Personal constructs in adults with type 2 diabetes mellitus: a dependency grid analysis

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Abstract

This thesis presents an investigation into the personal constructs that people with type 2 diabetes use, to live and manage their condition. The approach adopted was underpinned by personal construct psychology, utilising qualitative and dependency grid methods to determine individual personal constructs in a multiple case series design.

In the thesis a critical discussion is presented of current UK national policy and clinical guidelines in diabetes care. This found that gaps exist in the current evidence base, particularly in individual approaches and interventions provided by healthcare professional services. The synthesis of research literature in the experience of adults with type 2 diabetes showed that some common themes exist; achieving balance, normalising and psychological alterations. Furthermore the synthesis revealed that self-efficacy and personal model research studies in diabetes have found that these issues are influential in how people live and cope with their condition.

Using a convenience sample of adults with type 2 diabetes, predominantly cared for in the community, a series of interviews were conducted in a sample of 23 participants. Ten participants completed all the stages of the research data collection and these are presented in the results as a case study series. The dependency grid technique required each participant to complete a series of grid ratings of constructs and elements associated with their living with type 2 diabetes.

The results of the exploratory qualitative interviews were five major themes of family, relationships and interactions; social-life/activity; emotional changes/support; meaningful work/sense of worth; and making adjustments/diabetes functional activity. The themes were translated into the dependency grids as constructs and participants then rated people as elements against these constructs. The analysis of the ten case studies showed personal constructs associated with interdependence with family, friends and healthcare professionals. The interdependence identified had strong or weak associations with diabetes related constructs depending on how each individual participant had rated them.

The findings suggest that people with type 2 diabetes do not always consider primary care services as appropriate for their needs and contrast this with the value they previously made to secondary care services. Each individual has developed their own level of interdependence with some type 2 patients with diabetes being self reliant or using family members/friends more than professional health services. Recommendations include further exploration of interdependence in type 2 diabetes. Limitations of the study include sample issues, and a methodological approach that is educative and lengthy in implementation.

Contents

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Preface

Despite a large amount of research into all aspects of the pandemic diabetes mellitus, there exist some unanswered clinical, psychological and social questions. In particular there has been relatively little enquiry in the United Kingdom in the psychological effects of having type 2 diabetes mellitus, and even less focused in primary care. This is not surprising given that research endeavour has been directed towards treatment and service delivery rather than from a user perspective. However, globally there is a growing body of literature which contributes to an emerging framework of health service intervention and social support networks located within patient-centred approaches to care. The result of this is that the predominant bio-medical model of care, previously utilised in chronic conditions management, is being credibly challenged in terms of meaningful outcomes for patients.

The thesis presents an in-depth investigation of personal constructs in people with type 2 diabetes mellitus under community care health services in the UK. Despite the very scarce use of personal construct psychology approaches in chronic conditions, the thesis will present a critical argument as to why this approach is needed. This will contribute to the emerging alternate framework for individualised, patient-centred care in type 2 diabetes mellitus. Indeed current national guidelines have called for, and support, patient self-management, expertise and greater use and understanding of the psychological and social effects in chronic conditions (Department of Health 2001a, 2001b, 2005).

The work presented in this thesis was completed over a five year period, during which I worked as a lecturer in nursing at the University of Central Lancashire. My interest in diabetes stems from earlier than this however, when I worked for the Liverpool Diabetic Eye Study. I spent some years collecting and analysing data in a large epidemiological study to determine sensitivity and specificity of screening methods for diabetic retinopathy. I became interested in user perspectives of conditions and realised that there was little knowledge available to inform both patients and healthcare professionals. Having met and given clinical care to a number of patients who had diabetes related eye problems it became apparent that they also had unanswered needs which related to their personal issues in altered psychological and social functioning.

In particular, I was interested in the complexity of chronic conditions management and how that relates to the therapeutic relationships between the patient and their family and with healthcare professionals with whom they interact. I became aware that the predominant bio-medical model of care appeared to be failing many aspects of service delivery and began to consider what the alternative might be. During this time a number of studies were conducted and published by myself and research collaborators which reflected this interest and clinical need.

In the thesis, Chapters 1 to 3 summarise the search for alternatives to the bio-medical structuring of diabetes care, through identification and critical appraisal of the available global literature and identify current gaps in knowledge. Chapters 4 and 5 present the theory and working methods for the in-depth enquiry conducted. The development and adaptation of the repertory grid method is detailed, in particular, as it is specific to a model of dependency and people with type 2 diabetes. Chapter 6 presents the results of the two phases of the study in a case series, individual personal construct design. Chapter 7 details the discussion, limitations, recommendations and conclusion to the thesis.

Chapter One

Introduction

1.1 Introduction to the chapter

This chapter includes a brief description of the patho-physiology associated with diabetes mellitus, aetiology and complications of diabetes mellitus, in particular focusing on the associations with type 2 diabetes. Included briefly are details on other types of diabetes, however, the pre-disposing factors, aetiology and progression of complications of type 2 diabetes will be specifically discussed with reference to the relevant contextual research literature. It is somewhat tempting, given the nature of the arguments posed in this thesis and the research findings, to ignore the information presented in this chapter, and indeed it will be brief. The focus of the research appraisal in this thesis is related to non-bio-medical approaches to care and the centrality of the patient experience, nature and personality to the outcome of living with type 2 diabetes. This is in juxtaposition to the nature of bio-physical processes and treatment aimed at correcting abnormalities of the disease process.

Further sections in this chapter examine the current context of care for people with diabetes; the evidence base to support and challenge the current health service delivery models employed, and the case for primary versus secondary care for people with type 2 diabetes.

1.2 Aetiology of Glycaemic Disorders

This section of the introduction examines the research literature to support a typology or classification of glycaemic disorder, a term which encompasses diabetes mellitus but also includes the important pre-cursors to the disease, i.e. impaired glucose tolerance. In order to correctly locate type 2 diabetes in the glycaemic disorder typology, other types of diabetes mellitus will be referred to.

For hundreds of years it has long been recognised that different types of glycaemic disorder exist, each with their own unique properties, grouped together within a disease classification named diabetes mellitus (Courten 2002). Early in the twentieth century Himsworth (1936) amongst others identified two main types of diabetes associated with insulin sensitivity and insensitivity. The basis of these two types developed according to being able to determine levels of insulin within the body, with complete lack and partial production of insulin (Bornstein & Lawrence 1951). Preceding this was, of course, the discovery by research that treatment with exogenous insulin would promote survival in hyperglycaemia (Banting, Best, Collip et al. 1922). This stage of research was viewed as important and a major breakthrough, one could argue, however, that this was the beginning of research endeavour and service delivery focused on physical treatment rather than prevention, despite knowledge that suggested a link between sedentary lifestyles and disease (Himsworth 1936).

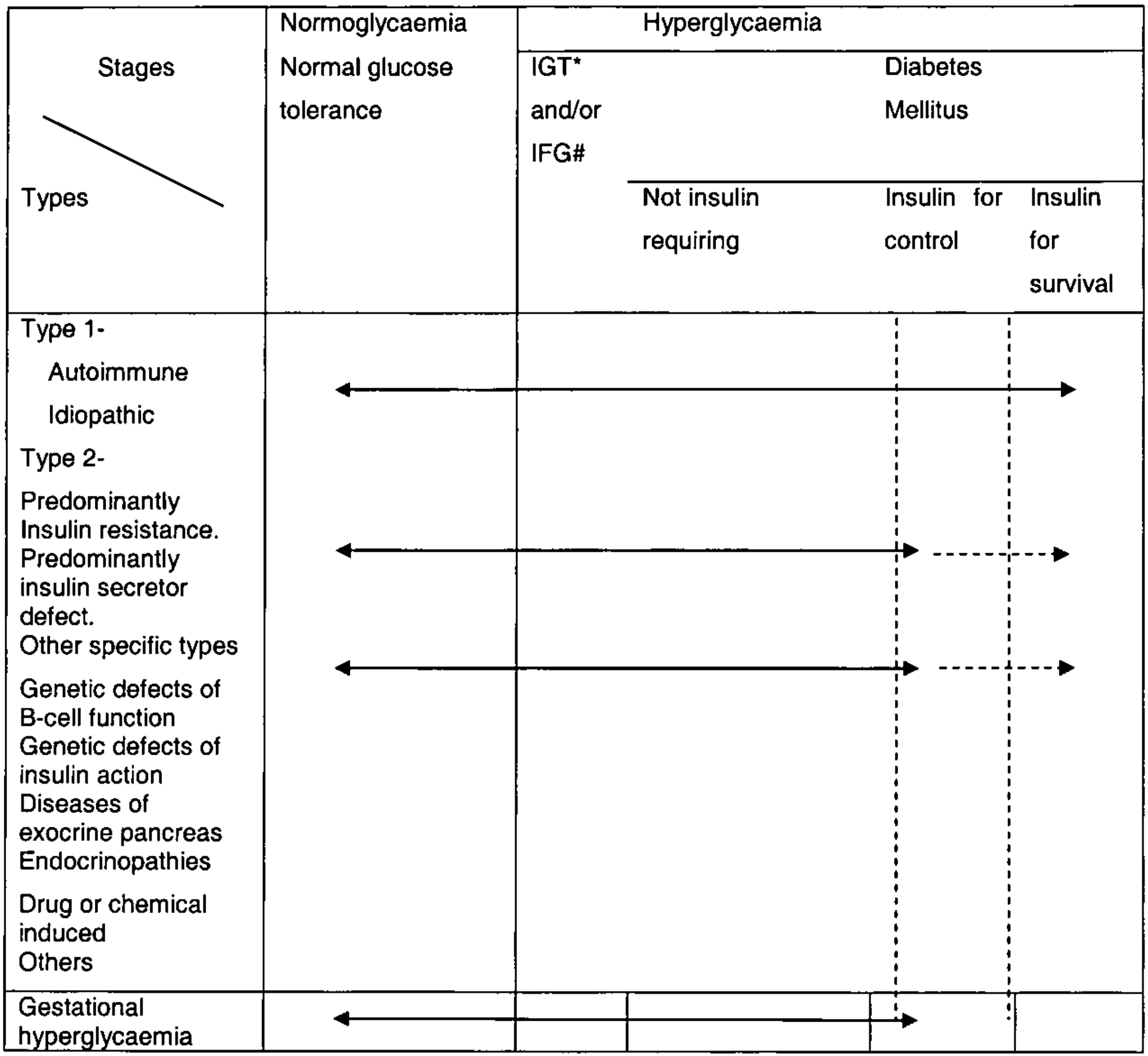
The focus on treatment led to a classification of diabetes known as insulin dependent diabetes mellitus (IDDM) and non-insulin dependent diabetes mellitus (NIDDM). However epidemiological and aetiological studies published in the last 20 years have determined that, linked with improved understanding of the causes, pathogenesis and diagnosis, it is now appropriate to classify diabetes mellitus according to levels of glycaemic disorder within a typology. Therefore, in practice, this would suggest defining each individual patient according to their degree of insulin sensitivity and action, into a typology which can change (Courten 2002). This begins to emphasise and address the gaps in original research by being able to focus on prevention and individualised care. It will be further argued, in a later section, that this may be a more logical reason for primary care service delivery in type 2 diabetes other than current resource driven initiatives.

Current classifications list the two major types of diabetes mellitus as type 1 diabetes mellitus (previously IDDM) and type 2 diabetes (previously NIDDM) and is based on stages of glucose tolerance or insulin sensitivity and aetiological type (Courten 2002). Therefore a definition of diabetes is arrived at:

> "A group of metabolic diseases characterised by hyperglycaemia resulting from defects of insulin secretion, insulin action or both" (WHO 1999, Pg.1)

The following table illustrates the current classification of glycaemic disorders, (WHO, 1999, Pg.14).

Table 1: Current classification of glycaemic disorders (WHO).



Stages / Types	Normoglycaemia	Hyperglycaemia			
	Normal glucose tolerance	IGT* and/or IFG#	Diabetes Mellitus		
			Not insulin requiring	Insulin for control	Insulin for survival
Type 1- Autoimmune Idiopathic	◄──	───	───	───	──►
Type 2- Predominantly Insulin resistance. Predominantly insulin secretor defect.	◄──	───	───	──►	- - -►
Other specific types Genetic defects of B-cell function Genetic defects of insulin action Diseases of exocrine pancreas Endocrinopathies Drug or chemical induced Others	◄──	───	───	──►	- - -►
Gestational hyperglycaemia	◄──	───	───	──►	

*IGT: Impaired glucose tolerance

#IFG: Impaired fasting glucose

Concerning typology, unfortunately, the least understood yet most prevalent is type 2 diabetes, as the concentration of research has focused on aetiology and pathogenesis in type 1. What is speculated, at present, is that individuals may change over time across glycaemic typology in both directions (Courten 2002). This is evidenced by reports of individuals with type 2 diabetes achieving glycaemic control through increasing physical exercise and reducing weight (Courten 2002).

1.3 Diabetes Mellitus – the disease

Diabetes is a heterogeneous group of disorders of carbohydrate, fat and protein metabolism characterised by chronic hyperglycaemia, degenerative vascular changes and neuropathy (Williams & Pickup 1999). Long-term complications associated with diabetes include coronary artery and peripheral vascular disease, stroke, renal disease, central and peripheral nerve damage, amputations and blindness, resulting in increased disability and reduced life expectancy for people with diabetes (Brownlee 1985, Ganda 1985, Amos, McCarty and Zimmet 1997). Currently over 2% of the United Kingdom population has been diagnosed with diabetes (Department of Health 2001, Diabetes UK 2005, WHO 2005). Nationally and globally the incidence of diabetes is predicted by the World Health Organisation (WHO) to continue to rise, with the global diabetic population expected to double by 2010 (Amos, McCarty and Zimmet 1997). In terms of chronic ill health, diabetes is recognised for its impact on society and resources in the National Health Service of the United Kingdom, costing 8% of the total health budget (Audit Commission 1999). Publication of the National Service Framework for Diabetes recommends wide-ranging changes and standardisation to current practice in the UK (Department of Health 2001a).

People with diabetes have a decreased life expectancy and impaired quality of life (Amos, McCarthy & Zimmett 1997). There are two major clinical subclasses of diabetes: Type 1 is caused by an absolute deficiency of insulin secretion. It is characterised by the abrupt onset of signs/symptoms of insulinopenia usually before the age of 30 years. The classic presenting syndrome of polyuria, polydipsia and polyphagia is often seen in individuals with type 1 diabetes (American Diabetes Association (ADA) 1997, Ross & Gadsby 2004). Type 2 diabetes results from insulin resistance with an insulin secretory defect. It is the most prevalent form of diabetes and is characterised by ketosis resistance under basal conditions (ADA 1997). The onset and progression of symptoms is slow and patients are usually older and are often obese (Prentice 2001).

1.4 Associated aetiology in diabetes

Impaired glucose tolerance (IGT) is defined by the WHO (2000) as a stage of impaired glucose regulation, with a fasting plasma glucose of < 7mmol/l and an oral glucose tolerance test OGTT 2 hour value of > 7.8mmol/l but < 11.1mmol/l. This distinguishes people whose glucose tolerance is 'impaired' compared to the non-diabetic population, but who are not frankly diabetic. This level of glucose intolerance is not associated with the development of micro-vascular complications but is, however, associated with increased risks of deaths from ischaemic heart disease. Approximately 1 - 5 % of people with IGT will develop type 2 diabetes within a few years (Amos, McCarthy & Zimmett 1997).

Impaired Fasting Glucose (IFG) was introduced by the WHO (2000) to classify individuals who have fasting glucose values above the normal range, but below those diagnostic of diabetes. The fasting plasma glucose is > 6.1mmol/l but < 7mmol/l. Diabetes UK (2004) recommends that all those with IFG should have an Oral Glucose Tolerance Test to exclude the diagnosis of diabetes, and that they are actively managed with lifestyle advice. If after at least 3 months the blood glucose remains above 6mmol/l, then treatment with an oral hypoglycaemic agent should be considered (MacKinnon 2002). This is recommended with reference to the finding of the United Kingdom Prospective Diabetes Study (1999) regarding the development of chronic complications of diabetes.

1.5 Aetiology - Type 1 diabetes mellitus

This was originally named "acute diabetes" or "juvenile onset diabetes", and IDDM. This was renamed type 1 diabetes mellitus by the WHO in 1998. This type can occur at any age, commonly occurs in childhood, adolescence and early adulthood (under 30 years), and occurs in about 10 - 20 % of all people with diabetes. In type 1 diabetes mellitus the beta cells of the Islets of Langerhans are destroyed leading to either very low levels or an absence of circulating insulin (Ganda et al. 1985).

Genetic susceptibility, environmental agents, dysfunctional immunity and autoimmunity all appear to be related to the aetiology of type 1 diabetes. A combination of genetic and environmental factors, which trigger an autoimmune attack on the beta cells causing their destruction, is thought to be responsible but only occurring in genetically susceptible individuals. It does appear from research that environmental factors are the major contributing factor to type 1, with estimates of 60-70% of type 1 diabetes being caused by non-hereditary / environmental factors (Courten 2002). However, although environmental factors may quickly precipitate direct destruction of the beta cells, they may also initiate a slow diabetogenic process that manifests itself as clinical diabetes after many years, for example, the effects of repeated viral infections.

1.6 Aetiology - Type 2 diabetes

Formerly named maturity onset diabetes, or NIDDM, this was renamed type 2 diabetes by the WHO in 2000. It is the commonest type of diabetes, comprising approximately 80-90% of diagnosed cases, with a further 50% of undiagnosed cases from the total diabetes population (Amos, McCarthy & Zimmett 1997, Audit Commission 1999). This type of diabetes occurs from around the age of 40 years although it is most common over 60 years. Research demonstrates, as in type 1 diabetes mellitus, that there is a strong genetic predisposition, for development of type 2 diabetes (Hamman 1992). More recently, increasing importance is demonstrated in what happens during early life and pregnancy, particularly in relation to malnutrition (Barker 1998). People who become obese and decrease their levels of physical activity are more prone to develop type 2 diabetes (Eriksson et al. 2001). They become more insulin resistant, therefore requiring more insulin production to overcome insulin resistance, which worsens hyperglycaemia and hence diabetes develops.

The key metabolic abnormalities in type 2 diabetes are that the beta cells continue to produce insulin, but this is either deficient or faulty due to beta cell defects, or insulin resistance developing in tissue cells. Insulin resistance is described as an impaired biological response to either exogenous (external) or endogenous (internal) produced insulin and is characterised by:

a) Impairment of the action of insulin to inhibit gluconeogenesis (production of glycogen) in the liver (Turner & Clapham 1998).

b) Impairment of the action of insulin to promote glycogenesis (the storage of glucose as glycogen in muscle and liver) and impairment of the utilisation of glucose in liver, skeletal muscle and adipose tissue, thus causing insulin resistance (Goldstein 1992).

Turner and Clapham (1998) have demonstrated a genetic defect affecting the transport of glucose into skeletal muscle. Insulin resistance is worse in people with central obesity and physical inactivity, and occurs in about 92% of type 2 diabetics (Shelgikar, Hakaday & Yajnik 1991, Salbe, Weyer, Lindsay et al. 2002).

1.6.1 Phenotypology in Type 2 diabetes

The thrifty phenotype research has shown that poor foetal growth and poor nutrition in early life can lead to permanent changes in glucose-insulin metabolism which can result in later life in type 2 diabetes. (Hales, Barker, Clarke et al. 1991, Hales & Barker 1992, Barker, Hales, Fall et al. 1993). In essence, this means that environmental factors are the main cause of type 2 diabetes (Hales & Barker 2001). Current evidence supports the importance of environmental factors in the development of type 2 diabetes and the closely associated pandemic of obesity (Amos, McCarthy & Zimmett 1997, WHO 2000, Salbe, Weyer, Lindsay et al. 2002).

Considerable attention and research has been given recently to the link between rising levels of obesity in British society and rising levels of type 2 diabetes (West & York 1998). Research also demonstrates the longer the duration of obesity, the greater the risk of developing type 2 diabetes (Everhart et al. 1992, Wannamethe & Shaper 1999). In obese individuals there is an increased level of circulating free fatty acids (FFAs) released from the expanded visceral adipose tissue. These have the effect of reducing glucose uptake, oxidation and storage of glucose in muscle. Elevated FFAs inhibit glycolysis and, as a result, inhibit glucose uptake (Charles et al. 1997). Therefore elevated FFA's induce a temporary state of insulin resistance. Obesity increases the body's demands for insulin beyond the beta cell capability. Individuals with central or android obesity (apple-shaped figure) have a greater risk of type 2 diabetes and of developing cardiovascular disease, hypertension and hyperlipidaemia (Shelgikar, Hockaday & Yajnik 1991).

In the early 1990's, type 2 diabetes was further classified to distinguish those with and without syndrome x. Syndrome x is associated with a high overall cholesterol (> 200), high triglycerides (> 200), and low high density lipids (HDL) (< 40mg/dl), high blood pressure and gout, with the resulting cardiovascular disease leading to heart attack, stroke and kidney problems. Those with the apple-shaped figure and a predominance of abdominal fat are at higher risk of developing syndrome x (Shelgikar, Hockaday & Yajnik 1991).

In type 2 diabetes there is a two to four fold higher prevalence in people who are inactive (Zimmett et al. 1991, Pan et al. 1994, Dhawan et al. 1994, Levitt et al. 1999).

Regular physical activity increases insulin sensitivity and glucose tolerance, so these are less efficient in people who are under active (Boughouts & Keizer 2000).

Prior to the second world war, a study of hospital admission rates showed a reduction during food rationing of incidence of type 2 diabetes (Himsworth 1935). However, it has so far proved difficult to demonstrate the link between calorie and fat intake and incidence of diabetes (Colditz et al. 1992). Dietary changes from deficiency to surfeit in developed / developing countries, and studies of migrants, have shown an increase in type 2 diabetes in immigrants. This has occurred where they have moved from a country of lower to one of higher incidence of type 2 diabetes (Uitewaal, Manna, Bruijnzeels et al. 2004). In the UK the prevalence of diabetes in ethnic groups is about four times higher than the indigenous UK population (Oldroyd, Banerjee, Heald et al. 2005).

A history of gestational diabetes in one or more pregnancies is linked with an increased risk of developing type 2 diabetes in later life (Smirnakis, Chasan-Taber, Wolf et al. 2005). Genetic studies have shown gestational diabetes now encompasses previous classifications such as gestational impaired glucose tolerance and gestational diabetes mellitus (Holt, Goddard, Clarke et al. 2003). An offspring of a person with type 2 diabetes has a 15% chance of developing it and a 30% chance of developing impaired glucose tolerance, which may ultimately lead to type 2 diabetes. Populations with a high rate of inherited type 2 diabetes e.g. Pima Indians in North America, have a 50% prevalence rate of inheriting the disease (Pettitt, Nelson, Saad et al. 1993).

1.7 Prevalence of diabetes mellitus

In the UK today around 1.4 million people have been diagnosed with diabetes mellitus and these numbers are expected to double by 2010 (Amos et al. 1997, Whitford, Griffin & Prevost 2001). Of this total, approximately 80-90% have type 2 diabetes, with a further 50% with undiagnosed type 2 diabetes (Diabetes UK 2005). The prevalence is much greater in older people and ethnic minorities. It is thought that about 10% of individuals over 65 years may be affected and that it is commoner in people of African Caribbean and Asian origin. Griffin (2001) highlights that in certain ethnic populations living in Western cultures such as Asians in the UK, around 15-20% have type 2 diabetes. The WHO predict that the global prevalence of type 2 diabetes will more than double from 135 million in 1995 to 300 million in 2025, and that in Africa and Asia type 2 diabetes could become 2 to 3 times more common than it is today (Griffin 2001, WHO 2005).

The Juvenile Diabetes Research Foundation reported in November 2001 that juvenile onset diabetes was at its highest level and that it is increasing in Europe at a rate of 3-4% per annum in the under 15's, with the increase most marked in young children. UK studies have shown a doubling of the incidence of juvenile diabetes in the under 5's over the last decade (Williams & Airey 2002).

1.8 The context of diabetes care in the UK (Type 2 specific)

Type 2 diabetes accounts for 90% of disease typology in the world (Amos et al. 1997, Department of Health 2001a, WHO 2005). Predominantly people with the condition are cared for in the primary healthcare sector (Griffin 1998). Authors have attributed this siting of services to the general shift in resources and decision making abilities from acute (secondary) to primary care (Griffin 1998). Therefore there has been an assumption that this has led to a shift in the responsibility of care to primary sources.

A number of explanations present themselves through epidemiological and aetiological research. Type 2 diabetes has been a poorly diagnosed disease and in the last thirty years detection, largely by general practice, has improved increasing prevalence figures (Griffin 1998). Treatment modality of the condition is centred round prevention of complications and survival, as in type 1, and this tends to be delivered in primary care, i.e. lifestyle change programmes, health education (Kinmonth et al. 1998). Pharmacological intervention does not begin in type 2 diabetes with insulin therapy, which has been the domain of specialist nursing care in secondary settings (MacKinnon 2002). The number of people with type 2 diabetes means that acute diabetes services as they currently stand would be unable to work effectively (Kinmonth et al. 1998). It is interesting, therefore, to note that Griffin et al.'s (1998) systematic review discusses the 'shift' of diabetes care from secondary to primary services, yet no such shift has occurred in type 1. Indeed the opposite with new services being added, i.e. young adult diabetes services (Fleming et al. 2002). The plausible and logical conclusion to this debate, it is argued, is that the increased detection of the condition, predominantly in primary care, has led to a large increase in the burden of care. This has, by default, rested within general rather than specialist practice. With the reduction of resources in the acute setting for care of chronic conditions and the rise in prevalence of type 2 diabetes, it appears logical to conclude that rather than a 'shift' of care, it is a development of care to answer a new need. This is important as many of the interventions used in primary type 2 diabetes have been inherited from acute perspectives in type 1 care and may have little clinical or theoretical relevance.

1.9 Current national guidelines in diabetes care

The National Institute for Clinical Excellence (NICE) have published a series of practice guidelines for the management of type 1 and type 2 diabetes (NICE 2002, 2003). These guidelines detail, in particular, treatment recommendations and protocols for the management of chronic and acute complications arising from duration and poor glycaemic control. They also present review data to support patient education and management at diagnosis.

