were identified within the research that could be undertaken to extend product life. These were categorised into two groups; maintenance and rejuvenation.

Maintenance activities included

- direct maintenance - carrying out regular care and product maintenance and following the seller's or manufacturer's instructions
- indirect maintenance - using protective measures or following personal or household rules of use / maintenance

Rejuvenation activities included actions that prolong the life of a product following a degree of deterioration. It included carrying out repair / restoration at home, having the

product repaired or restored by a specialist, re-using a product for a different task or use in a different place, or buying or receiving the product second hand (i.e. rejuvenating an existing product).

Each of these components was scored on the basis of cumulative actions taken. If none or only one of the activities were undertaken no points were awarded, while if two or more activities were undertaken a score of one was awarded. There was concern that rejuvenation activities are a function of product age. The oldest products of those in younger age groups were inevitably less old than the oldest products of older people, hence younger groups had fewer opportunities to carry out rejuvenation activities.

If no answers had been given for this section then the case was considered void. The variables 'someone else in household has done activities' and 'stored for possible future use' were ignored. These caused difficulties during data input and early analysis. The allocation of scores for maintenance and rejuvenation is summarised in table 4.9.

Table 4.9 Allocation of scores for maintenance and rejuvenation

Maintenance	Rejuvenation	Score
<2 activities	<2 activities	0
	≥ 2 activities	1
≥ 2 activities	<2 activities	1
	≥ 2 activities	2
All		MD (code 88)

MD = Coded as missing data

Following the scoring of each of these components, they were merged to form one measure of 'patterns of consumption that influence product life in ownership. The merged score chart is shown in appendix 5.

Disposal

The factors explicitly related to the consumer's participation in disposal that can influence the service life of products were identified and discussed in section 3.2.3. The following section identifies the various options available for each of the factors selected for inclusion in the final questionnaire and scores them individually, or in combination with another factor, according to whether they are more or less optimising of product life. Knowledge of the condition of the product at disposal is essential to judging whether a product's lifetime has been optimised.

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- **Prompt**

It was considered most optimising to dispose of a product because it was no longer 'fit for use' i.e. product failure. On most occasions a product disposed for this reason has been optimised (with the exception of products failing due to abuse or neglect). It was judged to be less optimising to dispose of a product because of fashion or technological change because these discount the residual value of the existing product. There are rare exceptions, e.g. in the case of some electrical goods, the environmental costs of running an older less efficient model may exceed the environmental costs of replacing it (as noted above).

Sometimes the prompt for disposal was unrelated to the product itself. Examples of this included

- where changes in related / associated products led to product disposal e.g. changing kitchen units or re-decorating the living room
- where products were already replaced and the owner was disposing the previous product because it was now unnecessary.

These are both reactions to new wants relating to fashion or technical obsolescence and were, therefore, not considered to be optimising product life. Further examples cited in returned questionnaires are shown in appendix 5.

In other cases, changes in personal circumstances, apart from the product, changed a person's needs and reduced or terminated the usefulness of the product. Examples are shown in appendix 5. On such occasions consumers were reacting to external forces or needs which were not strictly controllable and were, therefore, not deliberately reducing their product's life span. These changes were unforeseen and were, therefore, scored similarly to those who were more optimising. When a person did not remember or did not know why they had disposed of a product, their entry was recorded as missing data. The disposal decision may have been made some time ago; not remembering what prompted disposal was not necessarily indicative of low involvement. The allocation of scores for prompt is summarised in table 4.10.

Table 4.10 Allocation of scores for prompt to disposal

Prompt	Score
Product failure (d)	2
Product obsolescence (a,b)	0
Reaction to wants (e)	0
Reaction to needs / external forces* (e)	2
Don't know (f)	MD (code 88)

* Circumstances beyond consumers control
MD = Coded as missing data
a,b,c etc. – questionnaire response options

- **Route and Condition**

When the prompt to disposing of a product was within the respondent's control, the optimal route of disposal is dependent on the condition of the product. Disposing a product that was functioning well was thought to indicate indifference to product life. When the decision was taken to dispose such a product, passing it on for re-use by others was considered more optimising than disposing of it as waste.

Retaining a product until it was functioning but looking worn was considered more optimising than disposal in good condition. This, however, still demonstrated indifference to its further potential life. When the decision was taken to dispose such a product, passing it on for re-use by others was considered more optimising than disposing of the product as waste. The downside of re-use for worn products is that their condition makes them less attractive to further users.

Retaining a product until it requires repair was considered more optimising than disposing of a product that was functioning well or one that was worn. However this still demonstrates indifference to its further potential life as it shows an unwillingness to fix it. It may be argued that passing such a product on to others who may repair it is more optimising than its disposal as waste, but this may not have been practical. Consequently, how such a product was disposed of was scored equally. (This score assumes that the product needed repair because of continued use rather than through neglect).

Disposing of a product that had broken beyond repair was considered most optimising. Although it may be argued that passing such a product on to others for recycling was more optimising than disposing it as waste, this may not have been possible.

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Consequently, how such a product was disposed of was scored equally. (This assumes that the product was broken by continued use rather than through neglect).

When a person did not know or could not remember the condition of the product when it was disposed of, it was not possible to say what disposal route was more optimal. In such cases responses to the disposal section for that product were considered void and labelled as missing data.

For those products for which the respondents' prompt to disposal was beyond their control, the condition of products when changes of circumstance arise was incidental. Whether the action was followed by appropriate disposal choices was used to judge the respondent's level of optimisation. Passing on such products for reuse by others was considered more optimising of product life than disposing them as waste, irrespective of their condition. The combination of being prompted to dispose of a product that was broken beyond repair by changing needs / external forces was considered illogical. The scores for condition and route where the respondent's prompt to disposal was within their control are displayed in table 4.11 below.

Table 4.11 Allocation of scores for condition and route (within individual's control)

Condition (within control)	Route (within control)	Score
Functioning well (a)	Re-use (e, f, g, other)	1
	Waste (a, b, c, other)	0
	Don't know (g)	MD(88)
Functioning but worn (b)	Re-use (e, f, g, other)	2
	Waste (a, b, c, other)	1
	Don't know (g)	MD(88)
Needing repair (c)	Re-use (e, f, g, other)	3
	Waste (a, b, c, other)	3
	Don't know (g)	MD(88)
Broken beyond repair (d)	Re-use (e, f, g, other)	4
	Waste (a, b, c, other)	4
	Don't know (g)	MD(88)
All	Don't remember / know	MD (code 88)

MD = Coded as missing data
a,b,c etc. – questionnaire response options

The scores for condition and route where the respondent's prompt to disposal was beyond their control are displayed in table 4.11 below.

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Table 4.12 Allocation of scores for condition and route (beyond individual's control)

Condition (beyond control)	Route (beyond control)	Score
Functioning well (a)	Re-use (e, f, g, other)	3
Functioning but worn (b)	Waste (a, b, c, other)	0
	Don't know (g)	MD(88)
Needing repair (c)	Re-use (e, f, g, other)	3
	Waste (a, b, c, other)	3
	Don't know (g)	MD(88)
Broken beyond repair (d)	Re-use (e, f, g, other)	X (code 111)
	Waste (a, b, c, other)	X (code 111)
	Don't know (g)	MD(88)
All	Don't remember / know	MD(88)

MD = Coded as missing data
a,b,c etc. – questionnaire response options

Some respondents defined other routes of disposal to those stated in the questionnaire. Products that were stored, burnt or put in a skip were classified as waste, most stored goods were awaiting disposal. Products that were sent to a scrap merchant or returned to a lender were classified as being re-used.

Following the scoring of each of these components, they were merged to form one measure of 'patterns of consumption that influence product life in disposal'. The merged chart is shown in appendix 5. The results provided scores indicating how optimising people were in their acquisition, ownership and disposal of each of the three product categories. These scores were then analysed.

To take the analysis a stage further and compare consumers' patterns of consumption across acquisition, ownership and disposal and between product types, a system of profiling the consumption process was required. This was achieved by transforming the scores into dichotomous categories of those who were highly optimising of product life (score 5 and 6) and those who were less optimising of product life (all other scores).The resultant information was then used to classify each individual's consumption profiles. A total of six profiles were created. The first three summarised optimising activity across each stage of consumption for each product, enabling comparison between products. The second three summarised optimising activity for different products at each stage of consumption, enabling comparison between stages of consumption. This is shown pictorially in Table 4.13.

Table 4.13 Profiles for product category and stage of consumption

Profiles for each product category	
A O D	Optimises product life across entire consumption process
a o d	Does not optimise product life at any point in consumption process
A o d	Optimises product life in A, but not O and D
a O d	Optimises product life in O, but not A and D
a o D	Optimises product life in D, but not A and O
A O d	Optimise product life in A and O, but not D
A o D	Optimises product life in A and D, but not O
a O D	Optimises product life in O and D, but not A
Profiles for each stage of consumption	
P1 P2 P3	Optimises product life of all three products
p1 p2 p3	Does not optimise product life of any of the three products
P1 p2 p3	Optimises product life of P1, but not P2 and P3
p1 P2 p3	Optimises product life of P2, but not P1 and P3
p1 p2 P3	Optimises product life of P3, but not P1 and P2
P1 P2 p3	Optimise product life of P1 and P2, but not P3
P1 p2 P3	Optimises product life of P1 and P3, but not P2
p1 P2 P3	Optimises product life of P2 and P3, but not P1
Key: A - Acquisition, O – Ownership, D – Disposal and P – Product (capital letters - optimised, lower case letters - not optimised)	

Green consumption profile

A process of recoding was also used to build a green consumption profile on the basis of answers regarding participation in environmental activities. This scoring process was simpler, involving the addition of activities that each person had undertaken (i.e. 0,1,2,3).

4.7.2   Phase two - interview data preparation

There were also two steps of data preparation upon completion of the interviews; 'transcription and verification' and 'data coding and elaboration'.

Transcription and verification

Each of the interviews was recorded directly on to tape. Each tape was then transcribed onto computer as soon as possible after the interview had taken place (see appendix 6). The transcription followed the conventions described by Silverman (2000, p298-99). The use of punctuation in the transcript is based on subjective personal interpretation. In addition to the vocal exchange, silences, pauses, laughter, sighs and other non-verbal sounds were observed and noted on the transcript. On occasions when the conversation was disrupted or diverted to an unrelated subject, the transcription was paused. This

happened infrequently, but as interviews took place in public areas they were vulnerable to some interruption.

The range of products discussed within the interviews sometimes went beyond those specifically selected for investigation. These discussions were transcribed and the findings used on the occasions that they provided insights useful to the broader analysis.

Reflections on how the interviews had passed and the nature of the relationship that developed between interviewer and interviewee were recorded. In addition, observations were made immediately following the interview on non-verbal forms of communication. Marshall and Rossman (1999) outline possible observations including kinesics (movement of eyes, face, hands, legs, stance), proxemics (use of space, movement, props, spread of territory), appearance (clothing, grooming) and audience reaction (distraction, engagement and feedback, interruption). To ensure the accuracy of the transcription process several five-minute selections were audited.

Data coding and elaboration

The process of data analysis followed the conventions set out by Marshall and Rossman (1999) (see table 4.13) and advice in Miles and Huberman (1994 p245-6). Following the completion of each transcription a summary table was created highlighting key characteristics and observations relating to that interview. Each transcription and accompanying summary was then read several times. Themes, patterns and categories emerging from the data were subsequently observed and coded using a series of different abbreviation codes and colours.

Table 4.14 Conventions for qualitative analysis

1. Organise data
2. Generate categories, themes and patterns
3. Coding data
4. Testing emergent understandings
5. Searching for alternative explanations
6. Writing the report

(Source: Marshall and Rossman, 1999, p152)

The emerging themes, patterns and categories were then considered in relation to the research objectives and the structuring of the analysis in chapter six was developed on this basis. Although the analysis provides a credible interpretation, the findings are

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tentative and a critical approach is taken to the themes developed and alternative explanations pursued.

The analysis of the interview data refers again to optimising patterns of consumption. It is essential to note that the interpretation of what constituted optimising in the context of the interviews was not systematically prescribed. The nature of the interview process did not facilitate this. Judgements concerning what constituted optimising patterns of consumption in this analysis were, therefore, inevitably more subjective.

4.8   Data evaluation

This section reviews the characteristics of the final samples for phases 1 and 2 of the investigation and evaluates the quality of the data collected. This valuable process illuminates areas for caution during the subsequent interpretation of results.

4.8.1   Phase one – sample appraisal

This section explores the characteristics of the final sample. It describes the sample's demographic and socio-economic profile and assesses how representative it is of the population. Furthermore, it examines the impact of respondent memory recall and investigates the degree of product applicability. Implications of biases discovered within the sample are discussed and the limitations they place on the reliability of the results are outlined.

Sample profile

In total 711 (23.7%) acceptable questionnaires were returned. A breakdown of the response rate is shown in table 4.15. A detailed discussion of the classification of responses is outlined in appendix 7.

Table 4.15 Questionnaire response rate

	Frequency	Percent
Acceptable response	711	23.7%
Spoilt response	36	1.2%
Unable to complete	69	2.3%
Did not respond	2184	72.8%
Total	3000	100.0%

This compares favourably with response rates noted in other environment and behaviour research. Bohlen et al (1993) and Grob (1995) both report response rates under 20% for self-completed mailed questionnaires. Self-completed questionnaires are generally more vulnerable to non response than other research methods and in this case the length of the questionnaire and the lack of specialist appeal possibly compounded this. Of those respondents who returned questionnaires 191 agreed to take part in future research.

- **Demographic profile**

Males represented 38.8% and females 61.2% of the valid responses obtained. This compares to 47.5% and 52.5% respectively in the Sheffield 1991 census (aged >18) (Census for population, 1991). The higher response rate amongst women can be attributed to the nature of the questionnaire. Females may have felt the questionnaire was more relevant to them due to their more prevalent role in undertaking domestic activities (ONS, 2003). Furthermore, in some cases the section that identified respondents agreeing to further research revealed that a woman had completed the questionnaire when it had been addressed to a man. This imbalance in the gender profile of the sample requires consideration during the analysis.

Comparison of the age profile of the sample with the 1991 census data for Sheffield (see table 4.16) indicated that the age distribution of the sample was skewed. The response amongst younger members of the population (18-34) was poor. This may be attributed to the problem that respondents may have felt, with the exception of everyday footwear, that the questionnaire was not applicable to them. People within this age range may be living at home or in furnished rented accommodation. They may have moved away from home but still be registered on Sheffield's electoral role. Respondents of this age are also likely to be time poor, for example juggling work with young families. Morbidity and mortality were the probable cause of low representation of the elderly (65s and over). Most correspondence explaining incomplete questionnaires were received from respondents in this age group.

Data on household structure revealed that the most common composition (43.7%) was to contain two adults with no children. Single person households made up a further 13.7% of households. Comparison with the 1991 Sheffield census revealed that the number of households with one or more children under 16 (27.1%) was close to the population norm (26.7%). Lone parent families make up only 3.4% of these households,

slightly less than the population norm (4.1%) (Census for population, 1991). Married respondents (61.8%) dominated the sample; a further 9.4% were living with their partner. Of the remainder 14.5% were single (never married), 6.6% were divorced or separated and 7.6% were widowed.

Table 4.16 Age profile

Age	Sample %	Population %
18-24	6.0	12.8*
25-34	13.6	19.3
35-44	19.8	16.8
45-54	21.7	15.0
55-64	18.1	13.3
65+	20.7	22.8
Total	100.0	100.0

(Total number = 711. Unknown data = 0)
* The first age category in the census was 15 to 24, the figures for this group were reduced by 30% to represent 18-24 (based on an assumption that there were roughly the same numbers of people in each year group).
Source: Percentage population statistics calculated using Census of population (1991)

- **Socio-economic profile**

The employment status of the main income earner in each household was disclosed. The findings revealed that the economically active made up 67.3% of the sample: 53.2% were households where the main income earner was in full time work (>30 hours per week), 6.1% were working part time and 3.5% were self-employed. In 4.5% households the main income earner was unemployed. Those who were economically inactive included 30.1% in retirement, 1.7% in full time education and 0.8% were 'other' (containing for example the long term sick). It was not possible to compare these figures with the census data as census figures are based on all economic activity, rather than the main income earner. In addition, fluctuations in the labour market since the 1991 census would make any comparison inadequate. For example, in the census 7.3% were unemployed, but unemployment figures have been decreasing, hence the sample's 4.5% may not be unrepresentative.

The occupations of the households' main income earners were classified using the National Statistics Socio-economic Classification (NS-SEC) codes[1]. Those who were not working were coded according to whether they were unemployed, retired or in full

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[1] The National Statistics Socio-economic Classification is a flexible and nested, occupationally based classification. See http://www.statistics.gov.uk/methods_quality/ns_sec/cat_subcat_class.asp

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time education. The classification can be found in table 4.17 alongside the NS-SEC codes for the previous occupations of those who are now economically inactive. Many of those who had retired or were unemployed failed to disclose their previous occupation, resulting in a large number of missing values for this question. The data indicates a high proportion of current main income earners in the top three classifications (34.7%) with a much smaller proportion in semi-routine and routine occupations (12.3%). This imbalance is amplified when the previous occupations of the retired (30.6%) and the currently unemployed (5%) are taken into consideration.

There are currently no statistics available on NS-SEC codes for Sheffield's population to compare with the sample. However, the 1991 census data revealed that 19% of the population were classified as AB groups according to the old class system (Census for population, 1991). On this basis it appears that those in more highly qualified occupations (1.1, 1.2 and 2) are over represented in the sample. This needs to be interpreted cautiously as the codes are not directly comparable and the fluctuations in the economic climate and job market make the census information less reliable.

Table 4.17 NS-SEC codes of main income earners by current and previous occupation

NS-SEC Codes	Current occupation %	Previous occupation %
1.1 Employers & managers (large orgs)	6.7	10.3
1.2 Higher professionals	12.8	19.9
2 Associate professionals	15.2	20.8
3 Intermediate occupations	6.2	10.3
4 Employers (small orgs) & own account workers	2.9	3.8
5 Lower supervisory/ craft & related	6.6	12.2
6 Semi-routine occupations	10.9	20.2
7 Routine occupations	1.4	2.6
Retired	30.6	-
Student	1.7	-
Currently unemployed	5.0	-
Total	100.0	100

(Total number current occupation = 708. Unknown data = 3. Not applicable = 0)
(Total number previous occupation = 583. Unknown data = 116. Not applicable = 12)

The response to the question concerning total household income was completed by 86.8% of the sample, over half of whom stated a household income of under £20K (29.2% - £10K or under, 28.7% - between £11 and 20K). Household incomes tapered off steadily from this point, 18.3% - between £21 and 30K, 10.7% between £31 and

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40K, 7% between 41 and 50K and finally 6.2% stating their combined household income exceeded £50K. Concerns that this question might elicit spurious data appear unfounded. When matching income percentages against occupation type, data reliability seems reasonable; suggesting those who did not like the question left it blank.

Concern that there was a bias in the sample with over representation of those in higher social groups was amplified when examining house tenure. The sample contained a much higher proportion of people from owner occupied dwellings (76.4%) than the population (56.8%) (Census for population, 1991). Consequently those people renting accommodation are under represented. A number of factors may have contributed to the low rate of response from those in rented dwellings. Sheffield's two universities create a large fluctuating student population and consequently a substantial volume of rented furnished accommodation. Respondents in this category may have felt the survey was not relevant to them, as they do not 'own' the household products. In addition, students and others living in rented accommodation tend to be more transient and may have moved since the electoral register was last updated and, therefore, not received their questionnaire. The bias also reflects the deficit of respondents in the younger age groups (aged 18-34 years) outlined above.

The 1991 census indicated that 9.7% of Sheffield's population had a degree or equivalent. The sample revealed a much higher total of 20.8% stating they had such qualifications. The highly educated nature of many of the respondents confirms concerns that there are biases within the sample. The lack of further information within the census on education levels prevents elucidation of other differences between the sample and the population. It is suspected that less educated people are under represented. The sample contained 17.7% whose highest form of qualification was GCSE level and 32% who had no formal qualifications. Despite processes of simplification, the complexity and length of the questionnaire probably deterred those with poor reading and literacy skills.

The question on private vehicle access was asked to gauge respondents' level of mobility and access rather than car ownership. It was found that 58.7% have access to one private vehicle, 19.6% have access to several and 21.6% of respondents had no access. When compared to data on car ownership, those without access to private mobility appear underrepresented in the sample. National census data reveals that 32%

of households did not own a car or van in 1991 (the figure for Sheffield was 45%) (Census for population, 1991). Despite the national figure decreasing to 27% in 2001 (Census for population, 2001) and the issue that direct comparison of figures is not viable due to the survey question being phrased in terms of access rather than ownership, these figures reinforce suspicions that disadvantaged social groups are under represented.

- **Environmental profile**

The survey gauged the proportion of respondents who had supported environmental groups or undertaken a range of environmental activities in the previous two weeks. The results indicate a fairly high proportion of sample involvement in all of these activities (see table 4.18). Comparison with national averages suggests the sample undertake more activities than the population. In 1994 11% of the UK population reported membership to an environmental group (MORI, 1994), compared to 19% in this study's sample, although figures are not directly comparable. In a recent Mintel report (1999a) only 22% of consumers stated that they tried to buy organic fruit and vegetables when possible), compared to 33% of consumers in this sample. A report on domestic energy efficiency (Palmer and Boardman, 1998) indicated that only 22% of UK households were using CFL light bulbs, compared to 46% in this study's sample. Due to variation between regional schemes, figures were not available for direct comparison on the question concerning waste recycling. At the time of distribution of the questionnaire, very limited doorstep recycling schemes were implemented for Sheffield residents, and there were concerns regarding the city achieving recycling targets. It is suspected that the sample over represents those who recycle waste.

Table 4.18 Environmental activities undertaken

Environmental activities	% Yes	%No
Support environmental groups	19	81
Bought organic fruit and vegetables	33	67
Used energy saving light bulbs	46	54
Recycled old newspapers, glass or cans	57	43

(Total number support environmental groups = 692. Unknown data = 19)
(Total number environmental activities = 699. Unknown data = 12)

Aggregation of the consumption activities data into an environmental activities index show that in total only 21% of respondents had failed to do any environmental activities. One action was undertaken by 34%, two by 31%, whilst 13% had performed all three actions, much higher proportions that expected.

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The high amounts of environmental activity recorded could be attributed to a variety of factors. Respondents who were not aware of 'organic' fruit and vegetables may have failed to differentiate these from standard fruit and vegetables. Questions did not measure frequency or volume of activities so respondents could provide a positive answer on the basis of one incident alone. Social pressure may have led to over reporting or responses based on a broader time frame than the two weeks specified within the question. Alternatively it may reflect other biases within the sample (e.g. income and education) which may have increased the proportion of environmentally pro-active (e.g. see Bohlen et al, 1993, Vining and Ebreo, 1990).

Memory recall

A critical issue arising during survey design was the extent of memory recall that questions demanded. Concerns arose that the accuracy of answers could be compromised when respondents were asked to recollect events occurring several years before. This problem was addressed by asking participants to identify how recently they had made decisions concerning the products selected for discussion.

Significant differences in memory recall were observed across the different product types. The vast majority of decisions about the acquisition and disposal of everyday footwear, as would be expected, occurred during the last five years (98.2% and 96.8% respectively). A much larger proportion of the sample were recalling events that had taken place over five years ago for the acquisition and disposal of both big kitchen appliances (15.2% and 23.5% respectively) and upholstered chairs (35.4% and 40.4% respectively). This dependence on memory recall requires consideration during analysis.

Product applicability

On some occasions respondents left certain sections of the survey incomplete, stating that they were 'not applicable'. This section explores the degree of product applicability by stage of consumption and product type, as this has implications for data analysis and interpretation. In total there were 543 cases where respondents deemed a section of the survey 'not applicable' of which 139 respondents stated multiple cases (19.5%). A breakdown of the applicability of questions for each product at each stage of consumption is outlined in table 4.19 below.

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	Acquisition			Ownership			Disposal		
	EDF	BKA	UPC	EDF	BKA	UPC	EDF	BKA	UPC
'Applicable'	708	660	621	707	682	658	692	593	535
'Not applicable'	3	51	90	4	29	53	19	118	176
Total	711	711	711	711	711	711	711	711	711

Overall there were a disappointingly high number of respondents who had failed to complete one or more sections. In total the sample of 711 respondents contained only 464 respondents who had experienced all three stages of consumption for each of the three types of product. There were 688 respondents who completed all three stages for everyday footwear (96.8%), 579 who had completed all stages for big kitchen appliances (81.4%) and 513 that had completed all stages for upholstered chairs (72.2%). These variations require attention during analysis. Consideration must also be given to differences in the number of respondents who had acquired all three products (85.5%), owned all three products (91.6%), and disposed of all three products (68.6%). The longer potential service life of the larger products made inevitable a higher number of respondents who had no experience of disposal.

Many returned questionnaires containing multiple sections deemed as 'not applicable' were accepted. Explanations are generally inherent within other parts of the survey. For example, respondents living in rented (presumably furnished) accommodation and those living with their parents frequently stated that they had never acquired upholstered chairs or big kitchen appliances. Several instances arose where 'not applicable' responses raised suspicions. A number of participants failed to differentiate between different sections and where they had selected 'not applicable' as their response for section one, they continued to leave the following sections blank too. It was also considered odd that a number or older respondents reported never having acquired or discarded certain products. In these cases it is suggested that the circumstances by which the respondent came by the product or discarded its predecessor were forgotten.

In the section on ownership, respondents were requested to select their oldest product in each category. A question was then asked regarding use intensity to ensure that respondents were selecting products that were in regular use. A larger than anticipated number of respondents stated that they only wear their everyday footwear 'occasionally' (35.6%). It was decided that occasional use was acceptable for everyday footwear as

respondents may have several pairs or they may be seasonal and, therefore, it may be only necessary or appropriate to wear them 'occasionally'. In addition, 5.5% stated that their upholstered chairs were only used occasionally. Again this was considered inevitable as despite asking for products in regular use, upholstered chairs may be permanently in position but infrequently used e.g. a bedroom armchair.

People selecting products only used rarely (<1% for big kitchen appliances and upholstered chairs and 4.7% for everyday footwear) were removed to ensure they did not skew or distort the analysis.

Product variation

The product types selected within each product category varied across each stage of consumption (see appendix 8). Whilst for everyday footwear and upholstered chairs one product type dominated the sample for all three stages of consumption, the spread of product types for big kitchen appliances was much broader. Shoes (casual / formal) and 2/3 piece suites dominated the everyday footwear and upholstered chairs categories (>45% in all 3 stages). Sandals and dishwashers were the least cited products (<10% in all 3 stages). The variation in frequencies across product type can be expected and explained. Nationally, ownership levels for dishwashers are less than for other big kitchen appliances. Sandals are affected by seasonal fluctuations, which will influence ownership levels. It was anticipated that by exploring products by category rather than individual type, the questionnaire would be applicable to a greater number of respondents and memory recall requirements would be reduced. The consequence of variations in product type to answers provided needs consideration during analysis.

Sample limitations

The demographic and socio-economic profile revealed certain sample biases. The sample contains more environmentally pro-active people than expected. Those groups who are under represented in varying degrees include men, young people (<35), those renting their homes, the less educated and probably those in lower social groups and people with no access to private vehicles. The use of weighting techniques to rectify bias and adjust the sample to more fully represent the population during analysis was considered. This was eventually rejected due to the complexities of gauging the extent of the bias across the sample profile. Instead results are interpreted with reference to sample limitations.

A substantial number of big kitchen appliances and upholstered chairs were acquired and disposed of beyond the five-year point. The decision was taken to incorporate these findings into the analysis but consider the implications of the extent of memory recall during the interpretation of the data.

The relatively small number of respondents to whom all of the sections were applicable requires consideration during the statistical analysis of the data. Where profiling occurs, for example when using the scoring mechanism, further distortions to sample bias may occur if only such respondents are included.

4.8.2   Phase two – sample appraisal

The requirements of qualitative research regarding the need to obtain a representative sample are not as stringent as those of quantitative inquiry, due to the differences in philosophical tenets that underpin them.

The demographic characteristics of the sample of respondents who participated in the semi-structured interviews are outlined in table 4.20. Their names have been changed in accordance with protocols on respondent confidentiality. Overall the sample is demographically and socio-economically quite well balanced. The principle limitation is the lack of younger people (aged 18 to 34).

4.9   Chapter summary

This chapter has examined relevant methodological literature, applying the findings to establish an appropriate research design. It has described the implementation of the design, summarised the processes of data preparation and evaluated the data obtained. Chapters five and six describe and analyse the findings from the two phases of research discussed here.

Table 4.20 Demographic characteristics of interview sample

Name	Age	Occupation	Household Income
Peter	25-34	Unknown data	Unknown data
Andrew	35-44	Museum / gallery assistant	£31-40k
Richard	35-44	Electrician	£31-40k
Tony	45-54	Measurement and control engineer	£21-30k
Dennis	55-64	Disability benefits	£10k or under
George	55-64	Retired previous occupation not disclosed	£10k or under
Eric	55-64	Teacher	£21-30k
John	55-64	Management consultant	£41-50k
Colin	55-64	Civil servant	over £50k
Sharon	25-34	Dinner lady	£11-20k
Anita	35-44	Unemployed advertising agent	Unknown data
Barbara	45-54	Customer services manager	£21-30k
Janet	45-54	*Driver	£21-30k
Susan	45-54	Teacher	£41-50k
Margaret	55-64	Metallurgical consultant	£31-40k
Eileen	65+	Retired house person	£10k or under
Gloria	65+	Retired contracts clerk	£10k or under
Grace	65+	Retired employment agency manager	Unknown data

* Occupation of main income earner (not interviewee)

CHAPTER 5 – QUESTIONNAIRE ANALYSIS

5.1   Introduction

This chapter focuses on providing a detailed analysis of the questionnaire findings. Each stage of this process is outlined in figure 5.1 below. Section 5.2 provides a descriptive overview of the questionnaire findings, outlining current patterns of consumption across acquisition, ownership and disposal that influence the life span of the three categories of household product. Sections 5.3, 5.4 and 5.5 provide a comprehensive analysis of the data based upon the research objectives, exploring consistency across consumption profiles, the influence of a number of demographic, socio-economic and environmental factors and contrasts between intention and actual patterns of consumption. In section 5.6 the results are discussed in the context of wider literature and aspects of the findings to be explored during the next phase of research are identified. The chapter is summarised in 5.7.

Figure 5.1 Structure of questionnaire analysis

Stage 1 - Describe	→	Provide initial descriptive overview (s5.2)
Stage 2 - Analyse	→	Use data to answer research questions (s5.3,4&5)
Stage 3 - Discuss	→	Review findings in wider context (s5.6)
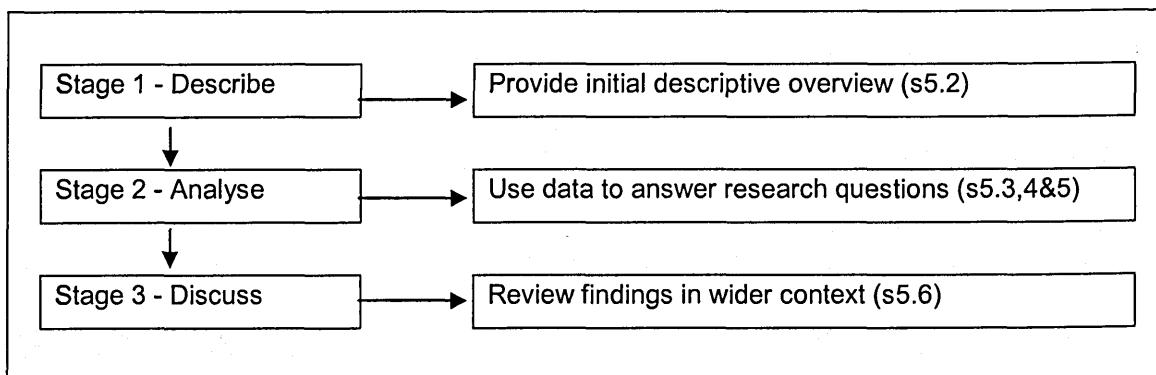
5.2   Questionnaire findings - descriptive overview

This section provides a descriptive overview of the questionnaire findings, addressing the objective 'to describe how current patterns of consumption across acquisition, ownership and disposal affect the service life of three categories of domestic product'. In addition, it identifies problems arising during the analysis process, highlighting data limitations and code reclassifications.

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The research results revealed substantial differences in patterns of consumption between the three categories of product. There were also notable variations across the three stages of consumption (addressed sequentially below). Some of the findings were intuitively predictable, while others were not.

5.2.1 Processes of acquisition

Current patterns of acquisition were found to be affecting the service life of products in a number of ways. Factors other than the failure of a previous product[1] prompted over 50% of purchases of new everyday footwear and 60% of upholstered chairs, indicating the dominant role of external factors in prompting such purchases. Updating to more modern versions was the principle external factor causing the early replacement for more than a quarter of both of these products. When acquiring everyday footwear consumers appear particularly susceptible to the appeal of special offers, which prompted 19% of purchases. The predominance of external factors in prompting these new acquisitions has implications for the residual service life of existing functioning products. Big kitchen appliances were generally less susceptible to such forces (<30%).

Most products in each of the three categories were purchased new either from a shop, catalogue, the internet, mail order or another source. Very few items were acquired ' pre-owned', the majority of respondents preferring to acquire a new product than extend the life span of an existing one. Of the three, upholstered chairs were the most likely items to be purchased or received second hand (5% were bought used and a further 11% had been acquired from a friend or family). The number of used big kitchen appliances acquired was half this, and used everyday footwear less than half this again.

Patterns of search varied considerably across product type. In the majority of cases everyday footwear was bought impulsively, without forward planning (47.5%). In contrast, for the other more expensive product categories 'comparison-shopping' and prior research were more common. Almost a quarter of consumers stated that they had carried out some form of research before buying their most recent big kitchen appliance.

This more careful assessment of higher priced products was evident in respondents' requirements, with far greater emphasis placed on prioritising reliability and quality

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[1] Or first time purchases of this type of product

when purchasing these items than on obtaining a modern or fashionable style. Ensuring products were reasonably priced featured as a priority for all three groups. Practical considerations associated with product use featured far more strongly in the acquisition of big kitchen appliances than the other two product groups. The obvious and anticipated exception to this was the prioritisation of correct size when purchasing everyday footwear. As expected, aesthetic factors were prioritised far more frequently for upholstered chairs and everyday footwear than for big kitchen appliances.

Long life expectancy, though rarely cited as the top priority, was prioritised by almost a quarter of respondents as one of the top three requirements when acquiring upholstered chairs (see figure 5.2). This was unexpected, given that the majority of acquisitions of upholstered chairs were prompted by factors other than product failure. Over half of the respondents failed to prioritise any attributes associated with long life expectancy when acquiring everyday footwear.

Figure 5.2 Priorities in acquisition
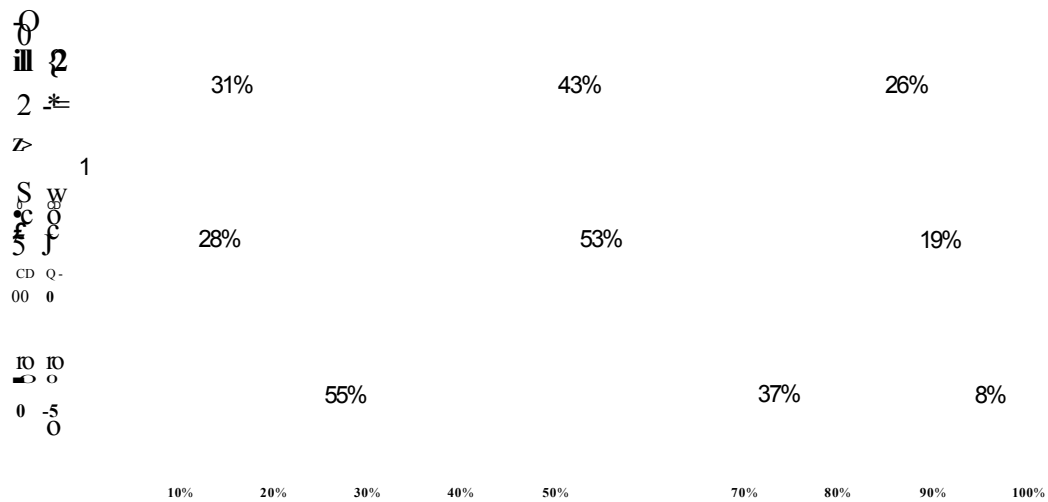
□ % Prioritising neither long life expectancy nor characteristics associated with long life expectancy

□ % Prioritising one or more characteristics associated with long life expectancy

□ % Prioritising long life expectancy as a top 3 requirement

5.2.2 *Processes of ownership*

Current patterns of consumption during ownership were also found to affect the service life of products. Again, these patterns varied for the different product categories. Careful treatment by users varied significantly by product. As anticipated, respondents

took greater care of the higher priced products, with around a quarter trying to maintain them in their original condition (25% big kitchen appliances, 30% upholstered chairs). The proportion showing this kind of attention to their everyday footwear is much lower (13.6%). In the case of all three products a surprisingly high proportion of respondents, over 30% for each, claimed to be indifferent to care during use. This has implications for the retention of product quality and consequent service life.

The data on frequency of product cleaning reinforces the impression of respondent apathy towards maintaining product quality, especially of everyday footwear. Remarkably few respondents routinely cleaned any of the three products (<50%). The majority behaved reactively in their cleaning activities, responding to dirt or marks or fitting it in when they had the time. Just over one in ten respondents never or rarely cleaned their everyday footwear. Overall big kitchen appliances faired slightly better than upholstered chairs.

Exploring the relationship between treatment during use and cleaning habits revealed unexpected twists. The anticipated link between those who claimed to take the greatest care of their products and those carrying out preventive cleaning was not absolute. Indeed many of those who were indifferent in their treatment of big kitchen appliances and upholstered chairs during use were actually undertaking preventive maintenance (31% and 20% respectively).

Activities used to prolong the life span of the selected products were investigated. These were split into two categories, maintenance and rejuvenation activities. The actions that comprise these two categories are shown in table 5.1. In addition, the table provides information on the total number of respondents who have undertaken these activities for each of the selected products.

In most cases, considerably greater numbers of respondents undertook maintenance activities than rejuvenation activities for all three products. The one exception was the small number of people claiming to use protective measures to prolong the life of a big kitchen appliance. This result was predictable; maintenance activities are considerably easier to pursue and are relevant across the life span of a product, not just during its decline. In addition, where respondents are younger they may not have had their oldest products long enough to necessitate employing rejuvenation strategies. For products that

tend to have a longer life span, such as upholstered chairs, this factor may be particularly cogent.

Table 5.1 Summary of respondents who answered positively to carrying out a selection of product life extension strategies on their oldest product in each of the three categories

	EDF % Yes	BKA % Yes	UPC % Yes
Maintenance activities			
Regular care and maintenance	43	57	54
Used protective measures	49	27	50
Followed seller's / manufacturer's instructions	31	81	51
Followed personal / household rules	35	67	64
Rejuvenation activities			
Repair / restoration at home	11	21	19
Repair / restoration by a specialist	20	28	15
Reuse for different task / in a different place	3	3	6
Got used / second hand	3	12	18

(Total number everyday footwear = 644. Unknown data = 63. Not applicable = 4)
(Total number big kitchen appliances = 615. Unknown data = 67. Not applicable = 29)
(Total number upholstered chairs = 605. Unknown data = 53. Not applicable = 53)

Product category appears particularly influential in determining which, if any, activities are undertaken to prolong service life. With the exception of the use of protective measures, substantially fewer product life extension activities were undertaken for everyday footwear than for the other two product categories. This confirms the impression being formed of the majority of respondents having a lackadaisical attitude to the service life of everyday footwear. Respondents were far more likely to have carried out activities on the higher priced products, in particular big kitchen appliances.

Few people had carried out any of the rejuvenation activities on any of their oldest products (<30% for all product categories). The most likely products to have been repaired or restored at home or by a specialist were big kitchen appliances. Surprisingly few respondents had used adaptive strategies in order to retain their products longer, with less than 7% reusing any of their products for a different task or in a different place. Understandably kitchen appliances are less suited to reuse.

The compound results indicate that over 50% of respondents had carried out at least two maintenance activities for all product categories. The majority of those exceeding two

maintenance activities restricted these to the higher priced products. A remarkable 27% had not carried out any maintenance activities on their everyday footwear at all. The number undertaking over two rejuvenation activities is very small for all products (<3% for each). Again in mass far fewer rejuvenation activities had been conducted for everyday footwear confirming suspicions that of the three product categories they are preserved least carefully.

5.2.3 Processes of disposal

Product category had a substantial impact on the process of disposal. External factors (such as redecoration or moving home) played a much greater role in prompting the disposal of upholstered chairs than the other two products. Everyday footwear and big kitchen appliances were more likely to be discarded for reasons related to the product itself, with physical deterioration accounting for 65% of discarded products in both cases. Relative obsolescence was apparent across all product categories. Changes in fashion accounted for 23% of discarded everyday footwear and 34% of discarded upholstered chairs, whilst 17% of discarded big kitchen appliances had become outmoded in terms of their functions and features.

The condition of discarded products suggested that some were becoming waste prematurely (see figure 5.3). The chart indicates that the vast majority of discarded upholstered chairs have some residual life, around a quarter were functioning well and others functioning but looking worn; relatively few were irreparable or broken. In the case of discarded everyday footwear, 50% of discarded items have some residual life, with only 32% considered irreparable and 18% in need of repair. By contrast, most large kitchen appliances were irreparable (43%) or broken (24%), although even in this product category a third of discarded items have some residual life.

There were notable differences in where and how products were discarded. Everyday footwear and big kitchen appliances were most likely to be disposed of as waste. Their size then determined the nature of their disposal, 71% of everyday footwear entered the waste stream via the domestic bin, whilst 74% of big kitchen appliances were removed by retailers, the council or individual trips to the local tip. The diversity of routes of disposal for upholstered chairs was much greater. They were significantly more likely to be passed on for re-use than the other product categories, with 33% given free to family and friends, 14% sold or traded privately and 10% donated to charity.

Figure 5.3 - Condition of discarded products

100%

15%   14%
              24%

80%
       19%

       35%

60%   □ Functioning well
       24%   □ Functioning but looked worn
              56%   □ Needing repair
                             □ Broken beyond repair
40%
18%

       43%
20%
32%   9%

              12%

0%

Everyday footwear   Big kitchen appliances   Upholstered chairs
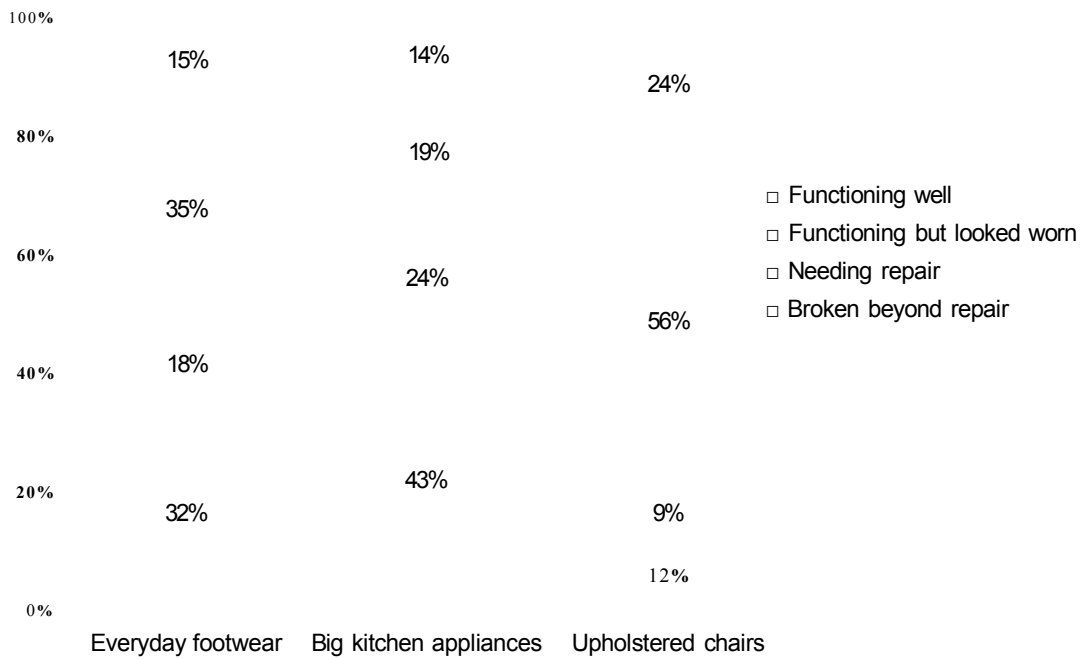
Encouragingly, of those products disposed that were still 'functioning well', reuse strategies that extended product life had been employed in over 85% of cases. In contrast, large numbers of products disposed that were considered to be 'functioning but looking worn' were disposed of as waste (more than 60% of everyday footwear and big kitchen appliances and 41% of upholstered chairs).

5.3 Product life scores, profile formation and analysis

This section describes the next stage of data processing and analysis, fulfilling the objective 'to classify consumers according to shared patterns of consumption that affect service life for the three stages of consumption and for the three categories of product'. It then applies this information 'to examine how consistent consumers are in their patterns of consumption across acquisition, ownership and disposal for the three categories of domestic product'. In addition, some of the difficulties arising during the application of the scoring system to the data are discussed.

5.3.1 Scoring

The product life scores were calculated using the scoring system described in chapter four. These were originally devised in ordinal format ranging from 0 which was non optimising to 6 which was highly optimising. The number of low frequencies in some

categories prevented effective statistical analysis. To make the data more manageable and analysis more satisfactory the data was condensed into three ordinal categories; non optimising, moderately optimising and highly optimising1.

The final classification and percentages of respondents within each category are shown in figure 5.4.

Figure 5.4 Patterns of optimising consumption

		Non optimising	Moderately optimising	Highly optimising
	Acquisition	35%	54%	11%
	Ownership	16%	67%	17%
	Disposal	31%	45%	24%
	Acquisition	16%	70%	15%
	Ownership	11%	71%	19%
	Disposal	18%	15%	67%
	Acquisition	50%	45%	5%
	Ownership	37%	59%	5%
	Disposal	18%	29%	53%

10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

n Non optimising   a Moderately optimising   D Highly optimising
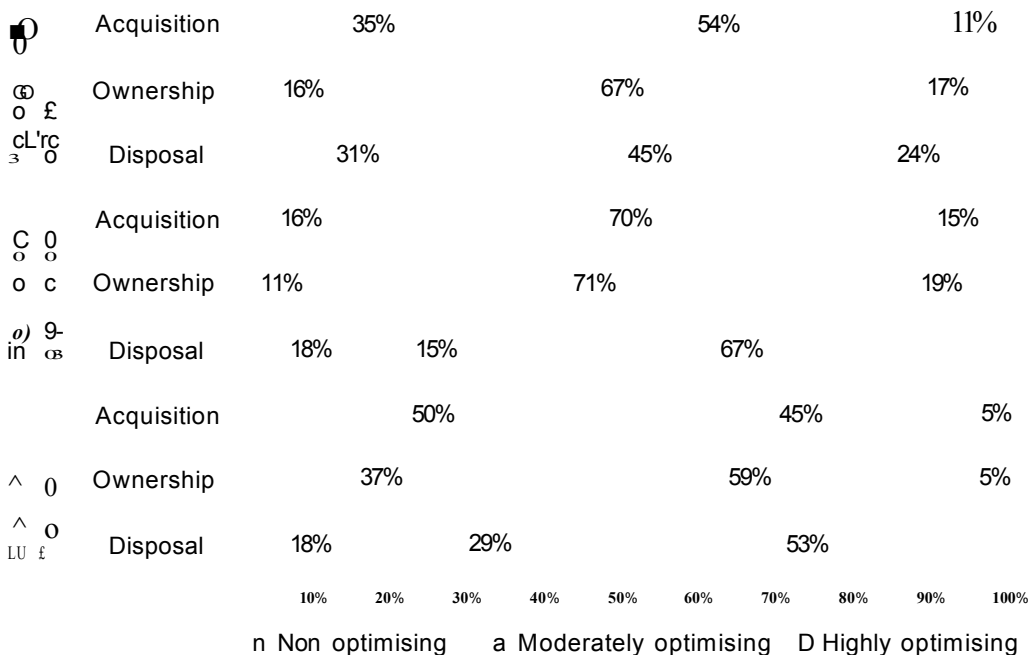
5.3.2   Examining consistency

These aggregated results indicate significant inconsistency in patterns of consumption across acquisition, ownership and disposal for all three categories of product (for statistical tests see Appendix 9). Interestingly the numbers of respondents displaying highly optimising patterns of consumption increases at each consecutive stage of consumption for all product categories. This trend was particularly striking for everyday footwear and big kitchen appliances, where over three times more respondents were highly optimising in their patterns of disposal than in acquisition or ownership.

' Reclassified: non optimising (0,1) moderately optimising (2,3,4) and highly optimising (5,6)

The comparison of those who demonstrated either moderately or highly optimising patterns of consumption with people not optimising product life at all reveals a more complex picture. For the higher priced products there were greater numbers of respondents failing to optimise in acquisition or disposal than during ownership.

Overall, there were substantially more people optimising the service lives of their big kitchen appliances than their upholstered chairs. Everyday footwear was the most neglected product category, having the largest proportion of respondents failing to optimise product life and the least number of respondents displaying highly optimising patterns of consumption during acquisition and ownership (5% cf. 10-20%).

The results reveal generally low levels of life span optimising activity. The minimal number of respondents who are highly optimising product life in the early stages of consumption has significant implications for the longevity of products. Failure to prioritise longevity at the point of acquisition, or to prolong life through careful use, will inevitably lead to products entering the waste stream more rapidly.

5.3.3   Profile formation

The analysis of respondent consistency based on the classification above provides an insight into general trends across the sample but fails to distinguish what is happening at the individual level and is, therefore, blunt. To sharpen understanding of the data consumer profiles were built based upon each individual's sequence of actions across the whole consumption process for each product.

There are six profiles per person, the first three profiles define an individual's consistency across the consumption process for each product category, and the second three profiles define an individual's consistency between product categories for each stage of consumption. There are eight possible classifications for each profile. They are based on whether a person was or was not highly optimising in their patterns of consumption. The ranges of classifications for consistency are shown in table 5.2.

Summary pie charts are provided in figure 5.5. The data sets are tabulated in appendix 10. Although these charts are not labelled with values, they provide a summary impression of the data. They are colour coded so that non optimisation is blank,

optimisation at one stage only is patterned yellow, optimisation at two stages is patterned green and optimisation at all three stages is block green.

Table 5.2 Profiles of individual's consistency

Consistency across the consumption process for each product category.

(One profile per product)

Consistently highly optimising product X across the whole of the consumption process	1
Highly optimising product X at two stages of the consumption process	2,3,4
Highly optimising product X at one stage of the consumption process	5,6,7
Consistently failing to optimise product X at any stage of the consumption process	8

Consistency between product categories for each stage of consumption.

(One profile per stage of consumption)

Consistently highly optimising all three products at stage X of the consumption process	1
Highly optimising of two products at stage X of the consumption process	2,3,4
Highly optimising of one product at stage X of the consumption process	5,6,7
Consistently failing to optimise any products at stage X of the consumption process	8

5.3.4 Profile Analysis

The individual profiles reinforce the finding that patterns of consumption are inconsistent in terms of product optimisation across the consumption process and between product categories.

Very few consumers are highly optimising in their consumption during all three stages for any product category (<2%). Even those who are highly optimising during two stages for everyday footwear and upholstered chairs are rare (<7%). This contrasts with large kitchen appliances, for which 25% of respondents exhibited highly optimising patterns of consumption during two stages. On occasions where respondents were highly optimising during two stages of consumption, very few optimised in 'acquisition and ownership' for any of the product categories. Overall the profiles indicate that over a fifth of consumers fail to optimise product life across the whole consumption process for all three products.

Big kitchen appliances were far more likely than the other product categories to be optimised at one or several points across the consumption process. Upholstered chairs were optimised least, with 56% failing to optimise their consumption at any stage.

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Figure 5.5 Pie charts of consumption profiles

<div align="center">

Everyday footwear   Big kitchen appliances   Upholstered chairs

A-O-D □ A-O-d □ A-o-D Da-O-D □ A-o-d □ a-O-d □ a-o-D □ a-o-d

Acquisition   Ownership   Disposal

□ EDF - BKA - UPC □ EDF - BKA - upc □ ED F - bka - U PC □ edf - BKA - U PC

□ E D F - b k a - u p c D e d f - B K A - u p c m e d f - b k a - U P C D e d f - b k a - u p c

</div>

KEY:

EDF/edf- everyday footwear, BKA/bka - big kitchen appliances, UPC/upc - upholstered chairs

A/a - acquisition, O/o - ownership and D/d - disposal

Captial letters - those who have highly optimising consumption patterns

Lower case letters - those who do not have highly optimising consumption patterns

Overall the product showing least variation across the spectrum of possible profiles was everyday footwear, with the vast majority optimising only in disposal (49%) or failing to optimise at all (42%).

The profiles of consistency across product type at each stage of consumption indicate many consumers consistently failed to optimise the life span of any of the three product categories in acquisition (75%) or ownership (73%). In sharp contrast, a significant majority were highly optimising in their disposal of one or more products (85%).

Overall the trends in consistency between those products optimised during acquisition and ownership were similar. Where one product only was highly optimised this was most frequently the big kitchen appliance and where two products were highly optimised the majority were upholstered chairs and big kitchen appliances.

In summary, the results confirm that there is considerable inconsistency in patterns of consumption, both between product categories and across different stages of consumption. They demonstrate that few consumers currently behave in ways that optimise the life span of products. Relatively low levels of life span optimising activity in acquisition and ownership suggest that action is especially important at these stages to reduce waste. The indication is that some products are more prone to non-optimisation than others and a product focus is required.

5.4 The influence of consumer characteristics on patterns of consumption and consequent variations in service life

This section describes the next exploratory stage of data analysis, seeking explanations for differences in patterns of consumption and consequent variations in service life by consumer characteristics. It tackles the objective 'to identify whether those consumers who share similar patterns of consumption are influenced by particular demographic, socio-economic or environmental factors'.

A series of chi squared tests were carried out to explore the relationship between consumption patterns and consumer characteristics (see appendix 11a and b). These were conducted on optimising patterns at each stage for each product. Chi squared tests based on the consumption profiles were not viable, as distributions contained expected frequencies less than the allowed minimum frequency thresholds.

5.4.1 The influence of demographic and socio-economic factors

The power of demographic data to explain variations in consumption and consequent product life between different product types and across the consumption process was limited (statistics were based on three stages non optimising, moderately optimising and highly optimising). A table displaying the statistical data is found in appendix 11a.

Men were significantly more likely to be life span optimisers for everyday footwear in acquisition and disposal, as might be expected. Age was a significant predictor of optimising patterns of consumption, especially in ownership, with increasing age linked to optimising life span (although this relationship was not always linear). This may be attributed to older people having more free time available for maintenance and product life extension activities. This assertion was reinforced by the finding that retired people were more likely to optimise. It may also arise because of different attitudes across generations, younger people having a greater interest in fashion and style changes. An exception was that significantly more people aged 18-24 and households with children optimised the disposal of upholstered chairs, which might be because they were already worn, having been passed on by friends or family and such people had merely utilised their residual life.

Significantly more households with children were highly optimising in their patterns of acquisition of big kitchen appliances than would be expected by chance (35-44 age bracket show similar pattern). This can be explained by the greater dependence of this group on big kitchen appliances on a daily basis and, therefore, the more pressing need to get the 'right' product.

The explanatory power of socio-economic factors was generally rather weak. The one exception was for patterns of acquisition and ownership of big kitchen appliances. The patterns in acquisition of big kitchen appliances are complex. The results indicate significant differences in optimising activity by current employment and level of education. The nature of the relationship, however, is not clear. Whilst a third of those failing to optimise during the process of acquisition were retired, the retired also made up the majority of those who are highly optimising in their acquisition (21%). This anomaly was evident in the data for education; where people with no qualifications made up the greatest proportion of non optimisers (42%) and the greatest proportion of those who are highly optimising in their acquisition (27%). In addition, equal numbers

of people who had degrees were non-optimising as were highly optimising. This highlights the presence of frugal and wasteful extremes within each of these groups suggesting the presence of other determinants that are moderating these relationships.

The data on ownership revealed that those who were least likely to optimise the life span of their big kitchen appliances at this stage were home owners, high income earners (>£50K), well educated (degree level), and those with access to more than one vehicle. A possible explanation is such people have limited time to undertake maintenance and organise repair work, and can afford replacements. Finally, respondents who did not have access to a vehicle were significantly more likely to be highly optimising in their disposal of upholstered chairs. It is possible that without means of transport such bulky items are more likely to be retained till failure.

5.4.2   The influence of environmental factors

The influence of involvement in environmental activity and support for environmental groups on optimising patterns of consumption was tested to explore whether respondents engaged in environmental initiatives were more likely to optimise product life. The results suggested that, with the exception of the disposal of upholstered chairs, there is no positive association between life span optimising and involvement in environmental activity. Indeed, a significant inverse result arose concerning the disposal of everyday footwear. See appendix 11b.

5.5   The influence of product life intentions

This section describes the next exploratory stage of data analysis, examining the influence of product life intentions on consumer choices across acquisition, ownership and disposal. It addresses the objective 'to investigate the influence of consumer intentions regarding product life on the patterns of consumption selected'. Intentions were explored to identify whether respondents had deliberately sought to optimise the life span of their products and whether actual patterns of consumption were consistent with their intentions.

5.5.1   Exploring product life intentions

Product life intentions were examined in relation to each product category and at each stage of consumption. For the acquisition and disposal stages, respondents were asked

to reflect on their original intentions when they first bought or received the product, while for the ownership stage they were asked to reflect on their intentions with regard to the remaining life span of a selected product.

Intentions regarding product life varied considerably by product type (see figure 5.6). Most respondents stated that their intentions at all three stages of consumption were to retain big kitchen appliances until absolute or functional failure (>86%). In contrast, the intention to retain items only till they became worn (aesthetic failure) was much more prevalent for the other two products at all stages of consumption (>38%), especially for the latest acquisition (everyday footwear 57% and upholstered chairs 59%).

Figure 5.6 Product life intentions

		Obsolete fashion/function	Aesthetic failure	Functional failure	Absolute failure
Big kitchen appliances	Acquisition	7%	59%	15%	19%
	Ownership	7%	42%	17%	34%
	Disposal	16%	50%	14%	20%
Everyday footwear	Acquisition	4 4	24%	68%	
	Ownership	3 4	25%	68%	
	Disposal	7% 6%	25%	62%	
Upholstered chairs	Acquisition	6%	57%	26%	11%
	Ownership	5%	39%	35%	21%
	Disposal	8%	38%	35%	19%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

□ Obsolete fashion/function □ Aesthetic failure □ Functional failure □ Absolute failure

Most respondents considered themselves impervious to the forces of relative obsolescence. With the exception of the disposal of upholstered chairs, less than 10% disclosed intentions to keep products until they were made obsolete by fashion or changes in technology.

Despite greater numbers of respondents intending to keep their upholstered chairs till absolute failure in comparison to everyday footwear, overall intentions regarding the service lives of upholstered chairs are least optimising across the three product groups

Interestingly, in the case of all three products, intentions regarding the residual life span of the oldest product (discussed in the ownership stage) were more optimising than intentions regarding recently acquired and previously discarded products.

The original service life intentions when acquiring the last discarded everyday footwear were considerably more optimising than they were for the newly acquired everyday footwear, indicating a trend to shorter product life expectations.

The variables were combined into two categories -'optimising' (containing intentions to keep till absolute or functional failure) and 'non optimising' (containing everything else). Statistical analysis revealed that differences in intentions between product categories and between each stage of consumption were significant (see appendix 12). Possible reasons for this are discussed in section 5.6.

5.5.2   Profiling product life intentions

The exploration of intentions was then extended to look at individual profiles based upon 'optimising' and 'non optimising' intentions across the consumption process for each of the three product categories. The detailed results are shown in tabulated form in appendix 13. Figure 5.7 contains a series of summary pie charts. As with the actual consumption data, they are not labelled with their values but rather provide a visual impression of the data. They are colour coded so that complete non optimisation is blank, optimisation at one stage only is patterned yellow, optimisation at two stages is patterned green and optimisation at all three stages is block green.

The data confirms that large numbers are highly optimising in their intentions towards the service life of big kitchen appliances across the consumption process and indicates a high level of internal consistency, with 80% of consumers intending to keep their appliance until functional or absolute failure at all three stages of consumption. In contrast, only a quarter shared this profile for everyday footwear and 17% for upholstered chairs.

Overall 42% of respondents showed no intentions to optimise their upholstered chairs at any point across the consumption process. This validated concerns that large numbers of respondents were consistently apathetic towards the potential service lives of upholstered chairs. Over a quarter of respondents had no intentions to optimise their

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everyday footwear at any point. This failure to intend to optimise product life of upholstered chairs and everyday footwear has considerable implications for waste reduction. If longevity is not viewed as a priority then behaviour is likely to reflect this.

Figure 5.7 Profiling intentions

Everyday footwear intentions   Big kitchen appliance intentions   Upholstered chairs intentions

□ A-O-D □ A-O-d □ A-o-D □ a-O-D □ A-o-d □ a-O-d □ a-o-D □ a-o-d

Acquisition intentions   Ownership intentions   Disposal intentions

□ **E D F - B K A - U P C D E D F - B K A - u p c**   □ **E D F - bka - U P C**   □ **edf - BKA - UPC**

□ **E D F - b k a - u p c   D e d f - B K A - u p c   D e d f - b k a - U P C   D e d f - b k a - u p c**

KEY:

EDF/edf - everyday footwear, BKA/bka - big kitchen appliances, UPC/upc - upholstered chairs

A/a - acquisition, O/o - ownership and D/d - disposal

Captial letters - those who have highly optimising intentions

Lower case letters - those who do not have highly optimising intentions

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Just under half of the respondents had profiles for everyday footwear that indicated inconsistencies in intentions between stages of consumption, despite being the same product category. The most common inconsistencies were to have optimising intentions in disposal alone (11%) or in ownership and disposal but not in acquisition (15%), suggesting the possibility that attachment to footwear increases over time. Inconsistencies in profiles for upholstered chairs frequently included optimising intentions in ownership alone (14%) or a combination of two stages that included ownership.

The results indicate that there are substantial inconsistencies in intentions towards different products at all three stages of consumption. Overall, 80% of respondents demonstrated inconsistencies in intentions across product type in acquisition, 64% in ownership and 71% in disposal, thus confirming that product category has a significant impact on consumers' intentions with regards to product life. Less than 7% failed to have optimising intentions for any of the three products in acquisition, ownership or disposal, suggesting that few people deliberately fail to optimise all three products.

The inconsistencies across product category at each stage of consumption reflect the relative dominance of highly optimising intentions towards big kitchen appliances. Whilst the patterns indicate inconsistent intentions from one product to another, comparison between the different stages of consumption reveals greater consistency in ownership with quite similar overall proportions identified in acquisition and disposal.

5.5.3   *Examining intentions with patterns of consumption*

The next logical step in the analysis is the comparison of intentions with actual patterns of consumption, to explore how consistent respondents were in their intent and actions at each stage of the consumption process for each product category.

Initially, a simple comparison was carried out contrasting optimising intentions against patterns of optimising consumption for each product at each stage of consumption (see appendix 14, section A). Analysis of the cross tabulations revealed that during acquisition and disposal there was evidence of consistency between intention and patterns of consumption. A small number of consumers intending to keep either upholstered chairs and/or everyday footwear until absolute failure at acquisition and disposal were significantly more likely to be optimising in their acquisition and disposal

of these items. This pattern was similar, though less marked, for large kitchen appliances. By contrast, there were no significant relationships between intention and consumption patterns relating to any product category during the ownership phase. This has significant implications as it suggests lack of consumer understanding of how to achieve their intentions. This could be the result of a lack of information or because of other competing factors being more dominant e.g. time famine.

The next phase of analysis involved comparing respondents' profiles (see figure 5.8). Again bar charts are not labelled with values (which can be found in the appendices) but provide a visual impression of the data. All of the bar charts indicate significant irregularities between intentions and actual consumption behaviour (see appendix 14b). Consistency between intentions and consumption behaviour for each of the profiles was infrequent, especially for everyday footwear and big kitchen appliances (8% of cases for both) and in ownership (only 3%). The tendency across all profiles was for intentions to be more optimising than actual consumption behaviour, as might be anticipated. On rare occasions profiles contained a segment with greater numbers optimising in their consumption patterns than intended for that segment, but this did not compromise the overall trend.