It is a similar picture in the recently published National Service Framework (NSF) for Diabetes (Department of Health 2001a). Although the central philosophy of this framework is patient-centred care based on empowerment, this is not delineated into meaningful therapeutic practice. Again there are recommendations that people should have access to psychological support and psychiatric support in case of pathology, however, there are few recommendations concerning how psychological assessment and therapy might be achieved. A central statement in the National Service Framework for Diabetes (Department of Health 2001a) refers to empowering the patient through patient education and involvement in care. This is a rather assumptive statement and ignores the considerable work on empowerment as a psychological intervention rather than one based purely in education (Anderson 1986, Anderson et al 1991, 1995, Gibson 1991, Hamelink 1993). This is also limited given that there has been considerable research completed in the psychological assessment of people with diabetes, which will be critically reviewed in chapter 2 of this thesis.

Despite the limitations of the national guidelines in the patient-centred domain, there are clear indications in the NSF that wide-ranging changes are needed nationally in diabetes care. These are focused on the standardisation of services, answering clinical, local needs and reduction of incidence of complications, for example a national retinal screening programme (Gillibrand et al. 2004). The establishment of patient-centred services with improved communication between healthcare providers is viewed as a central part of health service policy (Department of Health 2001a,b).

1.10 The evidence base for service delivery in type 2 diabetes

Governmental policy has been driven by the limited resources available to the NHS. The limitations of taxation means that there is increasing pressure on healthcare professionals to base practice on cost-effective interventions and, therefore, become evidence-based (Department of Health 1996, 1997).

In terms of the evidence base to determine the correct context of care for people with type 2 diabetes, this is somewhat limited. Three systematic reviews currently exist, however, one by Renders et al. (2001) is not specific to the UK – they reviewed interventions to aid the management of diabetes mellitus in primary care, outpatients and community settings and were not specific to type 2 diabetes. Griffins (1998) meta-analysis of randomised controlled trials (RCT's) of diabetes care in general practice and Griffin & Kinmonth's (1997) review of shared diabetes care between hospitals and general practice were focused on UK studies and the 1998 review was on studies in type 2 diabetes. These three reviews and other research will be critically appraised to determine the best current evidence for recommendations for the optimum context of care for people with type 2 diabetes in the UK.

Griffin (2001) argues that primary care is the logical place to deliver effective, fair and efficient health services which are continuous and co-ordinated. This is based on observations of historical studies (WHO 1985, Starfield & Fox 1994). Griffin's (1998) review of RCT's of general practice diabetes care was largely insubstantial due, not to technique, but the paucity of good research in this area. The RCT's evaluated tended to compare hospital versus general practice care of people with diabetes, were few in number and were of mixed quality according to standard grading of evidence (Muir-Gray 1997).

Griffin (1998) purports that the reason behind so few RCT's in this area is because the interventions are too complex to delineate and measure objectively in a large RCT. This is a limited and assumptive view and is probably related more to the inability of researchers to develop reliable and valid outcome measures which have true value in primary care; relatively little understanding of the use of pragmatic approaches in RCT design; and the current definition and grading of evidence in the NHS, which excludes other research designs as contributing answers to clinical questions (Muir-Gray 1997).

In terms of reference to this thesis, the main problem, of determining the most effective context of care for people with type 2 diabetes, with Griffin's (1998) review is that it assessed both people with type 1 and type 2 together. This does not fit with the previously stated logical explanations of delivery of care to people with type 2 diabetes and may not best answer peoples' healthcare needs. However, within Griffin's (1998) findings there were identified three RCT's dealing exclusively with people with type 2 diabetes. These will be considered and critically appraised with reference to the review findings. Although these trials are focused on medical outcomes it was considered necessary to include them in this review so as to highlight the important, but often missing, link between psychological issues and physical health related outcomes.

Porter (1982) conducted a trial to evaluate what would now be considered very basic diabetes care in general practice in Scotland. He used a simple randomisation process, excluded people treated with insulin but failed to collect important demographic data, for example, mean duration of diabetes and mean age of participants. The intervention examined was what Griffin (1998) classifies as routine general practice care of people with type 2 diabetes plus diabetes team meetings, patient record cards and a patient recall system for general practices without one. The main outcome measures used were reporting of symptoms, assessment of liver function, and examination of fundi, weight, blood pressure, blood glucose measurement, urinalysis, costs and mortality. No measures were made of impact on the patient in terms of quality of life, satisfaction with service or patient knowledge. One hundred and ninety seven patients took part and the trial found more favourable outcomes in people randomised to general practice compared to hospital services.

Hayes and Harris's (1984) RCT evaluated routine general practice care following randomisation of people with type 2 diabetes referred to a hospital diabetes out-patient clinic. Mean age in both groups was given but not mean duration of diabetes, which could have a bearing on the main outcome measure used in this study - glycosylated haemoglobin (HbA_{1c}). Unequivocal evidence exists that the longer the duration of diabetes the more likely and severe will be the chronic complications (Diabetes Control and Complications Research Group 1993). In addition to the Porter (1982) study outcome measures, glycosylated haemoglobin (HbA_{1c}) was recorded as a measure of glycaemic control and admission rates to hospital for diabetes–related episodes. The main result for this study in 200 people with type 2 diabetes was a significantly lower HbA_{1c} in the general practice than the hospital group. Again no measures were made of educational aspects, psychological variables or satisfaction.

In 1993 Hurwitz, Goodman & Yudkin published the findings of their trial of 181 patients with type 2 diabetes in primary care compared to secondary care. This study was broadly similar to the previous two, however, all pertinent demographic data were recorded and the intervention included; prompted general practice care; general practice education sessions; use of a structured patient review form, fundoscopy by optometrists, use of a central, computerised, patient recall system, and prompts for review episodes to both the general practice and the patient. Satisfaction was included in addition to the other two studies' outcome measures, which, if limited, is at least a broad indicator from a patient perspective. No difference in mortality was detected between the two groups, however, those people cared for by the general practice had lower HbA_{1c} and had fewer losses to follow up.

In the above cited studies, only Hurwitz et al. (1993) excluded patients with complications from a comparison of hospital and primary care services. This suggests that, overall, it was not considered important in terms of co–morbidity on the patient experience of services. However, significant co–morbidity may have a bearing on these results. The issue of diabetes mellitus complications is intrinsically linked to the experience of living with diabetes even if a patient has not suffered these. This is because the knowledge of the possibility of complications occurring is used as the basis of interventions to motivate people who self-manage. By maintaining good control a patient will increase their chance of not developing complications. The central tenet of services is to prevent complications occurring, therefore experience of healthcare intervention will inevitably involve patients having discussions about these and therefore is a necessary construct to explore. Hampson (1997) in her personal models of diabetes research did not find differences in the patient perceptions of experience of diabetes in those with or without complications.

Since Griffin's (1998) review a further comparative study of general practice versus diabetes service (centre) was conducted by Groeneveld et al. (2001) in the Netherlands. Using 15 general practices and a total of 246 patients, they found that HbA_{1c} was not significantly lowered in the intervention group (diabetes service) compared to the GP group supporting care of people with type 2 diabetes in primary care. They did find, however, that those patients with poor HbA_{1c} had a significantly lower value in the intervention group. This study provides basic support that GP care can be effective generally in the care of type 2 diabetes. There was, however, no measurement made of other important factors, i.e. quality of life, apart from drop-out rate, which improved.

Summarising the four studies in the care of people with type 2 diabetes, it could be stated that general practice care results in some improvement in health-related outcomes. There is, however, very little evidence in support of this context of care, which is emerging as an alternate framework for therapeutic intervention and is a main aim of national guidelines (Department of Health 2001a, b). Currently, therefore, the argument that supports the care of people with type 2 diabetes in the community is based on 'logical default' rather than design or an acceptable evidence base.

Renders et al. (2001) review included both patients with type 1 and type 2 diabetes to assess the effectiveness of primary care, outpatient and community settings for healthcare delivery. This review, however, was not aimed at interventions for patients, rather those directed at the healthcare professional, resulting in an inferential statistic against patient outcomes. Out of 48 publications of 41 studies, 6 RCTs met the grading criteria for quality. The conclusions drawn from this review relate to complex issues of management of diabetes and the communication strategies employed to address patient management difficulties:

- Healthcare professional intervention improved processes of care.
- Healthcare professional intervention had an unclear result on patient orientated outcomes.
- Structured and regular, prompted review resulted in improved process outcomes.
- Computer assisted recall and reminder systems plus healthcare professional intervention improved process outcomes.

Although the issue of healthcare professional assessment involvement and patient education is discussed in detail in a later chapter of this literature review, Renders et al. (2001) also concluded that interventions of this type improved patient orientated outcomes. However, this evidence was considerably less substantial than for the improvement in process orientated outcomes.

Griffin & Kinmonth's (1997) review of RCTs in shared diabetes care systems compared to general practice care included Greenhalgh's (1994) earlier systematic review in the same area. This was even more limited in its findings than the other reviews, again related to paucity of good research. The main conclusion from this review was that the features of primary care are 'suited' to meet the clinical needs of people with diabetes. This finding however cannot be stated to meet the psychological and social needs of people with diabetes and will be examined in more detail in chapter 2.

In appraising the evidence base for the care of people with type 2 diabetes in primary care, Griffin and Williams (2002), with reference to the 1997 review, indicate that it is 'well suited' to initial diagnosis not only of diabetes but a whole range of conditions (Griffin & 2002). This again supports the view that the context of care of type 2 diabetes is in primary care settings by default rather than design. However, other findings of the review indicate that aspects of general practice care are based on preventative medicine approaches and encompass registers of people with life-long conditions, organised periodic patient recall and review, local and convenient to the patient and take a holistic approach. This last assertion appears not to be supported by current evidence. A further result indicated that the primary care team are aware of and sensitive to family circumstances but, again, the evidence to support this statement is limited. The above relies on and assumes that general practices are well organised and resourced. There is insufficient evidence to confidently state that this currently exists uniformly in general practices in the UK (Griffin & Williams 2002).

Rosenquist (2002) argues that to achieve primary diabetes care on the above basis will require good patient education and an understanding of how patients learn. This view is supported in the research literature (Brown 1999, Cooper, Booth & Gill 2003a). This is an important factor but negates the overriding impact of psychological and social variables in a person's life, both intrinsic and extrinsic, to having a chronic and complex condition.

Patient education is one aspect of diabetes care which fits with an emerging patient-centred framework as a basis for diabetes care rather than a system based on a bio-medical approach and has been extensively researched (Anderson 1986, Brown 1992, 1999, Cooper, Booth & Gill 2003b, Deakin et al. 2005). Patient education studies in diabetes, which have been subjected to review, do not demonstrate effective outcomes for patients unless they are connected with some aspect, however small, of the psychological and social issues in diabetes (Brown 1992). Studies of patient education in type 2 diabetes which also address the theoretical frameworks underpinning an educational intervention are relatively scarce. Those that delineate and explore such underpinnings appear to have better results and are more robust (Cooper, Booth & Gill 2003a). It is beyond the scope of and relevance to this thesis to review patient education per se in type 2 diabetes in Chapter 2, however, studies in interventions that aid self-management of type 2 diabetes are critically appraised including those with an educational focus. Other aspects of meanings and experience attached to them in terms of dependency have not been examined in relationship to accepted interventions in type 2 diabetes care.

1.11 Summary of Chapter 1

The aetiology and epidemiology in relation to glycaemic disorders and in particular type 2 diabetes has been examined, concluding that whilst an aetiological classification exists people with diabetes may in the future be classified on a continuum rather than a distinct measure. Within current national guidelines there are clear recommendations that services should move away from group-based generic protocols and shift to individualised patient care with the formation of an 'individual shared care plan' (Department of Health 2001a). How healthcare professionals, and indeed patients, can achieve this without assessing, recognising and exploring individual issues is not clear within these guidelines.

The current evidence-base for supporting delivery of service to people with type 2 diabetes in primary care, was examined and found to be limited in terms of patient-centred approaches. Even in terms of process-based interventions the evidence is somewhat lacking and an argument is presented that challenges current thinking, that people with type 2 diabetes are predominantly cared for in the primary sector by logical default rather than design. Aspects of design of service tailored to meet people with type 2 diabetes individual needs should be addressed through research endeavour, particularly those related to patient experience and psychological assessment. This may then aid timely intervention to prevent abnormal psychological, social and healthcare professional relationships resulting in unhealthy outcomes for sufferers. Enquiry specific to type 2 diabetes is also justified given that 90% of all cases of diabetes are classified as type 2 and nearly all cases are in adult age groups (Amos, McCarthy & Zimmett 1997). It is argued that, by examining the relationships, experiences and dependencies in a person's life with type 2 diabetes, new insights may be gathered to guide intervention testing and for practice to inform the formation of a more patient-centred health service in type 2 diabetes.

Chapter 2

Theoretical perspectives in chronic conditions

2.1 Introduction

Chapter 1 has highlighted that diabetes care, without reference to patient-centred care and/or self-management, results in limited understanding, research and ultimately practice (Rosenquist 2002). New approaches to primary diabetes care, it is argued, should be based on these aspects to elicit greater understanding of the patient experience and contribution to management. Research into patient-centred care and self-management, in people with type 2 diabetes (particularly in the UK) is relatively sparse and, in terms of quality and depth, very limited. This chapter describes and critically appraises the theoretical perspectives and models which are pertinent to this thesis, and provides examples of research, which has utilised self-directed behaviour/self-regulation, self-efficacy, health locus of control, and personal construct psychology.

2.2 Self-directed behaviour/ self-regulation and personal illness models: definition, description and examples

An important aspect of personal experiences of illness is that governed by self-directed behaviour or self-regulation. These models "conceptualise the individual as an active problem solver whose behaviour reflects an attempt to close a perceived gap between current status, and a goal, or ideal state. Behaviour depends on individuals' cognitive representations of their current health status and the goal state, plans for changing the current state, and techniques or rules for assessing progress."
(Pitts, 1991, Pg. 7, 8).

Mahoney and Arnkoff (1979), purport that there are five aspects to self-directed behaviour. It is interesting to note each of these aspects have a resonance with core aspects of type 2 diabetes self-management goals. The first aspect of self-directed behaviour is described, as 'self-monitoring' – people with type 2 diabetes often perform this task on a daily basis, when measuring their own blood glucose levels. The second aspect is 'goal specification' – people with type 2 diabetes determine goals in collaboration with healthcare professionals, particularly in terms of maintaining control, e.g. HbA_{1c} levels. The third aspect is termed 'stimulus control' – an example in type 2 diabetes management, would be a patient maintaining a dietary regime, whereby the patient is controlling a basic stimuli. The fourth aspect is termed 'self-reinforcement' – in people with type 2 diabetes this could be related, for example, to the 'reward' of reducing the chance of developing complications by maintaining good 'control'. The fifth aspect is termed 'behaviour rehearsal'. An example in type 2 diabetes would be a patient trying out new health-related behaviours, e.g. an exercise regime, and deciding if the activity was feasible in the long-term.

Self-regulation theory has been related to the importance of illness representations for the understanding of symptoms and the regulation of coping behaviour (Leventhal, Meyer and Gutman 1980, Leventhal, Nerenz & Steele 1984). The theory broadly splits the experience of illness into two aspects, those of process-orientated problems (physical aspects) and those of the emotional impact of the illness. The theory also places equal importance on the emotional impact of, and the cognitive reaction to, a chronic illness (Hampson 1997). Leventhal (1987), explored how respondent learning played an important role in the model. This can be explained in terms of food intake, which is an important aspect of type 2 diabetes management. Food acquires personal meaning, based upon a person's experiences with it, which is both an unconditional and conditional response to stimuli. Leventhal, Meyer & Gutman (1980) developed the personal illness model, based on the self-regulatory model.

Condition representation, or personal model of illness in chronic disease research has received little attention in relation to glycaemic disorder and even less so in type 2 diabetes (Hampson, Glasgow & Toobert 1990). However the prior and present attention to these issues has and is making an important contribution to challenging the bio-medical approach to care. This takes into consideration alternate views of patients (Leventhal, Nerenz & Steele 1984, Lawson, Bundy, Lyne et al. 2004). This situation may exist because the issue is complex and interrelated with other factors, i.e. social, and therefore difficult to examine. It could also relate to the fact that generally psychologists perform studies that are quantifiable and generalisable to the population rather than individual approaches. Indeed, in diabetes, few studies exist that attempt to measure personality traits or correlate personal models to self-care activity and hence to outcomes (Hampson, Glasgow & Toobert 1990, Lustman et al. 1991, Hampson, Glasgow & Foster 1995).

Personal illness models are described by Hampson et al. (1990) as patient's cognitive representations of their disease and they theorised that these may manifest as individual, different illness-related behaviours. They were particularly interested in studying how these behavioural differences of 'self-care activity' were predicted by personal models. Research endeavour to explain personal illness models has a close relationship to personal constructs of illness. Illness representations and psychological study was first explored by Leventhal et al. (1980). Leventhal and his team identified that there were 5 main components of personal models in illness representation; identity or symptoms, consequences, causes, control or cure and timeline. Using Leventhal's theory, Hampson, Glasgow & Toobert (1990) performed an exploratory study in women with type 2 diabetes. A convenience sample of 46 female outpatients with type 2 diabetes was examined by self-report questionnaire and interview. The sample of women (in the USA) were given a self-report questionnaire to complete which comprised of a personal models of diabetes interview (PMDI), a summary of self-care activities and HbA_{1c} past results were referred to. The PMDI questions tracked Leventhal's five domains of illness representations. Open and closed questions were used based on beliefs about diabetes. Interesting and important facets of the PMDI are those questions relating to emotional reactions to disease. These factors have received particular focus in Leventhal's model of illness representation. Personal constructs also closely examine a person's emotional reaction to events. Hampson et al. (1990) also make the connection of these emotional reactions being closely linked to the patient's interactions with their healthcare provider. Their results showed that overall patient's responses to the PMDI, were predictive of following a bio-medical model of care.

In further research Hampson (1997) utilised the PMDI to compare personal models and their predictive ability of self-efficacy in different conditions. In a study of 57 older (over 60) adults with type 2 diabetes (compared to adults with osteoarthritis), it was found that beliefs about the effectiveness of activities to control blood glucose levels were most predictive of self-management activity (and in particular following dietary recommendations). In order to complete these studies, Hampson and colleagues (1997) used the PMDI which focused on the five illness representation domains. Some authors may argue that this is a prescriptive approach to exploring personal models, however, Hampson (1997) used open questions so that participants could explain their responses more. Interestingly, this research also found that people with diabetes were more likely to blame themselves for the illness, when compared to the people with osteoarthritis. Other results from the testing of associations determined that the three core personal model constructs of treatment, seriousness and cause were related to dietary intake, physical activity and glucose testing. The strongest association was that of dietary intake to treatment effectiveness. In conclusion, from these studies, Hampson has determined that patient-based constructs that assess beliefs and feelings about diabetes and its management are able to predict self-management (care) behaviour. In particular, levels of dietary intake and physical activity were predicted by personal model constructs, of which treatment effectiveness was most strongly related to perceived outcomes (complications of diabetes). An identified (by the author) potential problem of using the PMDI is that it is lengthy and time consuming to complete. Hampson, Glasgow & Foster (1995) contend that this can be improved by reducing the number of items and delivering it as a 'straight' questionnaire. A further question remaining is whether a study in a US population sample can be applied to a UK one. It is argued that probably there are some transferences possible as the tenet of intervention is broadly similar, aimed at diet, exercise and drug therapy. Hampson asserts from her series of studies, that overall personal model constructs are important to consider in research and clinical practice as services move towards more individually-tailored interventions and education which help to maintain 'normal' blood glucose levels in people with diabetes.

The PMDI has very recently been used in a study in Manchester in adults with type 1 diabetes and examined patients perceptions in accessing diabetes care services (Lawson, Bundy, Lyne et al. 2004). They found differences in personal models of non-attendees to attendees, with those accessing healthcare being more orientated to understanding issues of having type 1. They conclude that 'emotional and cognitive responses to diabetes should be assessed'. Personal models in older adults with type 1, using a case study series design was also studied in the USA by Oram (1992). This in-depth study, only available as an unpublished thesis, explored the complexity of relationships and psychological factors in two people with type 1 diabetes using a sequential series of interviews.

Hampson, Glasgow & Foster (1995) specifically examined health-related beliefs using the PMDI and tested the association to control in patients with type 2 diabetes. They found strong correlations between personal models, especially beliefs and dietary and exercise taking. They concluded that assessing personal models is useful for determining education and counselling for nutrition and physical activity. This study was important in that it is one of the few which asserts that taking the patient perspective to condition management is necessary in relation to achieving effective self-care. This point has been raised in recent studies into patient education and the PMDI findings have been used as part of a framework in an intervention study (Cooper, Booth & Gill 2003a).

Lustman, Frank & McGill (1991) examined the relationship of personality characteristics to measures of control (HbA_{1c} levels) in type 1 and type 2 diabetes. Using Cloninger's (1986) Tri-dimensional Personality Questionnaire they found that those people with extreme personality features had higher HbA_{1c} levels than those with average features. Personality characteristics were delineated according to Cloninger's biosocial theory of personality (1986) and are summarised as; novelty seeking - excitability, impulsiveness, extravagance and disorderliness; harm avoidance - worry and pessimism, tension about uncertainty, shyness and fatigue; and reward dependence - sentimentality, persistence, attachment and dependence. By using principal component analysis they determined that the presence of personality disorders (extremes of traits) were associated with poorer glucose regulation in type 1 and type 2 diabetes. However, this was not consistent across all personality traits measured. In fact the only personality trait that was significantly associated with control in type 2 (n = 54) was the trait of opportunism. A more significant correlation to control and personality traits, was in fact, where the patient had been referred from; the most significant being those enrolled in a diabetes treatment study.

It is clear that there are some unanswered questions in relation to the interrelationship or connectivity of psychological and social and personal factors which may have a bearing in the life of a person with diabetes. No study identified to date has attempted to examine personal constructs in an individual, in-depth basis using personal construct psychology (Kelly1955) as a theoretical framework. A very small number of studies conducted in the USA have elicited some information in relation to personality traits, personal models and their effect on control in type 2 diabetes.

A major criticism, of the self-directed regulation model, is that health care professionals often do not have control over the consequences that in turn control behaviour, e.g. conditional reinforcements that influence health behaviour. In other words, self-regulation, in definition of the model, cannot account for all aspects of self-management, as it does not adequately allow for cognitive processes of the individual to be taken into consideration, when attempting to change health-related behaviour. Therefore other models need to be considered. The aspect of gaining personal meaning has a relationship with personal construct theory, which is the core theoretical underpinning for the study presented in the thesis. However, the self-efficacy model has been put forward as an answer to the gaps in the self-regulation model.

2.3 Self-Efficacy: definition, description and examples

Self-efficacy is defined as "the degree to which a person believes they are capable of meeting a particular challenge" (Bandura 1982). In Bandura's social cognitive theory an important distinction to the self-directed behaviour model, is that environment stimulates behaviour and vice-versa. Bandura determined through a series of experiments, that people can learn and alter their behaviour, without reinforcement. He also observed that people can learn important behaviours by observing others, which he termed 'vicarious learning'. He then further determined that in order for these processes to take place, cognitive, emotional and physiological variables were important. A three way reciprocal process is therefore described by Bandura, where behaviour affects a person's environment and vice-versa and also includes the person as having an affect on behaviour and environment.

Bandura describes two cognitive processes which are especially influential on behaviour; outcome efficacy expectations - were a person has the belief that behaviour will produce a specific effect; and self-efficacy expectations – were a person has a belief in their ability or competence to perform the behaviour. This model has particular resonance in behaviour in people with type 2 diabetes. For example, a person may believe that exercise will help in maintaining control, (high outcome efficacy expectation). However they may not have the belief that they can perform the exercise (low self-efficacy expectation). Bandura further argued that self-efficacy beliefs vary according to situations.

In terms of application of self-efficacy theory, a useful approach would be to ascertain whether a person has a high or low self-efficacy for a specific behaviour in a specific situation. This therefore demonstrates that self-efficacy is a good concept for understanding and predicting behaviour. The ability to predict behaviour can be very useful in helping people to self-manage a long-term condition like type 2 diabetes, as interventions to help change behaviour can be targeted at desired outcomes. It has been shown that people with a strong sense of self-efficacy show less psychological and physiological strain in response to stressors, than those with a weak sense of self-efficacy (Kaplan, Sallis & Patterson 1993). This can be related to a person's beliefs about their ability to self-manage their type 2 diabetes.

The tenets of the self-efficacy theory have been widely tested in health-related issues. Self-efficacy beliefs have been found to be related to clinical problems such as phobias (Bandura 1983), addiction (Marlatt, Baer, & Quigley 1995), depression (Davis & Yates 1982), social skills (Moe & Zeiss 1982), assertiveness (Lee 1983, 1984); to stress in a variety of contexts (Jerusalem & Mittag 1995); to smoking behaviour (Garcia, Schmitz, & Doerfler 1990); to pain control (Manning & Wright 1983); and to health generally (O'Leary 1985).

According to Bandura's (1986) social cognitive theory, individuals possess a self-system that enables them to exercise a measure of control over their thoughts, feelings, motivation, and actions. This self-system provides reference mechanisms and a set of sub-functions for perceiving, regulating, and evaluating behaviour, which results from the interplay between the system and environmental sources of influence. Bandura provided a view of human behaviour in which the beliefs that people have about themselves are key elements in the exercise of control and personal agency, and in which individuals are viewed both as products, and as producers, of their own environments and of their social systems. According to this view, what people know, the skills they possess, or what they have previously accomplished are not always good predictors of subsequent attainments because the beliefs they hold about their capabilities powerfully influence the ways in which they will behave. Consequently, how people behave is both mediated by their beliefs about their capabilities, and can often be predicted by these beliefs, rather than by the results of their previous performances. Bandura presented arguments that centred on perceptions of self-efficacy that would influence all aspects of behaviour. Bandura's (1962) social cognitive theory, as a process of social learning in response to stimuli, has been used to underpin studies in diabetes mellitus, particularly in relation to patient education (Cooper, Booth & Gill 2003a).