Figure 5.8a reveals the differences between intentions and consumption patterns across acquisition, ownership and disposal for each product. The chart reveals the large difference between intentions and consumption most vividly for big kitchen appliances. In this instance the number of respondents who were actually optimising at any point were less than the number intending to optimise across all three stages. For everyday footwear the intention profiles were more diverse, and considerably more optimising, than those for actual behaviour.

Figure 5.8b exposes the similarities and differences between intentions and consumption patterns between product categories for each stage of consumption. During acquisition and ownership the chart indicates considerable inconsistency between intentions and actions relating to the three product categories, with substantial numbers failing to accomplish any of their optimising intentions. In sharp contrast, the differences between intent and action during disposal are minor.

Figure 5.8 Consumption and intentions profiles

a) Examining consistency between consumption and intentions profiles by product category

intentions

⇒ Consumption

Intentions

Consumption

Intentions

m Consumption

0%   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%

⊟ A-O-D ▫ A-O-d ▫ A-o-D ▫ a-O-D ▫ A-o-d ▫ a-O-d ▫ a-o-D ▫ a-o-d
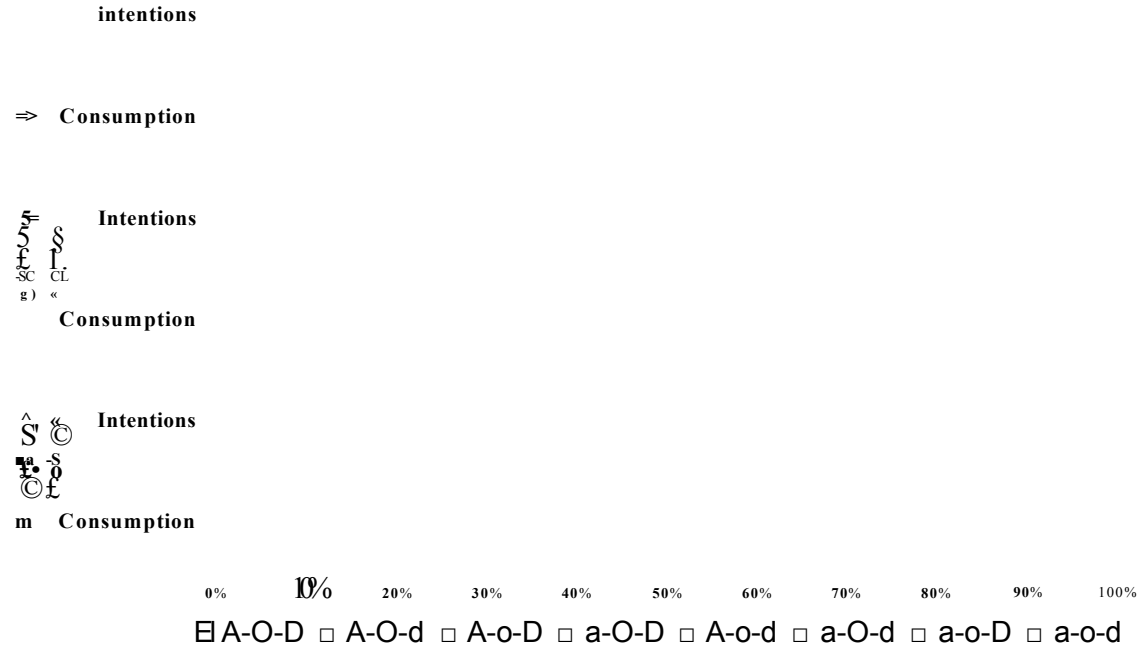
b) Examining consistency between consumption and intentions profiles by stage of consumption
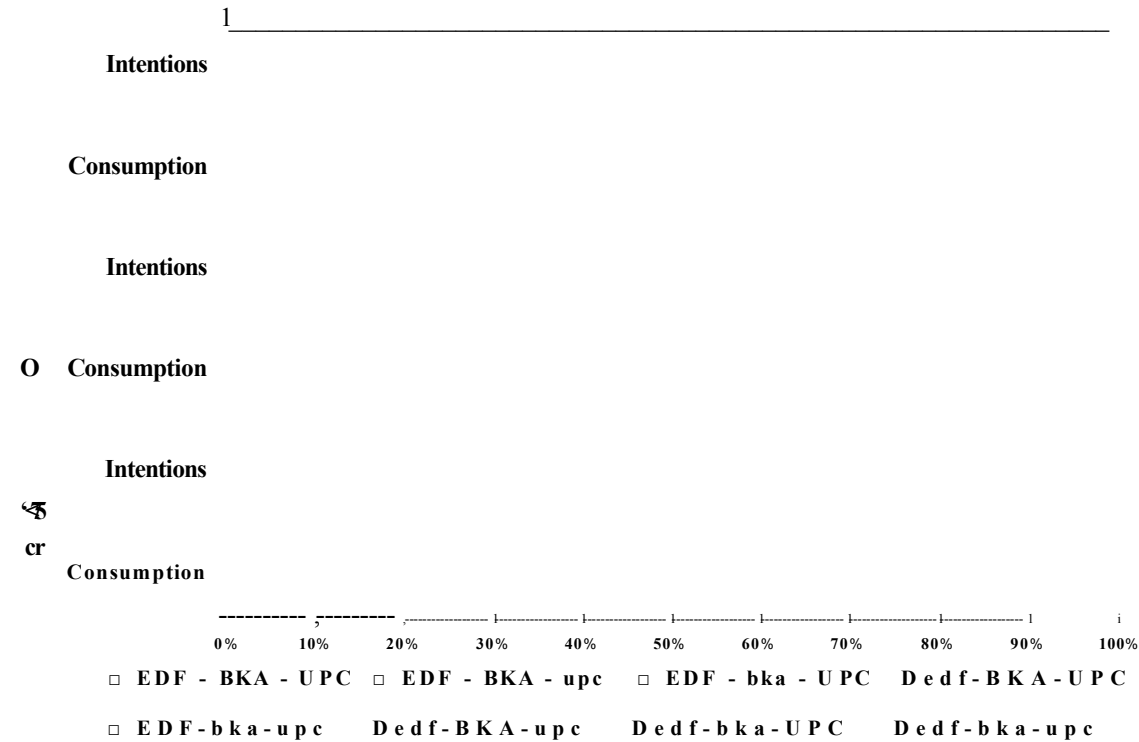
Intentions

Consumption

Intentions

O Consumption

Intentions

cr Consumption

0%   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%

▫ E D F - B K A - U P C ▫ E D F - B K A - u p c ▫ E D F - b k a - U P C D e d f - B K A - U P C

▫ E D F - b k a - u p c D e d f - B K A - u p c D e d f - b k a - U P C D e d f - b k a - u p c

KEY:

EDF/edf- everyday footwear, BKA/bka - big kitchen appliances, UPC/upc - upholstered chairs

A/a - acquisition, O/o - ownership and D/d - disposal

Captial letters - those who have highly optimising intentions / consumption patterns

Lower case letters - those who do not have highly optimising intentions / consumption patterns

5.6 Discussion of key findings

This section discusses the key findings of the research, interpreting results in the wider context of the product life debate. It draws upon information from existing literature to both substantiate and counter research claims. It seeks explanations, identifies areas of accord and contention, and establishes core areas for further exploration.

5.6.1 Patterns of consumption

The investigation of patterns of consumption supports the proposition that consumers are exerting considerable influence on the service life of the three categories of product. The nature and mechanics of consumer influence are complicated.

- **Complexity of product replacement**

The data reveals that the simple failure and replace model of consumption is not the dominant pattern for the acquisition of new everyday footwear or upholstered chairs, shaping only 40% and 23% of acquisitions respectively. The impact of external factors in driving new acquisitions in both these product categories was much greater than expected. The availability of more modern styles and advancements in product features were cited as reasons for the replacement of 30% of everyday footwear and 46% of upholstered chairs. This provides evidence in support of concerns of the role of relative obsolescence in triggering new acquisitions.

In addition, the data support the argument that a sizeable number of acquisitions do not necessarily involve any comparison to, or evaluation with, existing similar products. Special offers were particularly powerful, spurring almost a fifth of all everyday footwear acquired.

Some larger acquisitions were by-products of broader household decision making and not necessarily individually targeted. For example, changing kitchen, redecorating, moving house and changing family size instigated numerous acquisitions. Research conducted in five Nordic countries in the late seventies discovered similarly the key role of non product related factors on product replacement choices (Dahl, 1980).

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The comparison of prompts for acquisition and disposal of similar products reveals differences between these stages. In all three cases, disposal was more likely to be prompted by an assessment of the current product leading to the conclusion that it was no longer fit for use. In contrast acquisition was more frequently prompted by external factors. The difference was particularly large in the case of everyday footwear (a quarter more), indicating the distinct separation of acquisition and disposal decisions in this category, and the ease and propensity of footwear for accumulation. Despite this, there were still considerable numbers, a third or more (almost two thirds in the case of upholstered chairs) citing external factors as the main cause of disposal.

These findings support concerns that significant numbers of product replacement decisions are intrinsically linked to social processes. The strength of external signals in product replacement decisions is also implicit in the degree of impulsiveness displayed in acquisition. For example, 51% of respondents acquiring everyday footwear agreed with the statement that they 'found it by chance ... just saw it, liked it and got it'. Such spontaneity was also apparent during the acquisition of the high priced products (accounting for the purchase of 21% of upholstered chairs and 10% of big kitchen appliances[1]). This has significant implications for the condition of products in the waste stream, as discussed further below.

- **Self reliance**

The survey exposes considerable consumer reliance upon self-evaluation of available options as the principal means of search for higher priced goods (65% in both cases). Despite the open phrasing of the most comprehensive search option[2], which provides numerous possibilities (e.g. as simple as asking a friend's advice), less than a quarter agreed that they had done anything more than a basic comparison for all three products. This indicates that the majority of consumers rely heavily upon their own capacity to evaluate product characteristics, depending on existing individual insight, visual indicators and information provided by the retailer in store. Only a minority pro-actively seeks independent or objective sources specifically relating to their acquisition.

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[1] Data for those who received products as gifts or could not remember treated as missing.

[2] 'I did some research about this type of product before comparing several similar products and choosing one'

The research indicates a tangible lack of forethought, trouble shooting or reflection of needs prior to acquisition. It appears that many respondents simply muddle their way through this process. This has considerable implications for the service life of all product types. Respondents are not reflective in their processes of rationalisation, so products may not necessarily meet long-term needs. There appears to be limited demand for experiential or objective knowledge of product qualities; most respondents prefer basic comparison-shopping, placing their trust in subjective and possibly unreliable indicators. This indicates the importance of comprehensive product labelling and standards for life cycle costs, reliability and durability. The appliance manufacturer ''Miele' are now voluntarily labels products with their technical design life.

- **Priorities**

Just over a quarter of respondents who chose their products did not prioritise product life or associated characteristics when acquiring any of the three products (over a half for everyday footwear). This has repercussions. If consumers willingly compromise the fundamental quality of products for the sake of other benefits such as lower cost, then poorer quality products gain market share, leading to rapid replacement cycles.

Long life expectancy was prioritised most frequently as a top three priority for the more expensive products (26% upholstered chairs, 19% big kitchen appliances). However, in the case of upholstered chairs the relationship between prioritising product life and the consequent exploitation of its benefits is not clear. Although not directly comparable, as answers may relate to different products, the data on disposal shows that 80% of upholstered chairs were disposed of before the point when they need repair. This illustrates that even consumers with a broader outlook in acquisition are vulnerable to wider forces following this.

Surprisingly, reasonable price was cited as less important for upholstered chairs than for the other product categories. There appears to be recognition of this being a more long term investment with respondents willing to spend more to get the product they want.

- **Used products**

Few products in any of the three categories were acquired pre-owned, accounting for only 3% of everyday footwear, 8% of big kitchen appliances and 16% of upholstered chairs. In contrast, significantly more respondents passed on products for continued use

by others, making up 27% of everyday footwear, 22% of big kitchen appliances and 57% upholstered chairs of all disposal routes.

This dichotomy of reuse figures is perplexing. It could be that as the processes of acquisition were found to be frequently based on reactions to external stimuli that used products are less likely to be acquired. Private buying is purposive, encompassing an investment of time and effort to browse newspaper or store adverts, car boot sales etc. whilst receiving products is often indiscriminate. In contrast, there are continuous external signals relating to new products, the presence of special offers, hire purchase, and credit and (with the exception of vehicles) more choice. Uncertainties about residual life may also deter acquisition of used products.

Cooper and Mayers (2000) reported that 40% of UK households had second hand electrical appliances in the home. This suggests that there is potential bias in the sample, in which less privileged people acquiring pre-owned goods are underrepresented. Alternatively the inherent social stigma attached to second hand products may have led respondents to overlook certain acquisitions.

More than half of the larger products discussed in the questions on disposal were given to friends or family for reuse. This appears to confirm the theory that used products are not always competing directly with new products (Cooper and Mayers, 2000).

During the disposal process, the majority of respondents were aware of the residual life of products perceived to be in good condition. Those products that were considered to be functioning well were passed on for reuse in over 85% of cases. Despite this, the pattern of disposing more used products than the volume acquired leads to a glut of used products and is ultimately unsustainable.

- **Quality retention**

The research revealed that general product negligence was commonplace. Over a third of respondents were indifferent towards product care during use for all three products and in particular for everyday footwear. A lack of routine cleaning further demonstrated the lack of a comprehensive strategy to retain product quality. This has significant environmental implications. Negligence in use will lead to more rapid deterioration,

increased vulnerability to damage and disrepair, loss of quality and, ultimately, faster movement to waste generation.

As highlighted in the results, the expected relationship between conscientious care in use and routine cleaning was tenuous. This was unexpected; a number of reasons for the discrepancy have been considered. It is possible that people may be ignorant of the long-term benefits of routine cleaning. Another possibility is that those who were trying to maintain products in their original condition were reactive to the slightest sullying and that their rapid responsiveness prevented routine cleaning from being required. Alternatively, those who routinely clean may simply do so out of habit and are not necessarily making a concerted attempt to keep the product looking new. The age of the products may also have influenced response, the statement 'to take great care to keep it in its original condition' may have been considered too resolute when it came to people's oldest products, even if they were routinely cleaned.

The figures for participation in rejuvenation activities were remarkably low across all three product categories, with over half not having carried out any activities. Possible reasons for this apathy towards rejuvenation are that people lack time, skills or the inclination. They may have judged the costs and risks (i.e. subsequent failure) of rejuvenation to outweigh the benefits. Alternatively there may not have been the need, i.e. in some cases the selected products may not have required rejuvenation due to age or use intensity. Reuse for a different task or in a different place was especially low (<6% for all products), indicating limited flexibility. No data was available to compare with these findings.

Where repair work had been conducted the figures indicated that larger products, particularly big kitchen appliances, were repaired more frequently than everyday footwear. This is unexpected considering the availability and in-expense of shoe repairs both at home and by specialists. It may be attributed to relative cost and, possibly, to product type; fashion and sports footwear are less simple to repair.

The contrast between volumes of home and specialist repairs was not as large as anticipated (<10% in all cases). About a fifth of respondents stated that they had carried out repairs / restoration at home for their oldest big kitchen appliance or upholstered chairs. No comparison figures were available. There is limited understanding of the UK

population's home working skills. This shortfall needs addressing, particularly with regards to the safety implications of home repair of electrical equipment.

- **Consumer responsibility**

One of the most incisive findings of the research is the impact of 'wear' on disposal decisions. The condition of 35% of discarded everyday footwear, 19% of discarded big kitchen appliances and 55% of discarded upholstered chairs were described as 'functioning but looking worn'. In each case a large proportion of these worn items were treated as waste. These statistics lend support to the previous findings on rejuvenation activities during ownership, suggesting limited attempts to prolong product life once products are considered worn. Box (1983) for example also found that 55% of discarded furniture (lounge suites or dining tables and chairs) was 'still usable', or 'usable but probably would not last that long'. One possible reason for the propensity of upholstered chairs to be disposed of when worn is their relative size. Storage is problematic so they are not prone to accumulate like smaller products. The materials i.e. metal used to make big kitchen appliances make them less susceptible to external wear.

'Wear' leads to products that despite being in working order, have lost their visual appeal or show signs of functional deterioration. They still retain some residual value but represent higher risks in terms of possible reuse strategies than products that are in good external condition. The volume of products entering the waste stream prematurely in this condition represents a major environmental challenge. The apathy shown towards actions that retain product quality during use will lead to faster product deterioration, with the consequence of more rapid disposal.

Under these circumstances, in which large numbers of products are disposed of prior to failure, designing more durable products may be an ineffective solution unless consumer responsibility for product life is simultaneously addressed. The suggestion by van Hinte (1997) that products should be designed to age with dignity may alleviate the problem of product disposal on the basis of wear, but judgements regarding such an attribute are very personal.

It is acknowledged that the perception of what constitutes 'wear' will vary enormously from one person to another and from one product category to another. Whilst subjective,

the justification for the term's use is that it illustrates the point that the respondent recognises that the product is still viable but has chosen to dispose of it anyway.

- **Product distinction**

The results indicate clear and substantial variation across product categories. A synopsis of the core differences is provided in the table 5.3. It is possible to attribute the variation between products to a range of factors such as cost, purpose and function.

Table 5.3 Variations in consumers' influence across product category

Everyday footwear	Big kitchen appliances	Upholstered chairs
Least prioritisation of long life	Most comprehensively researched	Greater incidence of reuse in acquisition and disposal
Least cleaned and cared for	Least likely discarded whilst still functioning	Most susceptible to relative obsolescence
Majority discarded as waste	Most maintained and rejuvenated	Treated with most care during use
Least optimised in acquisition and ownership	Most optimised overall	Least optimised in disposal

Everyday footwear are least optimised probably because of their low cost and the ease of replacement and accumulation. Big kitchen appliances are clearly the most frequently highly optimised, possibly because of their strong functional role. They are generally less vulnerable to changes in fashion than upholstered chairs. The patterns of consumption for upholstered chairs are the most puzzling. They require the greatest initial investment and many people cited long life as a crucial requirement, yet the majority of upholstered chairs had not been subject to rejuvenation activities and many were discarded prior to failure. This is perhaps due to substantial refurbishment costs.

These differences across product type support similar reports of differences between product categories observed in other research (Jacoby, 1977; Box, 1983) and confirm the need to engage a product centred approach in any further research in this area.

- **Consumption stage distinction**

Examining consistency between the different stages of consumption revealed the trend that with each consecutive stage of the consumption process the volume of highly optimising respondents increased for all three products. The data for everyday footwear and big kitchen appliances expose extreme contrasts with far greater numbers optimising in disposal than the previous stages.

The argument may be forwarded that this distinction is attributable to the scoring system. For example, those disposing as waste those products that needed repair were scored as highly optimising in the scoring system. In hindsight this may have been too lenient.

Initial impressions based entirely upon the disposal data for everyday footwear and big kitchen appliances are positive, indicating highly optimising consumption patterns with the majority of products being disposed of on the basis of failure. However, closer inspection of the overall picture across the consumption process reveals that products are becoming worn more rapidly. They are reaching the point of disposal at a faster rate because consumers are not acting to mitigate the wearing process, with quality retention being undermined by neglect in use, disregard of repair options and poorer quality products being given preference at the stage of acquisition.

This illuminates the internal complexities of consumption and highlights the benefits of employing a full consumption cycle perspective to study consumers' influence on product life.

- **Mixed intentions**

The data on anticipated product life revealed numerous complexities. The figures indicate more variation between the different products than expected. Many people were more optimising in their intentions regarding the anticipated life span of their big kitchen appliances than of other products. Intentions regarding the anticipated life span of upholstered chairs, and to a lesser extent everyday footwear, varied between the different stages of the consumption process.

There are a number of potential explanations for these differences. In each section of the survey the questions on intentions followed the questions on actions and respondents may have been post-rationalising their intentions to appear consistent. Furthermore, for each stage of consumption respondents were asked to identify one product from within each category. The variation may have occurred because intentions are specific to product type. Intentions may even be specific to individual products.

Many respondents admitted that their intention was not to keep products until functional failure. The frank lack of support for longevity indicates that future waste streams will

contain products with residual value and strategies to deal with this are necessary. Product life intentions for the most recently acquired everyday footwear were less optimising than those discussed in other sections of the survey, suggesting that they are becoming prone to shorter life cycles, counter to sustainable consumption requirements. For upholstered chairs, however, and to a lesser extent everyday footwear, intentions were most optimising in ownership, possibly because at this stage respondents were discussing their oldest products to which they may have an attachment.

Overall, it appears that there may be inadequate public appreciation of the relationship between life span optimisation and resource use.

5.6.2 Consistency in consumption profiles

The analysis of consistency within the consumption patterns of individual respondents confirms an emerging impression that remarkably few people have coherent strategies for optimising product life across the consumption process for any of the three categories of product. In contrast, much greater numbers consistently fail to optimise at any stage of consumption, especially for upholstered chairs and everyday footwear. The distribution of inconsistencies was skewed with less respondents optimising in acquisition and / or ownership than in disposal, around two thirds failed to optimise any of the three products during these stages. The stark lack of optimisation at two or more stages of consumption has considerable environmental implications.

There are a number of possible explanations for the discrepancies in optimising activities. The first and perhaps most important is that respondents' underlying motivations may vary at different stages, leading to a contradictory picture in terms of product life but a consistent one on the basis of a specific variable. For example, from an economic point of view a respondent with limited resources may have kept a product until it was broken, yet prioritised low cost rather than longevity when buying a new one. From the perspective of someone who is house-proud, taking very good care of products during ownership, and possibly buying the best, is essential, but their product awareness may motivate early disposal on the basis of minor wear.

A further possibility is that there are barriers that inhibit optimising patterns of consumption and, therefore, impede individual internal consistency. For example, people who are risk averse may react to the impending failure of a big kitchen appliance by replacing it with a more durable model, rather than waiting for it to break, ignoring

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rejuvenation options. The less educated may not have the skills to undertake research prior to acquisition or understand and evaluate life cycle costs, yet may take good care of their products and retain them till they fail. People with time constraints despite optimising in other ways may not have the opportunity to maintain products.

Other possible causes of inconsistencies are methodological. Despite being the same product categories, product type may have a greater impact than anticipated. Alternatively, the scoring system's method of assessment of what constitutes highly optimising patterns of consumption is subjective.

Possible explanations for inconsistencies in optimisation across the consumption process are given further consideration in the next chapter.

5.6.3   Consistency between intentions and patterns of consumption

Initial comparison of respondents' intentions with their patterns of consumption at acquisition, ownership and disposal revealed that, whilst inconsistencies were prevalent in ownership, there was some degree of internal consistency during acquisition and disposal for all three products. In contrast, when comparing the profiles that summarised actions and intentions across the whole of the consumption process, large irregularities were identified in most cases, with the exception of disposal. This demonstrates that despite localised compatibility between action and intention, respondents often displayed different patterns of consumption to their stated intentions.

Most respondents were more optimising in their intentions than they demonstrated in their actual patterns of consumption. This was most profound for big kitchen appliances, despite their being more highly optimised overall than the other products. Very few respondents stated intentions to replace products on the basis of relative obsolescence (less than 10%), but had acted upon it.

The results indicate a conflict between aim and outcome. From the perspective of sustainable consumption some reassurance can be gained from the data asserting that many respondents intend to be more optimising than they are. The data suggest the presence of barriers that cause a divergence between intention and action. As outlined in chapter three, conflicts between stated attitude and displayed behaviour arise frequently in environmental discourse and have become the focal point of much environment and

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behaviour research (Ölander and Thøgersen, 1995). The barriers to achieving product life intentions are examined in chapter seven.

5.6.4 External explanations

The pursuit of explanations for various patterns of consumption was not particularly successful during this stage of the research. This was not entirely unexpected as only a limited number of possible factors were investigated and at a simplistic level.

Demographic and socio-economic characteristics were generally poor predictors of optimising consumption patterns. The tendency for older generations to be more highly optimising requires further exploration; possible moderating factors include life experiences, such as resource depravation during war time. The data for big kitchen appliances revealed that those who were least optimising in ownership were wealthy and well educated, possible moderating factors include lifestyle such as being time poor. Interestingly a positive relationship between increasing age and service life expectancy of appliances and a negative relationship between increased income and service life expectancy of appliances were also reported by Dahl (1980).

Analysis of the relationship between product optimisation and environmental activities suggests no clear association between simple green consumption activities and more complex sustainable product consumption. Further exploration is needed to identify the reasons why many consumers do not act consistently with their apparent environmental commitment. Possible reasons include costs, time, anticipated residual life, and lack of awareness of the relationship between their behaviour and product longevity and / or a lack of understanding of the environmental impacts of product life. Again, these are explored further in chapter six.

5.6.5 Contribution to knowledge

This phase of the investigation has furthered understanding of consumers' influence over the consumption life cycle. The work confirms the findings of other investigations e.g. Hunkin (1988), Andersen (1999), Cooper and Mayers (2000) demonstrating that relative obsolescence has a substantial influence on the service life spans of the three categories of household product studied. It provides new information regarding the maintenance and rejuvenation of products, which had previously received little

attention. This indicates widespread ambivalence to the retention of product quality through care in use and an indiscriminate rejection of repair and reuse strategies.

The work contributes significantly to the growing body of knowledge concerning consumers' influence on product life spans (Cooper, 1994a; Kostecki, 1998) by identifying the explicit aspects of acquisition, ownership and disposal that shape whether products are optimised or not. A tool has also been designed and justified that measures the extent to which a consumer extends or shortens product life at each stage. This provides data that allows the comparison of the consumption patterns of different consumers and the comparison of individual behaviour at different stages of the consumption life cycle.

Finally, the research has demonstrated how the use of an integrative life cycle approach to study consumption can provide a more comprehensive understanding of product life issues. The findings of this phase of the investigation have been published in Evans and Cooper (2003a).

5.7   Chapter summary

The data supports concerns that consumers are having a substantial impact on the life span of the three product categories, over riding the technical life designed into the product. They systematically verify many of the suspicions discussed within the literature review, demonstrating the critical need to integrate the consumer dimension when generating ideas to achieve greater sustainability.

The results reveal substantial differences in the patterns of consumption both between categories of product and across the different stages of the consumption process. They indicate that the service lives of everyday footwear and upholstered chairs are notably more susceptible to consumer influence than large kitchen appliances. Whilst also revealing that respondents are more optimising in disposal than in acquisition or ownership.

These findings validate the research decision to focus on specific product categories and provide strong support for a product-oriented approach to be used in further research and policy making. Furthermore, they highlight the complexity of consumption patterns

and endorse the consumption cycle approach. The findings demonstrate the need for policy intervention to engage with the whole of the consumption process in order to tackle product life issues effectively. Consumers need more awareness of the implications of their actions in acquisition and ownership for product longevity.

Inconsistencies in individual profiles across the consumption process and between the different product categories are numerous, exposing the complexity of disposal and replacement cycles. Discrepancies between intentions and actions further support the impression of a lack of coherent consumer strategies towards product life. An analysis of possible explanatory factors including demographic, socio-economic and environmental variables provided only limited insights. Further research is needed to explore the underlying reasons for individuals' inconsistencies across the consumption process and to explain inconsistencies between intention and actions.

The results have clear environmental implications. The lack of life span optimisation evident at the acquisition and ownership stages has substantial implications for future waste volumes. Failure to prioritise longevity and care for products in use will lead to premature wear and failure and, ultimately, faster disposal. The fact that products are discarded on the basis of wear, as opposed to failure, reinforces the problem. It is noteworthy that participation in more conventionally defined environmental consumption activities did not increase the likelihood of displaying highly optimising patterns of consumption. This suggests inadequate public appreciation of how consumption patterns can influence product life and the environment and indicates that green consumption is not necessarily a precursor to more sustainable consumption.

Chapter five has provided empirical support to the proposition that consumers influence the service life of domestic products across acquisition, ownership and disposal. Chapter six reveals and discusses the results of the qualitative investigation. It seeks explanations for inconsistencies in consumption profiles, observing differences between products and across the stages of consumption. In addition, it seeks to understand the basis of discrepancies between intentions and patterns of consumption, especially in ownership. The results of chapters five and six are synthesised and discussed in chapter seven in the context of the aims and objectives set out in chapter one and the conceptual framework outlined in chapter three.

CHAPTER 6 – INTERVIEW ANALYSIS

6.1   Introduction

The findings of the quantitative research (discussed in the previous chapter) indicate that consumers exert significant impacts on the life span of household products across the consumption process. The analysis demonstrates that many consumers lack a coherent approach to life span issues, characterised by varying degrees of product life optimisation at different stages of the consumption process and significant differences in optimisation between product types. Primary investigations to identify factors affecting consumers' influence on product life, beyond product category, were mostly unproductive.

This chapter focuses specifically on seeking *'explanations for differences in patterns of consumption and consequent variations in service life'*. The factors affecting consumers' influence on product life are identified and investigated using the data obtained from a set of eighteen semi-structured interviews. The style of analysis is based on thematic identification and mapping. Themes were identified from the raw data using a coding system. The themes were then mapped out using the analytical framework outlined in chapter three, and consequently analysed to satisfy the research objectives established in chapter one. Chapter four outlines the methodology.

The analysis addresses factors affecting consumers' influence on product life that a) lead to 'product life span optimisation' and b) cause 'non optimisation of product life span'. The evaluation of interviewees' actions at each stage of the consumption process as optimising, or not, was more subjective than the measure of optimisation used in the questionnaire. The nature of the interview process does not facilitate prescriptive measures. Table 6.1 provides a summary of the interpretation of product life span optimisation and non optimisation of product life span used at each stage.

Table 6.1 Interpretation of optimisation within the context of the interviews

	Product life span optimisation	Non optimisation of product life span
Acquisition	Replacement consequent to failure Comprehensive search strategy Prioritise quality in acquisition	Replacement prior to failure Impulsive / reactive Prioritise fashion or low cost
Ownership	Prioritise maintenance of product quality Rejuvenate products through repair and reuse	Avoid product maintenance Overlook opportunities to rejuvenate products through repair or reuse
Disposal	Discard after product failure Select most environmentally preferable method of disposal	Discard of product with residual life Select least environmentally preferable method of disposal

The structure of research for chapter six is outlined in figure 6.1. It begins with an exploration of factors affecting patterns of acquisition, ownership and disposal, specifically examining underlying personal, social / situational and product characteristics. Following this, the analysis focuses on the examination of individual consistency across the consumption process focusing on both differences at different stages of consumption and differences between types of product. It then investigates consistency between intentions and actual patterns of consumption. Leading from this is a section that reflects upon the relationship between environmentalism and optimisation. The chapter ends by looking at the findings in the context of previous research and presenting a summary of key findings. A summary of the characteristics of participants interviewed is given in 4.8.2.

Figure 6.1 Structure of interview analysis

Stage 1 - Describe	⟶	Provide initial descriptive overview (*s6.2, 6.3 & 6.4*)
Stage 2 - Analyse	⟶	Profile Analysis (*s6.5, 6.6 & 6.7*)
Stage 3 - Discuss	⟶	Review findings in wider context (*s6.8*)
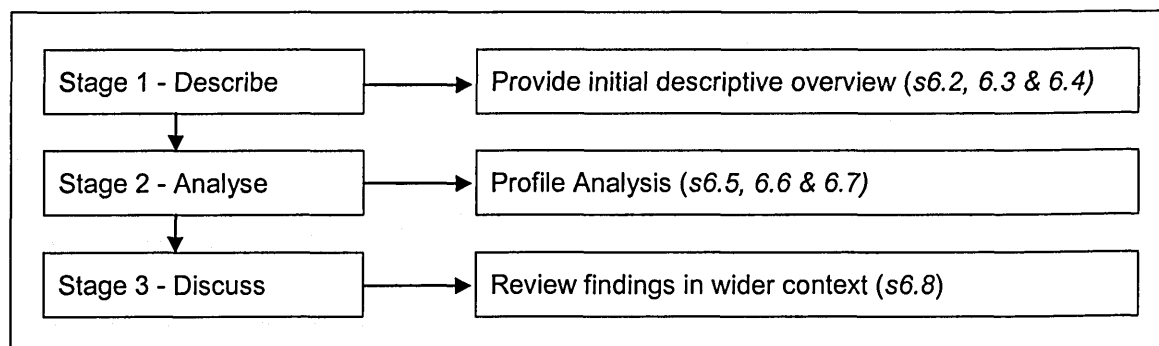
6.2 Factors affecting patterns of life span optimisation in acquisition

This section discusses the factors that were found to shape people's patterns of acquisition. The findings refer both to factors that appeared to promote optimisation and those that impede it. They are divided under the headings personal, social and situational, and product factors.

6.2.1 Personal characteristics

Life span optimisation

Personal characteristics appear to play an important role in determining patterns of consumption in acquisition. Many of those individuals who displayed signs of optimising activity, such as undertaking a comprehensive search, cited longevity as a principle objective. The motives underlying expressions of a positive attitude towards longevity differed. For some it was simply the need for reliability,

> *"I try and find something out about the machine, because I would rather actually pay a little bit more and get a decent kind of machine than go for the cheapest one on the market and find that it falls to bits two months after your warrantee or guarantee run out."* (Anita)

Several interviewees, such as Barbara, were driven by their dislike of the shopping experience. They reasoned that they would be rewarded for investing greater time and effort in getting the 'right' product by not having to repeat the shopping process for a greater length of time. A general dislike of change seemed to underpin the desire for acquiring longer lasting products in others.

Some interviewees participated in life span life span optimising activities to attain personal fulfilment, actualised through the satisfaction and pleasure they obtained from finding and acquiring the 'best' product. This was frequently coupled with the desire to impress others.

> *"I like very good shoes. I've got three pairs of Rains shoes, which, oh well they went out of business years ago ... I've had them years... they used to make the shoes for the queen!"* (Grace)

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These interviewees often showed considerable involvement in the acquisition process for the product category indicating a comprehensive understanding of product range and manufacturers.

Many spoke of the importance of their formative years in shaping their consequent patterns of acquisition. This manifested itself in a number of ways. The circumstance of being part of a large family with limited resources was emphasised as a factor in understanding the value of things.

> *"There was eight of us in family so you can imagine things had to be pretty prudent, we couldn't afford, we couldn't afford luxuries when I was a child."* (George)

> *"Well I had a big family anyway so I've always been a bit frugal (laughs)."* (Eileen)

Several interviewees referred to the transfer of values, skills and experiences from one generation to the next. The influence of family ethics of saving and resourcefulness were highlighted, as well as the ability to judge quality through being taught good taste.

> *"I think you know, this sounds a bit arrogant really but the whole thing about taste, I'm sure you know that I get that from my parents. I might not have thought so at the time, any more than my son would think so now, I'm sure he will. That's how families work isn't it?"* (Colin)

The most extreme reference was the suggestion of a genetic pre-disposition to avoid waste through careful acquisition.

> *"I think it's probably in the genes. I think my parents used to look on things in a similar sort of way, they would buy things for length of life and durability and I think I've probably inherited that and I think I'm sure it's in the genes (laughs)"* (John)

Routines in patterns of acquisition were also found to influence some interviewees. Dennis spoke about shopping at Coles (John Lewis department store) for durable goods as a habit.

> *"It's just sort of got used to using it that's all it's a pattern. Similar to going to Marks and Spencer's for your underwear or (laughs) something that you get used to."* (Dennis)

These shops were not necessarily selected because of perceived connections to product quality; they were simply where you went to get particular products.

The ability to access and process information effectively influenced whether people were able to find more durable products. Tony referred to how his skills as an electrical engineer contribute to his ability to find good products.

> *"I'm an electrical engineer and I'm also into measurement, control and instrumentation. So I have a really good understanding of how things work. That helps, it really does..."* (Tony)

Similarly Richard spoke about his experience as an electrician working in factories manufacturing sofas and how this had enhanced his ability to distinguish between poor and high quality leather upholstery.

> *"So I mean I know quite a bit a about the industry so you know I would tend to go for the better made ones to last."* (Richard)

John also referred to this ability to use information effectively, discussing how he has tied together his own experiences with those of friends and his wife's experiences at the citizen advice bureau to build up an 'armoury' to tackle consumption.

Non optimisation of life span

Many interviewees' failures to optimise in acquisition (such as replacing a product prior to failure or not prioritising durability) were triggered by impulsiveness, underpinned by a variety of rationales. On some occasions this was associated with a lack of interest in longevity, where this issue simply was not considered. On others it was catalysed by changing circumstances, for example a transition in personal finances led several respondents to replace products prematurely.

> *"When you need the money when your struggling with sort of baby and all the rest of it, buying a house, on what it was a 16% interest rate when we first took out our first mortgage, you haven't got a lot of money, so you did tend to be a bit cautious, but it ain't a consideration any more, I just go out and buy it."* (John)

Similarly Colin spoke about how the fruition of an investment project prompted the family

> *"...to look at the kitchen and say what are we going to do about this. It's a bit frayed around the edges, the cooker broke, so instead of buying a new cooker because we'd actually got funds, we took the opportunity to do something more radical."* (Colin)

Margaret's occasional impulsiveness was shaped by her dislike of shopping, which caused her to rush to get it over and done with as quickly as possible, leading to

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mistakes, which ultimately ended in premature disposal. Peter spoke about how his mood on the day quite often influenced his patterns of acquisition.

Lack of understanding and lack of skills to assess, or simple inability to recognise total life cycle costs of product ownership, also affected acquisition choices. Sharon was caught in a cycle of buying her children very cheap shoes and, despite care in use, replacing them on a monthly basis due to rapid deterioration and failure. This negative experience only served to reinforce her opinion that spending less made logical sense as items were perceived as unreliable. Several respondents reported reaching a similar conclusion on the basis of their negative experiences with larger products such as washing machines.

People's awareness of their own residual life span played a role in decisions not to invest in more expensive products, with several interviewees in older age groups deeming spending extra money on longer lasting products futile.

"I see no point in paying hundreds and hundreds of pounds for things, not at our age anyway, it sounds morbid doesn't it, but no, so." (Gloria)

6.2.2 Social / situational characteristics

Life span optimisation

Good financial standing was evident for many of those buying premium products, coupled with a willingness to invest.

" I think you have to you get what you pay for ... I think if you want something that lasts then you've got to be prepared to invest really don't you." (Eric)

The management of risk is evidently an important driver of optimising strategies for acquisition. Taking care to acquire a high quality product was considered worthwhile to ensure limited hassle and transaction costs across the product's life span. On such occasions actions were frequently directed more by opportunity costs, whether time or money, than by the features of the product. Eric, for example, bought household products wisely so that he had more money and time to spend buying and using expensive sports equipment.

In the larger product categories several respondents bought second hand or were reusing older items that they had been given. The interviews revealed three rationales underpinning the acquisition of older products, the first financial, that choices were dictated by available funds, the second aesthetic, that personal preferences were for worn items that displayed a sense of history, and finally, in the case of upholstered chairs, the belief that older products were inherently more comfortable.

Many interviewees mentioned their relationship with Cole's department store, referring to personal customer service, competitive cost and the provision of an additional one-year guarantee. The preference for this particular shop in many acquisition choices appeared to override preferences for any specific product. The role of the retailer needs to be given further consideration.

Three of the interviewees spoke of their patterns of consumption in the wider context of a general rejection of consumer culture. John discussed this from the perspective of a hatred of the social repercussions of the cycle of consumer expenditure and debt.

> *"I do despair a bit of people you know spending what little money that they've got to sort of keep up with the latest fashions and then getting stuff that lasts for you know a few months or a few years and then slinging it you know."* (John)

Anita took an environmental position, basing her actions on the impacts of waste. Barbara meanwhile, rejected materialism and contemporary society's obsession with possessions.

Non optimisation of life span

Perceived social norms were found to play a critical role in governing non-optimising patterns of acquisition. Sharon felt good because an improvement in her financial situation meant she was now able to buy each member of her family something new every Friday, which she perceived to be normal. Janet spoke of the need to follow fashion and buy new footwear for each season. Popular culture was also found to create the desire for acquisition; Andrew spoke of trips to London to search for shoes on the basis of which celebrities wear them.

> *"the kind of things that would influence me in sort of in a fashion sort of way in a look way, it would mainly be things like um pop singers, or um I don't know celebrities, that kind of thing really does influence me. So um I'd buy a pair of shoes similar to ones that, that a film star would have..."* (Andrew)

During the interview process it became clear that interaction with co-habitants in the home plays a crucial role in shaping patterns of consumption. Many decisions about product replacement and acquisition were influenced by others:

"...she's 90%, I'm 10%." (George)

Family conflict was evident in several cases of non-optimisation in acquisition. Peter who had only recently left home, spoke rebelliously against the cautionary ethics instilled by his family and of his desire for change and control over personal acquisition.

"Well actually I like a lot of change. I always like changing things... I want to try everything yeah!" (Peter)

In many cases buying cheap products was the result of pragmatic decisions based on available funds and spending priorities. This encompassed several types. Some weren't bothered because they could easily afford to replace items that broke or they no longer wanted, whilst others could not afford to spend more on better quality products.

"That's what it mainly boils down to it's what we can afford at the time, particularly when the washing machine broke down we more or less had to go out the same day or certainly the following day and get a new one, the same with cooker you see." (George)

In addition, some would rather spend their money on other things.

"I'm obsessed by old rock and roll music you know... Elvis Presley and all that type of thing, and that in my personal case may discourage me from actually going and buying certain essentials." (Dennis)

There was evidence amongst several interviews that product choice was deemed out of their control. John, Dennis, Peter and Grace had reacted to this by buying in bulk and/or buying when they saw a product they liked to avoid the disappointment of not being able find that particular product when they needed it.

"Fashion being what it is, things come and go and then things that you get quite attached to, particularly on the footwear side suddenly disappear from the catalogues and then you're stuck, so I m looking ahead." (John)

For Grace and Dennis, buying in bulk provided them with control by minimising the risks of them being caught out in someway.

"I like to see the new things that I've still got to wear. Because it tends to be, bit of delusory really I think. You've still got to wear them out eventually but you think you've got something in reserve in... It's a form of security I think" (Dennis)

6.2.3   *Product characteristics*

Many of those interviewed referred to the characteristics of the particular product categories as an important factor determining their patterns of acquisition.

Life span optimisation

During discussions of acquisition many interviewees drew distinctions between the characteristics of everyday footwear and the other two product categories. The main and obvious contrast was cost and subsequent risk, justifying the greater caution and consideration when acquiring the more substantial items.

"...with this end of the scale with kitchen appliances and chairs it's a big expenditure... you can't change it tomorrow if you make a mistake, it has to be right." (Tony)

It appeared that risks were perceived as greatest when acquiring upholstered chairs. Several interviewees regarded getting it 'right' so important, that cost was actually ignored.

"I must admit price doesn't necessarily dictate um, especially with something like settees, it would be getting what you wanted. So if you had to pay a little bit more that is more important and getting what you want than having to make do with a cheaper version and it's not the right colour, the right shape or whatever." (Susan)

People generally demonstrated higher involvement with their acquisition of upholstered chairs, referring in greater detail to the qualities they were attracted to and where they were acquired.

"the chair I still use in the kitchen which I use most days cost ten shillings from Oxfam in Egham in Surrey and it's still doing very well indeed" (John)

Product age appeared least important when acquiring upholstered chairs. They were the most likely of the products to be acquired pre-used. Andrew and Margaret spoke fondly about their second hand chairs, interpreting their historical legacy as an asset.

Several interviewees referred to specific product attributes that were prioritised in acquisition to ensure longevity. Examples include giving preference to dark colours for

footwear and selecting upholstered chairs that were leather or had machine washable covers.

Non optimisation of life span

The comparatively low cost of everyday footwear was cited by many as the principal reason for the less considered approach to this acquisition. Footwear was generally perceived to involve low risk.

> *"shoes you see because they're a certain price range, you can afford to take a gamble."*
> (Tony)

For many interviewees the relative cheapness of footwear seemed to create considerable apathy towards life span issues.

Several interviewees considered footwear to be far more vulnerable to the vicissitudes of fashion than the other two product categories. Fashion was used on several occasions as the main justification for frequent acquisition and disposal of footwear. Janet spoke about the need to change with the season and the common sense of buying cheap when you knew they would soon be out of date.

> *"...that's seasonal definitely seasonal because I wouldn't pay a lot for money for shoes if I can help it, I don't like to because I know next year I'm going to be throwing it away because it's not fashionable."* (Janet)

Unlike upholstered chairs, most of those interviewed were resolute in their rejection of pre-used shoes. Reactions to used big kitchen appliances were mixed. Some spurned them on the grounds of safety and reliability. However, in the majority of cases people simply didn't consider buying used or refurbished products.

6.3   Factors affecting patterns of life span optimisation in ownership

As the data analysis proceeded it became clear that the distinction between maintenance and rejuvenation (i.e. reuse and repair) was significant and that, despite some overlap, they were often shaped by different sets of factors. These are, therefore, discussed separately. During the interviews it was often difficult to disassociate maintenance of products with general maintenance of the home.

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Discussions on product maintenance did not intend, or indeed could categorise people distinctly. There was a spectrum of responses indicating various degrees of activity to retain product quality.

6.3.1 Personal characteristics

Life span optimisation

A few of the people who regularly cleaned their products did so because they believed it would help extend the life of their products.

> "...by cleaning them on a pretty regular basis, it preserves them shoes so it helps keep them longer." (George)

They accepted considerable individual responsibility for determining the life span of their products through careful use and maintenance.

> "I think it depends how you use it, if you don't use things properly they don't last." (Gloria)

> "If you look after something it will look after you won't it?" (Peter)

Some gained considerable personal satisfaction from prolonging product life through care during ownership, deriving pleasure from getting the most out of a product.

> "Now, we walk with quite a lot of people have done over the years, and you'll see them and they never clean their boots from one weeks end to the next but they don't last, because they all crack... Same with your kitchen appliances, I mean, if you don't clean them and look after them." (Gloria)

This was occasionally accompanied by an implied sense of supremacy over people who didn't care for their possessions. Most of the people undertaking regular maintenance of a product made references to the habitual nature of their actions.

> "My late mother in law approved of me when she first saw me because my shoes were clean (giggles). Having been a Boy Scout, you see, you get used to it..." (John)

In some cases the motives for regularly cleaning and maintaining products were less product focused. Several individuals mentioned their own impending mortality as a

factor encouraging careful maintenance. A general dislike of dirt and disorder, rather than the desire to prolong life, compelled others.

> *"The washing machine I wipe it round inside to make sure it's dry before we shut the door so it doesn't smell, the same with the dish washer and the fridge just keep that clean just wipe the outsides I like things to look clean. I don't like mess, I don't like messy splashes on things and things like that!"* (Janet)

This was accompanied by concerns about the perceptions of visitors to the home, of wanting to look good and give a particular impression to others.

There were considerable differences amongst interviewees in terms of their awareness of product maintenance requirements. Many of those who regularly cleaned their products appeared to have greater product knowledge.

Discussions of informal measures employed to retain product quality created more controversy than expected. Some measures to prolong product life, such as the use of throws on upholstered chairs, were considered appalling.

> *"...and drapes on your furniture you know it looks as though you're moving, are you not here to stay?"* (Janet)

> *"You don't buy a three-piece suite to cover it up! (looks concerned)."* (Sharon)

Both of these ladies took great care of their upholstered chairs. For others, measures that protect products were being used for reasons other than to extend product life. For example, Colin was keen to emphasise that he used throws on his sofa only because he liked the look and not because he had any desire to prolong its life. Similarly Grace kept all her shoes stored neatly in boxes, but explained that this was so she could find them using the pictures on the box, rather than to protect them.

On other occasions rules of use had multiple purpose. For example, Sharon enforced rules in the home for educational value as well as to protect products from damage.

> *"They're not allowed to eat on the settee, not allowed to drink on the settee, not allowed to write with anything at all (said adamantly with humour)."* (Sharon)

She explained that this was also teaching her children to look after and respect products.

"When they get older they'll do the same thing. And they will learn to look after their stuff when they get it." (Sharon)

There were some similarities and some distinctions between the personal characteristics that appear to influence whether people care and maintain their products during use and those that affect whether people reuse and repair. Those who accepted a degree of individual responsibility for the life span of their products were more likely to participate in such rejuvenation activities. Many of those who had products repaired shared a sense of pleasure that they, or a professional, had managed to keep a product going.

> *"If the washer went wrong, no I wouldn't sort of scrap it and get new, and I mean we kept the old one going, this bloke and I between us, we sort of kept it going for about nine years beyond its allotted span, you know. That's how I got to know him so well (laughs)."* (Margaret)

Gloria spoke about how her husband gleaned personal satisfaction from retaining things to the end of their service life and beyond through strategies of component re-use, both proud and frustrated by his resourcefulness and ingenuity.

> *"He's still got the shelves out of the freezer I had when we were at the other house which was a high one, he's still got some shelves that he uses in his shed (laughs)."* (Gloria)

Pragmatism also had a role. Some repaired simply because they wanted to make their things last longer.

> *"I suppose there are times when I might have done something and thought well, you haven't done a bad job there, you know, a bit of repair work, I suppose so, but, I don't really look for that, just as long as its served its purpose. Some times I'll have to use a non-standard method of making a repair, you know make do and try to adapt to whatever, you know, you need to do. Compromise that's it."* (Dennis)

Many of those who had repaired and reused products did so wherever possible regardless of product category. This suggests the possibility that life span optimising activities in ownership are to some extent evolutionary, supporting the idea that perceived successes in previous undertakings are powerful in inspiring further action. It also suggests the idea that this is linked to habit. This was reinforced by comments

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concerning repair as being simply something that was done. For some it was an unquestioned act.

> *"Well I think you tend to try having it repaired first with anything you know to try because you want to make it last a bit longer... I think it's only when it's on its last legs that they get replaced..."* (Eileen)

Individual creativity contributed to awareness of opportunities for reuse and their application. Andrew balanced his need for change with his desire to prolong product life by employing a range of creative strategies from gluing motifs to his shoes to changing cushions and throws.

> *"I'm really good at making use of stuff or adapting things to make them to make them look alright. I can make it look like it was a lot more expensive or a lot fancier or, or something like that. I have that kind of knack... all the stuff is quite standard but I jazz it up with these little things, so I sort of change of them but don't so much change."*
> (Andrew)

People who had an understanding or interest in how their products functioned were more likely to repair them either personally or through employing a professional.

> *"I like gadgets and things, if you have an interest you tend to learn a lot about them."*
> (Tony)

Both Tony and Richard used their skills as electricians in making repairs and informed decisions about when to replace. Individual knowledge and skills therefore evidently to contribute to rejuvenation decisions.

As with acquisition, earlier life conditions were found to influence consumption patterns during ownership, particularly decision making regarding repair and reuse. Many of those who had undergone resource deprivation in former times spoke of their innate frugality and despair of waste leading to rejuvenation wherever feasible.

> *"My dad died when I was five, so we just really didn't have anything. My mum wasn't working and there were five of us in the family and I was the youngest and so quite often it was a thing where you'd have to, I don't know, reuse things or things would get passed down to you. You wouldn't just throw things away and I've still really got that quite strong. And now I'm in the position to be able to afford things, even now I'm still a bit funny about things you know, I don't like to waste things."* (Andrew)

The influence of intergenerational transfer of skills and values was also referred to. Gloria spoke about how she and her husband's mother had things for 'donkeys years' and how her own children had continued the trend, retaining their products for a long time.

The anticipated connection between product attachment and life span optimisation was more complex than expected. A strong association was considered likely on the basis that people would be more likely to retain and rejuvenate products to which they had built strong attachments. Although, in some cases this was true, individuals who had no particular sense of attachment to their products often seemed less aware of processes of deterioration and the products' reduced ability to function effectively and were less likely to replace them prematurely. Hence its antithesis, product detachment, did not necessarily lead to a high turnover of products.

Non optimisation of life span

A number of interviewees demonstrated a disinterest in maintaining their products. The personal characteristics affecting those who were less active in retaining product quality were perplexing. It was sometimes linked to a dislike of household cleaning in which product maintenance was seen as a chore. After a lifetime of cleaning Eileen had become more lax in her approach.

> "As you get older I think you just get a bit fed up with it anyway. I'm no where near as meticulous as when I was younger, why it is I don't know, I just don't do it as much. "
> (Eileen)

A sense of time scarcity was implied as a factor impeding maintenance on several occasions. In Eric's case every spare minute appeared to be filled with external pursuits, such as mountain biking and paragliding. He showed no attachment to any of the products discussed, viewing them primarily on the basis of the functions they served.

For others the decision to be less active in maintenance was more deliberate. They were critical of other people who they considered too absorbed with possessions. Barbara spoke about her desire for 'life balance' and the need to not let her products own her. Several interviewees accused those who were strict about maintenance of being obsessive.

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"...a house is for living in and I, well I, I think people are to, far too obsessed with hygiene, I think it leads to health problems." (Margaret)

The choice to refrain from maintenance did not, however, extend to repair and several of those who were more lax about the day to day maintenance of their products frequently got items repaired.

For some interviewees the issue of retention of product quality caused tension. They were caught between the desire to keep something looking new and the knowledge that realistically their products would wear.

"I hate stuff when it's brand new. Well it just puts you on edge doesn't it? It's like, don't touch that, don't do that, don't spill that, keep it clean, keep it clean and keep it looking nice you want it to look nice for a little while. It's like with new shoes...once they're scuffed then you relax and it's like oh well, they look old now anyway so what's the point?" (Anita)

Others were more accepting of the processes of ageing and an inevitable loss of quality.

"Um you tend to be careful with anything new you don't want to scratch it or mark it, then you become relaxed to it... I suppose you devalue them a little, um and it's not as important to not have a mark on it or something it becomes part of the family really doesn't it" (Richard)

For some the process of wearing was seen as something favourable. Margaret, for example, used positive language about changes in her products over time. She spoke of products evolving and developing, relating age to growth. Others viewed time more negatively, however, associating it with steady deterioration.

"... the shoes and the clothes and things, they wash and wear you see, so I think they do depreciate don't they and they don't after six months they don't look sort of pristine do they the colours fade and things like that." (Janet)

Building on the argument raised earlier concerning the complexity of attachment, it was clear that attachment did not necessarily mean that products were not replaced. This led to the accumulation of resources. For example, Grace revealed that she had eighty pairs of shoes, each treated very carefully in use, hence illustrating how individually products were optimised whilst collectively resources were not. The concept of attachment to products is intrinsically linked to involvement (i.e. a high level of knowledge or interest in the product category). It was originally assumed that higher involvement would

increase the likelihood of product life optimisation due to enhanced product awareness. However, people who lacked involvement with a product category tended to be less aware of new products on the market, less liable to replace items that still functioned, and more likely to get products repaired.

Overall many of the interviewees did not repair at home or employ professionals to repair products. They felt no individual responsibility to get products repaired. Some appeared not to consider this as an option available to them. Others distrusted the repair profession on the basis of a previous personal experience or hearsay.

> *"It's not so much getting someone, it's finding someone who can do it reasonably without getting what's the word (laughs) ripped off "* (Janet)

6.3.2   Social / situational characteristics

Life span optimisation

Some interviewees made focused and deliberate attempts to keep certain products in their original condition to prolong their life and thereby avoid the inconvenience, time demands and financial outlay of unnecessary product replacement. This was often associated with the desire to manage risk. It was considered pertinent to take good care of products to avoid being let down. Others adopted this approach less consciously. Susan, for example, undertook regular home and product maintenance and her previous kitchen appliances had lasted a considerable length of time. She reasoned her position in terms of priorities rather than any ambition to prolong product life. She argued she would have changed them and could have afforded to at any time but that simply was not a priority, and that she would far rather spend money on things such as family holidays than household products.

In households with more than one member, family dynamics were clearly important to decision making with regard to maintenance and rejuvenation for the larger more expensive products. Interviewees frequently referred to their distinct personal maintenance responsibilities, such as defrosting the freezer. Discussions regarding repairs and re-upholstering were, however, scattered with references to the opinions and actions of other household members.

Financial circumstances were found to influence decision-making with regard to undertaking repairs. There appeared, to some extent, to be a linear relationship between wealth and repair, with increasing wealth leading to progressively less repairs. There were, however, exceptions in both cases. (This statement is made cautiously as the assessment of wealth may be flawed).

Some, were prompted to undertake rejuvenation strategies out of the desire for independence from external social structures and consumer culture. Anita spoke at length about her informal networks of reuse for children's toys and clothes as a means of prolonging product life and avoiding the high street.

Non optimisation of life span

Repair was frequently discounted following an assessment of cost of repair against the cost of a new product, taking into account potential residual life. The accuracy of personal assessments is sometimes questionable. In several cases it appears that such assessments were likely to be balanced.

> *"I can tell you how long we had the washer, 16 years, a Hoover automatic, and it just didn't work. It just stopped and my husband just said well we'll not bother fetching anyone out at fifty pounds a time, so we just went and a bought one from Co-op"*
> (Gloria)

However, in other cases it could have been a very simple problem

> *" I wouldn't upgrade my washing machine for a fancier one but if it broke down I'd just replace it, do you know what I mean, straight away... If it was still under warranty ...I'd get it repaired but if not I wouldn't go through the yellow pages and try and get a repair person to come out, and all that."* (Andrew)

Several interviewees were dictated to by their belief that we live in a throwaway society and, therefore, they did not now consider repairs.

> *"Well quite honestly um I think we tend to be more of a throwaway world now... my policy is now buy one reasonably cheap couple of years if it wears out throw it away and get another new one. ...I just think you can buy a new for the price you pay for repairs, so I've just sort of changed tack on that, and that's washing machines definitely."* (Janet)

> *"At one time I used to have things repaired and now I think a product has a life and now like with shoes I think what they charge for having shoes repaired and they are never*

ever the same afterwards. For heeling you would but I think everything else I enjoyed those. " (and implies and that's it) (Grace)

This was accompanied by placing the majority of responsibility for product life on manufacturers.

"It's the way shoes these days there are many styles that don't lend themselves to being repaired aren't there?... I cannot think Sian when I last went and had a pair of shoes repaired because I guess I don't buy the sort of shoes that are repairable." (Colin)

"I think things the likes of the washing machines in the old day it was probably just be a, the belt that went, now it's the whole programme chip isn't it so, you can't replace little bits ...I don't think things are meant to sort of mend anymore." (Janet)

"And this is what I can't understand because we're so much cleverer now, but it's because people, but then again. The manufacturers want us to keep on replacing (laughs) that's it I think so! Because you see we used to make things far better than we do now..." (Grace)

In general, interviewees who were motivated to maintain their products by the desire to impress others were more aware of a product's deterioration. They were also more prone to dispose of a broken or functioning but worn product than to employ strategies of reuse or repair.

6.3.3   *Product characteristics*

Life span optimisation

Greater detail was provided for patterns of maintenance for big kitchen appliances than the other two product groups. The attitude of interviewees to these products appeared more dispassionate, focusing on practical aspects of hygiene and cleaning. They were not considered susceptible to attachment.

"they're just an inanimate object aren't they?" (Gloria)

"Yes, new things just seem to be without any connections or background or anything I like them to have this kind of. It can't apply to a washer though, I don't have any particular attachment to my mother's washer at all you know (laughs)." (Margaret)

Despite appliances being least liable to attachment, they frequently appeared to be the most regularly maintained.

The products most cared for out of sentimental attachment were upholstered chairs, particularly ones that had been received as heirlooms. Several people perceived products within this category to mature with age rather than to deteriorate with it.

The original cost of a product and its perceived kudos was also implicated as an indicator of consequent care.

> *"I had the chairs and the settee recovered I didn't dream because it's a Duresta and again you can't rid of the things that you buy, no. It's good and it will hold and it will last me my time." (Grace)*

A product's age was often used as a gauge to determine whether the cost of repair was worth investigating, for all product categories.

The materials from which products were made were discussed as factors affecting maintenance and rejuvenation decisions. Some materials such as leather were thought to be more easily maintained, wear better, or last longer as they aged more gracefully.

> *"I think leather and wood um seem to get that sort of sort of patina that looks good."* (Margaret)

Non optimisation of life span

Everyday footwear was the least likely of the categories to be cared for. Several interviewees stated that they liked their footwear more after it had become worn. Andrew admitted adopting a process of deliberate neglect at the beginning of the life span of his shoes.

> *"You know if you buy a new pair of trainers and they're brilliant white, and they're just dazzling and I hate that, they're too white, they need to be a little bit scuffed and a little bit worn but I don't like them when they've gone past a certain point". (Andrew)*

For some the nature everyday footwear didn't lend itself to care. Trainers, for example, were perceived as something that you simply couldn't maintain or rejuvenate. On occasions this opinion also applied to upholstered chairs.

Some argued that products were never the same after a repair. References to a decline in quality following repair were made in relation to everyday footwear and re-upholstered chairs. Continued reliability following an initial repair was raised in relation to big kitchen appliances.

6.4 Factors affecting patterns of life span optimisation in disposal

The analysis of patterns of optimisation in disposal revealed some similarities with those characteristics influencing acquisition and ownership and some unique to this stage.

6.4.1 Personal characteristics

Life span optimisation

Many of the interviewees who were optimising in their patterns of disposal shared the attitude that waste was inherently wrong. The meaning underpinning this belief varied amongst people and was often multifaceted. Several people were able to provide a rational for their beliefs, inferring a sense of personal responsibility for looking after the world and reducing waste. They were critical of the culture of rapid consumption and disposal of durable goods on environmental and social grounds.

> *"I do think that using things to their conclusion as it were is a more sensible way of going about things than just chucking them out. I mean if you pass them on to somebody else then fair enough but just to throw things out, that really hurts, I don't like things just being thrown out."* (Margaret)

> *"I've always been very interested in consumer type issues and I've always fought my corner, and you know, tried to help other people fight their corner as well in consumer related matters. Plus with my wife working at the CAB so I think there's a sort of culture in our house of not really liking the consumer society very much."* (John)

For others, the basis was less overtly reasoned and more intuitive, seemingly catalysed by factors such as a dislike of change, resource scarcity in youth, and a rejection of social norms or expectations.

> *"... people just don't want change they certainly don't when, it becomes a hassle when you get old. It becomes a problem."* (Grace)

"Well I was bought up in the years waste not want not, the war years (laughs) and we were on rations and stuff like that so you did tend to not waste. " (Eileen)

This disapproval of waste was often integrated into attitudes towards replacement.

"we only go looking for the items when we absolutely need them. Yeah. We might go when we're out and about particularly on holiday look and say oh that's nice and that's nice but unless we need it we wouldn't dream of buying it." (George)

Non optimisation of life span

The role of personal characteristics contributing to decisions to dispose of functioning products was varied. Some of those who disposed of functioning items appeared oblivious to the continued existence of their products once expelled from the home, demonstrating an ignorance or lack of concern about waste. Where interviewees were conscious of waste generation, the lack of perceived personal effectiveness seems critical to premature disposal alongside the failure to recognise any individual personal responsibility to alleviate waste.

"I mean there is a big problem at the moment with fridges, but I don't think it would affect my decision to change it if I had to. Because I think oh one little fridge isn't going to make that much difference, but it does I suppose." (Richard)

Interviewees' attitude to change seems to play a critical role in disposal decisions. Those who liked change expressed a desire for new products and were more likely to dispose of functioning products. This often applied to those who disliked waste, where it created considerable internal conflict. On some occasions the desire for change was rationalised as a need rather than a want, lowering the intrinsic discord. For example, Andrew and Janet both used the relative size of their refrigerators as a reason for change. Andrew stated

"Well the last time that I bought a fridge freezer it was just to replace it, and there was nothing wrong with the other one, and I felt a bit kind of guilty really... we didn't even have a fridge when we were kids and I'm now thinking 'oh there's nothing wrong with this one' and now I'm going to get another one, and there was a little bit of guilt there. And the one that I got wasn't much different to the one I had really. It was a little bit smaller and that was the only kind of thing that swayed it." (Andrew)

An awareness and knowledge of new products becoming available is evidently a key factor inciting early replacement and consequent premature disposal. Several interviewees quoted technical and fashion changes in big kitchen appliances which, they judged, would lead them to replace their current products early.

> "... I think possibly the thing with kitchen appliances now they are making them in the silvers aren't they and the bronzes and the colours and I would possibly think oh that's nice ...they would sort of fit in with your colour scheme better, so that possibly may sway me to change things." (Janet)

> "I just think electrical goods especially, they soon go out of date, they're always updating things... Someone I know has one that defrosts itself and I thought god that's wonderful. ...next time I shall have one of those and that's sort of another step that would make me want to buy another freezer when I have to get down on my hands and knees and think I must defrost this." (Janet)

A personal dislike of clutter, or that of a partner, was mentioned as another trigger leading to the disposal of functioning items.