People with type 2 diabetes have to make decisions every day concerning their medication, diet, exercise and blood glucose monitoring. This has led researchers to link these tasks with the perception of self-efficacy by people with diabetes on how well they can perform these tasks. However this as Anderson et al. (1991) argues, has led healthcare professionals to believe that self-efficacy is concerned with disease management tasks rather than constructs of stress management, utilising family support, and dealing with emotions. An important aim of diabetes care and education is to increase patient's perceived self-efficacy either to aid in psychological adjustment or to increase self-management ability.

Perceived self-efficacy is an important psychological construct. This construct has been utilised in research to investigate the ability of people to engage in behavioural change. Studies in diabetes have tended to focus on self-efficacy as the ability to perform disease management tasks. This pursuit is still prevalent in diabetes research especially with supporters of self-blood glucose monitoring (Ikeda et al. 2003, Siebold et al. 2006). Other disease management tasks which are considered indicative of self-efficacy are meal choice, injection of insulin, and exercise taking.

A different view of perceived self-efficacy related to diabetes has been presented and researched by Anderson's group in America. Anderson et al. (2000) in particular have focused their research on self-efficacy and its impact on managing stress, obtaining family support, negotiating with healthcare professionals and employers, and dealing with uncomfortable emotions. Anderson and colleagues over the last 20 years have developed a measure of diabetes-related self-efficacy based on these issues; the Diabetes Empowerment Scale (DES) (Anderson et al. 2000). The original study was a randomised controlled trial which evaluated the effectiveness of a patient empowerment program (Anderson et al. 1991). This trial was able to reliably indicate that a program of this nature would have beneficial effect on patient outcomes on the psychological domain and in disease management. However, Anderson found that at this time there was no reliable measure of self-efficacy specific to diabetes and therefore at the same time developed the DES. A series of reliability and validity studies have ensued on the DES, which has been shown to reliably measure self-efficacy.

Bandura (1986) believed that self-regulation – respondent and operant learning theory did not account for humans influence on their environment. The aspect of incorporating personal variables has a relationship to personal construct psychology, whereby Kelly (1956) attempts to encompass all these various aspects of behaviour. The aspect of Bandura's situational changes to self-efficacy beliefs has some resonance with Kelly's (1956) situational dependency aspect of personal construct theory. Kelly argues that influential people in a person's life will affect that person's perceptions and beliefs. This also has a link to locus of control theory, were 'powerful others', (people), may have more perceived control over a person's decision-making process than the person themselves. It can be argued that perceived self-efficacy is an important issue for people with type 2 diabetes. Interventions which improve self-efficacy can have a beneficial effect on psychological and bio-medical outcomes. It is worthy of further study to delineate exactly what personal constructs there are which have a relation to perceived self-efficacy for people with type 2 diabetes.

2.4 Locus of control model: definition, description and examples

This model is based on the general tenet that most people believe they have a certain amount of control over what happens in their lives. The locus of control theory was explored by Rotter (1966). A person is said to have a high *external* locus of control, when they believe that other people or chance, will determine their behaviour and outcomes. A person is said to have a high *internal* locus of control, when they believe that they themselves determine behaviour and outcomes.

Locus of control theory has received attention in application to chronic conditions in the research literature and is based on Rotter's (1966, 1971) original work which describes three aspects of individual levels of responsibility affected by internal, external powerful others and chance factors. In 1987 Ferraro et al., presented a reliability and validity assessment of a diabetes locus of control scale. Based on Wallston & Wallston's (1978) multidimensional health locus of control scale, it aimed to measure the extent to which an individual feels that events in his/her diabetes life are under their control (internal) or unrelated to their behaviour and controlled by others (external). Some attempt has been made to use this construct since Ferraro et al.'s (1987) work in people with type 1 diabetes (Privette 1990, Tillotson & Smith 1996). The author of this thesis has previously explored the complexity of patient perception's related to locus of control and healthcare intervention (Gillibrand & Flynn 2001). This exploratory study determined that people perceived that others, in particular healthcare service personnel, may have forced the person into relinquishing control and decision making for their condition management. It appears that locus of control theory has some relation to personal construct psychology; in that both models account for the influence other people and the person themselves have on behaviour

2.5 Personal construct psychology and dependency: definitions, descriptions and examples.

Personal construct psychology as a theory was developed and researched by George Kelly (1955) and was used in exploratory design as well as practical, therapeutic application (Kelly 1955). Personal construct psychology (PCP) reflects a scientific viewpoint based on a theory that human beings can construct views of the world in which they live, based on experiences, assumptions and the ability to make choices. The extrapolation of these concepts is that human beings will have constructs which are meaningful to them and allow alternatives to be considered and explored according to external stimuli (Kelly 1955). Kelly and his supporters argue that in order for human beings to attempt to make sense of stimuli, they explain and view the world in patterns or 'templates' which Kelly names constructs (Kelly 1955, Pg.9). Therefore human beings build up collections or repetitions or a repertory of constructs that fit with the way they live and deal with changing stimuli. Kelly states this succinctly as a reflection of the humanistic movement of the time: "man creates his own ways of seeing the world in which he lives" (Kelly 1955, Pg.12). Constructs are formulated and are either accepted or rejected according to meaning in a person's life. These constructs can be grouped into systems, which incorporate sub-ordinate and super-ordinate relationships (Kelly 1955). Central to Kelly's theory was the perceived relationship the constructs in a person's life had, and were influenced, by other people. He termed this 'situational dependency'.

The concept of exploring deeper personal meanings is derived from Kelly's (1955) original theory on personal construct psychology (Fransella & Adams 1966, Bannister & Mair 1968, Landfield 1971, Phillips 1974, Fransella 1977). Banister & Fransella (1977) have explored the utility and applicability of Kelly's methods for empirical research and as a psychotherapeutic technique. They expand on Kelly's theory to encompass other domains apart from traditional mainstream psychotherapy. They present arguments for and against objective psychological measurement as opposed to examining 'real' human experiences in a non-reductionist approach. Basing the approach of the proposed research on objectivism and predictable outcomes would suggest a priori assumptions and knowledge of the subject of enquiry. This section analyses personal construct psychology and the different approaches taken in applied research methodology for repertory and dependency grid completion, analysis and interpretation.

Constructs can help to predict outcomes to events and the actions of the individual (Kelly 1955, Fransella 1977). There are always alternative constructions available when people have to deal with events in life and this represents the alternative choices that people make. Kelly (1955) argued that these were constructed and explained this rationale against a philosophical stance that he named "constructive alternativism" (Kelly 1973, Pg.15). This, it is argued reflects a somewhat redundant argument in today's context, of empirics versus realism and instead could be construed as encompassing both aspects and therefore accepted in terms of pluralism for underpinning methodological arguments (Bannister & Fransella 1986).

In order to explain and make clear the methodological steps in application of PCP to answer research questions via the repertory or dependency grid, Kelly (1955) delineates the building process in terms of eleven corollaries based on a fundamental postulate that states "a person's processes are psychologically 'channelised' by the way in which he anticipates events (Kelly 1955, Pg.103). It could be argued that Kelly in this process makes some appeasement to mainstream psychology and the development of PCP, despite his protestations of alternative views, which are not just based in reductionist paradigms.

The corollaries have been described, tested and refuted to varying degrees by scholars either by empirical questioning or theoretical standings. The following are listed as the corollaries: Construction; described as replication of events which are constructed in order for a person to anticipate such events; Individual; each person has their own, individual construction of events; Organisation; each person builds their own system to establish relationships between constructs; Dichotomy; there is a limited number of different, non linked constructs; Choice; people choose the constructs which help in expanding and defining a construct system; Range; there is a limited range of events for which constructs fit; Experience; as an individual experiences events again and again, the construct system will vary; Modulation; the system changes are limited to how the constructs vary within the system [note; Bannister and Mair (1968) examined this particular corollary and explained it in terms of how reactions to things can differ from one moment to the next]; Fragmentation; incompatible construction subsystems may be employed by the person; Commonality; the way in which two people's constructs which are similar may demonstrate similar psychological processes; Sociability; the way in which people view other people's actions which may play a role in a social process (Kelly 1955). These corollaries it can be seen form the central underpinning operational theory to PCP and it is argued can be the framework for the research question proposed and for the analysis of the enquiry detailed later in this thesis. What remains as experimentation however is the question of the transfer of the framework's use from examination of mental ill health to examination of issues in chronic conditions, in this case type 2 diabetes.

Kelly's corollaries can be viewed simply as a list of ways in which PCP theory has been developed. In analysis it encompasses three basic tenets which underpin the approach and method to be employed in this study: that people have ways in which constructs are developed based on experience and anticipation of events; that interaction with others' constructs will have an effect on one's own construct systems, and that this effect can be construed as having psychological or social process outcomes.

It is useful at this point to further delineate the theory of constructs in order that, in enquiry, the methodological steps can be followed. A construct is defined as a way in which some things are construed as being alike and yet different from others (Kelly 1955). Constructs therefore take a 'bipolar' nature demonstrating effect on a range to extremes. Bannister and Fransella (1986) argue that Kelly's theory was intrinsically abstract and non-specific in nature and therefore has manifested in difficulties of experimental application and resultant different modes of technique. In analysis, this can be appraised positively as experimentation to achieve definitions of personal meaning, the way in which we individually react to environmental (internal or external) stimuli.

Bannister and Mair (1968) describe PCP and the nature of constructs more pragmatically than Kelly's often viewed abstract sense, clearly in preparation for use in application to research methods and subsequent development and refinement of the repertory grid analysis technique. Their extrapolated view, that a construct is a way in which some things are seen as being alike yet different from others in context is essentially the same as Kelly's. However, they further postulate that a construct is a double-ended entity and is a basis for considering similarities and difference in terms of personal meaning and reaction to stimuli.

Thus the nature of attempts to measure and define personal constructs in individuals begins to appear in the form of Kelly's role construct repertory test and Bannister and Mairs' (1968) repertory grid analysis, both of which will be analysed further. However it will be seen from this, and further arguments, that in application Kelly's secondary techniques of dependency grid will prove more utilitarian in examination of constructs in this study and will be examined.

Two theoretical frameworks have been debated and researched as appropriate to diabetes-related health service intervention (patient-centred versus the bio-medical) and the question still remains whether both can be incorporated into one overall framework of care which is effective and efficient (Fahrenfort 1987). Patient-centred care focuses on patient autonomy, decision making, active participation and collaborative care. Bio-medical care focuses on compliance, planning, patient passivity and dependence (Tones 1993, Pibernik-Okanovic et al. 2004).

Dependency

Dependency and its relationships and effect on the patient-centred model of care remains an unanswered question in people with type 2 diabetes and formulates part of this thesis' aims and objectives for the in-depth enquiry described. The degree of dependency and the predominant use of the bio-medical model of care and its effect on people with type 2 diabetes, psychologically and socially has not been sufficiently examined to locate the construct to date. Finding and developing a reliable and valid methodology to answer these questions are complex and also not readily answered. Calls for such research have been made recently but, perhaps due to the nature of complexity, depth and individual enquiry approach, have not been attempted (Pibernik-Okanovic et al. 2004).

Snyder and Snyder (1961) presented an original analysis of the nature of dependency, particularly in a therapeutic relationship between a client and their psychotherapists. Snyder further explored the issue in a more in-depth exploration of therapy in abnormal dependence (1963). He presented this work as an examination between 2 case studies and their therapist into the nature and complexity of dependence in relation to father figure substitutes.

This important work, and other preceding works, led Snyder (1963) to consider a definition of dependency which is not dissimilar to Kelly's (1955) delineations of independence and dependence. Snyder's definition clearly delineates meanings of dependency associated in relationships rather than the health service delivery perspective; physical dependence on carers by patients who have differing levels of disability (Strandberg & Jansson 2003).

Snyder's definition states:

> "Dependent behaviour may be defined as behaviour involving the need for more help than the average person requires in meeting problem situations".

(Snyder 1963, Pg. 3).

Kelly's (1955) explanation is less focused on the interaction, and more focused on the personal meaning for individuals, in terms of how individuals attach meanings to experiences with others. Snyder (1963) refers to dependency, related to Maslow & Mittleman's (1941) theory; when a person is feeling helpless they may turn to others for restoration. People he or she will commonly turn to are friends, professionals involved in the situation (i.e. therapist) or spouse/close relatives.

In 1958, Peterson et al. identified that within a psychotherapeutic relationship, dependency was a significant psychological problem, determined through factor analysis of a specifically designed questionnaire. Snyder and Snyder (1961) performed an important study into the nature of the psychotherapeutic relationship. They examined 20 clients with a co-morbid dependent behaviour and delineated the dependent construct, by comparing the therapist's perception and style of therapy to the client perspectives. They tape-recorded a series of interviews with each client and therapist to elicit data through comparison of notes and a specific questionnaire designed to measure perceptions of the therapy conducted. This technique of in-depth, longitudinal examination of client perspectives related to dependency has not been used in examination of the experience of altered states of general health. This thesis attempts to meet this unanswered question in people with type 2 diabetes. A related work in people with type 1 diabetes mellitus was conducted by Oram (1992), however, she focused more on issue of perceptions of self related to diabetes self management (conditions work) activity. Researchers have attempted to link all these factors into a 'psychosocial framework', therefore this idea also needs to be defined, described and critically discussed.

Many examples exist of research which has used Kelly's (1955) personal construct psychology (PCP) approach and methods of analysis (Walker & Kalekin- Fishman 1996). Education and corporate management are two areas which have consistently used PCP (Fox, Walker & Smith 1996). There are considerably less examples related to altered states of health. The explanations for this may rest in the complexity of the method, the time consuming nature of it, the individual versus the general approach, and the usual lack of generalist data produced which does not fit with an evidence-base driven system of healthcare. The majority of examples in health research reflect Kelly's (1955) and later Fransella's (1978) use in altered mental states, particularly in bi-polar and eating disorders. Researchers have continued to use the method for research and therapy in other altered mental states (Smith et al. 1991). Most of these research and therapeutic endeavours have used the single or multiple case study method (Walker & Kalekin-Fishman 1996, Yin 2003). However, a few examples exist in general health which can be critically appraised for reference and the location of this thesis.

Personal construct theory has been used to examine student nurses perception's of mental health, care of older people and general surgical clinical experience placements utilising comparative or case study design (Fielding 1979, Davis 1985, Melrose & Shapiro 1999). Buckenham (1998) also presented a theoretical examination of the changes to a student nurse's perception of self, related to socialisation into the nursing culture, utilising the PCP framework. One example of research in diabetes using a repertory grid technique exists (Lenczycki, Anderson & Evans 1994). This was particular to measuring attitudes in people with diabetes (non-specified typology) and their dieticians. The study report (only available as a published abstract from conference proceedings) gave brief details of 17 participants with diabetes studied in the USA. The researchers found that certain aspects of food attitude could be pinpointed by using a grid with patients, administered by a dietician. They conclude that this innovative tool may be useful in clinical populations requiring dietary management and focus on the therapeutic value of the grid method as an aid to dietary advice intervention. It is disappointing that further detailed information has not been reported from this study and also that developmental research has not followed.

An exploratory study was conducted on personal constructs using a repertory grid method in people with chronic low back pain who were not patients of any service delivery. Large and Strong (1997) utilised Kelly's (1955) focused, triadic method to elicit personal constructs in relation to back pain. Within the findings which related significantly to coping, one of the constructs identified was the participants having acceptable social interactions.

A study by researchers in Manchester, (UK) used a dependency grid analysis method in 14 people with, and without, hypertension (Talbot, Cooper & Ellis 1991). They found the dependency grid useful in investigating social support systems that were utilised to aid in stressful situations and crises. They reported how Kelly's (1955) original situational dependency grid was unwieldy and unsuited to their study and that they needed to modify it for examination in hypertension. They relate how their findings indicate that the dependency grid could be useful as a diagnostic tool to determine 'unhealthy' dependency distributions, which may help in handling stressful situations, i.e. who to turn to, and how to use them for help. This, then they argue, may aid in therapeutic prevention of hypertension.

Considering that only one relational application has been made in the use of personal construct psychology in the experience of diabetes mellitus, it appears justified to examine further personal constructs per se. The critical discussion in this thesis is focused on the patient experience of type 2 diabetes. Utilising the personal construct psychology approach and method may produce answers to exploration of experience in terms of interrelationships and dependency.

2.6 The psychosocial framework in diabetes

This chapter has described psychological models, which have been used to explain self-management in type 2 diabetes. Researchers have argued that, in order to fully understand this issue, the social context needs to be included in models. The term 'psychosocial framework' is defined as a model which attempts to encompass the psychological effects of having a chronic condition, the social effects and support structures, the cultural aspects of a person's life, and personal aspects. Glasgow and Eakin (2000) describe succinctly the areas that encompass psychosocial factors in living with and managing diabetes and these have also been termed 'psychosocial issues'. They illustrate these main areas as a pyramid of decreasing (prevalence) issues that pertain to all types of diabetes and are also directed towards intervention strategies which may be used, considered, or developed in response to an individual's need. It is useful as a reference point to reproduce it here so that the research studies appraised can be located within the psychosocial framework of care in diabetes.

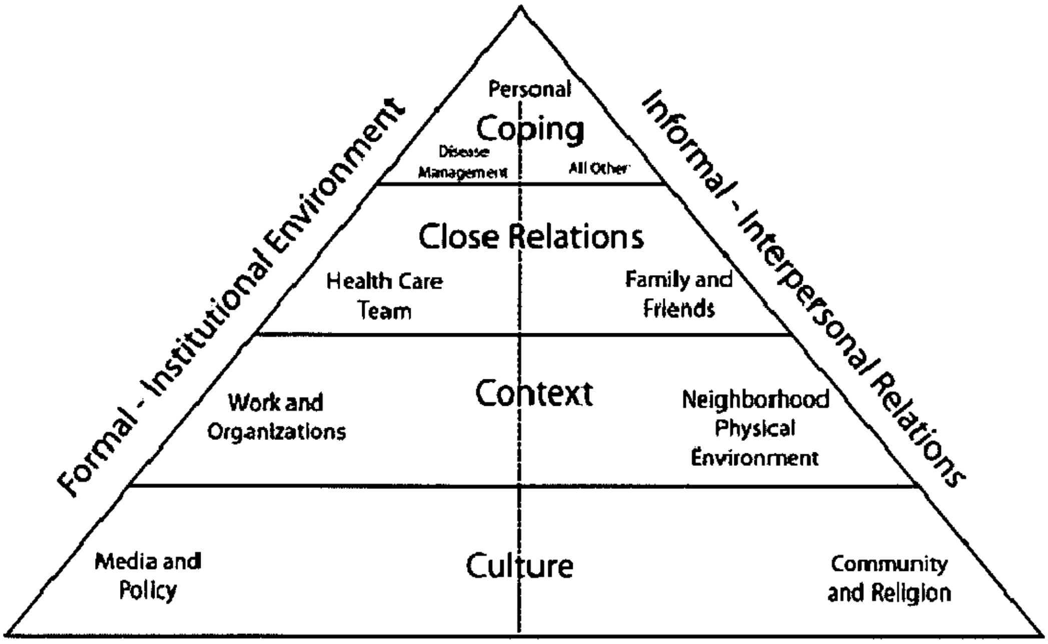


Figure 1 - *Pyramid of psychosocial factors*

Glasgow & Eakin (2000) Page 142.

Following their general literature review of issues in the self-management of diabetes they give a position statement and call for more research into these areas:

> "Given the current status of the literature, what is most needed are demonstrations that behavioural and psycho-educational assessments and interventions make a difference in the quality of life and outcomes of persons with diabetes...the field needs empirical documentation that psychological assessment and intervention procedures are practical, broadly applicable, cost-effective and produce meaningful long-term results if they are to be adopted widely or accepted into clinical practice".

(Glasgow & Eakin 2000, Pg. 454)

Currently six systematic reviews are published in the area of psychosocial interventions and self-management in diabetes dealing with varied contextual situations and specific disease. In the preceding chapter, context of care systematic reviews were appraised in relation to delivery of health services for people with type 2 diabetes. Of the systematic reviews available, only 2 exclusively examine issues in type 2; Norris, Engelgau & Aryan's (2001) review entitled 'Effectiveness of self-management training in type 2 diabetes' and Vermeire et al.'s (2002) Cochrane review entitled 'Interventions for improving adherence to treatment recommendations in people with type 2 diabetes.' These will be critically analysed to identify current and possible applications in practice and clinical health service delivery research questions that remain unanswered. Studies examining these issues published after these reviews in type 2 will also be analysed critically for relevance and quality.

Norris, Engelgau & Narayan (2001) performed a meta-analysis on current published RCT's in interventions that were specifically designed to 'train' people with type 2 diabetes to self-manage their conditions. This is an interesting 'technical' perspective to consider and one could question its underlying precepts in terms of 'training.' It is suggestive of a prescriptive approach to determine best modality of service delivery. It appears less related to person–centred psychosocial approaches to care than is explicitly stated in their introduction.

The central issue of self-management of chronic conditions has been considered to be the crux of treatment and intervention strategies in diabetes (Glasgow et al. 1999, Norris et al. 2002). Although Norris et al.'s (2002) review is written from a USA contextual perspective, their search strategy encompassed all the English language literature and indeed studies are included globally. Standard electronic database searching was utilised, however only full text available papers were followed up. A selection of relevant diabetes journals were manually searched including the UK publication Diabetic Medicine. Only studies identifying participants aged over 18 and having type 2 diabetes were included and resulted in 72 studies (RCT's) identified for inclusion in the analysis. The authors described self-management training interventions in 4 classifications to aid in a stratified sampling review technique:

- Knowledge or information.
- Lifestyle behaviour, including diet and physical activity.
- Skill development, including skills to improve glycaemic control-self monitoring of blood glucose; skills to prevent and identify complications.
- Coping skills (to improve psychosocial function) - interventions using empowerment techniques, promoting relaxation, self-efficacy.

Whilst the review was extensive in its scope, identifying 72 studies for inclusion, only 11 were conducted in the UK and two of these appear to be inclusive of people with type 1 as well as type 2 diabetes. However, this is not clear as both used pre-1990 classifications of diabetes which did not use the distinction of types, only treatment modes based on pharmacological intervention.

Despite the paucity of UK clinical trials of effectiveness, Norris, Engelgau & Narayan (2001) identified some significant findings which are applicable to practice. In terms of the categories in the stratified sampling procedure, there was a positive effect of self-management training in knowledge, self-monitoring of blood glucose, dietary change and glycaemic control (measured by HbA_{1c}) in the short term. It could not be stated however that self-management training had an unequivocal positive effect on physical outcome measures, i.e. blood pressure in the longer-term. Numerous methodological problems were raised in many of the studies reviewed as there was little ability to generalise the results outside of the individual studies' environment. The authors conclude that in the short-term, self-management training has a beneficial effect on physical outcomes but more research was needed on long-term sustainability.

Also highlighted, but not discussed, was the inability of these studies to demonstrate positive outcomes in psychosocial issues for participants due to the lack of reliable and valid measures, bio-medical focus, no theoretical framework referred to, and no user perspectives referred to in the intervention effect. This is surprising considering that these studies were attempting to evaluate what 'ipso facto' can be argued were psychosocial based interventions. Four studies did attempt to measure psychological outcomes and two reported improvements in problem solving and anxiety levels (Scott, Beaven & Stafford 1984, Pratt et al. 1987, deWeerdt et al. 1990, Glasgow et al. 1992). Three of the studies attempted to measure the effect of intervention on quality of life, only one employing intensive counselling which demonstrated a positive effect (Kaplan et al. 1987, de Weerdt et al. 1990, Glasgow, Toobert & Hampson 1996).

Overall this systematic review was problematic in a number of areas; a meta-analysis of statistical significance was not performed, rationalised by the authors as varied differences in intervention type and outcome measurement, results presented in a non-synthesised way and little firm conclusions presented. However, there is a small encouraging sign that issues in self-management may be important in outcomes of quality of life and anxiety in the context of self-management interventions. Perhaps the major problem with the studies in this review was the inherent and embedded bio-medical focus on outcome measurement and healthcare intervention and therefore the lack of attempt to measure many psychological and social consequence outcomes.

A cognitive assumption exists currently in the diabetes psychosocial literature that levels of adherence to treatment by patients is an indicator of self-management or coping with a life-long condition (Vermeire et al. 2002). Vermeire's research group discuss the nature of this assumption and debate the appropriate terminology as the background to their systematic review. The aim of this review was to examine the effectiveness of interventions aimed at improving adherence to treatment recommendations in people with type 2 diabetes (Vermeire et al. 2002). They denote compliance and associated research as having had a primarily healthcare professional led approach and not taking the patient's views into consideration. This leads them to surmise that this is a negative approach, in motivation terms, to adhere to treatment and, therefore, has resulted in the general negative findings of effect of interventions aimed at improving diabetes-related outcomes. They argue that a more appropriate theoretical framework would be to assess concordance as a model whereby the patient, not the healthcare professional, is the decision maker and healthcare professional intervention is based on empathy and 'matching thought' with a patient. Vermeire et al. (2002) finally, though albeit briefly, determine that a suitable theoretical framework for the systematic review would be 'adherence', which they argue encompasses notions of concordance, co-operation and partnership and acknowledges psychosocial issues in type 2 diabetes. This represents a middle ground compromise between healthcare professional's desire to control (out of best interests) and the patient desiring autonomy of decisions.

Vermeire et al. (2002) from their review conclude that interventions aimed at improving adherence fall into a number of broad categories; interventions aimed at improving the doctor/patient relationship, interventions aimed at self-management and self-care, interventions aimed at improving the process of medication taking, educational and behaviour interventions and organisational structures to improve diabetes management (Renders et al. 2001). Therefore in order to promote concordance, and to engage the patient in this process, interventions need to be focused on the patient/provider interaction as well as within an educative progression.

Empowerment of the patient to improve self-management is placed as a central tenet of the new national guidelines in patient care in the UK, and it could be argued, is a factor in the 'psychosocial framework' (Department of Health 2001a, 2001b). It appears that little understanding is presented in these guidelines of exactly what empowerment is, other than to describe it as information giving and allowing choices to be made. This is an overly simplistic view of empowerment which may do little to achieve its aims (Gibson 1991). The basing of clinical practice on ill-defined and researched theory based itself, on 'a priori' assumptions will, it is argued, result in equivocal outcomes of patients under that healthcare system.