> "Because my mum and dad don't throw anything away um whereas I suppose I am a bit like that. I tend to keep things until I haven't used them for a few years and get rid then but my wife is different, she likes to have a clean sweep (laughs) if you haven't used it in six months it's got to go you know! (laughs)." (Richard)

This confirms the important role of premature product replacement (i.e. relative obsolescence) in catalysing the disposal of functioning products.

The choice of disposal route for functioning products was influenced by a number of personal characteristics. Sharon cited her dislike of charity as the reason for not passing on functioning products for reuse. Peter justified discarding good quality footwear in the bin on the basis of an internal prejudice towards second hand shoes.

On many occasions, especially amongst those who shared the general attitude that waste was inherently wrong, functioning products had been passed on to family or friends. The transfer of goods to others was a commonly used strategy for alleviating personal dissonance.

Many people who passed things on to others indicated that they were pleased knowing that the product was going to a 'good home'. Margaret referred to liking the sense of continuity arising from passing things on, and the satisfaction from seeing products being reused.

"It's funny people always say it's being brought up in the war, but it's - I'm sure that it's more than that ... I got a lot of satisfaction out of working in the Oxfam shop, simply recycling and giving things another round." (Margaret)

6.4.2 Social / situational characteristics

Life span optimisation

An exploration of social/situational characteristics revealed that optimisation in disposal was sometimes unintentional. Several of those who retained products until failure did so because they were not in the financial position to replace products prematurely, as opposed to a desire to prolong product life. In other cases, the motive behind retaining products until failure was not product centred but based on the assessment of opportunity costs, i.e. an interviewee's preference to spend money on other products or services.

"... we've been lucky that what we've had has lasted but also I wouldn't have kept it, if I didn't, do you know what I mean? If something was nicer or ... if I wanted a new- we would probably would but that isn't a priority I mean" (Susan)

The ease of disposing of functioning products so that they could be re-used influenced whether people did so. For example, Andrew stated that the ease of doorstep charity collections as an important factor influencing his decision to pass items on that would otherwise have been discarded as household waste.

Non optimisation of life span

The disposal of functioning items was linked to a number of social and situational characteristics. Several interviewees used economic rationalisation for explaining the replacement of their functioning products. They could simply afford to buy a new model, the condition and residual life of the replaced item was irrelevant.

"Whereas at one time because we hadn't got any money we would have bought this kind of thing probably with a bank loan or using the stores credit facilities, now we

wouldn't do that I can buy it. It changes your attitude towards how, how you can go about, the fact that it may be worn out is not quite such an important factor as it would have been when we hadn't got any money because then we'd keep it till desperate straits really". (Colin)

Risk minimisation was used frequently when rationalising the disposal of functioning products, particularly that of large kitchen appliances. John replaced several items prematurely to minimise 'hassle' and avoid being left unprepared when products which had been in use for a long time, failed.

"On kitchen stuff both the cooker and the fridge that I replaced just recently I was amazed when I looked at the original receipt for them because both of them were almost twenty years old. I thought crikey you know I mean they were still working all right but I thought no, they're probably not going to last very much longer. So I thought rather than have a lot of hassle, sort of act now and get replaced at once so the fridge and cooker came on the same delivery so I just sort of bought the job lot (laughs)." (John)

Eric justified the replacement of his kitchen and the re-decoration of his entire home on the basis of preparation for a hassle-free retirement. The installation of a new kitchen had prompted many interviewees to replace appliances. On such occasions the risk of incorporating existing older products was considered unacceptable. Their potential failure could lead to problems getting another to fit either physically or aesthetically. Barbara spoke about the potential problems of finding spares for her products, which were over ten years old. In many cases people changing their kitchens replaced stand-alone appliances with integrated ones.

"... they were all of an age, and because we were having the whole of the kitchen done we went for more the fitted stuff." (Colin).

New integrated appliances were often installed with a new kitchen on the basis of a broader strategy regarding property value, investment and improved saleability.

Transitions in fashion, technology and popular culture that made products obsolete were present in many of the disposal decisions regarding functioning products. Peter and Janet reflected on the dilemma of having looked after most products extremely well, and finding that although still adequate and functional, they felt they were no longer 'right', which frequently prompted replacement.

Richard, Peter and Dennis referred to how the influence of dynamics between family members often influenced disposal decisions. On the whole it appeared that conflicts regarding whether to replace a functioning product were more frequently won by the advocate than the defendant. It seems that many of those who were content with the status quo were more passive.

The route of disposal was frequently affected by situation. Many felt that for bulky items it was more convenient to have the old item removed by retailer whether functioning or not, than trying to sell it on.

> "I mean they probably repaired it and resold it, I'm not bothered it's out of my house."
> (Sharon)

The passage of the larger products between family members was a common route of disposal, especially amongst those whose children had left home.

> "...we gave the three piece suite to our daughter because they'd just more or less got married and got this house and they had it cleaned and they had it. We'd had it 7 or 8 year and they had it a couple of years after that so, so that's how we disposed of it. She was quite happy with it." (George)

This was mainly rationalised on the basis of care and economics; they were helping their children who could not afford to buy the products new. Some happily admitted that this also offered them an excuse to get new products.

6.4.3 Product characteristics

Life span optimisation

The type of product and its condition often dictated the route of disposal. Generally upholstered chairs that were still in reasonable condition were passed on to other family members or friends or sold. A large number were disposed of this way. Despite this being preferable to disposal as waste, it does indicate the willingness of interviewees to forgo any potential residual life.

Big kitchen appliances were more frequently kept until they were broken. Their disposal was treated in a pragmatic way by most interviewees. Although this was often rationalised on the basis of their purely functional role in the home, other factors were

discovered. For example, Susan's wariness of new technology and the perceived complexity of new products probably contributed to her decisions to delay replacement.

Non optimisation of life span

Product size was important in waste disposal decisions. The small size of footwear meant the most popular route of disposal was the household bin, even for products that were in reasonable condition. The size of kitchen appliances prevented this and many were disposed of at civic amenity sites or by retailers or new products.

The deterioration in appearance of the product leads to waste. Many spoke about the visual condition of their products when discussing why they were disposed of.

Early replacement may be prompted by step changes in product technology. George and Janet both cited the example of frost-free freezers.

6.5   Consistency across consumption profiles

Chapter five revealed large variations in individual consumption profiles. It found individual patterns of consumption that influence product life differ across acquisition, ownership and disposal and between the three different product categories. Attempts to explain these variations at this early stage were limited. The interviews were used to examine the issue of consistency in greater depth. This section of analysis explores the profiles of selected individual interviewees, seeking explanation for inconsistencies and identifying any recurring trends. The analysis identifies and discusses inherent contradictions and exposes sources of contention.

Within the time provided it was difficult to build enough of a rapport with the respondent in order to challenge them unobtrusively about any inconsistency. On occasions where the suggestion of inconsistency was carefully raised or recognised by the respondent they would declare themselves 'mad' or 'silly' and were generally happy to give it more thought. Others were less aware or more sensitive, not recognising or skipping over contradictions, ignoring them and changing topic.

6.5.1 Consistency across acquisition, ownership and disposal

The interviews confirmed the complexity inherent in individual profiles that was suggested by the survey analysis. In particular, they illustrate how extreme variations can exist within an individual's patterns of consumption that influence product life so that product life is optimised at one stage and not another. The interviews identified numerous inconsistencies in behaviour across the acquisition, ownership and disposal phases. The reasons for such inconsistency varied by individual and often differed according to product category. Exploring the nature of factors affecting consumers' influence on product life facilitated explanation of some of the variation in individual profiles.

The earlier sections of this chapter have demonstrated that actions that optimise product life at different points of the consumption process are not necessarily employed with the deliberate intention of prolonging product life per se. Closer analysis indicates that many apparent discrepancies across interviewees' consumption profiles can be explained by a closer examination of peoples' underlying motives. A series of examples illustrating how variation in motives creates profile contrariety is provided below.

Colin and Grace both made a point of buying the 'best'; they implied use of comprehensive search techniques, demonstrating extensive knowledge of product range for more than one product type. Andrew and Peter spent a lot of time searching for products that were exclusive, and often expensive. In all cases a large part of their motivation in buying quality products appeared to be to impress others with their wealth, good taste or exclusivity. The desire to create the right image extended to ownership, so most products were regularly cleaned and cared for. However, in all cases an interest in product aesthetics made these interviewees more conscious of the processes of deterioration and, in the case of Andrew and Peter, more aware of new competitor products available. This frequently resulted in product disposal on the grounds of superficial wear and tear, hygiene and boredom rather than product failure. When products broke, none of the four made committed attempts to get them repaired.

For Susan and Eric acquiring good quality larger products was motivated by a desire for long term reliability. In both cases this was not driven by any desire to prolong product life for the product or environment's sake. Instead this strategy was adopted to ensure that such things took up as little time, effort and money as possible over the long term,

so that energies and finances could be directed on 'more important' matters (my emphasis). Neither interviewee was particularly attached to the products discussed or committed to extending their life when products failed.

In cases where people were aware of a sense of inconsistency when having bought quality and looked after products they replaced due to relative obsolescence, such products were frequently passed to charities, other family members or friends to alleviate the unease caused. John and Gloria acquired products wisely and carried out regular maintenance. They often repaired products and remarked that they had retained products for considerable lengths of time. Both, however, had replaced products before they had completely failed. These products had been retained for such a length of time that despite functioning in a practical sense, they had become entirely obsolete in terms of fashion and technology. Although their profile may appear to indicate inconsistency in disposal, on closer inspection this is possibly quite a harsh judgement.

In addition, the analysis provides evidence that some apparent inconsistencies are the result of ignorance or a lack of connection between actions and outcome. For example, people who acted to prolong the life span of their products through rejuvenation, because of a dislike of waste, such as Barbara, Margaret and Anita, did not necessarily actively maintain their products during use. In addition, some who disliked waste, such as Dennis, did not necessarily actively prioritise longevity in acquisition. The concerted attempts by all four to keep products going by repairing and re-using suggests that these interviewees simply did not perceive any connection between their failure to maintain and hastening waste generation. Margaret, Barbara and (to a lesser extent), Anita, were simply not interested in the appearances of products; how things look was not a priority and hence this was not regarded as something that may reduce life span.

Inconsistencies across profiles were also found to occur because of external constraints. Sharon and George have profiles that appear to be inconsistent; they buy the cheapest products and yet undertake careful maintenance and often retain items until complete failure, sometimes after several repairs. The most potent factor influencing both of these interviewees was their financial situation, which did not allow them the luxury of premature replacement and directed them towards cheaper goods.

"The cheapest with anything with everything I need on it." (Sharon)

This accounts for the apparent inconsistency between acquisition and the other phases of consumption. Closer inspection revealed that because of the poor quality of the products being acquired, in both cases, they generally deteriorated and broke down more rapidly.

On some occasions interviewees did not act in ways that were consistent with their expressed intentions, discussed in section 6.7. Inconsistencies were also found to occur because of relative priorities. In Eric's home, pets had priority over furnishings, therefore hindering the extension of optimisation in acquisition to ownership.

> *"I live in a house because my cats allow me to live there."* (Eric)

6.5.2 *Consistency across product type*

Most people were conscious of inconsistencies in their choices across product type and justified these differences with little prompting.

Differences between everyday footwear and upholstered chairs or large kitchen appliances were most frequently cited, echoing the findings of the questionnaire. In the majority of cases, interviewees optimised the larger, expensive products more frequently throughout the consumption process.

Explanations for incongruity in patterns of acquisition between the three product categories were often based on risks. Tony, Anita and Susan implied that the relative expense of the larger products magnified the financial repercussions of errors. Their care in acquisition was, therefore, motivated by the need to avoid expensive mistakes whereas shoes, as lower cost item, did not present such a risk. Interestingly, George, who was unable to buy large premium products because of financial constraints, used what resources he had to buy good quality everyday footwear. He did not want to risk damaging his sensitive feet.

Janet discriminated between all three products in acquisition on the basis of risks. She bought cheap footwear because of her allegiance to changes in fashion and did not want to risk wasting money on something she may not be able to wear the following year. She bought cheap appliances because of the perceived increased risk of failure and

expense of repair. In contrast, she bought expensive, handmade upholstered chairs, prioritising longevity to avoid the hassle of repeat purchases.

> *"I took time to pick that, and like it, and that takes quite a lot of doing so I wouldn't like*
> *to think 'oh, I've got to do all that again' (laughs), I find that a little bit of a hassle..."*
> (Janet)

Even within one product category differences between individual products were sometimes highlighted. Tony appeared to be quite impulsive when buying some casual footwear, but when it came to his work shoes he reflected,

> *"I must be the same as most people I have one pair of shoes that I absolutely love, go*
> *backwards and forwards to work in, and they'll have to really fall to pieces before I'm*
> *through."* (Tony)

Overall, interviewees were less clear in their justifications for differences in patterns of ownership between products. Many of those who maintained that they acted in ways to protect the life span of chairs and appliances in use freely admitted that their everyday footwear was not given the same attention. Most rationalised this on the basis of proportional original cost. When discussing his upholstered chairs, for example, Richard argued that,

> *"It was expensive when we bought it so you tend to think it's got to last a lifetime."*
> (Richard)

In contrast shoes were cheap and, therefore, not perceived to be worth much consideration. Further reasons for differentiation in actions between everyday footwear and other products was the cost of repairs relative to the cost of purchasing a new product and the issue of their comparative reparability. For example, trainers were frequently cited as being irreparable and difficult to maintain.

Andrew demonstrated the greatest variation during ownership. His approach to maintenance and rejuvenation was distinctly different for each of the three product categories. His kitchen appliances were kept immaculately clean and 'spotless'. They were not repaired unless they were still under guarantee. In contrast, his sofa was well worn and throws had been used to cover up areas where the material was ripped. Shoes fell somewhere in the middle, with some maintenance and a little rejuvenation. The

underlying reason for these differences appears to be linked to the range of impressions that he was trying to project to others about his identity.

"I like things to have a bit of character to say something about what they are, how they're used. I like furniture to be comfy and lived in and you feel comfortable using it. You know, I don't like it sometimes when you go to somebody's house and you feel like you can't move and you're kind of sitting like that (sits up stiff and pulls self in tight)". (Andrew)

With respect to appliances,

"I wouldn't want them to look used, or abused or whatever." (Andrew)

For footwear it was important that they didn't look too new or too worn. Creative measures such as the use of glitter for nights out was used to impress others. Despite prolonging their usefulness, this was not a concerted attempt to extend their life and he rarely got footwear repaired.

Self-image was also shown to influence differences in Grace's patterns of ownership for different products. She was horrified at the thought that any one should see her in a pair of shoes that were well worn, in sharp contrast she commented that she was quite content to have 'shabby' upholstered chairs. Her own use of shoes to judge character was reflected in her concern about others judging her.

Tony had repaired big kitchen appliances but had not employed any rejuvenation strategies for any other products. His skills as an electrician clearly motivated him to repair electrical goods, but he was apathetic towards shoe and chair repairs. In contrast, whilst repeatedly repairing shoes and reupholstered furnishings, Gloria stated that she did not repair kitchen appliances. This was justified on the basis of perceived expense, but fear and lack of knowledge clearly contributed to this decision too.

Again, differences between individual products of the same category were sometimes highlighted. Peter, for example, stated that he often treated his footwear in proportion to their original cost.

"That last pair of trainers that I have bought I wore them yesterday and somebody says to me 'oh you've got a new pair of trainers' and I've had them six month because I daren't wear them, because I don't want to scuff them. But some trainers, if I get them in

sale, if I get them like half price or less than half price, I'll just put them straight on and go out and not worry about them at all." (Peter)

The rationalisation for different patterns of disposal used for different products was frequently linked to the products' varied characteristics. Some interviewees, such as Eileen and Tony, retained big kitchen appliances until failure but replaced the other product categories whilst they were still functioning. They did not consider appliances quite as susceptible to changes in fashion and style, and felt less able to justify their replacement on the basis of the desire for change.

For others, such as Grace and Richard everyday footwear were commonly disposed of whilst functioning, but other products would be maintained and rejuvenated until they failed completely.

> *"No, NO, NO. I don't throw out. If it goes it dies."* (Grace)

In Grace's case well-worn footwear was a social monstrosity indicating a lack of self-respect, whilst it was considered wasteful to dispose of other products prematurely. Richard's reasoning was based on relative costs and fashion.

In contrast, Dennis retained his footwear until absolute failure but the other products were replaced prior to this point. This discrepancy was explained by two factors. The first and possibly more potent was that whilst Dennis consumed his own footwear, he appeared to have very little control over most household decision making. The second was that he commented that he liked 'to maintain a standard' and keep things looking their best. Shoes could be downgraded to other uses such as gardening when they passed this point, larger products could not. The capacity of footwear for personal reuse, therefore, had a vital role.

6.6 Consistency between intentions and patterns of consumption

The survey analysis revealed numerous differences between individuals' intentions regarding product life and actual patterns of consumption, particularly in the ownership phase. The interviews offered a useful tool for exploring further those factors influencing the translation of intent to action. The degree of consistency between how

interviewees intended to consume products and their actual patterns of consumption was sometimes difficult to discuss and judge. Some people simply did not recognise their inconsistencies whilst others chose to ignore or gloss over them. In a few sensitive cases, apparent contradictions caused confusion and anxiety.

The analysis identified four potential relationships between intent and action for each stage of consumption and each product (see figure 6.2). The first of these and the least identified was 'active optimisation', where intent and actual patterns of consumption were both optimising. The second was 'impeded optimisation', where intentions were optimising, but this was not being actualised. The third (and surprisingly common) scenario was where intentions were not necessarily optimising, but actions were, termed 'passive optimisation'. The final possible relationship is where neither intent nor action is optimising 'rejected optimisation'. This section illuminates the implications of each option for product life.

Figure 6.2 Types of consumer optimisation of product life spans on the basis of the relationship between consumer intent and action

Optimising intentions

	Active optimisation	Impeded optimisation	
Optimising in consumption	Passive optimisation	Rejected optimisation	Non optimising in consumption

Non optimising intentions
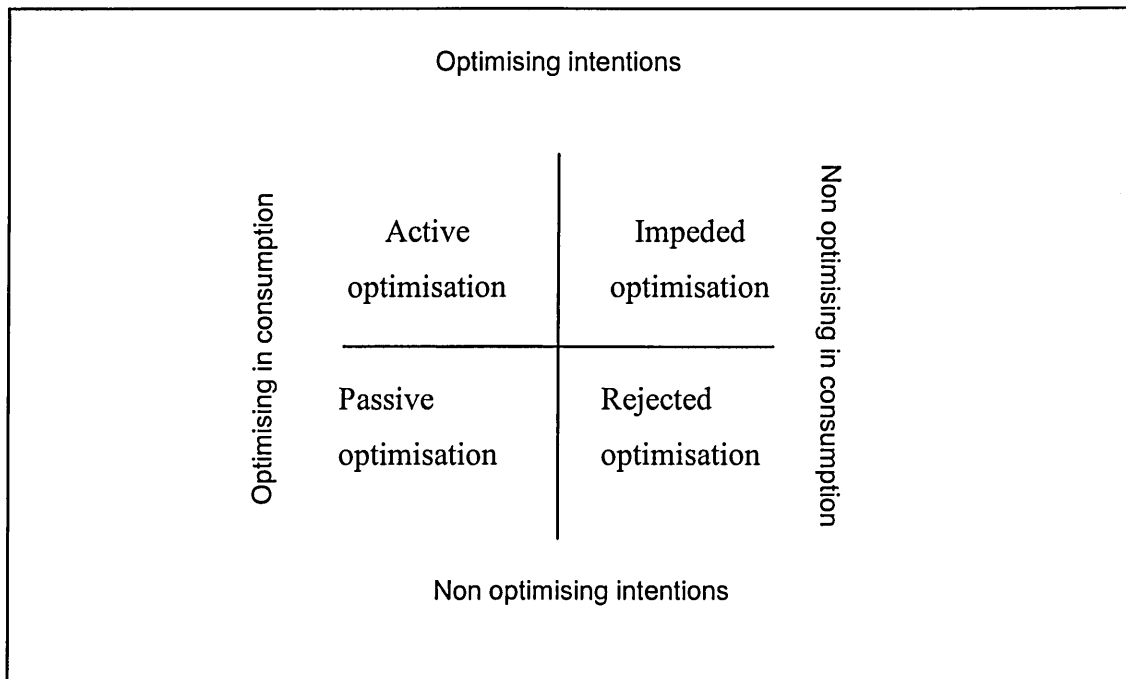
Active optimisation

There were a number of occasions where optimising intentions and actions were acting in harmony. Most of the interviewees who were found to have some incidences of active optimisation considered their attitudes and intentions with regards to product life as set and enduring

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"I'm not a faddish person, it's not one day 'oh yes I love this' and the next day 'oh I hate that.'" (Anita)

This sense of permanence was often demonstrated by frequent references to genes and inheritance and a predisposition to behave in a particular way. This was reinforced by the conviction, without prompting, that they would act the same even if their fortunes changed.

"I sometimes think if I did get a lot of money I think I'd still I'd still have the same attitude you know I just, because I've got so used to it." (Dennis)

"If win a million pounds tomorrow I don't think I'd be going out and buying you know labelled clothes and things like that because I'm not like that. Just because I'd got the money to go and waste it like that it would still be wasteful." (Eileen)

Despite this, the number of occasions when optimising intentions and actions were compatible across the whole consumption profile for any product category was very limited.

A number of complications were discovered underlying this apparently stable condition. There are several examples described below where, despite intentions and actions being harmonious, interviewees were not necessarily satisfied.

Margaret frequently demonstrated active optimisation, but she indicated frustration and irritation with herself, arguing that she wished she could be different. Margaret's dislike of waste made it difficult for her to get rid of things. Over her lifetime she continued to acquire more products but she now felt overwhelmed by the accumulation of resources that accompanied this strategy. In addition, she was not entirely content with the adaptive strategies that she employed to optimise various products' service lives.

"We end up with finding ways round using things because that bit doesn't work properly, and that you have to do that in a certain way in order to make it work...it would be much more sensible to chuck it out and buy a new one but we don't...it does make life stupidly difficult you know." (Margaret)

Most of the interviewees who expressed intentions to keep products looking their best undertook regular maintenance, setting high standards of care. In such cases, the resulting extended product life frequently posed a dilemma; either the person became

bored with the item before it failed, or the product became technically obsolete before it failed. In both scenarios the resulting disposal of the product triggered feelings of guilt. Several of the interviewees commented on the frustration that this caused and stated they wished that they could be different. For example, Peter described how, like his father, he always took great care to maintain products, but this conflicted with his desire for new fashion:

> "Yeah, that's why I suppose sometimes it's hard to throw things away… it's out of fashion, but you're thinking it's still like new, sort of thing, but you've got to throw it away then haven't you. Whereas if you've enjoyed something and just run it into ground you just think 'why haven't I?' 'Why didn't I'?" (Peter)

Impeded optimisation

There were numerous situations in which intentions were optimising but this was not being translated into positive optimising consumption patterns. Some interviewees simply did not see any conflict whilst others were more aware of the discord and provided justification for their inconsistencies. A large number of factors were identified that contribute to understanding why people who express a desire to optimise product life sometimes fail to act appropriately.

Tension was often created by the conflict between being sympathetic to product durability but, at the same time, wanting change. On most occasions the desire for change gradually overtook the sense that the product be kept until failure and it was replaced. Some interviewees successfully delayed this process using strategies such as dyeing and reupholstering, or changing accessories and the product's location.

The views and opinions of the family were also found to influence the translation of intention to action. Several interviewees mentioned that they were bullied by their partner to dispose products, whereas they would have retained them

> "well what happens is I get badgered, you're not going out in those things". (Tony)

A difference in attitudes to caring for products amongst family members was also found to cause friction. Despite her own attempts to maintain sofas Eileen was frequently let down by her daughter who allowed the dog on them and other abuses.

External constraints were shown to have a marked effect on intentions and consequent behaviour. Lack of finance and time, together with social circumstances, were frequently cited as constraints that impeded people's ability to act on their intention to optimise product life. These external constraints were both real and perceived. Perceived constraints are occasions when the rationale was incongruous with other information provided and, therefore, in reality, other intentions were prioritised over optimising product life. For example, Sharon bought cheap products on the basis of her family's modest income, although it became evident from the discussion that they had a materially intensive lifestyle. Eric spoke about limits to his time impeding maintenance, but this was because he preferred to spend his time pursuing hobbies.

Unfavourable past events hindered some interviewees from fulfilling their intention to optimise product life spans. Several reported previous experience of poor quality repair work, inability to have products repaired due to lack of parts, or defective specialist work (such as re-upholstering) had put them off doing these things again. For example, Richard was not satisfied with his re-upholstered chairs, which he felt were less comfortable afterwards, and consequently wouldn't bother to do this again. Janet reported that following a bad experience with a washing machine that only lasted two years she had consciously decided to change her approach and now bought the cheapest and did not bother with repairs. Dennis had spent money on repeated repairs of his stereo radio cassette but felt fooled by his experiences.

> *"...now it seems to have got to the stage, when they've got a lot of difficulty getting a new part so it looks like it's beyond hope so perhaps money that I've spent previously having it repaired I should have spent it on getting something more up to date and then discarded that if you see what I mean."* (Dennis)

Passive optimisation

A surprisingly large number of people who were optimising in their patterns of consumption were not necessarily acting upon deliberate intentions. Many of those who were passively optimising the life spans of products were pragmatic and did not form sentimental attachments to any of the products under consideration. Most showed little involvement with products beyond the point of acquisition. It was evidently difficult for them to locate an explanation for their main motivation, which appeared to be getting a product as reliable as possible in order to concentrate their time or money on other matters, such as hobbies and holidays, which they considered more important.

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Susan had not replaced her last big kitchen appliances until failure and spoke about how she felt 'amazingly lucky' that her products had lasted such a long time. Unlike Gloria, she did not link this to how she had looked after the products. The drawback with passive optimisation is its transience. During the interview Susan referred to how looks were important 'nowadays', and since she never actively prioritised longevity there was a sense that awareness of new things may instigate change. She discussed how she felt in between two generations with very different attitudes, generalising that old people buy well and to last, whilst young people dispose of things more readily, and buy new.

"I'm somewhere in between because I've been brought up where you buy well and to last, but I'm also where you know, where niceness and new things are important as well." (Susan)

Household differences were found to influence passive optimisation. For example Gloria appeared to be fixed in patterns of consumption that were dictated by her husband's attitudes and not necessarily her own. She had made attempts to dispose of various products but her husband had persisted in rescuing them from the bin. This led her to using a neighbour's bin to dispose of some products.

Some are fixed in patterns of life span optimising activities that are dictated by their circumstances and would change when opportunity allowed it. Peter stated that he would keep his upholstered chairs for at least ten years because of financial restrictions not because he wouldn't want to change it. A change in financial circumstances for Colin and John had been pivotal in encouraging premature product replacement. Eileen and Gloria did not tend to buy new things because they were limited by the amount of space in their home.

Others demonstrated life span optimising activities simply because it fitted in with their lifestyle and what they liked. Peter and Andrew liked their products to impress. Colin used throws because he liked that 'look'. For others optimisation was based on habitual patterns that remained unchallenged.

Rejected optimisation

The situation where interviewees had no intention of optimising product life and did not, were most frequent for everyday footwear.

Several interviewees stated that they had changed their attitude to acquisition on the basis of a belief that we now live in a throwaway world. This led to a situation in which they had no intention of optimising life span in acquisition and simply bought the cheapest product. This had consequences in ownership, as the reaction to any problem with the product was to immediately replace it with another cheap model.

6.7   The relationship between environmentalism and optimisation

As part of the objective to pursue explanations for differences in patterns of consumption and consequent variations in service life, the research explored the relationship between environmentalism and optimisation. One possibility that was considered was that people who were interested in environmental issues, who either supported environmental groups or participated in other environmentally beneficial consumption activities, such as recycling, would be more sustainable in their patterns of consumption and more likely to optimise product life. The survey findings did not support this suggestion, revealing that on some occasions the inverse occurred. The interviews provided opportunity to explore the environmental hypothesis further and try to unravel the puzzle arising from the questionnaire findings.

There was some anxiety prior to undertaking the interviews that introducing the topic of the environment may lead to bias, with respondents feeling obliged to indicate concern. This fear appears unfounded: those who clearly had little awareness or interest in environmental matters such as George and Susan, did not raise the issue in their rationale for their patterns of consumption. Even when asked directly whether actions were environmentally motivated, these interviewees rejected this suggestion.

Where an awareness of environmental issues had been disclosed during the course of the interview, this topic was broached as conversation drew to a close. This provided an opportunity to explore the relationship between environmentalism and optimisation in more detail. This process was quite revealing. Some, such as Andrew, Colin and Eileen treated this as almost an entirely separate topic, referring to composting and recycling activities. It was evident that they did not conceive any connection between the environment and earlier discussions about product consumption. Despite conveying

strong support for recycling of household waste and composting, they made minimal effort to optimise the service life of products in any of the three categories.

Several interviewees made the connection between product life, consumption and the environment. They included Anita, Barbara, Margaret and to a lesser extent John and Dennis. These interviewees all revealed personal insights into how their patterns of consumption, and those of society as a whole, influenced the environment.
This was often accompanied by an awareness of the complexity of environmental problems. For example, Anita and Margaret referred to potential social implications of increased product longevity.

> *"I think um that waste from tiny things like milk bottle tops to nuclear power stations is just, is just one of the huge problems, and quite, how you sort of fit this in with full employment because I do realise I suppose if you buy new things then you know it's helping the economy go round and all the rest of it, but I still think it's a bad system that has to rely on that."* (Margaret)

> *"I'm definitely into recycling (actually talking about re-use of original products). To keep costs low as well as save the environment. We all benefit really except some of the sales people and some of the huge big companies that make a fortune out of a lot out of us. But, um, I don't think I've put anyone out of a job because of my recycling."* (Anita)

A core difference that appeared to distinguish those who applied their environmental awareness from those who did not was their perceived sense of responsibility. For example, Margaret took personal responsibility, stating that her decision to use her existing refrigerator in her new kitchen was based on her awareness of environmental problems currently relating to their disposal. In contrast, Colin, who was equally aware of such problems, placed responsibility on others. Retailers took his products away for disposal.

> *"I don't know what happens, I probably should environmentally all that sort of thing."*
> (Colin)

Perceived personal effectiveness was found to moderate further the application of environmental awareness. Despite his knowledge of waste issues, Richard was apathetic and did not think his fridge would make much difference.

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There were several occasions where peoples' actions were at odds with their environmental assertions. Colin, for example, was highly critical of Sheffield Council's consumables recycling policies.

"Yes I do make an effort going to the bottle bank, taking the newspapers yeah, yeah... Yes, given that Sheffield is absolutely pathetic at that isn't it, it's in the dark ages Sheffield isn't it?" (Colin)

Yet most products he disposed of were still functioning. He seemed to overlook his personal responsibility and contribution to waste generation.

Dennis spoke of other peoples disregard for products.

"Some things you just totally cannot reason out, why people are so unreasonable and treat either property, which you are talking about here, or the environment with such disrespect or in such an uncaring manner and not thinking of the consequences... They don't think beyond the immediate present." (Dennis)

Yet during discussions it was revealed that many of his household goods were discarded prior to failure.

Andrew claimed to be very keen on recycling and reuse.

"I'm a bit mad for things being used again, I don't really see it as recycling I like it's like I want to get every last possible use out of something so I do recycle everything... I just think that everybody kind of benefits... I'm a dead sort of like altruistic person anyway. So it's kind of part of that really, I've got stuff that I think someone else can get something out of, I'd much rather it be used again and giving it to someone..." (Andrew)

Yet he too discarded products rather than getting them repaired, and had replaced several functioning electrical appliances that were in good condition, storing the old products in his cellar and attic. Overall, it appeared that Andrew had quite a high turnover of products, with many products disposed of that were still in good condition. The clash between his desire for change and dislike of waste created tension and guilt, but things that were new and different were frequently prioritised over the optimisation of an existing product's residual service life.

6.8 Discussion of key findings

This section discusses the key findings of the qualitative research in the wider context of the product life debate. The review of the literature in chapter two revealed that very little previous research had explored consumers' influence on product life or the factors that affect it. This section draws on these scarce resources to identify areas of accord and tension with the qualitative findings. In addition, it explores the suitability of the factors identified and transferred to this research context from the wider environment and consumption debate (described in chapter three).