Bio-medical approaches to care without the full involvement of the patient and his/her experiences being valued in their decision making has resulted in the negative outcomes evidenced in diabetes care in the UK. To glibly state however that empowering individuals will achieve good self-management is also overly simplifying, and indeed patronising, to the patient experience of life in general, not just the impact of diagnosis of a chronic life-long condition. Therefore it is provident that some more complex analysis is made of this concept and relates to the objectives of the research study presented in this thesis. To explore and describe the deeper meanings, interpretations and relationships that people with type 2 diabetes might experience in living with and managing their conditions.

If using (ego) defence mechanisms as a means of controlling anxiety in everyday life are 'healthy', it is questionable whether to 'empower' the patient, to encourage them to break down their defence mechanisms, is the correct approach, which is actually what empowerment aims to do (Hamelink 1999). If, as has been argued by Handen 1991, some people overuse their defence mechanisms in response to conditions, this is considered unhealthy and then by breaking those mechanisms down (empowering) may help. This again relates to the argument presented in this thesis that national guidelines, and some of the evidence behind them, have oversimplified proposed intervention strategies in people with diabetes. However, there have been attempts to test empowerment techniques using reflective questioning in diabetes mellitus which have had positive diabetes outcome related results (Anderson et al. 1995).

2.7 Summary of theoretical perspectives

This chapter has examined and appraised certain relational and historical theoretical perspectives to chronic conditions of particular relevance to this thesis. It has not been possible to appraise all the related theories and models which have been used in diabetes related research, however, the important underpinning principles in areas of the self-efficacy theory, self-directed behaviour regulation theory, personal construct psychology, and psychosocial issues have been explored.

Whilst the theoretical models and concepts presented and appraised have some bearing on this thesis, the pre-dominant theoretical framework is based on personal construct psychology and dependency,

Chapter 3

Living with type 2 diabetes

3.1 Introduction to the Chapter

This chapter is split into four sections each examining the research literature in a particular domain pertinent to the current state of knowledge in the area of patient experiences, psychological effects, social support and communication studies in people with type 2 diabetes. It is the intention in this chapter to appraise critically the research literature pertinent to studies which have explored patient experiences of living with type 2 diabetes, psychological effects, and studies which have examined social support strategies. Many of these studies have utilised the theoretical models described in chapter 2.

The search strategy employed for this review followed standard guidelines with electronic searching of databases being the main mode employed. However, secondary reference searching was employed, examination of the grey literature and, where necessary, personal contact with researchers in the field. The following databases were searched up to the date of writing this thesis and downloaded by direct export to a reference database; Medline, PsycLit, EmBase, Cochrane database of systematic reviews, Science Direct, Synergy, Ebsco, Cinahl, NHSNet, Social Science, Google, MSN, Alta Vista. The search terminology and Boollean combinations are listed in Appendix 1. The sections in the review will examine patient experience of conditions and intervention, psychological measurement and prediction of outcomes including behaviour change and social support strategies including family networks.

3.2 Living with type 2 diabetes

Logical assumption would suggest that research endeavour has uncovered explanations for the experience of having a long-term condition and, in certain contexts, this could hold true. In particular much work has been done which is noteworthy and of sufficient rigour in the USA to justify the basing of interventions in type 2 diabetes care on psychological approaches. The same, however, could not be stated for the UK and indeed Europe. The main contention social scientists may have against assertions of relative cognition in describing the patient experience, is that the majority of research has been guided by a positivist, quantifiable, generalist approach. This is highly questionable, given that the individual experience of diabetes and the individuals' environment has been shown to have the most important effect of living with the disease (Fisher et al. 1998).

A number of systematic reviews and reviews of a critical nature have determined an emerging framework for understanding the patient experience and the context of psychological care in type 2 diabetes (Fisher et al. 1998, Chesla et al. 2000, 2001). The studies can be categorised in four major themes which appear to be associated with management and living with type 2 diabetes:

- Patient characteristics; personality, conditions experience, beliefs.
- Healthcare professional; patient relationship-empowerment, beliefs of severity, care service and who provides care, involvement of the individual in conditions management.
- Non-conditions associated stress; work, fiscal pressures.
- Social networks/social support; family, friends, social community, peer support.

This section of the literature review examines and critically appraises the research which has studied the patient's perspective and lived experience of conditions specific to type 2 diabetes. This proves difficult in that the majority of studies use individual, differing methodologies, specific specialist groups of participants and are generally focused in the qualitative enquiry domain. It is perhaps more complex to judge quality of methods and group together findings from qualitative studies of patient experience however, examples exist in the diabetes literature in the form of meta-ethnography (Paterson, Thorne & Dewis 1998, Campbell et al. 2003).

These two qualitative syntheses of patient experience research in diabetes have perhaps two major problems. One is that they both include any type of diabetes and the other is that both do not identify all the available published research and, therefore, are not reviewed in the synthesis. This represents both implicit and explicit bias in the reviews' findings, however, each is worth appraising for the relevance to this thesis.

Paterson, Thorne & Dewis (1998) synthesised qualitative studies in diabetes and overall could identify one overriding theme that was common to many of the studies; that people with diabetes wanted to achieve a sense of 'balance' in their lives between living a 'normal' way and living with diabetes. The use of the term 'balance' was also delineated to describe issues of self-management, counter-balanced against healthcare professional direction and treatment regimes. Balance was also described in the context of trying to achieve good control of the disease processes, i.e. normoglycaemia and prevention of complications, with continuing lifestyle choices.

Campbell et al.'s (2003) synthesis was intriguing in that it failed to identify many of the studies that were identified by Paterson, Thorne and Dewis' (1998) earlier work, despite professing to cover a 20 year period. Indeed they failed to identify that very review, only acknowledging it in the discussion as having been found after the review was completed. They cite the reason for this in the supposed difficulties of searching systematically for qualitative studies of this nature. In the seven papers identified, which focused on patient experiences of diabetes and diabetes care, they present wide ranging findings as commonalities across time, context and culture. This is highly questionable and is based on a number of assumptions which can be challenged directly. It is questionable that patient experiences transfer across diverse cultures (Anderson 1999). Assuming that experiences and perceptions stay the same across time suggests that people's life situations and context of health and social care does not change. It is assumed in this synthesis that different health services produce similar patient experience. Campbell et al. (2003) present the following 'meta themes' of patient experience in diabetes as common across these studies; that there is a process of reciprocal translation which patterns responses to self-management of diabetes, that by employing a line of argument approach, people acquire a feeling of control of their diabetes which is achieved through stages of no particular type or order, and thirdly that attainment of a balanced lifestyle was associated with an approach to self-management which was described as strategic non-compliance by self-manipulation of diet and medication. This would then, they argue, enable a balanced fit without alteration to people's social and work activities. This result can be challenged and rests with the argument that the findings of Campbell et al.'s (2003) meta-synthesis is overly simplistic, negates many studies in the field and does not examine the complexity of work and social related activity. It is also questioned how, conversely, patients and others are affected by having diabetes. In particular, there is no separate view that the experience of type 2 diabetes may differ from other types.

As this thesis is concerned with exploring individual experiences and personal constructs with type 2 diabetes, it is necessary to locate and critically discuss previous patient experience studies, predominantly using qualitative methodology (Paterson, Thorne & Dewis 1998, Campbell et al. 2003). This is in order to identify key factors and issues which contribute to understanding the patient experience of type 2 diabetes.

The question first raised, however, before embarking on this critical appraisal section, is one which has been previously raised in this thesis and one which has been ignored by the cited reviews; the separation of experience in aetiologies in diabetes. Perhaps the answer lies within research conducted in the psychological and social effects in child and adolescent experience of type 1 diabetes. Hampson, Skinner, Hart et al.'s (2000) review of psychological outcomes in this age group with type 1 diabetes concludes that the psychological effect is tied to the way in which the child and adolescent develops, matures and grows physically and mentally, and this is clearly distinct from onset of disease in adult life. Also studies have determined that there is a significant difference in the experience and expectations of future considerations on health and the motivation for self-management between people with type 1 and type 2 diabetes (Hampson 1997, Eiser et al. 2001, 2002).

Despite this clear distinction, numerous studies of the experiences of diabetes have been researched with participants from different classifications, indeed one by the author of this thesis (Gillibrand & Flynn 2001). This is considered fair given that half of people diagnosed with type 1 are in the adult age bracket (ADA 1997). However, it also appears justified to conduct enquiry in people with type 2 diabetes who, form 90% of all people diagnosed with diabetes, and are nearly all in the adult age group. Researchers of patient experiences in type 2 diabetes, in Australia and the USA, have made the distinction of typology but have further made the distinction in terms of gender and explored patient experiences separately in men and women (Deitrich 1996, Koch et al. 1999, 2000).

Further there is a paucity of rigorous studies, and most available literature is from the USA. It is, therefore, questionable how previous research applies and transfers to the UK's different context of care. One final point is the distinction of culture and ethnic origin of participants which has been considered by enquiry in specialist groups of participants. Some studies also examine and explore the nature of chronic conditions experience as opposed to the distinct studies exploring diabetes, reflecting the theoretical perspective that having a life-long condition has some commonalities across disease groups (Strauss & Glaser 1975).

In the period 1985-2004, using the search strategy detailed previously and listed in Appendix 1, a total of 18 studies exploring the experience of type 2 diabetes, using a variety of qualitative methods, were identified. Of these, two studied the healthcare professional perspective in conjunction with their patients' experience. Of the remaining sixteen, 2 were conducted in the UK with one dealing exclusively with the patient perspective and both located in primary care settings (Murphy & Kinmonth

1995, Pooley et al. 2001). The Pooley et al. (2001) study was distinct from Murphy & Kinmonth's (1995), in that it explored patient and provider perspectives of care in type 2 diabetes in the North West of England using a geographical, environmental perspective to underpin the study.

The importance of building a theoretical framework for understanding the experience of diabetes was first identified in the nursing literature by Ternulf-Nyhlin (1990). Although her study focused on type 1 diabetes it was an early significant step in recognising that healthcare professionals, and in particular nurses, needed knowledge and insights into what a person with diabetes was actually experiencing in terms of their personal perspective.

Cohen et al. (1994) in a USA study, was perhaps the first to identify that people with diabetes perceived experiences of their conditions in terms of the psychological domain and its effect on their everyday lives, rather than the physical impact, as perceived by the healthcare professionals who were studied in comparison. Although the aetiology of diabetes was not indicated, the age range suggests that at least half of the sample may have had type 2 diabetes. This qualitative, ethnographic research used Leventhal et al.'s (1980) self-regulatory and Engelhardt's (1974) explanatory models of medicine as a framework for the study. This was used in order to delineate patients and providers explanations of how they perceive their disease. Using 39 patients with diabetes and 15 healthcare practitioners involved in their care, they determined that patients had explanatory models of diabetes based on psychological and social change perceptions. Conversely, practitioners had explanatory models of diabetes based on physical aspect and outcomes. This was an unsurprising result given that the focus of care, contextually and reflecting the training of healthcare professionals, was predominantly using the bio-medical model of care. The only relational experience study prior to this was Glaser & Strauss's (1967) work on a range of chronic conditions.

In Cohen et al.'s (1994) study, little is discussed concerning the nature of conducting a culturally focused enquiry, as in ethnography, and it is difficult to relate the findings of this study within that particular methodological approach. In summary, although this study had methodological questions concerning approach and patient sample, the findings have a contribution to the development of understanding the patient experience in diabetes. Specifically they found that people with diabetes have different explanatory models of conditions than the healthcare practitioners involved in their care. The questions remaining from this study are focused on understanding changes in the context of care, complexities of relationships between healthcare providers and their patients, the social support mechanisms employed by patients and how they interact and how these issues apply in people with type 2 diabetes.

Handron & Leggett (1994) noted that no studies had been conducted in people with type 2 diabetes on psychological factors or stressors. They were particularly interested in exploring how these factors impacted on self-management of conditions. This question posed methodologically complex problems, however, these were negated somewhat by the authors adopting a retrospective method to qualitatively analyse taped counselling sessions with 6 people with type 2 diabetes and their families resident in the USA. Despite this 'convenient' approach to sampling, the findings were interesting and have a relative bearing on the empirical work presented in this thesis. Perhaps the most important finding from their study was the sense of isolation from other family members that participants experienced and also the co-dependency on a significant other in living with and coping with the demands of the conditions. Dependency is a central issue explored by the research in this thesis and its relationship to the experience of type 2 diabetes. This issue of co-dependency and isolation was demonstrated in the transcript data pertaining to dietary aspects of managing type 2 diabetes and the medical regimes imposed (Handron & Leggett 1994). This issue was identified, but not explored in-depth, in Handron & Legett's (1994) study in relation to other factors of living with type 2 diabetes, i.e. work or social functioning or in relation to other people. They also found that everyday family stressors, external to their conditions, had a negative impact on their diabetes coping strategies and were noted in the form of adverse use of defence mechanisms, i.e. consistent denial and low self-esteem which could lead to pathology.

Murphy & Kinmonth (1995) studied 46 people with type 2 diabetes in the UK using qualitative in-depth interviews in a comparative study with healthcare practitioners' views. Their approach, and consequently the findings, was disappointing in relation to the psychosocial issues in that they focused on questioning the participants about the physical aspects of the disease and the patient provider relationship which dealt with these. Despite professing to be an exploration of patients' experience of conditions and their 'thinking' about diabetes, the implicit framework employed for the enquiry was bio-medically focused. The participants were prompted into discussions about the seriousness of the disease, the complications and how they related those issues to diabetes outcomes. The discussion section of the paper focused on the methodological issues of qualitative research and the fact that it was not generalisable rather than locating the results in any non-bio-medical domain of the literature. One could therefore contend that this study did little to describe and examine the 'meanings of diabetes' held in patients with type 2 diabetes. Murphy and Kinmonth (1995) in conclusion make an 'ex facto' assumptive link between the narrative interpretations they made and the relationship to rationalising non-adherent behaviour of people with type 2 diabetes. There is perhaps implicit data in the transcript quotes given but it is not an analysed result, more a tenuous link made by the researchers.

Dietrich (1996) reported a patient experience study in women with type 2 diabetes (newly diagnosed) in the USA, with a psychosocial focus and without 'a priori' assumptions in a naturalistic enquiry. This study's findings contribute to the emerging framework of understanding the patient's experience to underpin interventions in people with type 2 diabetes. Three themes were identified which explore and explain patients' perceptions and experience of conditions; physicians reaction at diagnosis; how it impacted on the patient's perception of seriousness, the physician-patient relationship and self-care. This study focused on aspects of a doctor-patient relationship and the findings may not be applicable in a different context of care which utilises a more multidisciplinary approach. The case of primary care has weighted towards nursing intervention, as in the UK (Griffin 1998, Collins et al. 2003, Gillibrand, Taylor & Hughes 2004). An interesting finding of this study was the relationship of perceptions of self-care and support to achieve this by family members and other people. It is also interesting to note that in Dietrich's (1996) recommendations based on the research findings, she argues that physicians should receive more training in applied psychology to be able to respond appropriately to the complexity of emotions shown by patients. This recommendation appears largely to have gone unheeded, given the paucity of evaluative studies of interventions based on training healthcare professionals in psychosocial techniques in chronic conditions (Kinmonth et al. 1998, Bundy, 2003). Kinmonth et al. (1998) in an intervention study, demonstrated that training healthcare professionals in psychosocial techniques can have a positive effect on patient outcomes. It has also been argued that training in these techniques needs to be further researched and where evidence exists to support it, carried out with healthcare professionals (Bundy 2003).

Mitchell's (1998) study in Canada utilised an in-depth approach to explore how people with diabetes experience living with the condition. Unfortunately, the specific aetiology of the sample was not detailed, however it appears from demographic data on treatment modality, that the sample was a mix of type 1 and type 2 diabetes in 19 people studied. Mitchell (1998) utilised Parse's (1981) theory of human becoming, as a theoretical framework in order to describe the way in which people prioritise and attach meanings to their conditions in given personal situations. Using this framework it appears that Mitchell (1998) uncovered in–depth psychological and social issues in the personal cognitive domain and as such is illuminating. The findings are intriguing and may have some application clinically. The main findings from Mitchell's (1998) study were; personal evaluations that fortify directness; rebellious decisions that are both helpful and not helpful; comparisons that strengthen personal resolve; contemplative moments that help clarify what is important in life; and the contemplation of alternative behaviours to situations.

A study focusing on women with type 2 diabetes in the USA found four themes closely related to healthcare professional intervention and impact on the patient (Rayman & Ellison 1998). Using a focus group with 17 women they elicited that generally the participants transformed over time to self-manage their conditions. These transformations were described in contextual terms as turning points, organisational culture of caring which facilitate learning to self-manage and identification of major shifts in the patient–provider relationship. They also identified that there was likely to be a set of personal characteristics which influenced how the patient learns to self-manage. This study was influenced by the particular context of care in the USA which utilises a system of qualified diabetes educators and much of their findings relate to issues of teaching and learning which can be traced to the fundamentals of how adults learn (Bandura 1986, Rogers 1995). Of particular note, and which would warrant further scrutiny, is the issue of personal characteristics which may influence self-management. The assumption in this study is based on the notion that people want to learn to self-manage their conditions, which is reflected in the sample chosen who were all considered 'experts' in self-management, evidenced by their practitioners' view of competence and good diabetes control.

Further studies have continued to explore patient and practitioner perspectives to the condition in the USA. Hunt, Arar & Larne (1998) focused specifically on issues of adherence or non-adherence to treatment and found similar results to Murphy & Kinmonth's (1995) study. Patients viewed their conditions in terms of life experiences and practitioners tended to view the conditions in terms of failed treatment and interventions to motivate behaviour change. A distinct, interesting finding was that patients felt that their social power and poverty had a limiting aspect to being able to self-manage their conditions. In a similar but different approach, Doherty-Sullivan &

Hunt-Joseph (1998) used telephone interviews with 10 people in the USA to examine experience of the condition focused on perception of lifestyle changes. They utilised Prochaska & Diclemente's (1992) model of trans-theoretical change and found that patients perceived they needed high levels of cognitive ability and motivation to change and maintain a healthy lifestyle with type 2 diabetes.

A study into the experience of women with type 2 diabetes in Australia, utilised an unusual, non-standard qualitative methodology of participatory action orientated research (Koch, Kralik & Sonnack 1999). This was, the authors argue, in order for the research to be 'consumer' led, and included 6 women with type 2 diabetes and a research team who met over a 2 monthly period in set sessions. This they argue gave a greater insight and understanding into what it is like to live with a chronic condition and allowed 'clarity of vocalisation not available through other methodology'. This approach is questionable in its assertions, however, it does mean that the research is guided by the people experiencing the conditions themselves and is from their viewpoint. Koch, Kralik & Sonnack (1999) noted that little study has been made into the lived experience of diabetes per se, and even less in type 2 diabetes. They cite over 500 papers retrieved in dealing with psychosocial problems, experiences and consequences in diabetes but not distinct for type 2. Of these studies they could only identify one which examined type 2 diabetes with a condition experience focus (Ellison & Rayman 1998). However, despite this consumer-led research method, the results suggest a bio-medically focused orientation, i.e. knowledge of symptoms, stressful questions, and constant vigilance to prevent complications, dietary problems, and feelings of fatigue. They did identify issues of social exclusion, 'not considering others' and expressions of 'depression'. Overall they summarized that the experience of type 2 diabetes in women was negative, they were not confident in managing their conditions and were anxious about the dietary restrictions. They also highlighted the poor overall nature of the therapeutic relationship with the participant's healthcare providers.

Using the same methodology, Koch, Kralik & Taylor (2000) also studied men with type 2 diabetes. Contrasting with the women's study, men viewed living with the condition positively, a part of life and chose foods with ease. They did find that being supported by their partner was helpful. One could argue that maybe, given this finding of partner support, Koch et al. (1999, 2000) needed to consider more closely the issue and complexity of relationships having an impact on living with a long term condition.

Indeed they acknowledge this issue in the discussion that studies are required, akin to Peyrot et al. (1988) which focus on marital adjustment to adult diabetes, to examine interpersonal congruence and spouse satisfaction and explore both partners adaptation to the conditions.

A similar positive finding to living with type 2 diabetes, but in a mixed sex, study was found by McCord & Brandenburg (1995) in 14 people, using grounded theory methodology in the USA. They found that most participants' had a good understanding of their disease and were compliant with their medical regimen and felt in the majority happy. This inherently biased focus on a medical perspective may not have elicited true patient orientated perceptions as attempted to uncover on the Koch et al. (1999, 2000) approach.

Hornsten, Norberg & Lundman (2002) and Hornsten, Sandstrom & Lundman (2004) present their findings of a series of qualitative interviews with Swedish people with type 2 diabetes. The first study examined and explored how people 'mature' in their psychosocial response to conditions. The second study explored personal understandings of conditions, utilising the personal model theoretical framework (Hornsten et al. 2002). It is interesting to note that some of their findings in the 2004 study are resonant to some extent to the findings presented in the exploratory study results section of this thesis, which have previously been presented in the literature but not cited by them (Gillibrand et al. 2002). Their results will be examined further in the discussion section of this thesis. Their assertion that Western–European explorations of understanding of type 2 diabetes has not previously been examined is challenged. Questions arise also as to the nature of the use of the personal model framework as the authors specifically state that this was discarded for the analysis (Hornsten et al. 2004). Although the sampling is broadly similar there are some significant differences. Hornsten et al. (2004) only selected participants within 2 years of diagnosis and in the age range 40-80 years.

One further qualitative study is considered in this section, which falls into a culturally specific category and was in first nation adults in Canada (Hernandez, Antone & Cornelius 1999). Ten people with type 2 diabetes were interviewed and the main finding was, that a process of integration of conditions was influenced by the nature and type of healthcare intervention, particularly the characteristic of the diabetes educator.

In summarising this section of the literature review, on studies in patient experiences of type 2 diabetes, it is perhaps useful to refer to Paterson, Thorne & Dewis (1998) position paper on patient perspective research in chronic conditions. Although their comments are focused on all chronic conditions, they are pertinent to this summary. They argue that nurse researchers have led the enquiry into patient experience of conditions and found varying and contrasting results which add to our understanding in this area. They suggest that there are gaps remaining - how experience differs according to context of social, cultural and contextual circumstances, and do previous findings hold true? Does age have a relevance to conditions experience; has enough account been made of researcher's subjectivity and thinking in interpretation? There are questions pertaining to using triangulation methods and are these appropriate? Importantly, for the arguments presented in this thesis, the consideration of prospective interviewing to attempt to uncover the taken-for-granted and difficult to articulate aspects of living with chronic conditions. Finally, they argue that more complex, specific articulation of experience (i.e. individual analysis) rather than attempts to group comparisons in a pseudo-generalist manner are needed.

Further to these gaps in current knowledge it appears from the critical appraisal of available patient experience literature, that there is little information on the patient experience of type 2 diabetes in a UK healthcare context; no examination of the complexities of relationships within a person's life with type 2 diabetes, and no consideration of the two-way processes in social support and affect on conditions perceptions and examinations into how there may be issues of dependency within and across these constructs which may have a bearing on the way people perceive and live with type 2 diabetes.

3.3 Psychological Outcomes and Measurement

A plethora of research data exists in variants of psychological affect measurement in diabetes. However, much of this is concerned with measures of physical and mental outcomes related to predictable behaviour and as such does not contribute to understanding of conditions experience or patient-centred interventions (Cooper, Booth & Gill 2003b). Also much of the enquiry has been focused on outcomes in type 1 and less in type 2 diabetes, which is surprising given that, as stated previously, 90% of diabetes is type 2, but not surprising given that many of the studies were carried out by hospital-based psychology services using convenience sampling.

Calls have been made in primary care in the UK for systematic measurement of psychological outcomes in people with diabetes (Bradley 1994a). However, national guidelines are rather sketchy to say the least in detailing what measures should be used, how and where to deliver them and by whom (Department of Health 2001a). It is recognised in national nursing guidelines that attention should be given to a patient's psychosocial and spiritual needs as well as the physical and indeed practice should be underpinned by principles of patient empowerment (Department of Health 2001a, 2001b).

3.3a Psychopathology

Studies have determined that mood change and disorder are more prevalent in people with diabetes than in the general population (Garvard, Lustman & Clouse 1993, Peyrot & Rubin 1993, Peyrot & Rubin 1999). Depression levels have been measured across varying diabetes typology, different cultural and contextual aspects and found to be consistently high, in some cases three times the current prevalence in a non-diabetes mellitus population (Peyrot & Rubin 1993, Peyrot & Rubin 1999, Fisher et al. 2001). Most of these studies have combined measures utilising generic mood alteration scales, i.e. Hospital Anxiety & Depression Scale (Zigmond & Snaith 1983), Beck's Depression Inventory (Beck, Steer, & Garbin 1998) and specific diabetes related measures (Bradley 1994b).

3.3b Behavioural Studies

Behavioural aspects of diabetes have been reviewed in this chapter under the section on self- management strategies, in particular focusing on appraisal of the systematic review available. Separate, distinct psychological state studies are few however and in particular scarce in type 2 diabetes (Glasgow 1999).

Problem solving as a measure of behavioural modification to aid self-care has been tested with various specific tools in people with type 2 diabetes (Toobert & Glasgow 1991, Bradley 1994a). Findings indicate generally that people employing problem solving skills would be predicted to be more likely to follow dietary and exercise regimes related to self-care activity than those who do not employ such skills (Toobert & Glasgow 1991). Marrero, Peyrot & Garfield (2001) reported a meeting of researchers in the field that called for systematic research programs that would identify behavioural science at the heart of diabetes management by patients and by healthcare professionals. They focus on the dearth of research in diabetes specifically conducted to measure and promote behaviour change in areas of diet and exercise, two important strategies for self-management in type 2 diabetes. They also call for a health service delivery model of diabetes care based on behavioural medicine (Marrero, Peyrot & Garfield 2001). This reflects repeated calls in some respect for explanations of the 'how to' aid people with diabetes.

Probably the most recognised studies in behavioural aspects of diabetes relate to the plethora of work to establish reliable and valid measures of psychological outcomes and behaviour (Bradley 1994b). Development of scales has varied from and to measuring health beliefs, perceived control, efficacy, knowledge and attitudes (Bradley 1994b). Generally studies developing and using such scales have found that scores were weighted towards the patient's perception of responsibility, self-care ability, own attitudes and coping styles, rather than any healthcare professionals or intervention use by them (Bradley 1994b). This supports arguments for detailed studies into the individual rather than general perceptions. Measures aimed at patient's ability to assess their own coping styles and appraising diabetes self-care, knowledge and stress have again been developed but received little attention for clinical application (Carey et al. 1991, Department of Health 2005).

Fisher et al. (2000) examined the relationship of ethnic origin and gender to behaviour in type 2 diabetes and in particular how couples resolve disagreements about diabetes management. They found that European Americans had less stable relationships and agreements than Latino couples and suggest that effective family-based programs of intervention must take into account ethnic origin and gender.

Vallis (1998) determined, in a small sample size study of non-adherent to adherent patients with diabetes, that the psychosocial variables were associated with adherence; less negative emotional impact from conditions, perceived greater benefits of adherence to the dietary regimen. He concluded that psychological factors of cognition, emotion and problem solving require further study.

3.3c Adaptation, coping and attitudes

Considerable attention has been given in type 2 studies to measures of attitude (Anderson, Donnelly & Dedrick 1990, Fitzgerald, Anderson & Davis 1995, Garay-Sevilla et al. 1999, Clark & Hampson 2003), adaptation (Dunn et al. 1986, Smari &

Vattysdottir 1997): and coping (Hendricks & Hendricks 1998, Sanden-Eriksson 2000, Lo & Maclean 2001, Macrodimitris & Endler 2001, Karlsen & Bru 2002). Some of these studies examined combined typology and others studied social as well as psychological factors (Garay-Sevilla et al. 1999, Macrodimitris & Endler 2001).

Attitude scales have been developed that have been tested for reliability and validity, and have been used in clinical trial studies, but have not been implemented into clinical practice (Bradley 1994b). Anderson, Donnelly & Dedrick (1990) used a previously assessed Diabetes Attitude Scale (DAS) to study patient attitudes to diabetes, intervention and healthcare professionals. It had originally been developed for use to measure healthcare professional's attitude and was adapted for patient use. They studied 1202 patients with non specific typology. The main factor accounting for 12.9% of the variance was in special training indicating the extent to which the patient believes that healthcare professionals need special training in diabetes to care for them. Therefore, measuring attitude would indicate to some extent how willing patients would be to follow advice from their healthcare professional, given knowledge of specialist status. This premise is further supported by the identified factor in measuring attitude to compliance. A further factor measured emotional impact and suggested that those patients who believed diabetes did not interfere with their quality of life, perceived themselves as healthier. The majority of participants in this study reported a negative impact on their quality of life and therefore perceived themselves as unhealthy. Anderson, Donnelly and Dedrick (1990) conclude that the DAS can be useful in measuring attitudes before and after patient education and comparing attitudes between patients and healthcare professionals. Despite this good initial study, further studies and clinical application utilising the DAS in type 2 diabetes studies are scarce.

Coping mechanisms and adaptation has been studied in diabetes with varying approaches. The predominant focus has been on the healthcare professional intervention perspective and have not been consumer orientated.Dunn et al. (1986) presented original findings in the coping response of people with both typologies. Using their assessed ATT39 scale, which measures the emotional component of attitude, they studied 166 people with type 2 compared to 134 people with type 1 (Dunn et al. 1986). They assessed ATT39 scores against measures of personality characteristics and locus of control (Dunn et al. 1986). They found that in type 2, age was associated with increasing acceptance and coping with a chronic condition with decreasing tolerance for changes in diabetes status. They also found that anxiety was associated with diabetes related stress and with poorer coping and increased guilt associated with external locus of control. They concluded that emotional response to diabetes involves complex, dynamic interactions among feelings and relates meaningfully to other aspects of personality. These findings whilst dated would bear further in–depth examination, particularly in relation to aspects of guilt, external locus of control and anxiety and how these connect and interact. These issues were explored within a locus of control framework in an exploratory study in people with type 1 and type 2 diabetes (Gillibrand & Flynn 2001).

Macrodimitris & Endler (2001) examined condition specific coping strategies and their relationship to control and psychological outcomes in type 2 diabetes. They used accepted measures of coping (Endler, Parker & Summerfeldt (1993), perceived control (Conway & Terry,1992), depression (Sawyer-Radloff,1977) and HbA_{1c} (which was self-reported from patient's own memory or hand-held notes). They found that coping and emotional pre-occupation were positively correlated with depression, and anxiety and coping predicted lower depression. Overall perceived control was interpreted as key to psychological and physical adjustment. One must question the findings related to control given that the HbA_{1c} levels were self-reported. The inherent bio-medical behavioural focus of this study and it's affects on the results needs considering. An interesting point raised by the researchers was that surprisingly few studies have examined coping in type 2, as compared to type 1, diabetes. They also note that it is interesting that the entire notion of measuring coping in a 'controllable' disease like diabetes is considered when compared to measuring the construct in 'uncontrollable' diseases like cancer. Their argument and assumption that diabetes is 'controllable' is highly questionable in psychosocial terms but one can see the reference in a bio-medical focus of care.

In a study of people with type 2 diabetes, it was found that participants of younger age, were most likely to report anxiety in both type 1 and type 2 diabetes (Karlsen, Bru & Hanestad 2003). These findings contribute to the argument that healthcare professionals should pay more attention to psychological needs and particularly in the younger age group.

Concerning future considerations of disease related outcomes, Hendricks & Hendricks (1998) reported that people's greatest fears were those of long-term complications associated with having diabetes. Again the study focused on a bio-medical orientated outcome measure.

Sanden-Eriksson (2000) examined whether having a strong sense of coherence ('reasoning'- based on Antonovsky's 1993 work) helped patients with type 2 diabetes control the disease. Again disappointingly this was an attempt to fit a complex theory of health perception to a bio-medical model of outcome measurement (HbA_{1c}). Not surprisingly the results showed that those patients who viewed themselves as healthy had a better sense of coherence and had lower HbA_{1c} levels. One significant result however was that those patients who had high levels of emotional acceptance of diabetes had high levels of active management and lower levels of HbA_{1c}.

Koopmanschap (2002) presented the results of a large survey in the perceived quality of life in people with type 2 diabetes in Europe (n = 4189). This study is part of the CODE group which aims to determine the cost effectiveness of type 2 diabetes care. The study demonstrated that people with type 2 diabetes report good levels of perceived health but are lower than those of the general population. Also the most significant finding was the lowering of quality of life in response to having complications. The study concludes that policy in diabetes care should aim to reduce the onset and severity of complications in order to improve quality of life.

3.4 Social Support Strategies

Previous studies in type 2 diabetes have focused on aspects of family and social support networks including separating contextual and cultural factors and having predictable positive outcomes on diabetes related end-points (Fisher et al. 1998, Glasgow et al. 1999, Chesla & Rungreangkulkij 2001, Chesla et al. 2003). Perhaps the most significant of these is Fisher et al.'s (1998) systematic review which determined that there are many different family and social support networks utilised by people with diabetes and those that used them in normal, family functioning ways to aid in management of conditions had better outcomes than those that did not. Also health intervention strategies and interventions which encompassed family member and social support networks resulted in improved outcomes for people with diabetes in physical and psychological measurements (Fisher et al. 1998, Glasgow et al. 1999, Chesla et al. 2000, 2001). Many of the studies included in these reviews were difficult to synthesise collectively as many had used individually developed measures and there was little repetition or use of generic measures across groups and cultures. Whilst findings confirm that increased quality of social support improves self-management behaviour (Fisher et al. 1998, Glasgow et al. 1999), quality of life indicators and in some examples diabetes outcomes (Fisher et al. 1998), little has been delineated in terms of the mechanisms of support and the complex nature of social interactions related to condition perceptions. Attempts to develop specific diabetes related measures of social support are few and appear not to have reached universal use and acceptance (Bradley 1994b, Polonsky et al. 1995, Talbot et al. 1997).

Glasgow et al.'s (1999) review suggests that there is evidence that increased levels of social support for people with diabetes in terms of family, friends and work environment will enhance perceptions of quality of life and diabetes related outcomes. Some attempt has also been made to delineate the experience of diabetes in terms of the social network model and these studies are critically appraised in relation to this thesis.

In Sweden, Sardaki & Rosenquist (2002) explored the barriers to self care perceived by women with type 2 diabetes. They found that by using and developing a social network model, issues relevant to role perception in women were identified in response to conditions and its' conflict with these roles. These were; the traditional gender role in the home, the expected nature of women's work, the cultural perceptions of women's bodies and prejudices concerning psychological outcomes in women with disease that exist in healthcare services. This they surmise can lead to role conflict in self-management of conditions. Role conflict is an original aspect to consider in the family/social support network, however, it could be that the relationships and dependencies that the women placed on them also bear investigation.

McDonald et al. (2002) explored if there was a relationship between personal factors (education), mental health and physical functioning on social support and health promoting behaviour in older African-Americans. The study employed standardised measures of general health perception (SF-36 – McHorney, Ware, Lu et al. 1994), social support (PRQ-85 – Weinart 1987), and correlated them against healthy behaviour outcomes (HbA_{1c}). It is interesting to note the reliance of HbA_{1c} as a sole measure of healthy behaviour as opposed to using other measures not associated with physical outcomes within a psychosocial focused study. The study's assumptions meant that the only significant predictor of social support in this population was physical functioning based on glycaemic control, inferring that people within differing levels of control would use social support networks to a lesser or greater degree to achieve an improved physical outcome.

A study in Greece demonstrated that perceptions of family support correlated with good glycaemic control in the 'unique' social context of Greek family life (Ilias et al. 2001). They conclude from their results that information about family support is needed for Greek practitioners, however, the study did little to delineate constructs in this area.

Four identifiable factors have been linked to self–care behaviour in people with type 2 diabetes: patient demographics; doctor-patient relationships; stress and social context. Using a within study generated survey in 397 adults in Texas, Albright, Parchman & Burge (2001) studied social context (defined as family understanding of disease) and was the most strongly associated with dietary change, exercise and concordance with medication taking. They concluded that in practice, when trying to improve self-care behaviour with patients, the healthcare practitioner should include family members. What would be illuminating and may aid in practice would be an explanation of how and if dependencies exist within the family and the person with diabetes and how that affects perceptions and behaviour.

Using a triangulation method combining qualitative and quantitative methods, Gerstle, Varenne & Contento (2001) studied whether changes in family structure and processes had an effect in women with type 2 diabetes on their disease control. The change in food tasks, patient care, and disease management made, and the social context of the women's daily lives, influenced their control in negative and positive ways. They conclude that nutrition advice should take into consideration the features of existing family social support and help them organise this to aid in conditions self-management. This again adds to the knowledge that family and social support is important to people with type 2 diabetes, however, they do not describe or explore the complexities of that support, in other words, how it 'works'.

A plausible relationship between denial of disease and psychosocial factors in people with type 2 diabetes was studied in Mexico. Garay-Sevilla et al. (1999) found no correlation between participants who denied existence or aspects of the disease and levels of social support, but did discover that denial of disease can increase over time and is associated with poor metabolic control.

In a study focused on aspects of compliance to treatment, MacLean & Lo (1998) found that compliance was associated with the capacity to utilise family support in 95 people with type 2 diabetes. Fukunishi et al. (1998) examined 178 people with type 2 diabetes in Japan, using the stress and coping inventory (Matheny, Aycock, & Curlette 1993) and the intervention of a patient education program to see if there was an association between perceptions of social support and glycaemic control. Their findings suggest that social support was more significant in reducing HbA_{1c} levels than patient education on diabetes.

Aalto, Uutela & Kangas (1996) performed a large survey in people with type 1 and type 2 diabetes and normal population controls and found that there was no difference in levels of social support available to all three groups. However, those patients in the disease groups and, in particular, the people with type 2 diabetes, had perceived lower quality of life, were less likely to pursue healthy behaviour and therefore had an increased burden placed on social support resources. This finding requires further exploration to determine why this occurs, in what context and aspects of the relationships within the social network.

An association between levels of social support and perceptions of self-care and behaviour in people with type 2 diabetes has also been determined (Wang & Fenske 1996). They determined some aspects of the nature of the social support by examining and comparing groups who had different aspects of social support, i.e. those with friends and family, those without and those with family and peer support. The best support network appeared to be those subjects who had friends and family in their lives and conditions, with the support systems overall accounting for a quarter of the variance for the aspects of self-care. Tilotson & Smith (1996) demonstrate in their study of 465 patients with type 2 diabetes that people are more likely to adhere to a weight control program if they have an internal locus of control and high social support. In the low social support group, internal locus of control was not associated with adherence. They conclude that ways in which locus of control and social support are related is not clear and is complex, requiring more analytical study, but both factors are useful to promote adherence. They fail to note that by focusing on a controlling mechanism and bio-medical originated issue of adherence rather than a patient-generated issue or psychosocial factor, this may have produced a different picture of locus of control. The notion that locations of control may be forced upon the individual, by the practitioner or social support networks, in paradox to aims of healthy self-care behaviour, has been studied (Gillibrand & Flynn 2001).

In summary, this section has reviewed selected available research in the area of social and family support related to management of the condition by people with type 2 diabetes. Information is available that suggests if people have good levels of family and social support they will have improved psychosocial and physical outcomes. However, very little information is available on how the mechanisms of social and family support work, how they relate to psychological dynamics and theory, and how people act in response to these.

3.5 Communication studies in type 2 diabetes

Probably the most attention given to research in aspects of communication in chronic conditions is that concerning the patient-provider relationship (Cohen et al. 1994, Murphy & Kinmonth 1995, Collins et al. 2003). However, these studies have tended to focus not on the underlying principles of the nature of the therapeutic relationship, but rather the content and delivery of such communications and what that means in terms of the experience for the patient.

Balint (1957) did examine the psychotherapeutic nature of the relationship between a doctor (general practitioner) and his/her patient in what can be described as seminal work. He used in-depth examinations of case studies of doctor/patient consultations, based at the Tavistock clinic in London. He found that the psychotherapeutic nature of a doctor/patient relationship was based on environment, personality, professional's training in psychotherapeutic techniques, trust and adequate support mechanisms in particular for the doctor, i.e. consultant psychiatric supervision. Certainly effective communication is seen as key to improving healthcare interventions, reflected in current NHS guidelines (Richards 1990, Levinson et al. 1997, Department of Health, 2001a, 2001b, 2005).

The way in which healthcare professionals communicate and interact with patients clearly will have some effect on patients' perceptions and health-related outcomes. A small number of studies have examined in detail the experience of consultations between healthcare providers and people with diabetes. Probably the most comprehensive was that conducted by Collins, Watt, Drew et al. (2003) who compared consultations in people with diabetes and people who had undergone head and neck surgery. Currently this may be the only study which compares consultations between different healthcare professionals with the same patient. The researchers argue that the research was needed to provide a more comprehensive view of effective consultations than separate policies for doctors and nurses. Therefore the main objective of their study was to compare patients' interaction and communications activity by documenting how different healthcare professionals manage conversations with patients. Other aims were to explore conversation analysis research in an interdisciplinary context, and to explore ways of combining conversation analysis with participant's knowledge and understanding of communication. Data was collected via 155 semi-structured interviews with 54 patients and 20 professionals; recordings of 100 patient/professional consultations; three discussion groups with patient representatives and health professionals; recordings of all research team meetings. The main method was conversation analysis of the consultations, with qualitative analyses of interviews, discussions and ethnographic observations. It is interesting to note that ethnography was used in some aspects to examine cultural perspectives but not in the conversation analysis. The principal investigator was the main person conducting the interviews and performing data analysis, this raises the question of subjectivity in the research process which the authors did not acknowledge. They supported the analysis in terms of reliability by referring the results back to the conversations and observations. They also had discussions of the interpretations in the team meetings.

Following analysis, Collins et al. (2003) reported themes of; distinctive differences between doctors and nurses communication with patients. They found that nurses contributions were more dependent on interaction, connected and open to patient's contribution and more local in direction. Doctors in contrast were more self-sufficient, distanced from the patient's contribution and more extensive and far-reaching. The researchers suggest that this result shows the potential of the nurse's and doctor's communication to complement one another and serve different purposes. The conversation extracts presented in the report were used to support the analysis these were, however, difficult to interpret and, at times, appear 'disjointed'. Interestingly, and pertinent to this thesis, was the finding that nurses tend to focus more on 'hidden' or underlying issues and behaviour in the consultations than do the doctors. In essence this means that nurses tend to focus more on personal issues. A key finding by Collins et al. (2003) was that "consultations involving more specialised and autonomous nurses accommodated medical and patient agendas..." (Page 24).

The strength of Collins et al.'s (2003) study is in the in-depth examination of conversations between healthcare professionals and patients. Questions remain over reliability of the analysis and interpretations performed by a single researcher. This was strengthened by having team discussions of the results and 'external' discussion groups. The authors conclude that in the UK, clinical practice can be altered beneficially by; training healthcare professionals in conversation analysis and consultation techniques; recognising and using doctors and nurses different approaches to the patient for synergistically improved outcomes. There currently is very little recommendation in government policy to recognise the differences in approaches and how to utilise them effectively and the authors recommend that policy should change. It would however be potentially difficult to assess outcomes attributed to policy of this nature, when funding is streamed through primary care services. Despite acknowledging the important contribution specialist nurses can make it appears difficult to match outcomes to them via a primary care led service in type 2 diabetes.

The nature of communication within a person's social relationships and related personal constructs has not been considered in studies exploring issues in patient and healthcare interaction. However, the in-depth techniques some studies have utilised certainly give greater insights into the nature and content of the relationship under study.

3.6 Summary of living with type 2 diabetes

Clearly there is an emerging theoretical framework for the experience of type 2 diabetes and indeed for the formation of interventions aimed at aiding self-management (Norris, Engelgau & Arayan 2001, Vermiere et al. 2001, 2002). Psychological outcomes and predictors of behaviour have been determined (Glasgow et al. 1999). Understanding has been gained in the patient-provider relationship in the care of people with type 2 diabetes (Collins et al. 2003). What has not been determined are the deeper, personal meanings, and prior experiences of people, and how they impinge on their living with a chronic condition.

The concept of social support, psychological adaptation and self-management has been studied extensively in diabetes to predict behaviour and outcomes but have not provided explanations of inter-relationships of these factors or how they determine a person's experience of chronic conditions. By using a personal psychology approach and examining dependency, it is argued new insights and illuminations will be gained in the experience of type 2 diabetes in the community. This argument stems from the realisation that subject meanings cannot be separated from behaviour and explanations of behaviour are required (Harre & Secord 1972). Fielding (1986) succinctly summarises the crux of this issue:

> “Man does not exist in isolation but his personal identity and actions derive meaning from his interaction with others” (Fielding 1986, Pg.30)

Therefore the question is raised, can the method of enquiry within personal construct psychology approaches be adapted to explore and examine psychological and social issues in people with type 2 diabetes? This would be enquiry from the patient’s perspective without a bio-medical focus and would be able to identify the connectivity of factors, which people may employ in living with the condition.

The use of personal construct psychology and the dependency grid analysis technique, it is argued may achieve these objectives, which have not previously been examined utilising an in-depth approach, encompassing qualitatively and quantitatively derived data.

Chapter 4

Methods Theory

This chapter presents a description, discussion and critical analysis of the methods employed in this study. The major part of this chapter examines the repertory grid method with reference to the development of personal construct psychology and concomitant development of different grid techniques with justification presented of the utilisation of a dependency grid for this study. The techniques of analysis are also critically appraised and compared for the repertory and dependency grid techniques. This section was considered necessary in terms of the relatively new application of these methods in this inquiry, in particular the application of the dependency grid method in exploration of the experience of chronic conditions.

4.1 Philosophical considerations

The notion that one philosophical stance should be adopted for a programme of enquiry is questioned in this thesis, and the emphasis is placed more pragmatically in terms of how clinical questions and patient experiences are answered and explored. Whilst it is common to present arguments for humanistic versus reductionist approaches in healthcare research, the sections in this chapter, which examine the theoretical framework utilised in personal construct psychology, will demonstrate that this argument is spurious to the process of enquiry. Kelly, (1955) the originator, succinctly argues that whilst reductionism was, and still is, the guiding paradigm in psychological inquiry, the tenets of this are questionable when considering examination of personal meaning in people's lives, and that there are always alternative constructions available when people have to deal with events in life. This represents the alternative choices that people make. Kelly (1955) purported that these were constructed, and explained this rationale against a philosophical stand that he named "constructive alternativism" (Kelly 1955, Pg.15). This could reflect a somewhat redundant argument in today's context of empirics versus realism and instead could be construed as encompassing both aspects, and therefore accepted in terms of pluralism, for underpinning methodological arguments (Fransella & Bannister 1977).

The arguments that have been presented in the past decades concerning the nature of enquiry and whether it should be positivist or interpretive, represent a considerable debate in this area which one could argue often detracts from the actual aims of performing the research in the first place. These arguments stem perhaps from the observation that science is essentially a social activity as opposed to a discipline (Johnson 1999). Also when investigating social and interpersonal phenomena, positivism has less credence generally than humanistic approaches to research.

Johnson (1999) and later Johnson, Long & White (2001) argue that when studying human personality, empiricism is crude and unsatisfactory and studies would fail to achieve predictive validity when using positivist approaches necessary for generalisation and application. However, one could consider this argument limiting and one–sided, considering the extensive literature on quantitative measurement of psychological outcomes in having diabetes, as one example. It is argued that empiricism in the context of this thesis refers to not 'hard' scientific measures, although it could be viewed that these are used, but more to a recognition of rigorousness in the research endeavour.

Further philosophical considerations are focused on the nature of this thesis' research technique, in that much rests on the interpretation of participants relating their experiences through language and it's communication. Carruthers (1996) argues that language is the main, if not only, means of how one can express knowledge and therefore relate individual experiences. This is supported by the view of Rorty (1982) who argues that 'we can only apprehend' the nature of the social world through language. This in essence represents a pragmatist's view of the nature of social research. In contrast to this could be presented Foucault's (1972) work, which in summary negates language as the ultimate underpinning to interpretation but suggest that it resides within the position of power in relationships, and the practices of language communication.

4.2 Qualitative Exploratory Methodology

Most qualitative studies exploring patient experiences utilise inquiry methods in the form of an unstructured or semi-structured interview. There are examples in diabetes related research with few focusing on type 2 diabetes generally (Morse 1991, May 1991, Fielding 1993, Paterson et al. 1998, Brown 2001). Whilst some would argue that a semi-structured interview schedule impinges the researcher's assumptions and prior experiences onto the participants, and therefore can influence the results, others acknowledge that the researcher has always an implicit or sometimes explicit influence on the research process (Hanson 1994, Van Maanen 1995). An entirely unstructured interview may be useful in a pilot stage of inquiry but could, if continued, provide experiences not involved in the field of inquiry, therefore making it difficult to demonstrate causal relationships and commonalities. The semi-structured interview offers the ability to respond and explore issues raised by the participant in the context of the questions, or tangentially but remaining focused on the research question and therefore can represent a negotiated conversation. Authors agree that in using this method of data collection, the researcher needs to be reflexive in terms of him or her being able to reflect on their own experiences and how they affect the study (Morse 1991). Therefore the data collection method in this study utilises a semi-structured interview schedule of questions and topic areas for discussion, applied via face to face interviews with participants, having developed the schedule from initial pilot interviews and prior exploration in the field (May 1991, Arber 1993, Fielding 1993).

There are various forms of data analysis in qualitative inquiry which can be applied according to the nature and method of the study. In terms of this method, accepted data analysis is focused on the process of thematic identification (Strauss 1987, Miles & Huberman 1994). Coding procedures and the methods of achieving this are established in the literature, and this process is proposed for analysis of the transcripts generated from interviews. The procedural moves for coding generally follow similar patterns with varying degrees of complexity (Miles & Huberman 1994). Reading and re-reading the transcripts, it is argued, provides the opportunity for the researcher to become familiar with the data and to identify codes and emerging themes (Strauss 1987, Miles & Huberman 1994). This then becomes a process of thematic analysis, which essentially is a method of organisation and achieving a sense of meaning (Morse 1991). Miles & Huberman's (1994) procedural moves for qualitative study were considered. They stipulate that these activities are not mutually exclusive but should occur concurrently; data reduction involves selection, focusing, simplification, abstraction and transformation of raw data; display is concerned with an organised assembly which may be achieved manually or by a computer programme (in this study a manual visual matrix was created); conclusion-drawing centres on noting regularities, patterns, explanations, possible configurations and causal flow propositions (Miles & Huberman 1994).

In any applied research method, consideration needs to be made to reliability and validity, however there is still considerable argument as to whether objective measurements of these two issues (as used in quantitative research), should be applied similarly to qualitative inquiry (Johnson et al. 2001). Most researchers agree that whilst possibly different in context and application, the principles remain similar in that they need to be addressed (Sykes 1990). Clearly a measure of reliability and validity in this method is the ability to describe and follow procedural moves (Kirk & Miller 1986, Sykes 1990, Miles & Huberman 1994). Reliability refers, in this context, to the researcher making adequate recognition of their own influence in the research process, hence why in this study acknowledgement is made of the researcher's knowledge and experience in the field of inquiry (Sykes 1990). In this study recognition is made that in conversing with participants there is not a one–way flow of information and experiences. Validity in qualitative research applies to relationships of findings to existing knowledge, the strength of supporting evidence to the findings, i.e. transcript examples presented, and the strength of claims made about the descriptions or explanations of such (Kirk & Miller 1986, Sykes 1990). Reliability testing in qualitative research can involve specific methods of independent analysis of the data or 1) scrutiny of the findings by an expert panel or individual, (Hinds, Scandrett-Hibden & McCauley 1990) 2) follow-up interviews, and 3) relating the findings to participants (May 1991, Miles & Huberman 1994). These methods were chosen for application in this study to assess reliability.