6.8.1 Overview of factors affecting consumers' influence on product life

The results have indicated that there are a large number of personal, social/situational and product characteristics that may affect consumers' influence on product life, these are summarised in figure 6.3. Many of the factors identified in the provisional lists in tables 3.7, 3.8 and 3.9 were observed during the interviews, although the nature of the relationships between these factors and product life were often substantially more complex than had been originally proposed. This section provides an overview of the key factors in the context of previous research.

Personal characteristics

A large number of personal characteristics were found to be affecting the consumers' influence on product life. The interviews supported the findings of the questionnaire with regards to the weakness of demographic information to explain behaviour. The influence of psychological factors was more dominant. The role of attitudes and values in shaping behaviour was similarly complex to the findings of other environment and behaviour research (e.g. Hutton & Athola, 1991; Thøgersen, 1995). A favourable predisposition towards product life did not necessarily translate into actual action, this was found to be impeded by a combination of motivation, opportunity and ability as hypothesised by Ölander and Thøgersen (1995).

The interviews indicated weak translation of positive environmental attitudes into product life optimising behaviour. This was affected by the presence of factors identified in previous research as barriers. People did not think they could make a difference, impeded by their low sense of perceived consumer effectiveness (as found by Ellen et al, 1991; Schwepker and Cornwell, 1991), and on other occasions their

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perceived responsibility for the problem and solution (as identified by Miller, 1998; Hines et al, 1986). Furthermore, it confirms Heiskanen and Pantzar's (1997) belief that in most cases ordinary consumers are simply unaware of the impact of their consumption on the environment.

Figure 6.3 Factors affecting consumers' influence on product life

Personal characteristics
- Attitudes e.g. to longevity, cleanliness and change
- Values (what is important and its relative magnitude)
- Previous experience (non specific e.g. formative years and specific e.g. one event)
- Sense of individual control, responsibility and effectiveness
- Personality, nature of relationship to possessions e.g. attachment / detachment
- Intelligence, knowledge and skills (level of understanding and capability to respond)
- Preferences (what gives pleasure / satisfaction, what doesn't e.g. shopping)
- Habit / ritual
- Desire (perceived needs)

Social / situational characteristics
- Demands of other co-habitants in the home
- Family circumstances (e.g. special needs, family breakdown)
- Financial situation
- Opportunity costs
- Popular culture
- Risk and time management
- Social norms (family and friends)
- Social progress (product and systems evolution)

Product characteristics
- Appearance
- Character
- Nature / function
- Origin
- Price
- Time / residual life

The positive nature of the relationship between product attachment and length of service life proposed by Hinte (1997) was apparent. However, attachment was not shown to necessarily be an optimal environmental strategy as in most cases where attachments were found, products were just as likely to be replaced, with attachments leading to accumulation and storage of seldom used items.

The effect of enduring involvement, i.e. having a sustained interest in the product group (Richins and Bloch, 1991) on service life was also found to be more complex than expected. Those that showed greater knowledge of product groups were identified as being more likely to optimise service life in acquisition. However, their continued interest in such products also made them more aware of new innovations and the findings of this work suggest that this impeded long term product satisfaction and retention.

Several interviewees were found to get a sense of personal satisfaction, of control and competence from undertaking consumption activities that extended product life during acquisition and ownership. This was identified as a motivating factor for undertaking further actions, confirming the findings of De Young (1996) regarding the importance of psychological factors in reduced consumption behaviour. However, the analysis revealed that a positive intention coupled with optimising patterns of consumption was sometimes associated with increased frustration as it was considered to be more complex than simpler non optimising behaviour. This has ramifications for product life, it is necessary to ensure positive action has positive feedback.

The interviews demonstrated how passing products on to others for reuse was used to influence and help others, this confirms findings in other environment and behaviour research on explanations for participation in conservation activities e.g. by Granzin and Olsen (1991).

Social / situational characteristics

Social stresses were identified as impacting upon the consumption patterns of several interviewees. A lack of time and the need for convenience were highlighted as causes of non optimisation in acquisition, ownership and disposal, confirming suspected trends discussed by Schor (1992) and Miller (1998). However, concerns regarding time scarcity also led several interviewees to optimise product life spans in acquisition, as a strategy for purposively reducing risks (later time and transaction costs).

Social expectations were found to influence life spans. Two interviewees based their rational for optimising patterns of consumption on the rejection of consumer culture, wishing to avoid main stream advertising, fashion and marketing. In contrast, the desire for change drove several people to repeatedly change products that had not broken. The

discussion of the culture of the need for change has been raised by Hinte (1997). Change and the desire for new was found to have a profound effect on people, consumption and ultimately on product life. This was identified as a principal cause of internal conflict and a moderator of the relationship between action and intent.

Other family members were found to exert considerable influence over decisions relating to acquisition, ownership and disposal. This took the form of ongoing influence and intergenerational transfer effects.

Having task knowledge and the applied behavioural skills was found to exert considerable influence on life span optimisation in acquisition, via the ability to calculate lifecycle costs, and in ownership, through a technical understanding of products that facilitates repair. This supports the findings of other environment behaviour research by Simmons and Widmar (1990), Vining and Ebreo (1990) and Oskamp et al (1991) and highlights the need to address the deficit in household management skills.

The interviews confirm that cost is an important issue for many consumers when considering whether to undertake repairs, supporting the findings of Cooper and Mayers (2000) and Adler and Hvlacek (1976). However, the interviews suggest that there are other important factors present that are moderating this relationship. Historic experience of repair was found to have a profound impact, encouraging those who had positive experiences to undertake further repairs but also deterring those who had negative experiences. Worryingly, many interviewees who had been dissatisfied with professional repair work stated that their experience had put them off repair as a strategy for all products within that category. In addition, several people mentioned cultural factors as deterrents to repair, arguing that we live in a throwaway society in which products were no longer supposed to be repaired.

Product characteristics

The findings of the qualitative research support the work of Martin (1998) concerning the importance of product type to the formation of attachments. The majority of interviewees rejected any notion of sentiment towards their big kitchen appliances and most disposed of them directly as they were replaced. The other two product types were

considered, in some cases, to have aesthetic as well as functional value and several interviewees did indicate a degree of attachment to these.

The interviews suggest that the process of quality evaluation over the life span of a product, as discussed by Granberg (1997) is less constant than previously implied. The interviews reveal that evaluation was something that occurred more deliberately in relation to external signals and not necessarily on the basis of the product alone. Furthermore, the interviews also revealed how frequently replacement decisions were unrelated to disposal decisions and entailed no review of satisfaction with existing products. This suggests many new acquisitions are independent of the state of existing stock, although more research is required to understand the processes of product evaluation and dissatisfaction over time. At the point of disposal product characteristics were found to have a large impact on disposal choices, as suggested by Roster (2001).

There is potential for future research to address the quality evaluation process for consumer durables that triggers replacement prior to failure using 'Gap analysis'. This is a technique employed within the service industry to examine the quality gap between perceived and expected service to identify the zone of tolerance (Johnston, 1995).

This introduces a contention that underlies what represents optimisation in disposal. Many interviewees perceived passing on their waste products to others as being inherently good. Some used this strategy to appease their conscience; it seemed to release them from the sense of individual responsibility they felt for producing waste. Reuse is important and can be considered less wasteful than placing items in the bin. However, it still indicates that the person is relying on someone else to need and use their waste. The number of interviewees who actually considered buying used products in their patterns of acquisition was very limited. This is especially the case with well worn products. The closer a product is to the end of its service life when it is passed on for reuse; the more unlikely it is that someone else will want it.

6.8.2   Contribution to knowledge

There has been no previous investigation explicitly addressing factors affecting consumers' influence on product life, hence this thesis offers one of the first comprehensive explorations of its kind.

It moves the debate on the consumers' influence on product life forwards, providing evidence to indicate that factors affecting this process are more complex than inferences in supportive research suggest. The use of the integrative consumption life cycle approach within the thesis to study the factors affecting consumers' influence on product life was highly effective. This facilitated the identification that inconsistencies in product life span optimising behaviour, which had appeared within patterns of behaviour and between intent and behaviour, occurred because motives underpinning actions were often not deliberately optimising. Hence, it revealed that consumers were actually consistent, but on the basis of other motives.

This analysis also extends research addressing the study of intention and action, building on attitude and behaviour models used in other aspects of consumption and environment research (e.g. Ölander and Thøgersen, 1995). These investigations have primarily focused on understanding why positive attitude is not translated into positive action and, therefore, tend to focus on impeded activity. The approach used within this research has drawn attention to the value of exploring other relationships between attitude and consequent action for building a comprehensive understanding of the barriers to action.

The findings of this phase of the investigation have been published in Evans and Cooper (2003b).

6.9   Chapter summary

The use of semi-structured interviewing provided a richly detailed data source that enabled some of the motives underlying consumption patterns to be explored in depth. The interview process enabled sensitivity with regard to complex issues and probing facilitated the emergence of new dimensions to discussion, which enriched the findings from the quantitative research.

The interviews revealed a wide range of factors that influenced people's patterns of consumption that affect product life across acquisition, ownership and disposal for the three categories of product. These were explored using the analytical framework established in chapter three.

The findings confirmed the pivotal role of the consumer to a product's service life. At the acquisition phase situational characteristics such as available funds, time and knowledge were found to have a larger impact than during ownership and disposal, when personal and product characteristics appeared to have a greater role.

The analysis indicates that multiple factors operate simultaneously. It is often difficult to judge the relative strengths of each and it is possible that some factors were not identified during first exploratory discussions. It is also important to recognise that the presence of a factor does not always result in an impact. For example, it is not concluding that people with large families will always optimise life spans, rather, that this is one factor found to influence several people interviewed.

The findings support the proposition arising from the survey data that consumers lack a coherent strategy towards optimising product life. They exposed substantial contradictions and complexities within individual consumption profiles. Many inconsistencies in profiles were explained by looking in greater detail at the motives and other factors that were influencing individual patterns of consumption. Even where similarities between consumer profiles were identified, the motivations underpinning their activities were different.

The discussions confirmed the findings from the survey analysis that maintenance is often a separate issue to rejuvenation. Several examples were identified of people that undertook one and not the other. This needs to be given consideration in further research.

People were rarely consistent across product category. Most interviewees provided clear explanations for variations in their actions towards different products. Many consumers rationalised these differences on the basis of product attributes.

The exploration of inconsistencies in intentions and behaviour suggested that the links between the two are tenuous. Several interviewees who had no intention to optimise product life were doing more towards this than those who had such an intention.

The research indicates that the movement from green consumption to more sustainable consumption is not linear or simple. The interviews found that ignorance of the links

between optimising activities and resource and pollution minimisation, lack of perceived personal effectiveness and a rejection of individual responsibility were factors impeding this progression.

The following concluding chapter synthesises the results of chapters five and six in the context of the conceptual framework and draws upon them both to ascertain the real and perceived barriers to product life optimisation, thereby illuminating the constraints upon more sustainable consumption of products.

CHAPTER 7 – CONCLUSIONS

7.1 Introduction

The final chapter of this thesis draws together and discusses the key findings of both phases of the research in the context of the aims and objectives described in chapter one. These findings are then addressed in the context of the final objective of the research, endeavouring to ascertain the thesis' contribution to knowledge by:

a) presenting a summary of the barriers to consumer optimisation of product life,

b) discussing the implications of the research findings for a variety of stakeholders, and

c) evaluating the strengths and weaknesses of the conceptual framework devised for exploring consumers' influence on product life.

Having accomplished this, the chapter turns its attention to a critique of the research process, addressing the limitations of the study and identifying requirements for work in this field. The chapter concludes with a discussion of options for future research. The structure of the conclusions is summarised in figure 7.1.

Fig 7.1 Structure of conclusions

Stage 1 - Review	→	Summarise research outcomes *(s7.2)*
Stage 2 - Evaluate	→	Summarise barriers, discuss implications *(s7.3)*
Stage 3 - Critique	→	Appraise framework and methodology *(s7.4&5)*
Stage 4 - Conclude	→	Future research and thesis synopsis *(s7.6&7)*
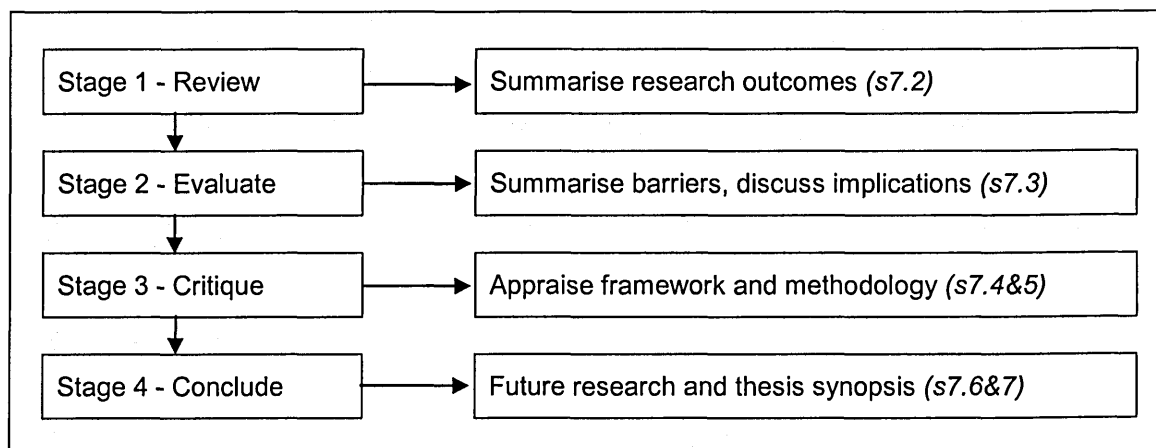
7.2 Review of the aims and objectives

The principle aims of this research were:

To identify how different patterns of consumption across acquisition, ownership and disposal influence the service life of domestic products, and to seek explanations for differences in patterns of consumption and consequent variations in service life.

In pursuit of these aims, the thesis distinguished three sets of objectives. This section summarises the findings that correspond to the first two sets of objectives.

Objective One - To examine how different patterns of consumption across acquisition, ownership and disposal influence the service life of domestic products, in particular to:

a) Describe how current patterns of consumption across acquisition, ownership and disposal influence the service life of three categories of domestic product.

The research identified a range of factors relating to consumers' direct involvement in the consumption process that may influence a product's service life span (section 3.2.3) and these were translated into viable survey questions (section 4.6.1). Data were then collected for each of these factors, and current patterns of consumption and their influence on service life were described (sections 5.2.1-3), and discussed (section 5.6.1).

In summary, the research confirmed suspicions that consumers exert considerable influence on the life spans of everyday footwear, big kitchen appliances and upholstered chairs across acquisition, ownership and disposal. They reveal that:

- Relative obsolescence has a significant role in prompting acquisitions of everyday footwear and upholstered chairs.
- Many acquisitions occur without a negative evaluation of existing stock, as a result of impulse purchases, special offers and broader household decisions, leading to product accumulation or disposal prior to failure.
- The majority of consumers depend on self evaluation of products in acquisition,

relying on their own capacity to evaluate product attributes using visual signals, information provided by the retailer and existing knowledge.

- Many people do not consider long life expectancy or associated attributes, such as reliability and ease of maintenance, requirements to prioritise in acquisition.
- Large numbers dispose of upholstered chairs, in ways that encourage their continued use. Few people, however, acquire any pre-owned products.
- Product negligence is commonplace, especially of everyday footwear; most people have a haphazard approach to quality retention.
- Repairs and other activities that rejuvenate product life are rarely undertaken.
- Many consumers are discarding products that are worn, but have not failed.

These findings provide empirical support to previous research based on speculation, small or convenience samples or single issues (e.g. Jacoby et al, 1977; DeBell and Dardis 1979; Hanson, 1980; Wilkie and Dickson, 1985; Stahel, 1986; Uusitalo, 1986; Hunkin, 1988; Mann, 1992; Harrell and McConocha, 1992; Cooper, 1994b) (as discussed in section 2.5.1).

The results also indicate a clear difference in current patterns of consumption across acquisition, ownership and disposal by product type. Big kitchen appliances are treated most favourably across the consumption process, more attention is paid to their acquisition, they are more frequently maintained and rejuvenated and, they are more likely to be kept until failure than the other products. Everyday footwear were least maintained and were chosen least carefully in acquisition.

These findings validate the research decision to focus on specific product categories and provide strong support for a product-oriented approach to be used in further academic research and policy making. In addition, they highlight the need to broaden the range of products studied, to enhance understanding of why some products are treated more sympathetically than others across their life span.

b)   *Classify consumers according to shared patterns of consumption that influence service life for the three stages of consumption and for three categories of product.*

A new research instrument was developed that provided a way of measuring the relative optimisation of different sequences of behaviour in acquisition, ownership and disposal (section 4.7.1), this provided a scoring spectrum ranging from 1 (failure to optimise) to 6 (peak optimisation). To sharpen understanding of individual behaviour, six consumer profiles were constructed (section 5.3.3), three depicted consistency in optimisation across the consumption process for each product category, and a further three consistency between product categories for each stage of consumption. This provided a means of comparing:

- Individual differences in patterns of consumption that influence product life at different stages of consumption, and
- Differences between different individuals' patterns of consumption that influence product life at different stages of consumption.

The research instrument is the first of its kind. A clear rationale was provided for the scores attributed to different combinations of behaviour and consequent classification and where possible, justifications were based on relevant literature identified in chapters two and three. Despite measures to maximise its credibility, however, the allocation of scores is subjective, and reflections on their logic during analysis (section 5.6.1), raised concerns that the measures of optimisation in disposal may have been too lenient.

c) *Examine how consistent consumers are in their patterns of consumption across acquisition, ownership and disposal for the three categories of domestic product.*

Following the process of scoring and classification, the consistency of consumers' patterns of consumption across acquisition, ownership and disposal for the three categories of domestic product were analysed (sections 5.3.2 and 4), and discussed (section 5.6.2).

The research identified that remarkably few people consistently optimise product life across the consumption process for any of the three categories of product. In contrast, much greater numbers consistently fail to optimise product life at any stage of consumption, especially for upholstered chairs and everyday footwear.

One of the critical findings from this examination was that large numbers were highly optimising in their disposal of products, but were not optimising in the acquisition and ownership stages. It is, therefore, imperative that future policy interventions engage with the whole of the consumption process in order to tackle product life issues and waste generation effectively.

These findings illuminate the benefits of employing an integrative consumption life cycle approach, as advocated by Boyd and McConocha (1996), Antonides and van Raaij (1998), Kostecki (1998), and Cooper and Mayers (2000).

Objective Two - To seek explanations for differences in patterns of consumption and consequent variations in service life, in particular to:

a)   *Investigate whether those consumers who share similar patterns of consumption are affected by particular demographic, socio-economic or environmental factors.*

The data collected from phase one of the investigation, i.e. the questionnaire, was analysed to ascertain whether consumers who share similar patterns of consumption are affected by particular demographic, socio-economic or environmental factors (section 5.4) and then discussed (section 5.6.4).

This preliminary exploration provided only limited insights, although it has suggested that:

- Men tend to be more optimising in their acquisition and disposal of everyday footwear.
- Older generations tend to be more highly optimising, especially in ownership, across all three product categories.
- Households with children are more optimising in their acquisition of big kitchen appliances.
- The more affluent and highly educated are least optimising of big kitchen appliances in ownership.
- There is no evidence to support the hypothesis that those who participate in other

consumption activities that protect the environment are more likely to be highly optimising of product life.

These findings support several results identified in previous research (e.g. Dahl, 1980). The main limitation of this type of analysis, and its findings, is that it only exposes the presence of a relationship between two variables. The underlying rationale that explains the relationship and the nature and role of any intervening variables remain unknown. These are often proposed on the basis of speculation.

A number of possible explanations for these trends were described, but the conclusion was drawn that further research was required to obtain a more comprehensive understanding of factors affecting consumers' influence on product life (section 5.7). This verdict formed the basis for the second phase of the investigation.

b) *Explore whether consumer intentions regarding product life are concordant with the patterns of consumption that they employ.*

Conflicts between stated attitude and displayed behaviour arise frequently in environmental discourse and have become the focal point of much environment and behaviour research (Ölander and Thøgersen, 1995). In the context of this thesis it was considered imperative to identify whether conflicts exist between intentions towards product life and displayed behaviour, as this would provide a fuller picture of the barriers to consumer optimisation of product life.

The data from phase one of the investigation, were used to describe consumer intentions towards the life span of each product category at each stage of the consumption life cycle (5.5.1), to profile intentions (5.5.2) and use these to compare intentions with patterns of consumption across acquisition, ownership and disposal (5.5.3). Key findings were then discussed (5.6.1 and 5.6.3).

In summary, the research suggests that:

- Intentions regarding anticipated service life vary considerably by product type, and are consistently most optimising for big kitchen appliances.

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- A large number of consumers only intend to retain upholstered chairs and everyday footwear until they become worn (as oppose to functional or absolute failure) and therefore have no intention of optimising product life.
- Intentions towards the residual life span of products owned for a long time are more optimising than intentions towards products recently acquired or previously discarded suggesting the influence of product attachment.
- Most people are more optimising in their intentions than they are in their patterns of consumption. For example, although very few consumers intend to replace any of the products prematurely in reaction to technological or fashion changes, many do.

The discrepancies between intentions and actions support the impression of a lack of coherent consumer strategies to optimise product life. Some reassurance can be gained from the insight that many respondents intend to be more optimising than they are, which suggests the presence of barriers to fulfilling intentions.

The data collected at this stage did not allow for analysis of the mechanisms underpinning the translation of intentions to action. This was, therefore, identified as a research requirement of the second phase of the investigation.

c) *Identify factors affecting the patterns of consumption selected across the different stages of consumption and between different types of product.*

The thesis identified a provisional range of factors, not explicitly linked to the consumption of a product, which may drive one consumer to influence product life in a different way to another consumer, or the same consumer to influence product life differently at different stages of the consumption process (section 3.2.5). These factors were classified under the headings personal, social / situational and product characteristics and included those factors investigated in phase one of the investigation. A conceptual framework for exploring factors affecting consumers' influence on product life was established (section 3.3).

This conceptual framework drew together the findings of many disparate pieces of research that touched on consumers' influence on product life, and factors that affect it. It is the first conceptual framework devised for analysing product life using an

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integrative consumption life cycle approach.

d)   Examined factors affecting consistency between patterns of consumption selected across the different stages of consumption and between different types of product.

A series of semi-structured interviews were conducted which explored the issue of consumers' influence on product life and factors affecting this (as per section 4.6.2). Data was prepared (section 4.7.2), described (sections 6.2-4), analysed (sections 6.5-7) and discussed in the wider academic context (section 6.8). These interviews add substantially to current knowledge of factors affecting consumers' influence on product life (discussed in sections 2.5.2 and 3.2.5). They show that:

-   A substantial number of factors that are not explicitly related to the consumption process affect consumers' influence on service life (summarised in section 6.8). These include factors that promote more life span optimising patterns of consumption and others that impede it.
-   Most individuals' consumption patterns that influence product life are affected by a considerable variety of factors at each stage of the consumption life cycle and across each of the product categories.
-   The majority of consumers appear to have complicated consumption profiles, displaying inconsistencies in optimisation over the consumption cycle and between products (confirming results from the survey data). The interview analysis identified that many inconsistencies can be attributed to differences in motivations that underpin individuals' patterns of consumption. For example, there were many occasions where optimising the life span of the product was not the primary motive for undertaking the optimising activity.
-   The nature and influence of factors is highly complex. A large combination of factors operates simultaneously, they are dynamic over time, and the strength of their impact fluctuates on the basis of interdependencies within the system, and in response to external signals.
-   Many consumers rationalised differences in their patterns of consumption between different product categories on the basis of product attributes, corroborating the earlier finding that a product category focus is essential.
-   Maintenance and rejuvenation are clearly distinguished within the analysis with

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consumers undertaking optimising patterns of consumption in one and not the other. This differentiation needs to be taken into consideration in future research.

- Overall consumers' acquisition of products appeared to be more affected by situational characteristics, including available funds, time and knowledge, whilst personal and product characteristics had a greater role in ownership and disposal. The processes of product replacement and product evaluation were more independent of each other than previously thought.

Overall the findings support several propositions regarding factors that may be affecting consumers' influence on product life that were identified in previous research, such as the affect on repair of the repair price versus the cost of a new product (Cooper, 1994a) (sections 2.5.2 and 3.2.5). The interviews, however, reveal that the reality is often substantially more complex, with far more mediating factors than previous propositions acknowledge.

In addition, the interviews demonstrate that an active factor for one consumer may be present but dormant, or not present, in another. For example, being part of a large family was considered by several interviewees to have affected their patterns of consumption that influence product life. This does not mean that everyone who is part of a large family will optimise product life spans, nor does it preclude those who have grown up in small families from being optimisers of product life spans.

e)   Explore factors affecting consistency between consumer intentions regarding product life and the patterns of consumption selected.

The interviews were used to undertake more comprehensive analysis of the mechanisms underpinning the translation of intentions to action and a model was proposed, which identified four potential relationships between intent and action for each stage of consumption and each product (6.6).

The interviews suggested a tenuous relationship between consumer intentions and actions across the consumption life cycle, supporting the findings of the questionnaire data. In summary they illuminate that:

- Intentions and actions were frequently incongruous, with the additional complication that individual consumers demonstrate many combinations of these relationships across the consumption cycle for the different products.
- On the rare occasions where active optimisation was identified, i.e. where intentions and actions were optimising of product life spans, it sometimes appeared to cause frustrations.
- Far more interviewees than expected were passive in their optimisation of product life, i.e. they were optimising without acting on deliberate intentions to extend product life.
- Rejected optimisation, i.e. where neither intentions nor actions were optimising occurred most frequently for the category of everyday footwear. In acquisition, several interviewees were caught in an ominous negative cycle of buying cheap, lower quality products, that consequently wore down more rapidly, which confirmed the attitude that we live in a throwaway society and lead to the purchase of another cheap product.
- There were many occasions of impeded optimisation, where intentions were optimising, but this was not being translated into positive optimising consumption patterns. The underlying reasons identified for these discrepancies were found to fit within the classifications provided in Ölander and Thøgersen's (1995) 'Motivation-Ability-Opportunity' model. The conflict between the desire for something new and being sympathetic to durability was particularly cogent, as was having the financial capacity and time. The findings also revealed the surprising strength of negative past experience on actions.

This interpretation of intentions and actions builds on the attitude and behaviour models that have looked at other consumption and environmental problems (e.g. Ölander and Thøgersen, 1995). These investigations have primarily focused on understanding why positive attitude is not translated into positive action and, therefore, tend to analyse impeded activity. The approach used within this research has drawn attention to the value of exploring other relationships between attitude and consequent action for building a comprehensive understanding of the barriers to action.

The interviews also considered the relationship between environmentalism and optimisation. Overall there was little evidence to indicate progression from one to the

other. Translation of environmental concern into optimising consumption patterns was connected to people's sense of personal responsibility, effectiveness and knowledge. Several interviewees indicated that they considered passing on products for reuse by others as being environmentally friendly, which has been disputed within this thesis.

This section has illustrated how the thesis has built upon the threads of previous research to establish a suitable conceptual framework, and used this to structure and answers the first two sets of research objectives. The next two sections address the third set of objectives which ascertain the thesis's contribution to knowledge and demonstrate how this research moves the debate on consumers' influence on product life spans forwards.

7.3   Barriers to consumer optimisation of product life spans

This section outlines the principal barriers to consumer optimisation of product life spans, discusses their implications and makes a number of suggestions as to how they may be overcome. Insights regarding solutions are partially drawn from the analysis of factors that stimulate optimisation of product life spans.

a)   The prevalence of a haphazard approach to acquisition is considered a major barrier to the optimisation of product life spans. Only a minority of consumers appear to undertake any strategic evaluation of their needs or make a critical assessment of product quality on the basis of independent reviews, prior to purchase. Most consumers rely on self evaluation of products using retailer's information. Large numbers of purchases are bought impulsively.

The core factors influencing this include peoples' inherent desires for something new, a belief that we live in a throwaway society, a lack of funds to buy premium products and a lack of skills and knowledge to calculate life cycle costs.

This has profound implications for the service life spans of products. Unplanned purchases are less likely to meet long term needs and may therefore be discarded more rapidly. The purchase of cheaper products leads to a negative cycle of unreliability and rapid replacement. The market does not send the right signals to

the supplier, i.e. to produce higher quality products.

Possible solutions to address this problem include;

i) The provision of more information at point of purchase concerning predicted life span and life cycle costs.

ii) The introduction of enhanced modularity in products, so that they can be partially upgraded without total replacement. Thereby accommodating the desire for something new, whilst reducing the overall impact.

b) The optimisation of product life spans in ownership is impeded by widespread ambivalence towards product maintenance and rejuvenation, particularly of everyday footwear. Most consumers were lackadaisical in their treatment of products and did not make concerted efforts to retain product quality during use. Repair options were frequently overlooked, unless the product was still under guarantee.

The core factors influencing this include the perception that housework was a chore, time scarcity, a dislike of newness, relative cost and previous negative experiences (in the rejection of repair) and the belief that we live in a throwaway society.

This has considerable implications for products' service life spans. Products are deteriorating at a more rapid rate due to negligence, and a large number of products are disposed when they are worn (rather than when they fail) or when they are broken but could be repaired. This implies that products are entering the waste stream more rapidly.

Possible solutions to this problem include;

i) The more effective marketing of repair and reuse services. Perceived expense of repair is possibly greater than actual expense, data provided by OFT (2002) indicates that 70% of repair charges for electrical goods are under £50.

ii) The internalisation of environmental costs by reducing the cost of labour versus the cost of resources.

c) The optimisation of product life spans in disposal is impeded by the frequency of decisions to dispose of products prior to failure. Large numbers of products that are disposed of as waste are worn, rather than broken. This is compounded by failure to optimise product life spans in acquisition and ownership.

The core factors influencing this include ignorance and lack of concern or perceived personal responsibility for waste, the perceived acceptability of passing products on for reuse by others and the minimisation of risks.

This has many implications for the service life spans of products; the widening acceptance of a throwaway society amongst consumers, even for highly priced items such as furniture, will lead to greater volumes of waste production and declining product life spans. Furthermore, the acceptability of passing products on for reuse appears to be greater than the acceptability of used products in acquisition, leading to a glut of partially worn products.

Possible solutions to this problem include;

i) The design of products so that they wear and age with dignity (van Hinte, 1997)
ii) To focus waste management policies and information campaigns to the top of the waste management hierarchy

d) Many consumers do not reflect on the resource implications of their consumption processes, which is a critical barrier to optimal product use. Consumption is used for the fulfilment of goals and needs. The lack (and sometimes presence) of coherent strategies to optimise product life is not the result of deliberate decisions, it appears that most consumers do not consciously consider this issue. Most people are simply unaware of the relationship between their consumption patterns and environmental deterioration. Even interviewees who were participating in other consumption activities with the intention of protecting the environment were found to be unaware of the impacts of their acquisition, ownership and disposal of the three product categories.

The core factors influencing the individual lack of attention to personal contribution to resource depletion, pollution and waste generation include the

dominance of other social norms and the prioritisation of other needs. When awareness was shown, this was impeded by a lack of perceived responsibility and effectiveness.

The service life of products is therefore rarely considered by consumers, with the exception of occasions where products fail prior to expectation.

Possible solutions to this problem include;

i) Education on waste management, information campaigns highlighting importance of waste hierarchy and need for source reduction, providing consumers with models of how to incorporate life cycle thinking into their consumption practices

ii) Requirement for innovative policies that encourage new forms of acquisition, ownership and disposal that encourage greater optimisation and are different to current private ownership models (e.g. Kostecki, 1998, Cooper and Evans, 2000).

e) The translation of the ambivalence of concern about product life into non optimising intentions forms a major hurdle to product life optimisation. The identification of frustrations encountered by those with positive intentions and behaviour is also a concern.

The factors influencing this include peoples' beliefs that we live in a throwaway society and the social norms regarding the 'right' to consume. If product life is not valued then it is unlikely that the products will be treated respectfully, leading to more rapid deterioration and disposal.

Possible solutions to this problem include;

i) Encouraging people to think in terms of their role as citizens before their role as a consumer (Hansen and Schrader, 1997).

ii) Ensuring positive reinforcement for those who have positive intentions and behaviour, ensuring external resources are in place, that facilitate ease of optimisation e.g. a well regulated repair market.

f) A further barrier is presented by the complexity and wide range of factors that influence consumers to behave differently with respect to varied product

categories. For example, the relative influence of price, fashion, technology. This suggests the possible need for product focused solutions to resolve issues.