4.3 The Repertory Grid Method

Kelly (1955) developed the repertory grid method as the working component of the personal construct psychology theory. He determined the method as a means of exploring personal construct systems by determining people's personal constructs and how they are related to each other. He did this by identification and use of elements which the person experiences, the relationships being defined in geographical terms of sub-ordinates and super-ordinates (Beail 1985).

The central component of the method is use of the interview with participants or clients, which is in itself an accepted and tested method within social and psychological enquiry. The interview is the vehicle in which constructs can be identified and explored. In order for the corollary framework to be tested systematically, Kelly devised a visual matrix in the form of a grid. The tenet of this approach is that the interview has structure and purpose, and when that is transferred, either numerically or graphically, with relation to content then a dimensional grid is formed. Kelly originally devised a system of interview process which had three main components: elements which define the area of construing to be explored; constructs which are ways that the participant groups and differentiates between the elements, and the linking mechanism which shows how each element is judged on each construct.

Kelly's initial method of repertory grid analysis was based on an examination of representation of people's personal constructs, how the person uses those to understand and predict how significant people in their lives will react to those constructs (Beail 1985). Therefore it is apparent that the grid and its definitions are flexible in terms of what elements and constructs are identified. Kelly used a set of elements based on significant people involved in a person's life and experiences, i.e. mother, father and indeed self, and defined these with a role specification sheet. There have been numerous variants of the repertory grid analysis techniques and it's application, which is to be expected given its flexible nature and there are recent examples of derivative use in industrial, educational and healthcare settings (Kalekin-Fishman & Walker 1996). Kelly did develop the grid technique however with the principle that the constructs identified in an examination could be statistically tested to determine the comparisons people make within the grid. The mathematical assumption upon which grids are based is that the associations between two constructs can be statistically tested and are representative of the psychological relationship between them for that person. Consideration of Kelly's final corollary (sociability) of the postulate leads to an argument that these associates could be tested in a sociological context as well (Bannister & Mair 1968). Researchers have explored other approaches and argue that qualitative, content analysis can have equal relevance to statistical methods when examining constructs identified through narrative techniques and this will be explored further (Banister et al. 1994).

There is no one correct method of analysis for repertory grids and the chosen method will generally depend on the type of grid used, the constructs and elements chosen and what type, if any, rating scale has been used (Beail 1985). To compare completed grids in one group of participants, Slater (1965, 1969) and others have developed computer packages which are based on comparing median scores of components within grids. This may involve combining grid scores to gain an overall 'picture'. The median combined cell scores are then subject to principal component analysis (PCA).

4.4 Dependency Grids, Laddering and PCA

Given all the variations available in grid formation and analysis, a logical decision needs to be determined in order to achieve a workable method for use in exploring personal constructs in people with type 2 diabetes. Therefore, critical examination is made of a further derivation of the repertory grid method; that of the dependency grid. It's use is generally described in terms of exploring dependency and resourcefulness and appears to fit more appropriately with this study's aims.

The dependency grid was first described by Kelly as the "situational dependency grid (sitsgrid), where the constructs were replaced by situations that were problem areas for the participant or client. Each problem is then referred to each element, which is usually defined in terms of different people involved in the problem and a rating scale may be applied to define each cell (Beail 1985). From personal communication with dependency grid specialist researchers (Professor Beverly Walker, University of Wollongong, Australia) and literature examination, it appears that the dependency grid method would be the most appropriate to adopt, develop and test as an experimental method at this stage (Fransella & Bannister 1977, Walker & Kalekin-Fishman 1996).

In dependency grids, PCA is accepted as the most appropriate, which involves producing a picture of the relationships between the various role titles (element columns in the grid) and the problems (construct rows in the grid). In the working methods section the experimental diabetes dependency grids can be viewed for an illustration of constructs (problems people with type 2 diabetes live with) and elements (people or roles involved with problem management). PCA, used to analyse a dependency grid, is a process where the score in each cell is the raw score minus the total score for that row, then using the PCA process, clusters of problems and people involved are graded and ordered according to the clustered variance (Beail 1985). This enables the principle components to be illustrated by determining the greatest degree of variance from the adjusted scores for each problem (construct). The most important element can also be identified by this process and can then be interpreted as a super-ordinate; the greatest problem (construct) identified and the most relational person (element) to that problem. This can then be taken and using the 'laddering' system, further explored in depth to determine the experience and the origin of the experience. Beail (1985) supports the use of laddering where one or two elements and a construct are focused on for further exploration and calculation of variances by calculating the index of the relationship between a main identified element and construct, which is mathematically indicated by the cosine. Using a cosine correlation value also enables a probability value to be calculated to account for chance and enhancement of reliability within calculations. Therefore significant correlations can be calculated between laddered grids with one participant, which is necessary to determine internal validity of the grid findings (Beail 1985)

It is worth noting at this point that authors identify as an essential element in the grid the placing of 'self' and clearly this is indicated in the diabetes dependency grid as many aspects of living with diabetes involve self-management (Beail 1985).

Using a dependency grid and laddering it is argued will allow participants to identify what is useful or not to work through problems in terms of the psychosocial issues of living with type 2 diabetes. This deviates somewhat from the original precepts of PCP, however does place the idea of how resourceful or not the person is in his or her ability to live with a life-long conditions. This then brings one back to the idea that PCP and use of a dependency grid is exploratory and in-depth in nature and delivery and begins to illustrate how the research objectives can be achieved. This also reflects an earlier statement that this method is essentially experimentation but could be useful to the participant in illustrating what could be construed as helpful in problem situations. A cautionary note to this argument for method is that within the process of enquiry there is available to the researcher, and the participant, a means of reflection on the process and outcomes determined.

4.5 Qualitative methods of grid analysis

Tindall (1994) presents an argument for qualitative, content analysis of grids whether dependency or repertory. When one considers that PCP is based on determining personal meanings of experiences, the argument appears to have merit in that the process itself is based on conducting an in-depth, narrative-based one-to-one interview. By continuing to utilise grids it could be illuminating not only to quantify results but also to explore the narrative data which inevitably results when participants are asked to state why they rated certain elements and constructs in the way that they did. This can then give a greater explanation of the personal construct system and the relationships or super-ordinates identified within it. This then allows subjectivity as well as objectivity of interpreting the data which reflects Kelly's original philosophy of 'alternative constructivism' to be embraced. The process of grid determination is the same and it is based on the laddering conversation, where agreement is reached on what the important constructs and elements involved in attaching meaning to experience are. Asking participants to view completed grids is a part of this process and so emerging issues can be identified and discussed. In essence, this is content analysis of discussions focused in a grid matrix, and as issues arise agreement can be reached between the researcher and participant to identify key constructs and elements. Using this method of laddering means, that results could be displayed qualitatively as an adjunct to the statistically analysed grids, to give further illuminations of participants' experiences. This could also aid in deeper exploration of issues in living with diabetes.

4.6 Reliability and validity in grid methods

Assessing inter-individual correlation coefficients within cells will give a measure of a grid's validity (Lenczycki, Anderson & Evans 1994). Reliability of data obtained from a grid can be assessed by measuring reliability scores for logical inconsistency and integrative complexity of the individual's completion of the grid (Grice & Hopper 2002). Other means to be considered in aiding reliability and validity assessment are ensuring transparency in the procedural moves, especially when an attempt is made to experiment with a novel grid and application in an interesting field of enquiry. Cleary explaining the steps within a research process and how they were developed, refined and tested has been associated with qualitative and quantitative approaches (Judd, Smith & Kidder 1991, Miles & Huberman 1994). Completed grids with raw data and their statistical or qualitative interpretation should be presented for scrutiny by external readers (Fransella & Bannister 1977). The process of determining the grid elements and constructs in a laddering process with participants, and by relating this to prior exploratory work will enhance the validity of the approach and reliability of the results obtained. Criticism in this area is addressed by the acknowledgment that there is both subjective and objective measurement made by the researcher in using one-to-one conversations.

4.7 Summary of methods theory

This chapter has analysed and described the methods employed within this programme of research to answer the enquiry aim and objectives. The qualitative, exploratory method was appraised for application. Finally, detailed examination was made of repertory and dependency grid techniques and their analyses to demonstrate applicability in what, it is argued, is a new application and experimental in nature. The next chapter details the working methods of application of this critical analysis to answer the research aim.

Chapter 5

Working Methods

5.1 Introduction to the Chapter

This chapter presents a description, discussion and critical analysis of the working methods for the empirical studies in this thesis, encompassing the exploratory enquiry and the second phase of personal construct identification in people with type 2 diabetes.

Firstly, the study design is briefly outlined, describing the two main phases of enquiry within the framework of a multiple case study series (Yin 2003). Ethical considerations and processes are then detailed. The formation and conduction of a steering group is discussed to aid with the enquiries. The study setting and study population are detailed with inclusion and exclusion criteria described. The recruitment and sampling strategy is detailed. The aims and objectives for the study are described followed by data collection and analysis for both phases. Finally, reliability and validity procedures are detailed and analysed.

5.2 Study Design

This study employed a multiple case series design for presentation of results as the study's aims and objectives are focused on individual experiences of type 2 diabetes and management, with two main phases of enquiry conducted. This method is congruent with Yin's (2003) embedded multiple case design with multiple units or types of analysis. The two main phases were:

Exploratory Phase- locating the framework

- A qualitative, exploratory study in people with type 2 diabetes, using semi-structured interviews.

Determinant Phase- identifying personal meanings of diabetes

- A dependency grid analysis to determine personal constructs, using a novel application of the situational dependency grid analysis technique (Kelly 1955). This was an in-depth individual analysis utilising a focused interview.

5.3 Funding

The exploratory phase of this study was supported by Diabetes UK, a charitable organisation funding research in diabetes in the UK (£5,000). The award was given under the small grants scheme to give support to programmes of research in diabetes in the initial phases. Funding by Diabetes UK does not imply that they endorse the content of this thesis and the views expressed are those of the author. The grant was supplied for; travelling costs, time cost replacement fees for the investigator, stationery, and transcribing.

Support for both phases of the enquiry and for the production of this thesis has been given by the University of Central Lancashire, Department of Nursing and the Faculty of Health in terms of time, training and cost resources.

5.4 Ethical considerations and procedures

The study was approved by two local research/ethics committees of the NHS covering the geographical area of the research. Both phases were approved on separate committee considerations before recruitment and data collection and also extensions were given. Copies of the approval letters can be viewed in appendix 2.

Issues that one committee raised on initial submission for approval were centred on the patient information sheet for recruitment and consent (Appendix 3). After consultation assurances were detailed in the information sheet that all tape-recordings would be destroyed after analysis.

An ethical issue which was considered, and required discussion with supervisors, was that the nature of the enquiry, in the determinant phase, could raise sensitive issues which may have an affect on the participant's thinking. Therefore after each interview a period of reflection and explanation was offered by the investigator in order to answer any of the participant's questions or concerns. All the participants' general practitioners were informed that they had taken part and telephone numbers of the investigator were given to each participant in case of further queries regarding the research. At the end of the study this had not occurred with any of the participants.

5.5 Steering Group

A steering group was formulated at the beginning of the study comprising: People with diabetes (Members of the Preston & District Diabetes UK Support Group); Dr J. Vora, Consultant Diabetologist, Royal Liverpool University Hospital; Dr.I.Khotari, General Practitioner, Liverpool Primary Care Trust; Professor M. Johnson, University of Salford (previously of University of Central Lancashire); Dr. B. Gibbon, Head of Nursing Department and director of studies; W. Gillibrand, principal investigator.

5.6 Study Setting

Given that this study was an enquiry in people with type 2 diabetes, and excluded those with other types, it is argued that the appropriate setting was within the primary care health sector; 90% of people with type 2 diabetes are cared for in this sector rather than the secondary, acute setting.

Two areas chosen for the research and are located in the North West of England; Preston and surrounding districts including Chorley and South Ribble, and Liverpool, Merseyside, excluding South Sefton. Within these areas all social classes are represented with some areas of Liverpool and Preston as cities, having ethnic minorities of predominantly Asian origin and a smaller percent of Afro-Caribbean origin peoples. In both cities there are large areas of social deprivation and poverty and the sampling procedure detailed in a later section of this chapter attempted to encompass this. The surrounding districts of Preston also encompassed rural areas and again selection of participants attempted to recruit from this setting as well.

As this study was aimed at exploring patient experiences, it was felt that as much as possible of the data collection should be conducted in the participants' homes, however, permission was gained to use the Royal Liverpool Hospital premises and the University research office in Preston, in case participants preferred this.

5.7 Study Population

The total population of both Preston and Liverpool combined is 569,106 (National Statistics Office 2004). This gives a point prevalence estimate of people with diabetes, based on 3.5% prevalence of all diabetes mellitus at 19,918 people. This then gives an approximate figure of 17,926 people with type 2 diabetes in these areas. However not all would have been diagnosed at the time of this estimate, given variations in diagnosis intervention in primary diabetes care services (Whitford, Griffin & Prevost 2001).

In theory all people with type 2 diabetes under predominantly primary healthcare services for their diabetes care, were eligible for entry into the study. Given the large numbers, a sampling frame needed to be employed to ensure that the convenience sampling method was carried out as fairly and appropriately as possible.
The inclusion criteria were:

- People with type 2 diabetes (based on WHO diagnostic criteria).
- Services for diabetes care were provided by the primary sector.
- Participants were able to understand and complete the consent process.
- Participants who were able to communicate verbally.

The exclusion criteria were:

- People with type 1 diabetes
- Women with gestational diabetes.
- Children (under the age of 18) with type 2 diabetes.
- People diagnosed with type 2 diabetes within 3 months of recruitment (newly diagnosed).
- People with type 2 diabetes under predominantly secondary care services (with severe co-morbidity).

5.8 Recruitment

It was considered that participation in this study should be entirely voluntary and without the influence of healthcare practitioners referring for inclusion. This was deemed necessary on a number of principles:

- Research governance and ethical considerations demand this.

- The theoretical framework sets assumptive parameters of importance of social/family intervention, not associated with formal healthcare intervention.

- Sample bias resulting from tertiary referral of people with specific psychological problems and possible psychological pathology.

Therefore recruitment was undertaken at the first invite, by the display of a patient information leaflet and reply slip returns in the waiting areas of general practices. Each general practice either gave, or did not give, their permission to display the leaflets which explained briefly the study and had a reply slip and pre-paid envelope attached with the research office address. The reply slip asked for the participant's name, address, telephone number, best time for contact and a consent signature to allow the researcher to contact them and take part in the research, stating that they had read the information leaflet. In Liverpool, a mobile diabetic eye screening service unit which visits all general practices on a rotational basis throughout a calendar year, was also used to display the leaflets.

Completed returned reply slips to the research office were catalogued on a password protected excel database and stored in a locked research filing cabinet. Second stage recruitment was ongoing throughout the two phases of enquiry as new participants volunteered and the inclusion/exclusion criteria applied to gain participation of identified key personnel. This second stage recruitment was undertaken by contacting the potential participant, usually by telephone and asking a series of demographic questions to determine eligibility for the study. Appendix 4 details the demographic questions asked. If at this point inclusion to actual data collection was not indicated the participant was thanked for their interest and an explanation was given as to why they would not be included at this point. Participants meeting the inclusion criteria were then asked for a suitable date, time and place for interview. Further explanations were given at this point of the 'opt out at any stage' clause and that their NHS treatment would not be affected by participation. A telephone number for the researcher was given in case of any queries and cancellations. Usually 24 to 48 hours before the scheduled interview participants were contacted again to check on availability and to confirm that the interview would be taking place.

5.9 Sampling Procedure

A convenience sample selection process was used by the researcher to identify 'key informant' participants for inclusion which would meet the study aims and objectives and give a broad range of experience. As this study's aims and objectives are to the individual, personal experience of conditions, underpinned by the theoretical framework of personal construct theory, a representative sample in terms of generalisation to the population was not aimed for with this sampling framework. Therefore the sample size was not considered pertinent, only in terms of ensuring a variety and depth of conditions experienced (Robson 2002).

5.10 Aims and objectives of the study

The overall objective of the study was to identify individual personal meanings of conditions experience in people with type 2 diabetes.

The following aims were addressed by the two phases of enquiry:

Exploratory Phase

- To explore and identify psychological factors that influence conditions management and experience in people with type 2 diabetes under primary sector healthcare.
- To locate these experiences within the emerging theoretical frameworks employed in the study.
- To utilise the exploratory stage findings in the development and formation of the method employed in the determinant phase of the enquiry.
- To assess the internal and external validity of the exploratory findings within the theoretical framework employed.

Determinant Phase

- To identify personal constructs in individuals with type 2 diabetes.
- To develop the method of dependency grid analysis as a determinant of personal constructs for use in chronic condition's experience examination.
- To determine reliability and validity of the method of dependency grid analysis.
- To determine the procedural steps in a diabetes specific dependency grid analysis.
- To determine the most appropriate, reliable and valid framework of analytical methods for the dependency grid technique.
- To determine the correct and most robust interpretation of analysed dependency grids.
- To use interpretive methods in identifying personal meanings of living with type 2 diabetes.
- To explore possible groupings of data from dependency grids and commonalities between participants or specific groups of participants.
- To explore the utility of the dependency grid method for therapeutic application in the clinical setting as a diagnostic tool, consultation aid, diabetes self-management aid, behavioural change vehicle, and/or communication improvement device.

5.11 Data Collection and Analysis

This section details the methods employed of data collection and analysis to meet the objectives and aims of the study. The exploratory phase method is detailed, and then the dependency grid analysis method is described, but with the addition of the 'continuum' of analysis which is embedded within the method.

5.11.1 Exploratory Phase

Semi-structured interviews were undertaken wherever possible in the participant's homes, using set areas of inquiry to reflect the personal experience of living with type 2 diabetes. The interviews were commenced with the completion of a detailed demographic profile (appendix 4) and brief explanation of the nature and purpose of the study. The anonymity and confidentiality of the data collected was explained to each participant, the proviso that their treatment in the NHS would not be affected and that they could withdraw at any time or stop the interview at any point were discussed. Each participant was asked to sign a consent form, stating their details and that they had read the information leaflet and had had the opportunity to ask any questions prior to the interview commencing. At the start of the interview the tape-recorder was switched on and a note made of the start time to determine interview time length, in order to report this in the results.

After initial introductory questions about their health, generally the interview was focused by the researcher on their experience of diabetes, usually beginning with an enquiry about their experience of diagnosis in terms of how they felt.

In particular the interview was focused on:

- The participants' quality of life.
- Their social interaction with others.
- Their interaction with healthcare professionals.
- Their perceptions of emotional responses to having diabetes.
- Their perceived impact on their families and friends.
- Aspects of impact in areas related to work or feelings of usefulness to society.

The participants were allowed freedom to digress to relate particular incidents in relation to crisis and tangential issues, and where necessary, prompting was used by the researcher to navigate participants to relate issues to their condition.

During the interview the researcher also recorded observational notes on mannerisms, body language and use of supplementary materials, i.e. when a participant would demonstrate their blood glucose measurements in a diary or graph.

At the end of the interview the time was noted after the participant had been invited to ask any questions. These were revealing and often would lead to further discussion which was pertinent to the data collected in the theoretical framework domain.

When the interview had finally completed the tape-recorder was switched off, the time noted and the participant thanked for taking part. If they then related other pertinent data, brief notes were made. Following the interview, permission was obtained from the patient to return if further exploration was required. Referral lines and offers of assistance via the research office and their general practice were made available to participants if required following completion of the interview.

The recordings were made anonymous by the use of numerical codes for identification of each participant. The tape–recordings were then stored in the locked filing cabinet in the research office until data analysis was commenced, with initiation of transcribing the recordings verbatim into word-processed text.

The researcher, using a tape recorder/transcribing machine which allowed the researcher to listen and re-listen whilst typing the interview transcripts to become familiar with the data at this initial stage, then transcribed each tape recording verbatim. This was necessary in order that analysis could begin during transcription and early emerging themes could be identified. The transcripts were open and axial coded and comparatively analysed to develop an analysis thematic identification matrix and identify common major themes (Chenitz & Swanson 1986). This process was augmented by reflection by the researcher with reference to his own previous exploratory work and theoretical underpinnings. Also the observational notes were referred to and included in the note making.

Once coding had been completed the codes where grouped into common themes, using the theoretical framework as a basis for analysis. In particular the analysis was focused on identifying commonalities of codes into themes underpinned by the perceived individual impact of living with type 2 diabetes.

5.11.2 Data Collection and Analysis - determinant phase

This section details the development, piloting and refinement of the diabetes dependency grid analysis technique which was used to achieve the study's objectives in determining people's personal constructs in living with and managing their conditions. The development first details the steps in piloting a repertory grid technique which was originally considered for use in this study, however proved not to meet the study's objectives. Therefore, after consultation and further development the situational dependency grid technique was considered more appropriate (Kelly 1955, Walker & Kalekin-Fishman1996).

This section details the various stages in the process of data collection and embedded analysis and is reflective of the arguments presented in the methodological principles chapter. The basis of data collection in this phase is a structured, focused interview between the researcher and participant, using the dependency grid method as a means of the focusing process and analysis to determine personal constructs.

The participants undertook a structured interview with the investigator, commenced with a general introduction, explanation of the method and collection of detailed demographic data. The method was explained by showing the participants an unfilled grid. The same provisos were given at the beginning of the interview as the exploratory phase, that they could withdraw at any time and their treatment in the NHS would not be affected, all data was anonymous and confidential, kept locked in the research office.

Pilot - repertory grid method

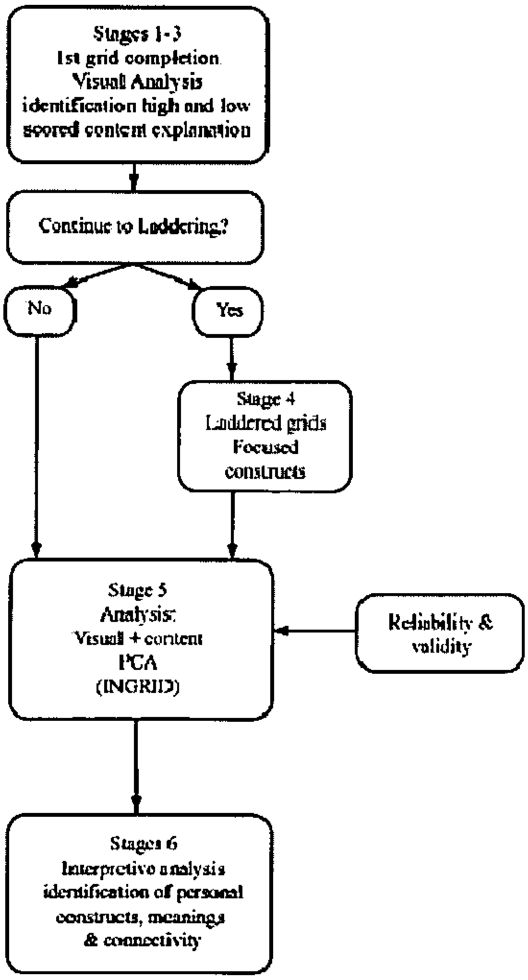
Initially a pilot phase of the study was conducted in order to experiment with and develop a utilitarian method of data collection for the determinant phase, and to identify personal constructs based on the original precepts of the theory (PCP). Following the stages determined by Kelly (1955) and later others (Fransella & Bannister 1977), a repertory grid was developed. The grid was piloted on a small number of participants, but after a short experimental phase it was clear that this type of grid was unwieldy and did not meet the study's aims and objectives.

5.11.3 Diabetes dependency grid test (DDGT)

This section details the main method of data collection and analysis in this study that were to meet the aims and objectives to determine personal constructs and meanings in living with type 2 diabetes. The diabetes dependency grid test is underpinned by the preceding methodological principles chapter and by the theoretical frameworks encompassing personal construct theory.

The procedural steps are similar to the pilot repertory grid method stages, however will be delineated in more detail. In order to facilitate following the steps and to demonstrate the theoretical framework, a flow diagram is provided which includes the stages of data collection and analysis combined: (Figure 2).

Figure 2: diabetes dependency grid analysis map



Stage 1

After the introductory explanations were completed and demographic data had been collected, each participant was shown an unfilled dependency grid, which had the broad constructs listed in the left hand column. These broad constructs were taken from the thematic results from the exploratory phase interviews. They were then asked to consider the elements and change or cross out any (performed by the researcher) which were not pertinent to their experiences and lives, i.e. partner may be husband, mother and father may be deceased, other healthcare professional could be dietician, etc.

Table 2: The diabetes dependency grid (unchanged)

Study ID No.	Spouse/ partner	son	daughter	father	mother	self	diabetologist	GP	nurse	Other hcp	Friend/ neighbour	Comments
Diabetes Self-management												
Diabetes care												
Diabetes complications												
Other health problems												
Diabetes management support												
Social pursuits												
Meaningful work												
Exercise												
Dietary management												
Emotional support												
Altering behaviour												
Changing lifestyle												
Future thinking												
Education												

Stage 2

The participant was then asked to rate each construct (situation pertinent to diabetes) against each element (person) on a scale of 0-10 to determine a level of dependency, with 0 having no impact and 10 the greatest. This required the investigator to read out and explain each construct and each element individually and give time to the participant to consider their answers carefully before indicating a number. Each cell within the grid was filled in apart from those that had been deleted in stage one as irrelevant.

Stage 3

As each cell was completed for each construct, participants were asked to explain their choice of ratings and their answers were recorded in the comments section. Once the grid was completed, participants were asked to explain the extremes of ratings in more detail, i.e. 'Why did you rate that particular person (element) as 0 for diabetes education?'

Stage 4

Once the grid was completed and all comments recorded, the participant was thanked for taking part and completing the grid. An initial 'eyeball' analysis was then performed by the researcher and bi-polar extremes of ratings grouped to highlight initial important elements to constructs. This was to identify issues to explore in the laddering process and give an estimated indication of that participant's personal constructs from the grid. The participant was then asked if they would like to continue and focus on the extreme ratings in the laddering process previously described in the principles section. If they responded positively then an open grid was used to focus on 1-3 constructs and 1-3 elements, depending on the rating scores obtained in the stage 2 grid. The participants were then asked to rate these constructs to elements again. If the comments revealed underlying personal meanings in the stage 2 process these were used as the constructs in the open grid to focus more in-depth on a particular construct. These were related to the people or person identified as having high impact on that construct. The interview was then terminated and offers of assistance and support with telephone number contacts given.

Table 3: Open dependency grid for laddering process

Study ID No.				Comment

Stage 5

This stage details the steps in analysis of the completed grids and encompasses four aspects. This was felt necessary and argued in the principles section as this was a novel, experimental method and the process of analysis requires determination, development and validation. It will be seen that within the three methods of analysis (visual, qualitative and principal component analysis) internal reliability and validity is determined by the initial visual analysis method and the laddering grid completion process.

Visual Analysis

This simple process involved viewing the completed grid and identifying the extremes of ratings to determine personal constructs in a basic way. This process enabled immediate identification of the people and constructs which were important to the participant in either negative or positive meanings.

Qualitative Analysis

Asking participants to view completed grids was part of the grid completion process and so emerging issues could be identified and discussed. In essence this was interpretive analysis of discussions focused in the grid matrix as issues arose and agreement arrived at between the researcher and participant to identify key constructs and elements. The completed comments sections of the grids were also subject to post interview individual analysis to augment the statistical analysis of the grids in aiding identification of personal meanings for each participant.

Principal Component Analysis (PCA)

Completed stage 2 grids were entered onto a SPSS (v.11.5) database as singular books for PCA of each grid on an individual case series process for each participant. Variance values were obtained via Eigen values with all above 10% level considered significant components and identified as a personal construct. The main variance analysis also identified the internal reliability of the initial visual analysis of the gird. The significant components were then plotted by scree graph to illustrate main variances.

If there were laddered grids completed (Stage 4) these were also entered onto SPSS as singular books, which additionally provided internal reliability checks on the laddering process, by determining PCA values for these focused constructs.

Modified INGRID analysis

The INGRID analysis method was developed by Slater (1965, 1969) and utilises PCA. The computer programme utilised for the purposes of this study is a modified version of INGRID, available as a hypertext markup language (HTML) package (Evans 2005). The DDGT construct and element labels are entered into the programme. The grid ratings are entered and then the package computes PCA followed by a complex combination of correlation calculations. The element distances are computed via PCA as the measure of the strength of the correlation to the constructs. The elements and constructs are plotted on 2 axes, which represent the 2 highest value variances (principal components) calculated via PCA. The programme produces a bi-plot diagram, surrounded by a globe or ovoid line which represents the overall correlation calculation between the constructs and elements and 2 main principal components. The plots of the constructs are represented in the diagram as arrows (vectors) and the angles between them represent the closeness of the correlations. The elements (people) are plotted as red dots and represent the correlation to the principal components and the distance from the constructs. When all these calculations are observed as the plotted diagram it makes the associations between the individual's constructs and elements, i.e. level of interdependence, apparent to the observer, rather than observation of the numerics, which are produced by the programme in tables. Appendix 5 is an example of the full computation tables produced by the programme. Examples in the literature of this analysis of dependency grids vary, however different computer programmes produce different diagrams, but in essence produce the same computations based on element distances on a rating grid via PCA (Appendix 6 shows examples of bi-plot diagrams, produced by variants of the INGRID programme, Norris & Makhlouf-Norris 1976, Beail 1985).

5.12 Reliability and Validity

In the exploratory, qualitative enquiry the following procedures were carried out:

- A random selection of 4 anonymous transcripts were broadly analysed following the same process by a second independent researcher to complete a process of inter-rater reliability.

- The interpreted results were presented to available members of the steering group, in particular the people with diabetes, for discussion.

- The lead researcher who has in-depth knowledge of the area under study reflected upon the theoretical constructs and information obtained from the study.

In the determinant phase the method of the diabetes dependency grid analysis was assessed for internal reliability in the following ways:

- Examination has already been made of issues in reliability and validity of grid completion and analysis, by detailing the procedural moves and statistical internal validity testing- see page 79, Chapter 4 (Beail 1985).

- Assessing inter-individual correlation coefficients within cells gave a measure of a grid's validity (Lenczycki, Anderson & Evans 1994). This is explained by the example in Appendix 5 – by looking at the correlations between constructs it can be seen how strong the association is. Then by referring back to the completed grid one can see if the ratings the participants made to elements is reflective of their perception of dependency.

- Transparency was made apparent in the procedural moves. This is made clear by the theory and methods chapters in this thesis, by detailing the development of the grid and how it was applied to participants in the interview process. Also the analysis procedures were detailed in a step-by-step description. Validity was enhanced by the process of determining, with participants, the grid elements and constructs in a laddering process. By relating this to prior exploratory work, and the research literature in this area, the validity of the approach and reliability of the results obtained were enhanced. Also, in relation to this, the laddering of the grid process or focussing were ways in which the validity of the first DDGT grid ratings and analysis could be checked. This in essence was a repetition of the full DDGT analysis process but focussed on the main constructs or derived constructs that the participant had extremity rated. By asking the participant to rate these constructs again was a way of checking the reliability of the process of personal construct elicitation.

- Recognition that there was subjective and objective measurement was made by the researcher in this process of a method which uses a one-to-one conversation. There is also recognition that there is subjectivity in the process of analysis, utilising the experience and reflections of the investigator. This is further discussed in Chapter 7 in the limitations.

5.13 Summary of working methods

This chapter has detailed the working component of the empirical work completed for this thesis and was founded on the preceding arguments presented in the methodological principles chapter. The two phases of data collection and analysis to meet this study's aims and objectives were detailed. The study population, recruitment and sampling procedures, ethical processes and resource implications were detailed for the overall study. The exploratory methods in the qualitative study were detailed in terms of data collection, analysis and reliability and validity measures. The piloting, experimentation, development and use of the dependency grid analysis method for the determinant phase of the enquiry was detailed, with the explanation of the individual case study series analysis presented for the next chapter on results.

Chapter 6
Results

6.1 Results – Exploratory phase

6.1.1 Sample

Twenty-three participants (23) were selected from 72 positive replies to a letter inviting participation based on key informant and the inclusion/exclusion criteria as a convenience sample. This was performed in a cascading process where the sample was chosen by reading the reply slips, examining the basic demographic information and identifying key informants for inclusion. All 23 participants gave written informed consent to take part in the study and were interviewed in their own homes. The geographical area covered ranged from inner city Liverpool, northwards to Preston and surrounding areas. All participants included in the analysis were under primary healthcare services. Any potential participants who were under hospital services and/or identified as having type 1 diabetes were excluded at selection. The mean interview length was 125 minutes, with a median of 136 minutes. One 'outlier' interview lasted over 5 hours and was a participant who had complex issues and could only relate them very slowly due to fatigue and needing frequent breaks. In actual meaningful dialogue the data from this interview was approximately 77 minutes.

6.1.2 Demography

Table 4: Demographic characteristics summary (All 23 participants)

Demographic Characteristic	**Frequency**
Age range	33-81 years
Male/female (ratio)	10/13
Cultural origin:	
Caucasian	19
Indian	2
Pakistani	1
Afro-Caribbean	1
Duration of diabetes (range)	9 months-15 years
Diabetes Management:	
Diet	10
Diet and tablets	8
Insulin requiring	5
Employment status:	
Employed	3
Retired (natural non-conditions related)	11
Retired (early due to diabetes)	8
Unemployed	1
Smoking	5
Diabetes related complications	3
Other health problems	9

6.1.3 Themes

At completion of the study, when no new data was emerging from coding, five themes had been identified which demonstrate issues in perceptions of the impact of having diabetes and the implications for the future of living with diabetes. The themes however, are delineated and described with relation to the applied analytical framework utilised to underpin the study. Therefore the themes are de-construed into general constructs with relation to either process-orientated or psychosocial-orientated domains of application to the individual patient condition experience. Within each theme there are further delineations of constructs which are derived from analysis of the interview transcripts. The constructs, whilst defined in process or psychosocial terms, can be interchanged within themes according to the individual experience.

The five themes identified were named within categories of:

i) Within a psychosocial orientated overall category

- Family: relationships and interactions
- Social life/activity
- Emotional changes/support

With associated delineated constructs of emotional support; altering behaviour; changing lifestyle; future thinking and education.

ii) Within a process orientated category of:

- Meaningful work/ sense of worth
- Making adjustments/ diabetes functional activity

With associated 'functional' aspects of condition experience of; diabetes self-management; diabetes care; diabetes complications; other health problems; diabetes management support; exercise.

Each theme will be discussed briefly with quotes given and reference made to supporting literature where appropriate. The quotes presented have been selected to demonstrate how the themes were identified from manual coding of participant's interview transcripts. All 23 participants related issues which coded into the identified themes apart from the last theme of loss of control, of which 11 participants related issues pertinent, therefore this could be classified as a sub-theme.

Psychosocial orientated themes and general constructs.

Family: relationships and interactions

All 23 participants related experiences in this identified theme, which resulted from coding issues related to any aspect of diabetes having an impact on the participant's family life. Issues coded ranged from minor effects to 'routine' family life, i.e. changes to cooking and diets, to more major effects, i.e. marital breakdown. All the participants discussed in particular implicit and explicit alterations in their relationships and interactions with their family members. These alterations were narrated as being subtle or very obvious. There is little supporting work in the effects to family life in adult type 2 diabetes. Most literature in this area is focused on the child with type 1 diabetes and family, although Shillitoe (1988) has made reference to considerations in the older person with diabetes and family dynamics in the UK. Family interactions and effects due to diabetes have been studied in America mainly through survey studies (Stokols 1992, Glasgow 1995).

Transcript example quotes:

It's brought it home to her (wife) now, how serious it is... having a hypo. That day she found me on the bedroom floor, well I could tell afterwards, when I was in Hospital, that she was shocked ...she said I didn't know what to do, I just panicked, I thought you were going to die." (A012)

"The reason we got divorced is because of being a diabetic- I'm sure of that. He just couldn't get to grips with me having to change what we eat and then later on having to use tablets and then insulin injections. It meant he was shut out of my life, he didn't feel a part of it. I'm still depressed about him leaving." (A021)

"I know when I go round to my sisters, she's thinking...do I offer him a cake or a drink or something or am I going to offend him, it makes our get togethers strained, you know?" (A018)

This identified theme demonstrates that living with type 2 diabetes can have a profound impact on the way people perceive their family interactions and communications about their everyday lives and their conditions. This issue can be related to perceptions of quality of life, which has been continually documented as a main outcome of living with a life-long condition (Strauss & Glaser 1975).

Social life/activity

Participants were especially enthusiastic in talking about their experiences in terms of effects on their social life, and would often say that it is something that never gets discussed at their surgery appointments. Experiences varied from having no effect to quite severe examples of feelings of social exclusion that were diabetes and cultural origin related. Previous studies have tended to focus on quality of life measurement in specific groups with psychological outcomes and have often been conducted in America (Bradley 1994b, Jacobson, de Groot & Samson 1997, Glasgow, Toobert & Gillette 2001).

Transcript example quotes:

"Sometimes it's difficult to choose the right thing when you're out at a restaurant or pub, because there just isn't anything on the menu. I also like a drink now and again and that's really difficult- you don't know what it's like not to be able to get drunk now and again". (A02)

"It's bad enough being black in this country ...then I have to ask for sugar free food and all that-it's a bad label to have. When I started on insulin that's when the harassment started with the police and other racist bastards. Three times I've been questioned cause I was injecting in a pub or restaurant... its just not on, you know?" (A022))

This theme relates to impact perception by people with type 2 diabetes and is closely linked to the impact on family life and interaction with friends. There is also a wider perception of general public impact and issues related to stigma which has been documented in chronic conditions (Strauss & Glaser 1975).

"I feel it invades my life, I do. I don't like injecting when I am out, that's something I've not really got to terms with yet... there isn't anywhere if you're out in town.and I'm not really brave enough yet to actually inject if I was in a restaurant." (A07)

Emotional changes/ support

Participants related the effects of having diabetes as a trauma, shock, and in some instances emotional wounding. Previous studies have explored long-lasting psychological effects (Anderson 1986, Glasgow, Toobert & Gillette 2001). Participants related how it was a constant worry and caused stress living with a condition, which might have severe effects on their health. They also narrated how, even after recovering from the initial shock of diagnosis, there were continued psychological effects that did not regress.

Transcript example quotes:

"I think that it's really affected me having diabetes. I'm not as happy, what with everything that's gone on, with all the problems I've had. I don't think that anyone really likes having to change what they eat and no one likes taking injections. It's the worry as well of what might happen to you- you know, losing your eyesight, sores on your legs- it's not nice is it? Sometimes I feel really down - depressed you know, especially when I'm tired." (A018)

"I feel it's there all of the time-it's like a scar, you know? Something that lasts forever and you can't get rid of." (A016)

"I still don't feel like I've got over the trauma of finding out I'd got diabetes, cause I knew straight away with my gran dying of it that it could have very nasty effects. I mean you're bound to worry aren't you, especially when they (HCPs) tell you that if you don't look after yourself you could go blind or lose a leg." (A022)

Adriaanse, Snoek and Dekker et al. (2002) have recently presented a qualitative study of newly diagnosed people with type 2 diabetes and they suggest that there are no long-term psychological effects. The approach they took was from a bio-medical viewpoint as they were recruiting their sample from a population who were being piloted for mass screening for type 2 diabetes. In this study the theme of emotional changes identifies that, if one examines people living with diabetes in the longer-term, there are psychological issues which need exploring which can be severe and long lasting.

Process orientated themes and general constructs

Meaningful work

Participants related how employment factors and employment viability are affected through living with type 2 diabetes. They described how having diabetes meant changes to their working pattern, but also some respondents narrated how the condition had meant profound changes leading to unemployment or early retirement. This may be regarded as a socio - economic impact on participants' lives, as a result of living with type 2 diabetes. Participants also narrated how important it was to continue to be engaged in meaningful work, whether that was as an income generator or not. Some people also talked about not looking after their diabetes properly and missing appointments due to the pressures of their work. Previous research has focused on worksite issues but in a general public health focus, not from the patient perspective (Jeffrey et al. 1993, Padgett et al. 1996).

Transcript example quotes:

"I had to retire early from a good engineering job. I kept trying to keep going but I was just too tired...I felt exhausted by lunch time and at 56 I just thought I'll have to give up." (A011)

"Sometimes I find it difficult at work to eat the right thing and take my blood measurements because I am too busy and for those who don't know that I am diabetic it can be embarrassing if you have to leave a meeting or something." (A019)

"I could not continue being a pilot... which meant everything to me. I can only fly now in the company of another qualified pilot and to me the great joy of flying solo has been lost, which was also my main means of earning through small plane contract work, like aerial photography." (A021)

There is little previous related work in the area of personal perceptions of impact in terms of work issues, however, it is clearly of importance and therefore should be explored further and in depth.

Making adjustments/ functional diabetes constructs

Adapting to living with a chronic condition continues to be documented and experiences in this study support the construct (Shillitoe 1988, Ternulf-Nyhlin 1990, Sanden–Eriksson 2000). Participants related in many instances how they have come to terms with living with diabetes. They also related within other constructs process orientated aspects of their condition's management by relating for example blood glucose self-monitoring activities, attending GP surgeries, consulting with the practice nurse; changing their treatment regimes on a daily basis, describing their difficulties in following exercise regimes and dietary restrictions. Some participants also related how other health problems and complications, particularly anxiety over them, had had an impact on their experience. All these aspects of condition experience have some support from previous literature, presented in Chapter 2 of this thesis and therefore have relevance to the second phase of the enquiry.

Transcript example quotes:

"I knew that things had to change and I just wanted to get on with it. I wanted to know what I needed to do and to put it behind me so I didn't have to worry or think about it. I think everyone goes through changes in their lives - I just viewed this as a quick change that I got used to." (A023)

"If I have a problem I have to put it in order." (A020)

"Once I'd got over the shock, I thought right I'm not going to let this affect me." (A03)

This is probably the theme identified with previous studies and has been reported as a major impact in terms of chronic conditions generally and in diabetes (Strauss & Glaser 1975, Shillitoe 1988). Patients faced with long-term conditions perceive real changes in the way they live their lives and have changed in the way that they think.

6.1.4 Summary of exploratory findings

People with type 2 diabetes have complex psychosocial issues, which affect their self-perception and management of having type 2 diabetes. This study has explored and identified themes which affect people in how they live with type 2 diabetes. This identification is important in terms of influencing knowledge and healthcare professional interventions. Each of the themes has been presented with supporting quotes from the transcript analyses and highlighted the impact perceptions which the participants related. These themes are important, however, they require further examination in terms of the underlying personal constructs for individuals.

6.2 Results - Determinant Phase

This section of the results details the in-depth case study analysis of personal constructs in individual participants who consented to further interviews using the dependency grid technique. Of the original 23 participants of the exploratory phase, 19 consented to further interviews in a case study series, using the grid analysis techniques. Four people did not progress to the determinant phase as one had died, one refused and two had moved out of the area.

Of the 19 participants who completed the first interview diabetes dependency grid test, (DDGT) 10 participants continued with further interviews utilising the laddering grid technique. These further grids were completed either within the second interview or required three interviews in a case study series. This series of interviews took place in a time period between 2001 and 2003 with the DDGT and laddering taking place over 2-3 months depending on availability of participants and time schedule of the researcher.

The main body of results is presented as a case study series of the ten participants as individual personal construct identification, derived from the analysis and interpretative process detailed in the preceding working methods chapter.

6.2.1 Laddered DDGT Case studies

Ten participants completed the DDGT laddering process to enable personal construct identification and interpretive analysis. The following tables illustrate the demography and process-orientated, descriptive measures. However, more details of the individual participant's demography and social situation are detailed in each of the case study presentations. Additionally, a summary is presented of the ten main DDGT bi-plot diagrams to illustrate the differences in the participant's personal constructs related to interdependence. Each participant at the end of the DDGT had a de-briefing session. This was in order to reflect on what had been explored and to discuss whether the participant required any follow up in terms of GP referral or via the GP, specialist service intervention, i.e. clinical psychology. None of the participants wanted this type of referral, even when in some cases the principal investigator had discussed with them the possible therapeutic benefits of such. After the completion of the focused grids a discussion ensued on the issues related to them. All the participants stated they were happy with the interviews and had no worries or issues from them. The researcher explained about the confidential procedures employed and gave all the participants a brief feedback of what they had related in the interviews. They were also given feedback of the initial visual analysis of the focused grids, reassuring them that there were no problems. The participants were told that their GP's had been informed about their consent to take part in the research, and that if they had any problems they wanted to discuss they could contact the researcher or their GP about them. The researcher reiterated that he would only contact their GP about any issues at their request and with their permission.

The following is a summary of the case study participant's demographics which is presented for ease of comparison, however each case study has detailed individual demography presented. The main form of results from the analysis is an illustration (bi-plot). This diagram is a plot of the 2 main principal components calculated against which the element and construct ratings have been added. The elements (people) from the DDGT completed grid are represented by red dots and labelled, from the top of the DDGT completed grid. The arrow lines represent the diabetes constructs, labelled according to the left hand column of the completed DDGT grid. The length of the construct arrow corresponds to the strength of the correlation it has to the element it is directed towards. The angle between the construct lines represents the closeness of the correlations between the constructs – how closely they group together to form a core personal construct for the participant. The angle of the constructs to the main principal component, horizontal line shows the strength of the relationship of the constructs to the principal component.

In order to compare how each individual case study's personal constructs differ or have similarities, the ten main diagrams from the DDGT completed rated grids are grouped together on pages 125-127. However due to constricting the bi-plot diagrams these are only presented for a broad visual comparison. In the first 2 case studies all the calculations are included to show how the bi-plot diagram is formulated. Also, in order to explain the labelling of the personal constructs, based on PCA and bi-plot visual examination, the comments participants made in explanation of cell ratings are given; recorded as 'field notes' during the DDGT interviews.

Table 5: Demographic characteristics of the participants who completed grid focusing

Age range	34-77 years		
Male female ratio	4:6		
Cultural origin			
Caucasian	9		
Afro-Caribbean	1		
Duration of Diabetes	1-20 years (range)		
Diabetes Management	No exercise (n)	Exercise (n)	Total
Exercise & Diet	1	1	2
Exercise: Diet & OHA's*	4	3	7
Exercise: diet & Insulin	1		1
Diabetes Complications			
Retinopathy	0		
Sensory neuropathy	2		
Autonomic neuropathy	1		
Renal impairment	0		
Macro-vascular	7		
Hypoglycaemic attacks	1		
Hyperglycaemic/ ketoacidotic events	0		
BMI status			
Range	21-41 (mean = 30)		
BMI Classification			
Healthy (18.5-25)	2		
Overweight (25-30)	4		
Obese (30-40)	3		
Very Obese (40-60)	1		
HbA$_{1c}$ (%)*	(mean = 6.92)		
Range	5.5-8.4		
	n		
4-7	3		
7+	3		
Not known	3		
Smoking status			
None/ never	8		
None/ gave up	2		
Smoking	0		
Retired			
Working	8		
	2		

*OHA = Oral hypoglycaemic agents

* HbA$_{1c}$ = glycated haemoglobin (self reported or from shared care record).

Table 6: Illustrates the socio-economic and co-morbidity status of each of the ten participants', who completed the determinant phase of the study, (this data is limited to what the participants' reported themselves, when questioned about their employment status, and the presence of diabetic complications, or other health problems).

Case Number	Male/female	Type 2 Diabetes	Raised BMI	Co-Morbidity	Employment status
1	Female	Yes	Yes	None	Employed
2	Male	Yes	Yes	None	Retired
3	Female	Yes	Yes	Ischaemic Heart Disease (IHD)/ Raised BP	Retired
4	Male	Yes	Yes	IHD	Retired
5	Female	Yes	Normal	IHD	Retired
6	Male	Yes	Normal	Raise BP/ Cardiovascular Disease	Retired
7	Female	Yes	Yes	None	Retired
8	Male	Yes	Yes	Raised BP/ Myocardial Infarction	Retired
9	Female	Yes	Yes	None	Retired
10	Female	Yes	Yes	Raised BP/ Erectile Dysfunction	Unemployed

The following pages (115-118) show all ten DDGT data analyses in the form of the INGRID generated bi-plots (constricted and only for broad comparison), showing the correlations between the elements and constructs for each of the ten participants.

Figure 3: INGRID Bi-plot illustrating the correlation of the constructs to elements and principal components 1 & 2 axes, for case study 1, completed DDGT

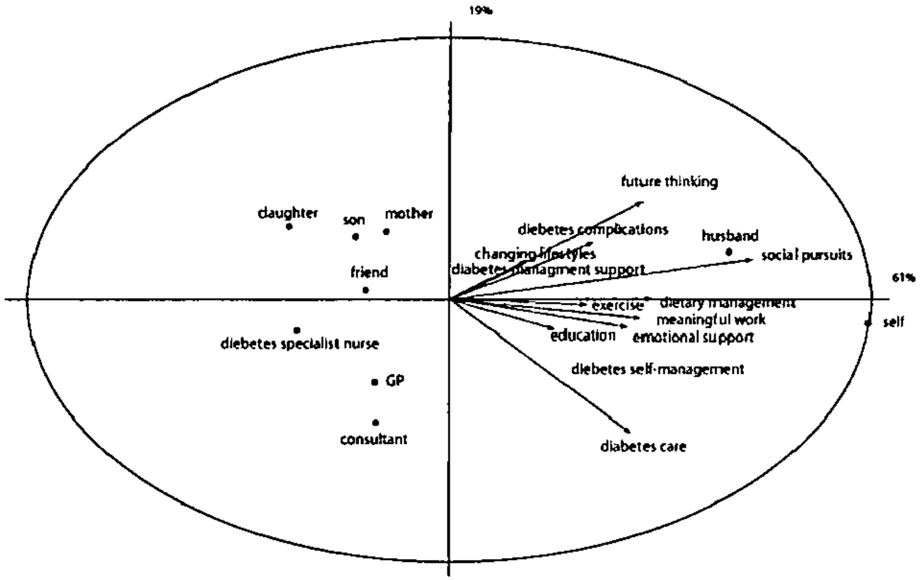


Figure 6: INGRID Bi-plot illustrating the correlation of the constructs to elements and principal components 1 & 2 axes, for case study 2, completed DDGT

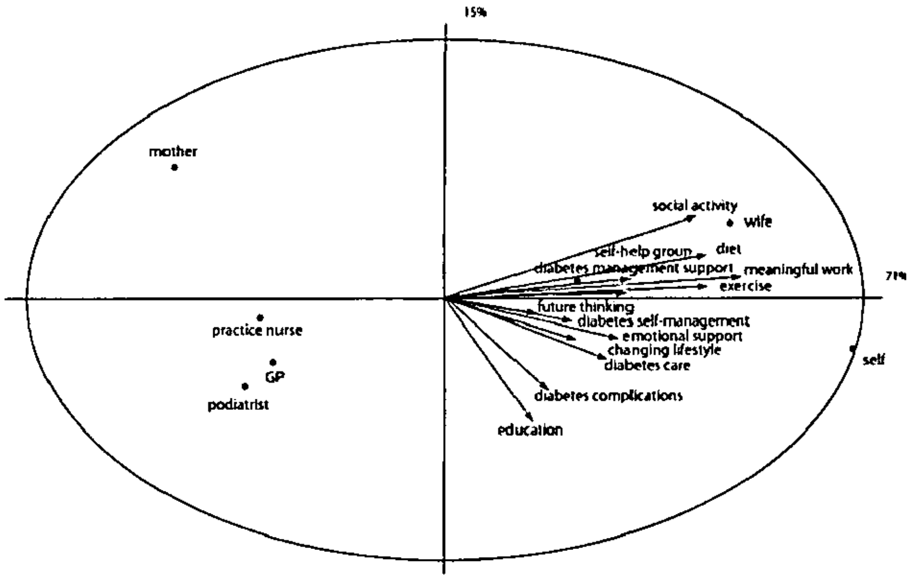


Figure 9: INGRID Bi-plot illustrating the correlation of the constructs to elements and principal components 1 & 2 axes, for case study 3, completed DDGT