Possible solutions to this problem include;

i)   Possibilities for extending technical life of those products that were least likely to be disposed prior to failure. Increase compulsory minimum performance standards, promote long term warranties and provide point of sale life span or guaranteed use data.

ii) For products such as everyday footwear that was least optimised over its life span provision of more information on how to extend life may be effective.

g)   The study of impeded optimisation highlighted a range of barriers that require attention. A link was apparent between life span optimisation and household . resources. Some interviewees on restricted incomes said that they were unable to optimise life spans at the acquisition phase but were forced to in ownership and disposal. In contrast, the more affluent could optimise in the acquisition and ownership phases but did not necessarily in disposal. Inequalities in opportunity and task knowledge reinforce these differences.

This complexity indicates that a range of strategies are required to promote increased optimisation, which takes into account different social groups.

h)   Finally, the relationship between product evaluation and replacement decision was found to be independent in many cases. This forms a rebound barrier to optimisation of product lives as it demonstrates that even when products are singularly optimised, their overall environmental impact may increase due to accumulation. The role of attachment and involvement were also more complex than originally envisaged, with neither necessarily leading to more optimal product lives.

This discussion of the barriers to consumer optimisation of product life spans confirms the requirement to explore consumers' influence on product life, as an integral part of the product life debate and in the wider context of sustainable consumption (discussed in chapters one and two). It demonstrates the clear responsibilities of consumers that lie

beyond the control of product providers, although they have a clear role in providing choice and a role for facilitating optimisation.

7.4   Critique of the conceptual framework

The thesis has developed an original conceptual framework for exploring the factors affecting consumers' influence on product life using a consumption life cycle approach. This has facilitated one of the first comprehensive studies of product life spans from the consumer perspective, using research from multiple disciplines to identify and define the key concepts and their interrelationships.

Over the course of the research, following the data collection and subsequent analysis a number of weaknesses of the conceptual model have been identified. The first and most important criticism is the simplistic nature of the classification of factors affecting consumers' influence on product life. The classifications were effective and the information can be organised in this way. However, the factors are considerably more complex than the framework suggests, operating simultaneously they are dynamic over time, between product groups and across stages of consumption.

Furthermore, the framework also fails to address the relative strength of individual factors. On the basis of the analysis it appears that they are in a constant state of flux, increasing and decreasing in strength according to interdependencies within the system and on the basis of external signals. Finally, although the possibility of conflict between intent and action was incorporated into the research design, data collection and consequent discussion, this was not adequately addressed within the conceptual framework.

The research hypothesised a clear differentiation between consumers' influence on product life and the factors affecting it. This differentiation was described in detail in chapter three on the basis of the degree of connection to the consumption process. In practice, there were some areas where this differentiation was not as clear as anticipated, particularly during discussions concerning product characteristics.

Both the definition and taxonomy of consumers' influence on product life are contentious; critics may put forward different interpretations. There is no universal agreement that the selected indicators represent or measure the dimensions of consumers' influence on product life, hence it is open to criticism in terms of content validity and subjectivity. Attempts have been made to reduce this by finding consensus using focus groups and limitations were considered during the analysis and discussion sections.

The conceptual framework explores the consumption patterns of individual consumers. A recent paper by Dolan (2002) criticises research that adopts such an approach on the basis that it decontextualizes consumption from such interdependencies as social and cultural context. These factors were acknowledged during the study of factors affecting individual consumption patterns, for example the role of family and friends was considered via the social factors affecting consumers' influence on product life. During the analysis of interview data it was apparent that family, in particular, exert considerable influence over individual consumption of these products. In its defence, however, this is an exploratory thesis and the study of individuals is sufficient to provide a preliminary overview.

7.5   Critique of the research process

This thesis has made an original contribution to knowledge of consumers' influence on the service life of everyday footwear, big kitchen appliances and upholstered chairs across the consumption cycle.

It has addressed fundamental questions concerning the nature and extent of consumers' influence on service life, the consistency of patterns of consumption across acquisition, ownership and disposal for the three product categories, the effects of consumers' intentions and their demographic, socio-economic and environmental characteristics on product life span optimisation, and the identification of a range of other factors not explicitly related to the consumption process that affect consumers' influence on product life.

The research contributes to the ongoing debate on product life, suggesting that consumers play a vital role in determining product life across the consumption process, confirming suspicions that arose in previous work (e.g. Cooper, 1994a; Heiskanen, 1996). The thesis indicates that many consumers optimise in some aspects of consumption and fail to optimise product life in others, showing little coherence in their approach from the perspective of this issue. It supports the need for consumers' influence to be carefully considered in any attempts to use increased durability or product life extension as a strategy for environmental protection. The thesis also contributes to the wider debate on resource productivity and material flows, suggesting the need to direct consumer policy towards the top of the waste management hierarchy to reduce waste at source.

The thesis has established a conceptual framework for exploring this issue that encompasses direct factors influencing product life (via the consumption process) and indirect factors, extrinsic to this. Despite escalation in life cycle thinking in recent years, catalysed by environmental concerns, the 'cradle to grave' philosophy has, to a large extent, remained within the realms of design. This is, therefore, one of the first studies to use lifecycle thinking as a method for exploring consumer behaviour. This approach has provided the ability to compare peoples' behaviour at different points across the life cycle of their products which provided new insights into the consistency of consumption patterns. In addition, the thesis has presented a means of measuring consumer optimisation of product life, which facilitates comparison of actions between stages of the consumption cycle and to explore differentiation in patterns by product type. Moreover, it has broadened the product base explored in product life research, which had previously shown some bias towards electrical goods.

The conclusions of the work have outlined the barriers to consumer optimisation of product life and discussed their implications and possible solutions. This contributes to a fuller understanding of the current situation and provides useful guidance to policy makers, and those who study, or work, in design and marketing. The thesis, therefore, provides comprehensive foundations for continued research, but a consideration of its limitations is also required, as the work has significant capacity for enhancement and amplification.

The process of reflecting upon the research process is a fundamental aspect of good research practice. Reflexivity encourages a full understanding of the boundaries of the study and provides guidance to others undertaking similar research. This process encompasses a review of the integrity of the research (as described in section 4.4).

Efforts were made throughout the design and implementation of the survey to maximise research reliability. However, the method of self reporting of actions used in the questionnaire has a number of clear and significant drawbacks that challenge the repeatability of findings, and make them vulnerable to inaccuracy. Amongst others, respondents may not report certain behaviour if they think it may be deemed socially unacceptable, time limitations may cause rapid and less accurate answering and another person could report on the selected respondent's behalf.

The work's substantial reliance on memory recall is also problematic to ensuring the repeatability of the research findings. The extent of memory recall was measured and discussed (4.8.1). This has the most significant repercussions for data on acquisition and disposal of upholstered chairs, where 35 to 40% of respondents were recalling events from over five years before. Despite this potential for inaccurate reporting, the drawbacks of other methods such as direct observation outweighed these criticisms. Most other research investigating behaviour in the home has accepted this limitation and majority use self reporting (e.g. Cooper and Mayers, 2000). A study of search patterns for the purchase of footwear by Newman and Lockeman (1977) compared observation with later recall and found observation yielded significantly higher search scores. It is possible, therefore, that the results under-represent optimising activity in acquisition.

Furthermore, this work is based on findings from the city of Sheffield. The city focus provided several advantages. However, by adopting this approach the interpretation of results must also be limited to this area and not considered nationally representative. For example, Sheffield has above average elderly and student populations. A national sample would have provided a more representative sample of the UK.

The content validity of the survey research may raise some concerns. Great attention was paid to ensuring that the measures of the concepts, defined in chapter three and

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translated into research questions in chapter four, covered the concept's full meaning. It is possible, however, that the internal components of these concepts may be disputed. Further validation and testing of the research concepts developed and used in this research are therefore required. In their defence, they provide a useful starting point and are open to future refinement.

The method used to summarise the data collected to provide one measure of 'patterns of consumption that influence product life' for each stage of the consumption process, in the form of a scale of optimisation, is also contentious. The allocation of scores and subsequent profiling of respondents according to varied combinations of self reported behavioural data was a novel approach. A justification for this approach was provided and measures were taken to ensure consistency, but it has many limitations. Most obviously it relied too heavily on subjective judgements of what constitutes optimising patterns of consumption. On reflection, to test the credibility of this data, triangulation using multivariate analysis such as cluster analysis should have been undertaken, and this is highlighted as an essential element of further research.

The design of the survey tool maximised data collection and minimised survey length by addressing the same questions to each product. It is necessary to recognise that the nature of the products made some activities more applicable to them than to others. For example, following rules of use is more immediately obvious in the context of kitchen appliances. In addition, failure to participate in rejuvenation activities relating to the larger products may be a result of youth and inexperience rather than failure to undertake these activities.

The credibility of the qualitative data also requires consideration (as described in section 4.4). On several occasions at the close of interviews participants said that they had not previously given much thought to issues raised during the discussion. They felt that their interest in issues relating to product life had been stimulated, although some had found it difficult to assimilate their thoughts and respond to questions in detail.

The time constraints upon the interview impeded a thorough exploration of behavioural contradictions at the individual level. The findings are based on a limited sample and interviews lasting only one hour. Despite the limited time spent with each interviewee it

was surprising the volume of information that was generated and the number of trajectories that the analysis could have taken. This made the task of task of analysis more difficult and inevitably led to a degree of simplification. These difficulties dealing with the voluminous qualitative data arising from interviews are well recognised within social science research texts (Bryman and Burgess, 1994). Overall, the interviews reveal that the factors affecting consumers' influence are highly complex; the exploration provided by the interviews does not claim to provide a complete picture. The thesis offers a framework for further investigation.

The coverage of this research was extensive (as it looked at each aspect of the consumption process), this results in a degree of simplification and a sense of skimming over some large areas of theoretical research, especially in acquisition where there is extensive literature relating to each component of this process. However, in doing this the research was able to highlight how aspects of the consumption process are interconnected and how examination at one point only could lead to a false impression of wider trends. For example, the illumination of minimal consumer optimisation of product life in acquisition and ownership, that leads to more rapid product deterioration and consequent disposal.

7.6 Direction of future research

This exploratory research provides tremendous scope for further research. This section outlines the key recommendations.

Future research is required that explores the relative strengths of different factors affecting consumers' influence on product life, to identify which exert greatest influence so that solutions can be directed to areas which will have greatest impact.

Product category was found to be critical to consumers' influence on product life spans. There is a need to further expand the range of product categories investigated and to identify products with potential for improvements in their technical design. For example, this research has identified that large kitchen appliances would be suited to a strategy of design for increased longevity, but the other two product categories may be better suited to modular designs, where the aesthetic appearance could be updated

whilst the internal frame remained. In addition, the differences found between product categories may also be found within product categories, further analysis of this issue is required.

The work identified that the effect of family on consumers' influence on product life was cogent. Future qualitative research may benefit from observational studies within the home that understand how household dynamics affect decision making that leads to product replacement and relative obsolescence. A longitudinal study would be especially valuable to continue the process of understanding the complex processes of product re-evaluation over time, which was initiated in this research.

In terms of the broader debate on sustainable consumption, there is scope for further research on identifying 'spill over' processes, to identify the mechanism by which interest in one aspect of environmental protection and consequent participation in related consumption activities spill over into other areas. This could be used to explore whether people move through a longitudinal process in which their environmental behaviour becomes increasingly sophisticated, indicating whether green consumerism is a precursor to sustainable product consumption. This could form a case study within the investigation of lifestyle movements and the nature of cultural transition.

7.7   Conclusion

The research has fulfilled its objective to explore consumers' influence on product life spans across acquisition, ownership and disposal. It has identified how consumer choices in acquisiton and consequent behaviour during use and disposal exert considerable influence beyond the technical life of the product. The thesis supports concerns regarding the consumers contribution to relative obsolescence and identified numerous other ways in which consumer behaviour is shortening potential product life spans. The thesis indicates increasing acceptance of a throwaway culture and has outlined a series of significant barriers to more optimising patterns of consumption. In the light of continuing global environmental decline, it is imperative that consumers' contributions to the failure of products to achieve their optimal product life are understood, so that effective measures can be taken to alleviate problems and make undertaking optimisation easier.

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APPENDIX 1 - PRODUCT SPECIFICITY

The table below summarises past research choices for product specificity

Jacoby et al	1977	Disposal taxonomy	Qualitative interviews	Discreet durable products
Dahl	1980	Disposal pattern and cause of replacement (service life impls)		Discreet durable products - elec aps
Hansom	1980	Disposal behaviour framework	Theoretical	All product types
Harrell & McConocha	1992	Disposal behaviour motivations	Quantitative questionnaire	No specific product, criteria: item found not used for long time/ forgotten, moderate value, usable condition, no sentimental value.
Thogersen	1997	Waste prevention behaviour	Quantitative questionnaire	Packaging on non-durables
Taylor & Todd	1995	Waste reduction behaviour	Quantitative questionnaire	General category of garbage
Taylor & Todd	1995	Recycling and composting		Non-durables
Linn et al	1994	Waste minimisation/Precycling	Experimental	Packaging focus
De Young	1993	Source reduction behaviour		Grocery shopping
Durgee & O' Connnor	1995	Renting		Discreet products
Zikmund & Parker	1999	Renting to own		Consumer durables that are available in rent to own format.
Schwepker et al	1991	Purchase Intentions		Ecologically packaged products
Hoggs & Mitchell	1997	Cumulative consumption		Product groups
Ellen et al	1991	PCE and Ecological behaviour	Quantitative questionnaire	One-cat 'products'
Bayus	1992	Replacement and brand loyalty		Large electrical appliances
Rao & Bergen	1992	Acquisition / information avail - paying a price premium		Search and experience products - organisational buyer perspective
Wilkie & Dickson	1985	PCE / FIO and Ecological behaviour	Quantitative questionnaire	one-cat 'products'

APPENDIX 2 - PRODUCT CHOICE

The matrices on the following pages indicate the process of selecting products for investigation.

Allocation of general scores

Statement true on all occasions   –   10 points
Statement true on some occasions   –   5 points
Statement rarely or never true   –   0 points

Allocation of environmental impact scores

High environmental impact   –   10 points
Medium environmental impact   –   5 points
Low environmental impact   –   0 points

Table: Product Choice Furniture / Household Effects HK1 Process for choosing which products to select on the basis of their ability to test behavioural criteria / indicators and their environmental impact	Sofa	Kitchen units	Bed	Book / Display case	Table & Chairs	Wardrobe	Records / CDs	Cameras	Watch	Toothbrush	Living area seating
The product is used in regular domestic consumption	10	10	10	10	10	10	10	10	10	10	10
The product is owned by the majority of the population	10	10	10	10	10	10	10	10	10	10	10
It is likely that respondents will have had experience of AO and D of the product	5	5	5	10	5	5	10	10	10	10	10
The product is 'accessory equipment' rather than 'maintenance equipment'	10	10	10	10	10	5	10	5	10	0	10
The product can be considered 'High involvement'	10	10	10	10	10	10	10	10	10	0	10
The product is available in a wide range of cost / quality / durability	10	10	10	10	10	10	0	10	10	10	10
The product requires some form of regular maintenance (product care)	10	10	5	5	5	5	0	0	5	5	10
The product requires paper-work \ adherence to instructions	5	5	0	0	0	0	0	10	10	0	5
The product is influenced by changes in fashions	10	10	5	10	10	10	10	5	10	5	10
The product is influenced by changes in functions	5	0	0	0	0	0	0	10	10	10	5
The product is subject to problems with reliability	0	0	0	0	0	0	0	0	0	0	0
The product is receptive to reuse strategies	5	5	0	5	5	5	5	0	0	10	5
It is (technically) feasible to repair the product	10	10	0	10	10	10	0	10	10	0	10
The product has several possible disposal options (if still functioning)	10	10	10	10	10	10	10	10	10	10	10
The product has several possible disposal options (if needing repair)	0	0	0	5	5	5	0	5	5	0	5
The product is suspected of variations in its service life	10	5	0	5	0	0	5	5	5	0	10
TOTAL	120	110	75	110	100	95	80	110	125	80	130
Environmental impact											
Volume (Waste potential)	30	30	30	20	30	30	10	10	10	10	30
Toxicity (During manufacture, use and disposal)	20	20	20	10	10	10	10	20	10	10	20
Total Impact	**170**	**160**	**125**	**140**	**140**	**135**	**100**	**140**	**145**	**100**	**180**
Predisposed to joint (J) or individual (I) decision making (* - gender issue)	J	J	J	J	J	J	I	I	I	I	J

Table: Product Choice High Maintenance Equipment HK2 Process for choosing which products to select on the basis of their ability to test behavioural criteria / indicators and their environmental impact	Towels	Shoes (everyday)	Flooring (living area)	Soft Furnishings (living area)	Coat	Pans	Crockery	Kitchen wares
The product is used in regular domestic consumption	10	10	10	10	10	10	10	10
The product is owned by the majority of the population	10	10	10	10	10	10	10	10
It is likely that respondents will have had experience of AO and D of the product	10	10	10	10	10	10	10	10
The product is 'accessory equipment' rather than 'maintenance equipment'	5	10	10	10	10	5	5	5
The product can be considered 'High involvement'	5	10	10	10	10	5	10	5
The product is available in a wide range of cost / quality / durability	10	10	10	10	10	10	10	10
The product requires some form of regular maintenance (product care)	10	10	10	10	10	10	10	10
The product requires paper-work \ adherence to instructions	10	10	10	10	10	5	0	0
The product is influenced by changes in fashions	5	10	10	10	10	5	10	10
The product is influenced by changes in functions	0	5	5	0	0	5	0	5
The product is subject to problems with reliability	0	0	0	0	0	0	0	0
The product is receptive to reuse strategies	10	0	10	10	5	5	10	5
It is (technically) feasible to repair the product	5	10	5	10	10	5	5	5
The product has several possible disposal options (if still functioning)	10	10	10	10	10	10	10	10
The product has several possible disposal options (if needing repair)	10	0	5	5	5	0	0	0
The product is suspected of variations in its service life	0	5	5	5	5	5	5	5
TOTAL	110	120	130	130	125	100	105	100
Environmental impact								
Volume (Waste potential)	10	10	20	10	10	10	10	10
Toxicity (During manufacture, use and disposal)	10	20	20	10	10	20	10	10
Total Impact	**130**	**150**	**170**	**150**	145	130	125	120
Predisposed to joint (J) or individual (I) decision making (* - gender issue)	I*	I	J	I*	I	I*	I*	I*

Table: Product Choice APPLIANCES HK3 Process for choosing which products to select on the basis of their ability to test behavioural criteria / indicators and their environmental impact	Television / video	Stereo	Computer	W/M	Hoover	Toaster	Frd/Frz	Large White Appliances	Small elect Appliances	Brown Goods
The product is used in regular domestic consumption	10	10	10	10	10	10	10	10	10	10
The product is owned by the majority of the population	10	10	0	10	10	10	10	10	10	10
It is likely that respondents will have had experience of AO and D of the product	10	10	0	10	10	10	10	10	10	10
The product is 'accessory equipment' rather than 'maintenance equipment'	10	10	10	0	0	10	0	0	0	10
The product can be considered 'High involvement'	10	10	10	10	10	5	10	10	5	10
The product is available in a wide range of cost / quality / durability	10	10	0	10	10	10	10	10	10	10
The product requires some form of regular maintenance (product care)	5	5	5	5	10	5	10	10	5	5
The product requires paper-work \ adherence to instructions	5	5	5	10	5	5	10	10	5	5
The product is influenced by changes in fashions	5	5	0	5	10	5	5	5	5	5
The product is influenced by changes in functions	10	10	10	10	5	0	5	10	5	10
The product is subject to problems with reliability	0	0	0	10	0	0	5	10	0	0
The product is receptive to reuse strategies	0	0	0	0	0	0	0	0	0	0
It is (technically) feasible to repair the product	10	10	10	10	10	5	10	10	5	10
The product has several possible disposal options (if still functioning)	10	10	10	10	10	10	10	10	10	10
The product has several possible disposal options (if needing repair)	5	5	5	5	5	0	5	5	0	5
The product is suspected of variations in its service life	0	0	10	10	5	0	10	10	5	5
TOTAL	110	110	85	125	110	85	120	130	85	115
Environmental impact										
Volume (Waste potential)	20	20	20	30	10	10	30	30	10	20
Toxicity (During manufacture, use and disposal)	20	20	20	20	20	10	30	30	10	20
Total Impact	150	150	125	**175**	140	105	**180**	**190**	105	155
Predisposed to joint (J) or individual (I) decision making (* - gender issue)	I*	I*	J	J	I*	I*	J	J	I*	I*

APPENDIX 3 – QUESTIONNAIRE

The questionnaire used in the thesis is presented below. The colour of the paper on which the questionnaire was printed was yellow.

Using Products in Everyday Life

This questionnaire asks about how you use products that you have bought or received, used and discarded during everyday life. It focuses on three specific types of product:

'Everyday' Footwear	**Big Kitchen Appliance**	**Upholstered Chairs**
Footwear that **you wear on a daily basis for ordinary activities** including shoes, trainers, sandals, or boots (does not include slippers).	Large electrical appliances that are used mostly in the kitchen including cookers, refrigerators, freezers, or washing machines.	Chairs that are covered with fabric including dining chairs, armchairs, sofas, futons or sofa beds.

Guidelines for completing the questionnaire

1. Each question requires an answer for each individual product.
2. Each question has its own set of instructions, please follow them carefully.
3. If none of the responses listed are suitable please tick the box labelled 'other' and provide a short explanation in the box with the same number underneath. See example below.
4. Please try to answer all the questions.
5. If you experience difficulties with a question please make a note of this on the questionnaire.

Example

Where did you get each of these products from?

→ Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) a shop / retailer	√		
b) a catalogue, the internet or other mail order			
c) a charity shop or second hand market / shop			√
d) a private sale (e.g. newspaper / advert board)			
e) a friend / family			
f) other (→ please provide details in the box below)	①	② √	③
g) I don't remember / I don't know			

①	② a rental company	③

Please note your responses will only be used for research purposes. The information you provide is treated as **confidential**. It will not be used to sell you anything or be passed on to any other organisation.

SECTION I - Buying or Receiving Products

1. **What was the last sort of product that you bought or received (e.g. as a gift) in each of the following product categories? (Only include products got for use by you and your household)**

→Please tick one box for each product. If you have never bought or received this kind of product please tick the box labelled 'Not applicable' and leave the other questions relating to this product blank.

'Everyday' footwear		Big kitchen appliance		Upholstered chairs	
Shoes (casual / formal)	☐	Washer / Drier machine	☐	2/3 piece suite	☐
Sport shoes	☐	Fridge / Freezer	☐	Sofa	☐
Boots	☐	Oven / Cooker	☐	Arm chair	☐
Sandals	☐	Dishwasher	☐	Dining chairs	☐
Not applicable	☐	Not applicable	☐	Not applicable	☐

2. **How many years have you owned each of the products selected in question 1?**

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) Under 1 year	☐	☐	☐
b) 1-5 years	☐	☐	☐
c) Over 5 years	☐	☐	☐

3. **How did you get each of the products selected in question 1?**

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered furniture
a) It was given to me (e.g. as a gift)	☐	☐	☐
b) I found it by chance, I just saw it, liked it and got it	☐	☐	☐
c) I compared several similar products before choosing one	☐	☐	☐
d) I did some research about this type of product before comparing several similar products and choosing one	☐	☐	☐
e) other (→ please provide details in the box below)	①	②	③
f) I don't remember / I don't know	☐	☐	☐

①	②	③

4. **What was the *MAIN* reason for buying / receiving each of the products selected in question 1?**

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) the failure of an existing product	☐	☐	☐
b) to update to a more modern style of product	☐	☐	☐
c) to update to a product with more advanced features	☐	☐	☐
d) a special offer	☐	☐	☐
e) to start a home (first time I'd needed this type of product)	☐	☐	☐
f) other (→ please provide details in the box below)	①	②	③
g) I don't know / I don't remember	☐	☐	☐

①	②	③

5. **Where did you get each of the products selected in question 1 from?**

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) a shop / retailer			
b) a catalogue, the internet or other mail order			
c) a charity shop or second hand market / shop			
d) a private sale (e.g. newspaper / advert board)			
e) a friend / family			
f) other (→ please provide details in the box below)	①	②	③
g) I don't remember / I don't know			

①	②	③

---

6. **What were the three most important requirements for each of the products selected in question 1?**

→Please select three of the fifteen possible requirements for each product and put them in order of importance in the boxes below, using the numbers provided.

1 - Appealing colour(s)	6 - Reasonable price	11 - Quality / reliability
2 - Modern / fashionable style	7 - Low running costs	12 - Desired functions / features
3 - Traditional / timeless style	8 - Easy to clean / maintain	13 - Right size / fit / shape
4 - Attractive design	9 - Easy to repair / restore	14 - Well known brand
5 - Matches other products	10 - Easy to use	15 - Long life expectancy

	Example	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
First most important	2			
Second most important	6			
Third most important	10			
Not applicable, I did not choose the product				

---

7. **When first bought or received, how long did you intend to keep each of the products selected in question 1?**

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) until it became damaged / needed repair			
b) until it became broken beyond repair			
c) until it became worn or tired looking			
d) until the style of the product became out of date			
e) until a better product was found e.g. with advanced features			
f) other (→ please provide details in the box below)	①	②	③
g) I don't know / I don't remember			

①	②	③

IX

SECTION II - Use and Care of Products

8. What sort of product have you had for the longest time in each of the following product categories? (Only include products that are still in regular use by you and your household)

→Please tick <u>one</u> box for <u>each</u> product. If you do not have this kind of product please tick the box labelled 'Not applicable' and leave the other questions relating to this product blank.

'Everyday' footwear		Big kitchen appliance		Upholstered chairs	
Shoes (casual / formal)	☐	Washer / Drier machine	☐	2/3 piece suite	☐
Sport shoes	☐	Fridge / Freezer	☐	Sofa	☐
Boots	☐	Oven / Cooker	☐	Arm chair	☐
Sandals	☐	Dishwasher	☐	Dining chairs	☐
Not applicable	☐	Not applicable	☐	Not applicable	☐

9. How many years have you owned each of the products selected in question 8?

→Please tick <u>one</u> box for <u>each</u> product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) Under 1 year	☐	☐	☐
b) 1-5 years	☐	☐	☐
c) 5 – 10 years	☐	☐	☐
d) Over 10 years	☐	☐	☐

10. How intensively do you use each of the products selected in question 8?

→Please tick <u>one</u> box for <u>each</u> product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) it is used very intensively, everyday for all / most of the year	☐	☐	☐
b) it is used intensively a few times a week for most of the year	☐	☐	☐
c) it is only used occasionally	☐	☐	☐
d) it is rarely used	☐	☐	☐

11. How do you treat each of the products selected in question 8 during use?

→Please tick <u>one</u> box for <u>each</u> product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) I just use it, I don't worry about it	☐	☐	☐
b) I treat it with care (but not as much as when I first had it)	☐	☐	☐
c) I treat it with great care (to keep it in its original condition)	☐	☐	☐

12. How often do you clean each of the products selected in question 8?

→Please tick <u>one</u> box for <u>each</u> product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) rarely / never	☐	☐	☐
b) when they have become dirty or marked	☐	☐	☐
c) now and again, when there is time	☐	☐	☐
d) on a routine basis (e.g. once a week / month)	☐	☐	☐
e) I don't remember / I don't know	☐	☐	☐
f) I don't, but someone in the household does	☐	☐	☐

X

13. **Have you done any of the following activities to help make each of the products selected in question 8 last longer?**

→Please tick either 'Yes' or 'No' for each activity. If not applicable please state 'N/A' in the 'No' column

	'Everyday' footwear		Big kitchen appliance		Upholstered chairs	
	Yes	No	Yes	No	Yes	No
a) carried out regular care and maintenance on the product						
b) used protective measures						
c) followed the seller's or manufacturer's instructions						
d) followed personal or household rules of use / maintenance						
e) carried out repair / restoration on the product at home						
f) had the product repaired / restored by a specialist						
g) re-used it for a different task or in a different place						
h) bought or received the product either used or second hand						
i) kept the product stored for possible future use						
j) I haven't but someone else in the household has done						

Have you done any additional activities that are not listed here?

→Please describe any additional activities in the boxes below

'Everyday' footwear	Big kitchen appliance	Upholstered chairs

---

14. **How long do you intend to keep each of the products selected in question 8?**

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) until it becomes damaged / needs repair			
b) until it becomes broken beyond repair			
c) until it becomes worn or tired looking			
d) until the style of the product becomes out of date			
e) until a better product is found e.g. with advanced features			
f) other (please describe)	①	②	③
g) I don't know / I don't remember			

①	②	③

SECTION III - Discarding Products

15. **What was the last sort of product that you discarded (e.g. sold, donated to charity or threw out as rubbish), in each of the following product categories? (Only include products that were yours or were used by your household)**

→ Please tick one box for each product. If you have never discarded this kind of product please state 'Not Applicable' and leave the other questions relating to this product in this section blank.

'Everyday' footwear		Big kitchen appliance		Upholstered chairs	
Shoes		Washer / Drier machine		2/3 piece suite	
Trainers		Fridge / Freezer		Sofa	
Boots		Oven / Cooker		Arm chair	
Sandals		Dishwasher		Dining chairs	

16. How many years ago did you discard each of the products selected in question 15?

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) Under 1 year			
b) 1-5 years			
c) Over 5 years			

17. How did you discard each of the products selected in question 15?

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) it was put in the bin and collected with the other rubbish			
b) it was collected as bulky waste by the council			
c) it was taken to the local tip / dump (civic amenity site)			
d) it was collected by a retailer while delivering a new product			
e) it was sold or traded privately			
f) it was donated to charity (jumble sale, charity shop)			
g) it was given free of charge to family or friends			
h) other (→please provide details in the box below)	①	②	③
i) I don't remember / I don't know			

①	②	③

18. When discarded, what was the condition of each of the products selected in question 15?

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) functioning well			
b) functioning but looked worn			
c) needing repair			
d) broken beyond repair			
e) other (→please provide details in the box below)	①	②	③
f) I don't remember / I don't know			

①	②	③

19. What was the *MAIN* reason for discarding each of the products selected in question 15?

→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered furniture
a) it was not fit for use (e.g. damaged, worn or unhygienic)			
b) it did not have the desired functions / features			
c) changing fashions had made it look dated			
d) changing circumstances made it unnecessary or unsuitable (→ please provide details in the box below)	①	②	③
e) other (→ please provide details in the box below)	①	②	③
f) I don't remember / I don't know			

①	②	③

XII

20. How long had you originally intended to keep each of the products selected in question 15?
→Please tick one box for each product.

	'Everyday' footwear	Big kitchen appliance	Upholstered chairs
a) until it had become damaged / needed repair			
b) until it had become broken beyond repair			
c) until it had become worn or tired looking			
d) until the style of the product had become out of date			
e) until a better product is found e.g. with advanced features			
f) other (→please provide details in the box below)	①	②	③
g) I don't know / I don't remember			

①	②	③

SECTION IV - *You and Your Household*
These questions are asked in order to make sure that the views of a range of different people are considered.

---

21. Are you are male or female?
→Please tick the appropriate box.

Male ☐
Female ☐

---

22. What was your age on your last birthday?
→Please tick the appropriate box.

16 - 24 ☐   35 - 44 ☐   55 - 64 ☐
25 - 34 ☐   45 - 54 ☐   65+ ☐

---

23. What is your current marital status?
→Please tick the appropriate box.

Married ☐   Single (living with partner) ☐
Widowed ☐   Single (never married) ☐
Divorced / separated ☐

---

24. How many adults are there in your household?
→Please circle the appropriate number

Number of adults (aged 16+)   1 2 3 4 5 >5

---

25. How many children are there in your household?
→Please circle the appropriate number

Number of children (under 16)   0 1 2 3 4 >4

---

26. How do you occupy your current accommodation?
→Please tick the appropriate box.

rent accommodation ☐
buying accommodation (mortgage / loan) ☐
own accommodation outright ☐

Other (please describe) _____

---

27. How is the main income earner in your household currently employed?
→Please tick the most appropriate box.

Full time (>30 hrs /wk) ☐   Unemployed ☐
Part time (<30 hrs /wk) ☐   Retired ☐
Self employed ☐   Student ☐

Other (please describe) _____

---

28. What is the main job title of the main income earner in your household at the current time?

→Please include where applicable the number of staff this person is responsible for. If unemployed or retired, state their previous occupation.

29. **Please estimate your total household income each year?**

→Please tick the appropriate box.

£10K or under	☐	£31K - £40K	☐
£11K - £20K	☐	£41K - £50K	☐
£21K - £30K	☐	over £50k	☐

---

30. **Do you have any formal qualifications?**

→Please tick your highest qualification

Other (please describe) _____

GCSE / O-level / GNVQ	☐
GCE A Level / Advanced GNVQ Level 3	☐
Further Education below degree level	☐
Degree or equivalent	☐
No, no formal qualification's held	☐

---

31. **Do you have access to a private vehicle?**

→Please tick the appropriate box.

No	☐
Yes, access to <u>one</u> vehicle	☐
Yes, access to several vehicles	☐

---

32. **Do you support any environmental groups (via membership or contributions)?**

→Please tick the appropriate box.

Yes	☐
No	☐

---

33. **Have you done any of the following activities in the past two weeks?**

→Please tick the appropriate box.

	Yes	No
bought organic fruit or vegetables	☐	☐
used energy saving light bulbs	☐	☐
recycled old newspapers, glass or cans	☐	☐

OPTIONAL

It would be very helpful if you could spare some additional time to discuss the issues raised within this questionnaire. If you are willing to help further please provide your name and address in the box below.

Name		Telephone	
Address			
Post code			

THANK YOU FOR YOUR HELP

Please write any additional comments about the questionnaire on the back of this sheet. Thank you.

APPENDIX 4 – INTERVIEW SCHEDULE

The schedule and aides used to conduct the semi-structured interviews follow.

Using Products in Everyday Life

Discussion Schedule

First of all I would like to *formally introduce* myself. My name is Sian Evans and I am a researcher here at the university working in both the school of leisure management and the school of engineering. My *special interest* is the exploration of consumption patterns for household products and I very much *value the time and effort* that you have made to come to this discussion today to share your thoughts in this area.

The *aim* of this discussion is to draw on your experiences of buying, using and disposing of household products in your everyday life. The discussion will follow the *same three types of products* that were asked about in the questionnaire that you kindly completed. These are shown in the pictures here and include everyday footwear, big kitchen appliances and upholstered chairs. I will be asking about your actions, ideas and opinions on the consumption of these products. There are *no right or wrong* answers and no judgements are being made.

The *timing* of different questions will vary, but as a rough guide the questionnaire will be split into four sections. The first looks at buying or receiving products. The second focuses on using and owning products. The third addresses disposal and the final section deals with overall patterns and additional items. Each section will last approximately fifteen minutes. Please feel *free to interrupt* and ask me to repeat or explain a question, or stop the discussion.

The information that you provide will be treated with the *strictest confidence*. It will not be passed on to any other organisation or used to try and sell you anything.

Finally, would you mind if I recorded the discussion, this will save time?

Reminder of Product Categories

* Everyday footwear

Footwear that you wear on a daily basis for ordinary activities including shoes, trainers, sandals, boots etc.

* Big kitchen appliances

Large electrical appliances that are used mostly in the kitchen, including cookers, refrigerators, freezers or washing machines.

* Upholstered chairs

Chairs that are covered with fabric including dining chairs, armchairs, sofas, futons or sofa beds.

Beginning with

Section 1 - Buying / Receiving

This section is going to look mostly at similarities and differences between your approach to buying the three products. To help to do this I'm going to break it down into a series of shorter questions. During each answer it would be very helpful where possible for you to draw on specific examples of your behaviour.

So, first of all I'm interested in buying decisions and their timing. *What are the similarities and differences between products in what tends to prompt you to buy / replace them?* If its easier you may want to speak about people generally to begin with and then say how you are the same or different to others. An interesting starting point may be to say what you think about the influence of advertising.

If not advertising, what are the main things that tend to prompt you and why?
If advertising does, how does it? Is there any other influence? What are the main ones?

Influences Ideas

1. Person based - values, attitudes, norms friends / family past and present
2. Product based - existing product dissatisfaction or new product attraction
3. Situation based - life change, special event, special offer

---

Moving on to the next question about buying each of the three types of product. *What are the similarities and differences between products in terms of your main priorities when buying them?* Again if its easier you may want to speak about people generally to begin with and then say how you are the same or different to others.
*** Alternative if gift / received from someone else / chosen by someone else what about the product attracts you or don't you like?

Why differences?
Do you consider second hand options?
Efforts you take to find the 'right' product?
Are you able to find the 'right' products / meet priorities?

Influences Ideas

1. Person based - values, attitudes, norms friends / family past and present
2. Product based - existing product dissatisfaction or new product attraction
3. Situation based - life change, special event, special offer

---

Finally, do you think you act more or less the same within each product type when buying or is it different each time?

Lets move onto the next stage once products are in the home:

This section is going to look mostly at similarities and differences between your approach to owning / using the three products. Again, to help to do this I'm going to break it down into a series of shorter questions. As before, it would be very helpful where possible for you to draw on specific examples of your behaviour.

So, first of all w*hat are the similarities and differences between products in terms of your treatment of them on a day to day basis?* As before, if its easier you may want to speak about people generally to begin with and then say how you are the same or different to others.

> *Why / Why not?*
> *Informal rules of use?*
> *Does treatment during use change across time? Speed of change different for 3 products?*

Influences Ideas

1. Product based - make products last longer / keep them looking new etc.
2. Person based - values, attitudes, norms effect of friends / family past and present
3. Situation based - life change, special event, special offer

---

What are the similarities and differences between products in terms of your maintenance of them? (Maintenance - time specifically allocated for the care of the product to prolong its useful life) *Is this the same pattern as your treatment during use?*

> *Why / Why not? What influences?*
> *Does treatment during use change across time? Speed of change different for 3 products?*

Over time products gradually move from their 'ideal' state at which they were first bought or received. This is shown in the picture here (show diagram). Sometime after the product has been bought, it will move away from the ideal state.

Point at which dispose following loss of its ideal state varies and actions can be taken to repair product or make changes to it to retain satisfaction with it e.g. new cover for chair. In addition a product may be kept stored or in a different room for other uses, and a replacement bought.

Thinking of your own experiences. *What are the similarities and differences between products in terms of when dissatisfaction starts to set in? What are the reasons for becoming less happy with the three products?* As before, if its easier you may want to speak about people generally to begin with and then say how you are the same or different to others. *An interesting starting point may be to play with the counters and position according to products in your home.*

> *What triggers dissatisfaction? Why?*
> *Is this process gradual or sudden?*

What are the similarities and differences between products in actions to prolong their life once dissatisfaction has occurred? Repair / Reuse. Why?

Finally, do you think you act more or less the same within each product type or are their differences each time?

Moving on to

Section 3 - Disposal

This shorter section is going to look at similarities and differences between your approach to disposing of the three products. Again, to help to do this I'm going to break it down into a series of shorter questions. As before, it would be very helpful where possible for you to draw on specific examples of your behaviour.

So first of all *what are the similarities and differences between products in terms of what triggers ultimate disposal? Why?* As before, if its easier you may want to speak about people generally to begin with and then say how you are the same or different to others.

> Influences Ideas
>
> 1. Person based - values, attitudes, norms friends / family past and present
> 2. Product based - existing product dissatisfaction or new product attraction
> 3. Situation based - life change, special event, special offer

What effects the time between dissatisfaction and actual disposal?

What are the similarities and differences between products in terms of your choice of where and how you dispose of them? Again if its easier you may want to speak about people generally to begin with and then say how you are the same or different to others.

Finally, do you think you act more or less the same within each product type or are their differences each time?

Section 4 - General

Summary - impression highlight differences observed across stages of consumption.

Is this characteristic of your behaviour generally, or do you think the products effected your answers or is it so changeable that it is difficult to generalise?

How do you think you change towards each of the three products over time?

Overall do you think you are the sort of person who enjoys the opportunity to renew each of the three products or are you the sort of person who likes to extend their life? Why?

Green consumers (if not already spoken about environment). Discuss their environmental beliefs and how they see these fitting into their daily patterns of product consumption.

3 Product Types

Movement away from 'ideal' state

TIME

Buy / Receive
Product

Dispose of
Product

Options

May become dissatisfied because of technological change

May become dissatisfied because of style or fashion change

May become dissatisfied because product has become worn

May become dissatisfied because product has broken

May become dissatisfied for another reason

May dispose before any kind of dissatisfaction

APPENDIX 5 – SYSTEM OF SCORING

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Examples of reactions to wants and needs and external forces

Acquisition prompted by wants not necessarily needs – Examples
- Changing kitchen - wants new kitchen furniture buys new appliances at the same time
- Likes product and gets it - desires new product
- Re-decorating - changing decoration and changes product at same time to match
- Replaced with better quality - intention optimising but still wants rather than needs something better
- Special offer – prompted by a bargain

Acquisition prompted by needs/ external forces – Examples
- First time had product – defined as need (debatable for certain kitchen appliances)
- Given product – defined as external force, the respondent has little control over acquisition
- Changing needs - current prod unable to meet growing or shrinking needs
- Medical reasons - existing product unable to meet medical needs
- Moving house - defined as external force, little control over associated changes in needs
- Special purpose - existing prod unable to meet needs
- Re-upholstered – considered as acquisition by need

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Main reason for disposal

Disposal prior to failure prompted by new wants not necessarily needs – Examples

- Changing kitchen - wants new kitchen furniture buys new appliances and discards old
- Tired / bored - discards because no longer likes product
- Re-decorating - discards old because changing decoration so changes product too
- Replaced - discarded because got something new
- Excess to needs /Given to someone else - discarded as no longer required
- Could afford better quality replacement - discarded because bought 'better'

Disposal prior to failure prompted by needs/ external forces – Examples

- Moving house - External force leading to change in needs
- Wrong size - Reaction to changing needs – current prod unable to meet needs
- Gift replacement - External force - no / little control over a gift
- No longer fitted - Existing prod unable to meet needs
- Medical reasons - Existing prod unable to meet medical needs

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Patterns of consumption that affect product life in acquisition

Combines scores for source + search + priority requirements and then combines with prompt to give overall score from 6 highly optimising to 0 non-optimising.

Source	Search	Priority	Score
New (a, b, market, kitchen design / manufacturer, handmade, work, hospital)	Full research (d*)	Prioritised long life expectancy in top 3 (LLE) (15)	4
		Prioritised >1 req assoc with LLE (3,8,9 or 11)	3
		Did not prioritise LLE	2
	Partial research (c)	Prioritised long life expectancy in top 3 (LLE) (15)	3
		Prioritised >1 req assoc with LLE (3,8,9 or 11)	2
		Did not prioritise LLE	1
	No research (b**)	Prioritised long life expectancy in top 3 (LLE) (15)	2
		Prioritised >1 req assoc with LLE (3,8,9 or 11)	1
		Did not prioritise LLE	0
Used (c, d, upholsterer)	Full research (d*)	Prioritised long life expectancy in top 3 (LLE) (15)	4
		Prioritised >1 req assoc with LLE (3,8,9 or 11)	3
		Did not prioritise LLE	2
	Partial research (c)	Prioritised long life expectancy in top 3 (LLE) (15)	4
		Prioritised >1 req assoc with LLE (3,8,9 or 11)	3
		Did not prioritise LLE	2
	No research (b**)	Prioritised long life expectancy in top 3 (LLE) (15)	3
		Prioritised >1 req assoc with LLE (3,8,9 or 11)	2
		Did not prioritise LLE	1
Friend / family (e, other)	Received	Did not choose (16)	MD(77)
Don't know	Don't know		MD(88)

Prompt	Score
Product failure (a)	2
Product obsolescence (b, c, d)	0
Reaction to wants	0
Reaction to needs / external forces	2
Don't know	MD (code 88)

Patterns of consumption that affect product life in ownership

Combines scores for treatment & cleaning + maintenance & rejuvenation to give overall score from 6 highly optimising to 0 non-optimising.

| Treatment | Cleaning | Activities to prolong product life | | Score |
		Maintenance	Rejuvenation	
Indifferent (a)	Preventive (d)	≥ 2 activities	≥ 2 activities	4
			<2 activities	3
		<2 activities	≥ 2 activities	3
			<2 activities	2
	Reactive (b, c)	≥ 2 activities	≥ 2 activities	3
			<2 activities	2
		<2 activities	≥ 2 activities	2
			<2 activities	1
	Rare (a)	≥ 2 activities	≥ 2 activities	2
			<2 activities	1
		<2 activities	≥ 2 activities	1
			<2 activities	0
Care (b)	Preventive (d)	≥ 2 activities	≥ 2 activities	5
			<2 activities	4
		<2 activities	≥ 2 activities	4
			<2 activities	3
	Reactive (b, c)	≥ 2 activities	≥ 2 activities	4
			<2 activities	3
		<2 activities	≥ 2 activities	3
			<2 activities	2
	Rare (a)	≥ 2 activities	≥ 2 activities	2
			<2 activities	1
		<2 activities	≥ 2 activities	1
			<2 activities	0
Great care (c)	Preventive (d)	≥ 2 activities	≥ 2 activities	6
			<2 activities	5
		<2 activities	≥ 2 activities	5
			<2 activities	4
	Reactive (b, c)	≥ 2 activities	≥ 2 activities	5
			<2 activities	4
		<2 activities	≥ 2 activities	4
			<2 activities	3
	Rare (a)	≥ 2 activities	≥ 2 activities	2
			<2 activities	1
		<2 activities	≥ 2 activities	1
			<2 activities	0
All	Someone else in h/h	-	-	MD (66)
All	Don't remember / know (e)	-	-	MD (88)

Patterns of consumption that affect product life in disposal

Combines scores for prompt + condition + route to give overall score from 6 highly optimising to 0 non-optimising.

Prompt & Condition & Route

Prompt	Condition	Route	Score
Product failure	Functioning well (a)	Re-use (e, f, g, other)	X (111)
		Waste (a, b, c, other)	X (111)
		Don't know (g)	MD(88)
	Functioning but worn (b)	Re-use (e, f, g, other)	4
		Waste (a, b, c, other)	3
		Don't know (g)	MD(88)
	Needing repair (c)	Re-use (e, f, g, other)	5
		Waste (a, b, c, other)	5
		Don't know (g)	MD(88)
	Broken beyond repair (d)	Re-use (e, f, g, other)	6
		Waste (a, b, c, other)	6
		Don't know (g)	MD(88)
	Don't know (g)		MD(88)

Prompt	Condition	Route	Score
Product obsolescence Reaction to new wants	Functioning well (a)	Re-use (e, f, g, other)	1
		Waste (a, b, c, other)	0
		Don't know (g)	MD(88)
	Functioning but worn (b)	Re-use (e, f, g, other)	2
		Waste (a, b, c, other)	1
		Don't know (g)	MD(88)
	Needing repair (c)	Re-use (e, f, g, other)	3
		Waste (a, b, c, other)	3
		Don't know (g)	MD(88)
	Broken beyond repair (d)	Re-use (e, f, g, other)	X (111)
		Waste (a, b, c, other)	X (111)
		Don't know (g)	MD(88)
	Don't know (g)		MD(88)

Prompt	Condition	Route	Score
Reaction to needs / external forces	Functioning well (a) Functioning but worn (b)	Re-use (e, f, g, other)	5
		Waste (a, b, c, other)	2
		Don't know (g)	MD(88)
	Needing repair (c)	Re-use (e, f, g, other)	5
		Waste (a, b, c, other)	5
		Don't know (g)	MD(88)
	Broken beyond repair (d)	Re-use (e, f, g, other)	X (111)
		Waste (a, b, c, other)	X (111)
		Don't know (g)	MD(88)
	Don't know (f)	-	MD(88)

Prompt	Condition	Route	Score
Don't know	-	-	MD(88)

X = Illogical combination, MD = Missing data

APPENDIX 6 – INTERVIEW TRANSCRIPTS

See attached CD ROM.

APPENDIX 7 - CLASSIFYING RESPONSES

Several types of none response were identified. In total 36 responses received were dealt with as 'spoilt'. Judging the reliability of incoming questionnaires was considered important, selecting parameters for identifying spoilt papers allows a consistent approach to this process. A questionnaire was considered spoilt under one or more of the following conditions:

- Where confusion and error was evident in a substantial proportion of responses leading to the conclusion that the entire questionnaire was unreliable (11)
- Where whole pages of data were absent (7)
- Where poor performance led to excessive missing data in sections 1 to 3, which led to doubts regarding the reliability of the entire questionnaire (14).
- Where the entire section on household characteristics had been left blank (4)

The criteria for categorising a response as spoilt due to poor performance was set as when a respondent had left four or more whole applicable questions blank for any one product ($\geq 20\%$).

This was considered justified as the questionnaire incorporates cross-referencing with each question in each section referring back to a product identified at the beginning of that section. Where a respondent left a number of questions blank the reliability of subsequent questions was frequently called into doubt.

In total 69 responses were recorded as 'unable to complete'. This term was used when the following conditions prevented the respondent from completing the questionnaire

- morbidity (10), or simply old age (16)
- disability (4 impaired vision, 2 with dementia)
- mortality (3)
- migration (2)
- poor English comprehension (2)
- lack of interest (7)
- a complaint was registered (3)
- it was also used when a questionnaire was returned blank with no explanation (20)

These communications were mostly received as explanations over the phone. Several wrote letters which they enclosed when returning their blank questionnaires. A number of respondents had attempted one or two questions and then stopped and written 'too

old' or 'elderly'. Those respondents who had made a complaint were sent letters of apology (this was due to the problem with the internal post office's franking machine).

Two completed questionnaires arrived after the cut off date (analysis had already begun).

APPENDIX 8 - PRODUCT VARIATION

Variation in product type for each stage of consumption.

EVERYDAY FOOTWEAR

	Acquisition %	Ownership %	Disposal %
Shoes (casual / formal)	64.0	46.2	59.8
Sport shoes	17.0	14.2	23.9
Boots	11.1	31.5	7.3
Sandals	7.9	8.1	9.0
Total	100.0	100.0	100.0
N	705	704	686
Unknown data	3	3	6
Not applicable	3	4	19

BIG KITCHEN APPLIANCES

	Acquisition %	Ownership %	Disposal %
Washer / Drier machine	37.3	28.2	35.5
Fridge / Freezer	33.0	31.9	35.7
Oven / Cooker	21.5	36.1	25.0
Dishwasher	8.3	3.8	3.8
Total	100.0	100.0	100.0
N	652	681	580
Unknown data	8	1	13
Not applicable	51	29	118

UPHOLSTERED CHAIRS

	Acquisition %	Ownership %	Disposal %
2/3 piece suite	63.4	46.4	58.9
Sofa	13.3	10.4	14.5
Arm chair	11.1	5.7	13.3
Dining chairs	12.1	37.5	13.3
	100.0	100.0	100.0
N	610	653	525
Unknown data	11	5	10
Not applicable	90	53	176

APPENDIX 9 – BEHAVIOUR CONSISTENCY

Statistical exploration of consistency in product life classifications across the three stages of the consumption process for each product category, using the Friedman test.

1. Null hypothesis (H_o) = There is no significant difference between the product life classifications at each stage of consumption for each product.

FRIEDMAN TEST - A-O-D Consistency across PL index	EDF (mean rank)	BKA (mean rank)	UPC (mean rank)
Acquisition PL index	1.56	1.77	1.80
Ownership PL index	1.80	1.77	2.27
Disposal PL index	2.64	2.46	1.93
Number	530	417	344
Chi Square	382.462	147.014	48.579
df	2	2	2
Asymp. Sig.	**.000**	**.000**	**.000**

Given that the p (sig.) value is <0.05 for each product, H_o is rejected and it is concluded that there is a significant difference between the product life classifications at each stage of consumption for each product.

2. Null hypothesis (H_o) = There is no significant difference between the product life classifications of each product at each stage of consumption.

FRIEDMAN TEST - E_B_U Consistency across PL index	ACQUISITION (mean rank)	OWN (mean rank)	DISPOSAL (mean rank)
Everyday footwear PL index	1.60	1.52	2.11
Ownership PL index	2.42	2.28	2.26
Disposal PL index	1.99	2.20	1.63
Number	425	514	411
Chi Square	172.237	243.805	110.756
df	2	2	2
Asymp. Sig.	**.000**	**.000**	**.000**

Given that the p (sig.) value is <0.05 for each product, H_o is rejected and it is concluded that there is a significant difference between the product life classifications of each product at each stage of consumption.

APPENDIX 10 - PROFILES DATA

TABLE 1 - PROFILES OF OPTIMISATION ACROSS CONSUMPTION PROCESS

CONSUMPTION PROFILES		EDF N#	Val %	BKA N#	Val %	UPC N#	Val %
	A-O-D	3	0.6	6	1.4	3	0.9
Optimised	A-O-D	0	0	3	0.7	4	1.2
(bold & underlined)	A-O-D	18	3.4	48	11.5	8	2.3
	A-O-D	12	2.3	53	12.7	9	2.6
	A-O-D	5	0.9	10	2.4	22	6.4
	A-O-D	12	2.3	19	4.6	48	14.0
	A-O-D	257	48.5	182	43.6	57	16.6
	A-O-D	223	42.1	96	23.0	193	56.1
	Valid Total	530	100.0	417	100.0	344	100.0
Missing / Unknown		181		294		367	
	Total	711		711		711	

TABLE 2 - PROFILES OF OPTIMISATION ACROSS PRODUCT CATEGORIES

PLB PRODUCT PROFILES		ACQ N#	Val %	OWN N#	Val %	DISC N#	Val %
	EDF - BKA - UPC	1	0.2	9	1.8	43	10.5
	EDF - BKA - UPC	5	1.2	4	0.8	105	25.5
Optimised	EDF - BKA - UPC	4	0.9	4	0.8	19	4.6
(bold &	EDF - BKA - UPC	14	3.3	39	7.6	27	6.6
underlined)	EDF - BKA - UPC	11	2.6	6	1.2	49	11.9
	EDF - BKA - UPC	43	10.1	44	8.6	99	24.1
	EDF - BKA - UPC	28	6.6	32	6.2	9	2.2
	EDF - BKA - UPC	319	75.1	376	73.2	60	14.6
	Valid Total	425	100.0	514	100.0	411	100.0
	Missing / Unknown	286		197		300	
	Total	711		711		711	

APPENDIX 11 – INFLUENCING FACTORS

a) The influence of demographic and socio economic factors on optimising patterns of consumption

A series of Pearson chi-square tests were carried out exploring potential relationships between respondents classifications by optimising type (none, moderately or highly) and a series of demographic and socio-economic variables.

Null hypothesis (H_o) = There is no significant difference between the product life classifications for each stage of consumption and for each product and a series of demographic and socio-economic variables.

The table below provides summary statistics. It highlights the occasions where the p (sig.) value is <0.05 (Cramer's V). On such occasions this indicates that the null hypotheses has to be rejected and the conclusion drawn that there is a significant difference between the product life classification for that product at that stage and the particular demographic or socio-economic variable being explored.

SUMMARY STATISTICS

	Acquisition			Ownership			Disposal		
	EDF	BKA	UPC	EDF	BKA	UPC	EDF	BKA	UPC
Gender	.000	.020	-	-	-	-	.000	-	-
Age	-	.036	-	.001	.000	.000	-	-	.031
Household structure	-	.001	-	-	-	-	-	-	.027
Home ownership	-	-	-	.028	.000	-	-	-	-
Current employment	-	.024	-	-	.000	.000	-	-	-
Household income	-	-	-	-	.001	-	-	-	-
Education level	-	.020	-	-	.000	.013	-	-	-
Vehicle access	-	-	-	.040	.038	-	-	-	.019

INTENTIONS STATISTICS

	Acquisition			Ownership			Disposal		
	EDF	BKA	UPC	EDF	BKA	UPC	EDF	BKA	UPC
Gender	.003	-	.006	.018	-	-	.000	-	-
Age	.072	-	-	.006	.019	.007	-	-	.005
Household structure	-	-	.001	-	-	-	-	-	-
Home ownership	.010	.032	-	-	-	-	-	-	-
Current employment	-	-	.004	-	-	-	-	-	.001
Household income	-	-	-	-	-	-	-	-	-
Education level	.039	-	.015	.005	-	.004	-	-	.000
Vehicle access	-	-	-	-	-	-	-	-	-

b) The influence of environmental factors on optimising patterns of consumption

A series of Pearson chi-square tests were carried out exploring potential relationships between respondents classifications by optimising type (none, moderately or highly) and a series of environmental variables.

Null hypothesis (H_o) = There is no significant difference between the product life classifications for each stage of consumption and for each product and a series of environmental variables.

The table below provides summary statistics. It highlights the occasions where the p (sig.) value is <0.05 (Cramer's V). On such occasions this indicates that the null hypotheses has to be rejected and the conclusion drawn that there is a significant difference between the product life classification for that product at that stage and the particular environmental variable being explored.

SUMMARY STATISTICS

	Acquisition			Ownership			Disposal		
	EDF	BKA	UPC	EDF	BKA	UPC	EDF	BKA	UPC
Support environmental groups	-	-	-	-	-	-	-	-	.000
Environmental Activities Index	-	-	-	-	-	-	.025	-	-

INTENTIONS STATISTICS

	Acquisition			Ownership			Disposal		
	EDF	BKA	UPC	EDF	BKA	UPC	EDF	BKA	UPC
Support environmental groups	-	.037	.012	.007	-	-	.003	-	.005
Environmental Activities Index	-	-	-	-	.035	-		-	-

APPENDIX 12 – CONSISTENCY IN INTENTIONS

Statistical exploration of consistency in product life intentions across the three stages of the consumption process for each product category, using the Friedman test.

1. Null hypothesis (H_o) = There is no significant difference between product life intentions at each stage of consumption for each product.

FRIEDMAN TEST - A-O-D Consistency across PL intention	EDF (mean rank)	BKA (mean rank)	UPC (mean rank)
Acquisition PL intention	2.20	1.96	2.06
Ownership PL intention	1.87	1.96	1.79
Disposal PL intention	1.93	2.08	2.15

Number	663	559	470
Chi Square			
df	2	2	2
Asymp. Sig.	.000	.001	.000

Given that the p (sig.) value is <0.05 for each product, H_o is rejected and it is concluded that there is a significant difference between product life intentions at each stage of consumption for each product.

2. Null hypothesis (H_o) = There is no significant difference between the product life intentions for each product at each stage of consumption.

FRIEDMAN TEST - E_B_U Consistency across PL intention	ACQUISITION (mean rank)	OWN (mean rank)	DISPOSAL (mean rank)
Everyday footwear PL intention	2.34	2.29	2.17
Ownership PL intention	1.35	1.50	1.48
Disposal PL intention	2.30	2.20	2.35

Number	589	627	463
Chi Square			
df	2	2	2
Asymp. Sig.	.000	.000	.000

Given that the p (sig.) value is <0.05 for each product, H_o is rejected and it is concluded that there is a significant difference between the product life intentions for each product at each stage of consumption.

APPENDIX 13 - INTENTIONS PROFILES DATA

TABLE 1 - PROFILES OF INTENTIONS REGARDING OPTIMISATION ACROSS CONSUMPTION PROCESS

PL INTENTION CONSUMPTION PROFILES		EDF N#	Valid %	BKA N#	Valid %	UPC N#	Valid %
	A-O-D	169	25.5	447	80.0	82	17.4
Optimising intentions	A-O-D	35	5.3	52	9.3	42	8.9
(bold & underlined)	A-O-D	22	3.3	14	2.5	10	2.1
	A-O-D	97	14.6	15	2.7	38	8.1
	A-O-D	18	2.7	6	1.1	13	2.8
	A-O-D	71	10.7	6	1.1	66	14.0
	A-O-D	73	11.0	8	1.4	23	4.9
	A-O-D	178	26.8	11	2.0	196	41.7
	Valid Total	663	100.0	559	100.0	470	100.0
Missing / Unknown		48		152		241	
	Total	711		711		711	

TABLE 2 - PROFILES OF INTENTIONS REGARDING ACROSS PRODUCT CATEGORIES

PL INTENTION PRODUCT PROFILES		ACQ N#	Val %	OWN N#	Val %	DISC N#	Val %
	EDF - BKA - UPC	92	15.6	199	31.7	102	22.0
	EDF - BKA - UPC	115	19.5	139	22.2	118	25.5
Optimising	EDF - BKA - UPC	1	.2	2	.3	4	.9
intentions	EDF - BKA - UPC	97	16.5	111	17.7	48	10.4
(bold &	EDF - BKA - UPC	10	1.7	10	1.6	22	4.8
underlined)	EDF - BKA - UPC	239	40.6	134	21.4	130	28.1
	EDF - BKA - UPC	8	1.4	6	1.0	5	1.1
	EDF - BKA - UPC	27	4.6	26	4.1	34	7.3
	Valid Total	589	100.0	627	100.0	463	100.0
Missing / Unknown		122		84		248	
	Total	711		711		711	

APPENDIX 14 – CONSUMPTION / INTENTION CONSISTENCY

Two forms of statistical exploration of consistency between actual patterns of consumption and intentions were carried. Including:

a) Comparing consumers' optimising classifications with their optimising intentions across the three stages of the consumption process for each product category.

b) Comparing profiles of actual patterns of consumption with profiles of intentions by product category and stage of consumption.

SECTION A
A series of Pearson chi-square tests were carried out exploring potential relationships between respondents classifications by optimising type (non, moderately or highly) and their optimising intentions (non or highly optimising).

1.   Null hypothesis (H_o) = There is no relationship between respondents' optimising classifications and their optimising intentions across the three stages of the consumption process for each product category.

SUMMARY STATISTICS

	Everyday footwear	Big kitchen appliances	Upholstered chairs
Patterns of acquisition Vs acquisition intentions	.000	.003	.000
Patterns of ownership Vs ownership intentions			
Patterns of disposal Vs disposal intentions	.000	.000	.000

The table below provides summary statistics. It highlights the occasions where the p (sig.) value is <0.05 (Cramer's V). On such occasions this indicates that the null hypotheses has to be rejected and the conclusion drawn that there is a significant relationship between respondents' intention and pattern of consumption.

SECTION B
A series of Wilcoxon Signed Rank tests were carried out exploring potential relationships between respondent's consumption profiles and their intention profiles.

Wilcoxon Signed Rank tests
This is a non-parametric procedure used with two related variables to test the hypothesis that the two variables have the same distribution. It makes no assumptions about the shapes of the distributions of the two variables. This test takes into account information about the magnitude of differences within pairs and gives more weight to pairs that show large differences than to pairs showing small differences. The test statistic is based on the ranks of the absolute values of the differences between the two variables. SPSS HELP

2.   Null hypothesis (H_o) = There is no significant difference between respondent's consumption profiles and their intention profiles.

The table below provides the results of a series of Wilcoxon tests exploring consistency between consumption profiles and intention profiles by product type.

	Consumption Profile Vs Intention Profile (EDF)		Consumption Profile Vs Intention Profile (BKA)		Consumption Profile Vs Intention Profile (UPC)	
Ties*	34	8%	39	8%	159	40%
Negative Ranks**	370	89%	437	88%	151	38%
Positive Ranks***	14	3%	21	4%	84	21%
Total	418	100%	497	100%	394	100%
Significance	.000		.000		.000	

*Ties - the number of respondents whose behaviour was consistent with their intentions
**Negative ranks - the number of respondents whose behaviour was inconsistent with their intentions (where intentions were, on the whole, more optimising than actual behaviour)
***Positive ranks - the number of respondents whose behaviour was inconsistent with their intentions (where intentions were, on the whole, less optimising than actual behaviour)

The table below provides the results of a series of Wilcoxon tests exploring consistency between consumption and intention profiles by consumption stage.

	Consumption Profile Vs Intention Profile (ACQUISITION)		Consumption Profile Vs Intention Profile (OWNERSHIP)		Consumption Profile Vs Intention Profile (DISPOSAL)	
Ties*	132	26%	13	3%	121	38%
Negative Ranks**	323	63%	387	96%	145	46%
Positive Ranks***	59	11%	5	1%	51	16%
Total	514	100%	405	100%	317	100%
Significance	.000		.000		.000	

*Ties - the number of respondents whose behaviour was consistent with their intentions
**Negative ranks - the number of respondents whose behaviour was inconsistent with their intentions (where intentions were, on the whole, more optimising than actual behaviour)
***Positive ranks - the number of respondents whose behaviour was inconsistent with their intentions (where intentions were, on the whole, less optimising than actual behaviour)

The tables highlight that on all occasions the p (sig.) value is <0.05 (Wilcoxon Signed Ranks Test). On such occasions this indicates that the null hypotheses has to be rejected and the conclusion drawn that there are significant differences between respondents' consumption and intention profiles.