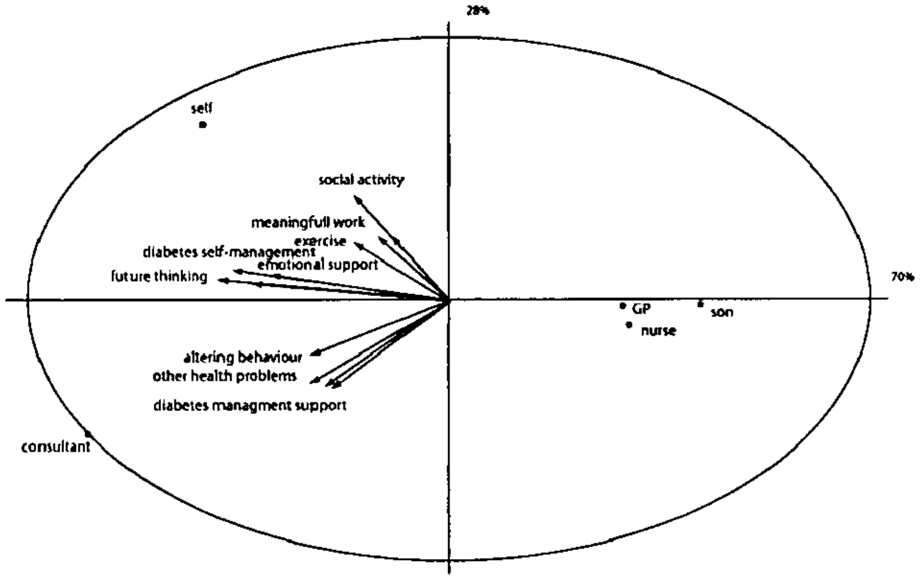


Figure 11: INGRID Bi-plot illustrating the correlation of the constructs to elements and principal components 1 & 2 axes, for case study 4, completed DDGT

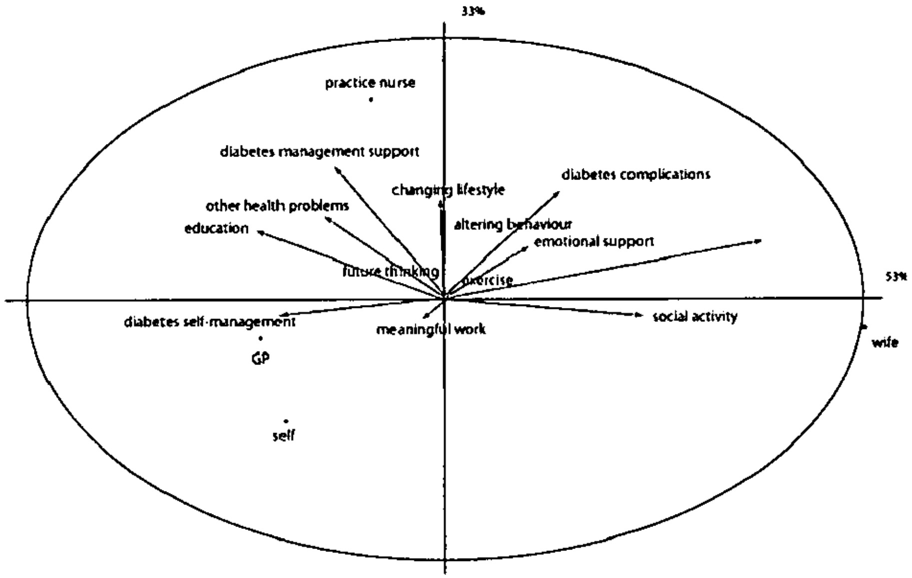


Figure 13: INGRID Bi-plot illustrating the correlation of the constructs
to elements and principal components 1 & 2 axes, for case study 5, completed DDGT

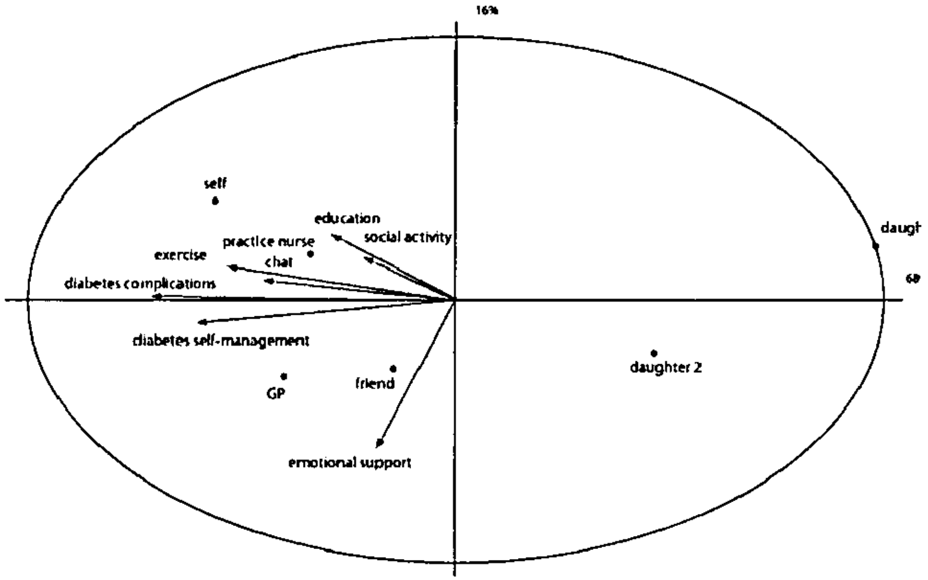


Figure 15: INGRID Bi-plot illustrating the correlation of the constructs
to elements and principal components 1 & 2 axes, for case study 6, completed DDGT

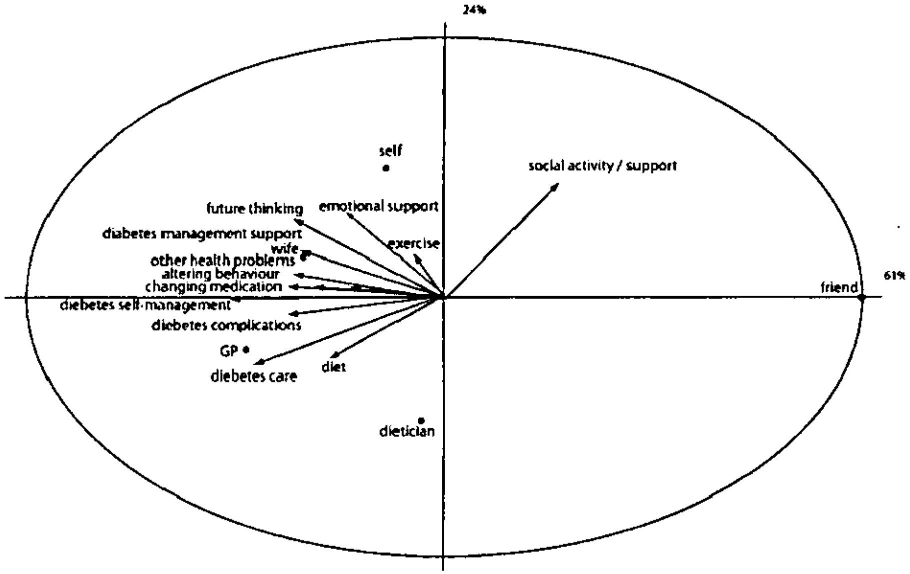


Figure 17: INGRID Bi-plot illustrating the correlation of the constructs
to elements and principal components 1 & 2 axes, for case study 7, completed DDGT

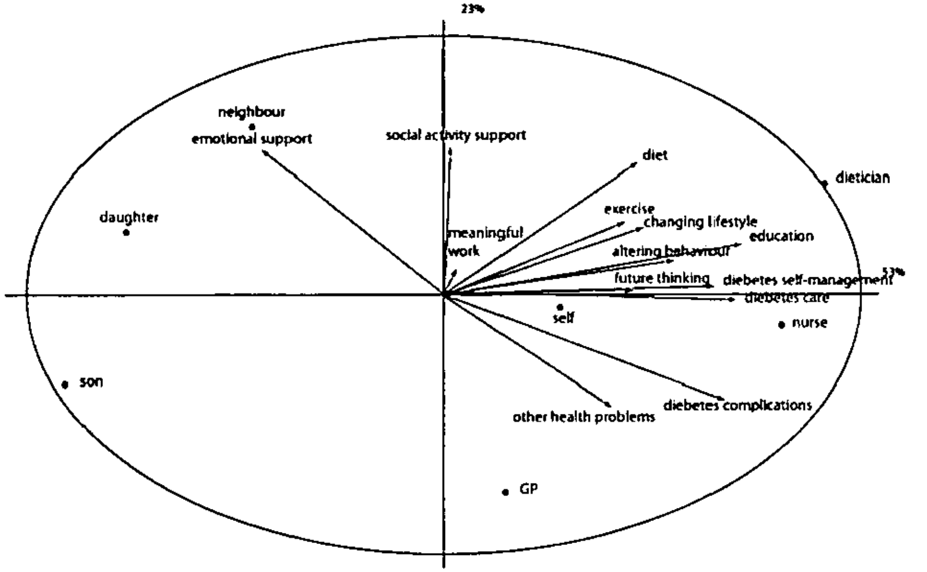
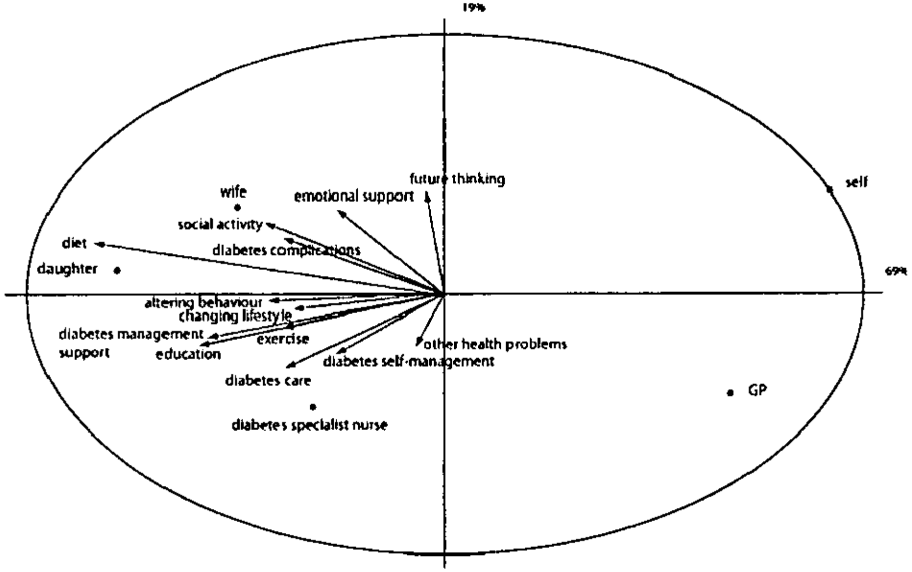
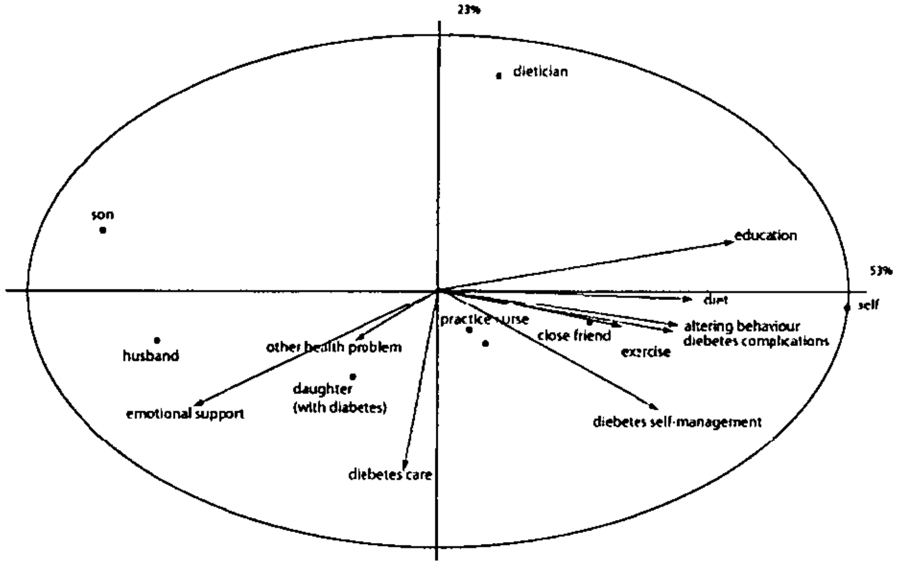
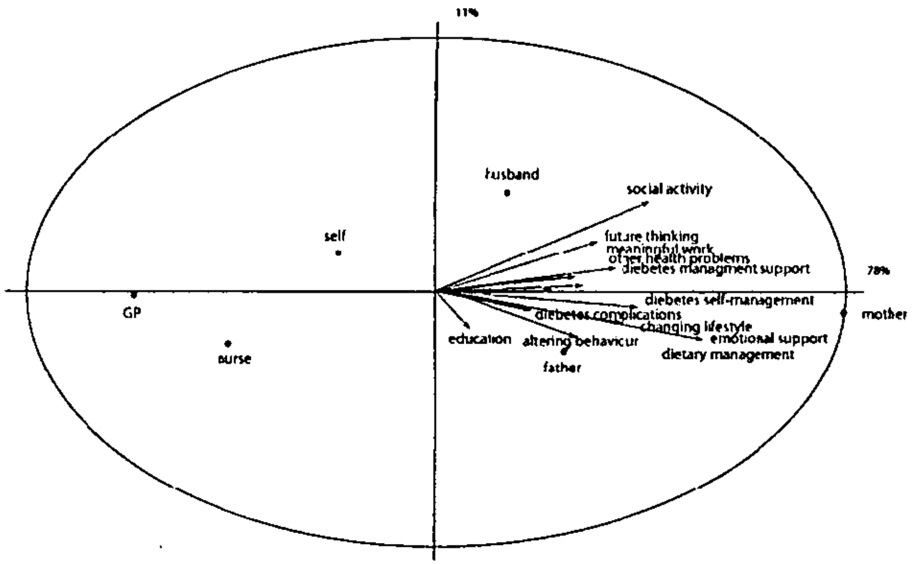


Figure 21: INGRID Bi-plot illustrating the correlation of the constructs
to elements and principal components 1 & 2 axes, for case study 8, completed DDGT




23%
dietician
son
education
53%
diet
self
practice nurse
altering behaviour
diebetes complications
close friend
exercise
husband
other health problem
daughter
(with diabetes)
emotional support
diebetes self-management
diebetes care


11%
husband
social activity
self
future thinking
meaningful work
other health problems
diebetes managment support
78%
GP
diebetes self-management
diebetes complications
mother
changing lifestyle
emotional support
education
altering behavicur
dietary management
father
nurse

Case Study 1 (A013/ DRG 008)

This case study is a presentation of a 53 year old white woman with type 2 diabetes who for the purposes of confidentiality and anonymity is given the pseudonym Dorothy.

Dorothy has had type 2 diabetes for 10 years, and is now treated with exercise, diet and twice daily injections of insulin. Her self-reported HbA_{1c} was 8.1% at the time of the first grid testing interview. Of note was her BMI status at 28, indicating being overweight but not obese. She currently works for a large civil service organisation as a clerical assistant. She is married and has 2 children – a son and a daughter who both have children of their own. She had a state education until age 16 at a local grammar school and entered a typing office for her first job. After having an extended career break for 14 years, for childcare, she gained her current employment.

The DDGT was completed with the laddering process over 2 interviews, spaced 3 weeks apart, with the previous exploratory phase interview occurring 9 months before. Including the first full grid, three grids were completed overall with the laddering process.

During stage one and two of the DDGT Dorothy and the investigator (WG) explored the construct labels within the grid and identified those pertinent to her life with diabetes, discarding 'other health problems' and 'diabetes management support' as not relevant to her situation. The researcher explored with some questions why, in particular, 'diabetes management support' was not relevant and Dorothy explained that she 'looked after' her diabetes and did not receive much, if any, support in terms of management. Dorothy and the researcher then explored and discussed the element labels (people) who were involved and important in her life with diabetes. Dorothy listed her husband, son, daughter, mother, herself, the consultant diabetologist who she had seen but was no longer under her care, her general practitioner, her diabetes specialist nurse, and her close friend.

The unfilled grid was then modified to take into account the constructs and elements Dorothy had identified. The researcher then explained how the rating scale worked and asked Dorothy to rate each of the constructs against each of the elements with the impact rating.

Table 7: Completed ratings for the DDGT: case study 1

Construct	**Element**								
	husband	son	daughter	mother	self	consultant	GP	DSN	friend
Diabetes Self management	5	3	0	3	8	6	6	0	5
Diabetes care	8	0	0	0	10	8	8	6	4
Diabetes complications	10	6	6	5	10	0	7	6	7
Other health problems	0	0	0	0	0	0	0	0	0
Diabetes management support	0	0	0	0	0	0	0	0	0
Social pursuits	10	0	0	4	10	0	0	0	0
Meaningful work	0	0	0	0	10	0	0	0	0
Exercise	5	3	0	0	5	3	0	0	0
Dietary management	4	0	0	0	8	0	0	0	0
Emotional support	10	5	3	5	10	8	5	3	5
Altering behaviour	3	2	0	4	3	0	0	0	0
Changing lifestyle	3	2	0	4	3	0	0	0	0
Future thinking	10	5	5	3	8	0	0	0	5
Education	5	3	2	4	7	5	4	3	1

After the grid rating was completed the researcher asked Dorothy questions to attempt illumination of the extremity ratings of some of the elements to constructs. For example she rated herself and her husband as 10 for diabetes complications and the researcher encouraged Dorothy to explore the reasons for that. She and her husband spent some time worrying and discussing what would happen to their lives if she developed any of the complications that she demonstrated she had good knowledge. In particular, she was worried about having a hypoglycaemic attack, and that she would have to totally rely on her husband to deal with that situation.

Anxiety appeared to be a theme within the comments she made on her rating. In rating the constructs of future thinking and other health problems she cited worry over raised blood pressure and what effect it may have on later life. Interestingly, she rated the blood pressure problem as 0 against all the elements and when asked to explain, commented that "you can't do anything about that".

The only person she rated highly for dietary management was herself as she did most of the cooking at home. She denied that when she saw a dietician that they had any impact at all on her eating habits. Dorothy did relate the dietary aspects of living with diabetes to her self-perceived weight problem and did not relate exercise to her weight.

The construct 'altering behaviour' was rated low across all the elements. When asked to explain she stated; "At my age I'm not going to change the way I think and behave" (towards her diabetes). This could be related to the negative connotations of using a term like 'altering behaviour'. However, in consistency with the theoretical framework of self-efficacy, it is more likely related to Dorothy's ability to self-manage her illness.

After completion of the first grid, the researcher asked Dorothy if exploration could be made of some of the issues identified within the construct to element ratings at the next interview using the laddering technique, to which she agreed.

INGRID analysis: Case study 1: DDGT

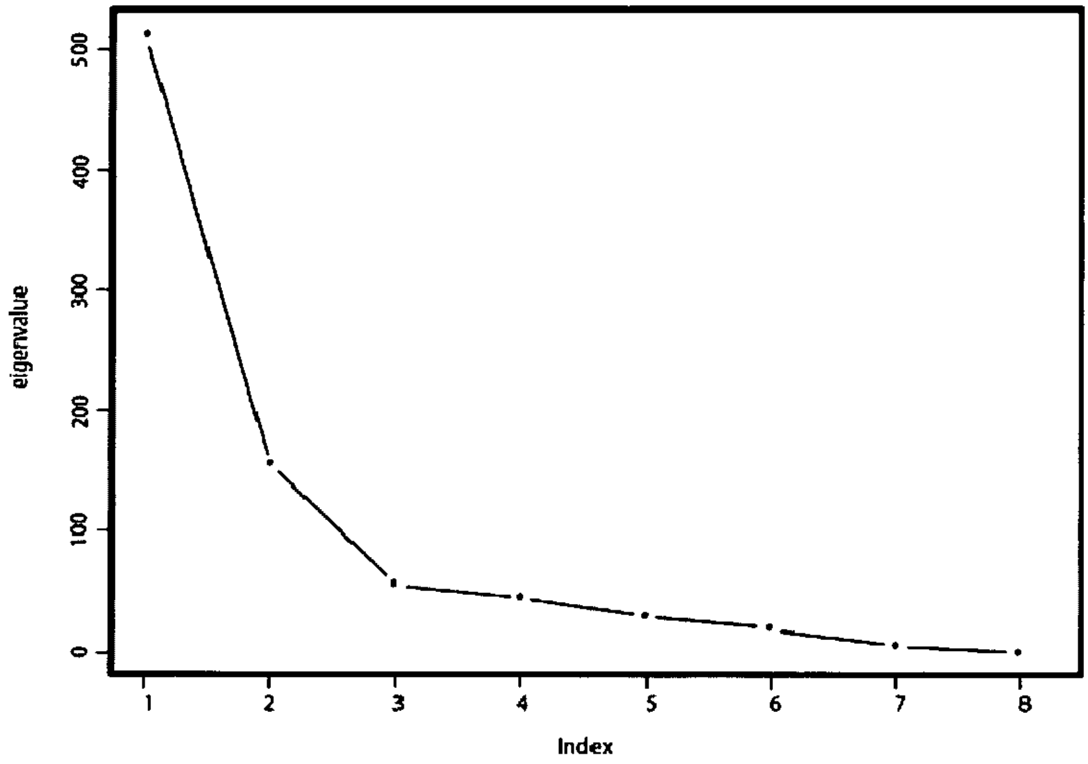
Cluster and subsequent PCA revealed 2 main components accounting for 61% and 19% of the variance respectively giving a total of 80% of the variance which indicates reliably that there are two core issues in Dorothy's living with diabetes.

The entire Eigen and percentage values of all the identified principal components are listed in the following table:

Table 8: INGRID computed (principal component analysis, PCA) variance values for DDGT: case study 1

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	513.15	61.46	61.46
PC2	157	18.81	80.27
PC3	57.19	6.85	87.12
PC4	47.32	5.67	92.79
PC5	31.01	3.71	96.5
PC6	21.2	2.54	99.04
PC7	6.74	0.81	99.85
PC8	1.28	0.15	100

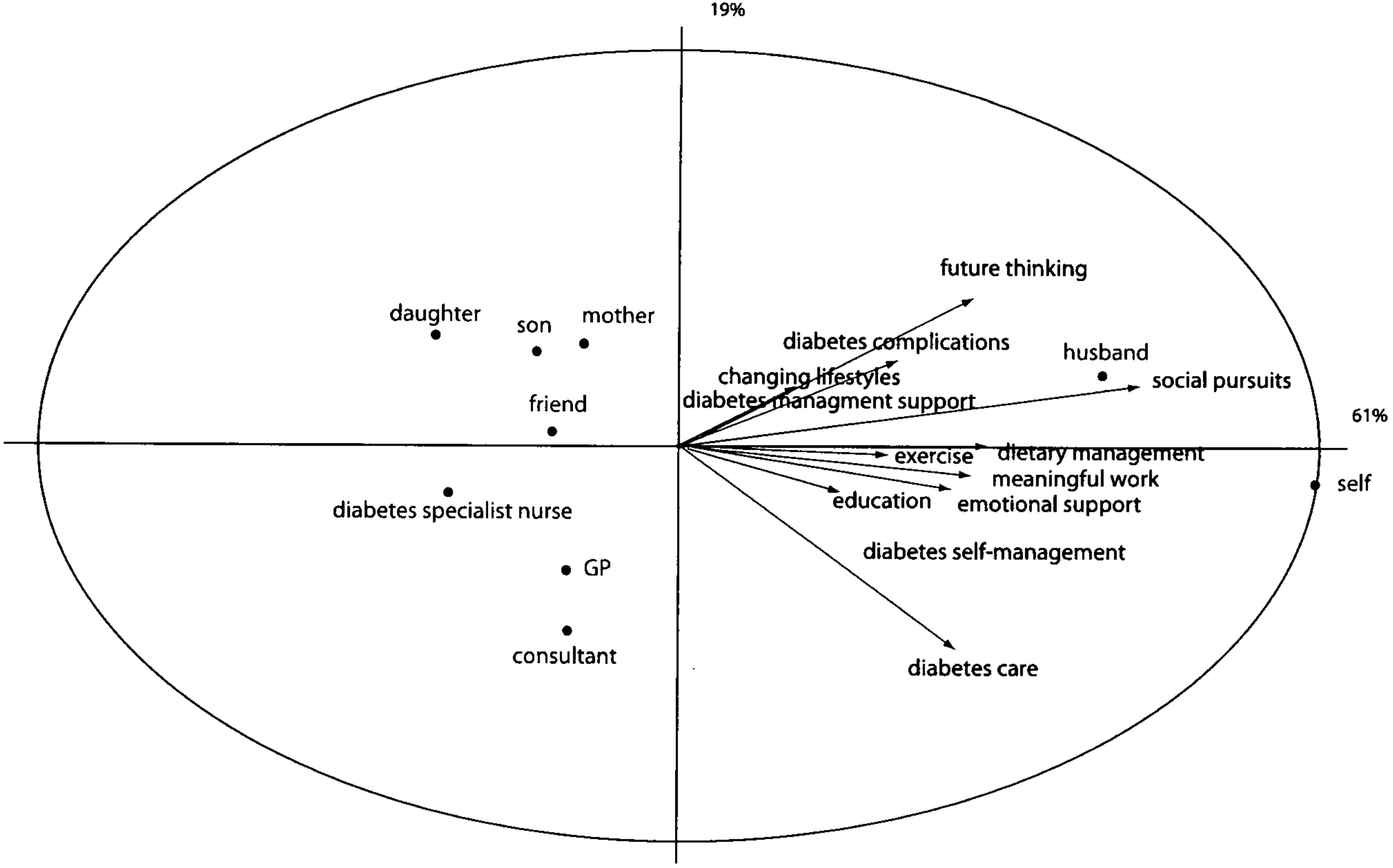
Graph 1: Scree plot of the above Eigenvalues for successive components (only first 2 have % variance above 10%).



The tables and diagrams in Appendix 5 are the detailed data, which are used to make the bi-plot (figure 3) in Dorothy's analysis. These tables are the correlation figures which are translated into the diagram for ease of visual analysis and interpretation of the data. The core individual personal constructs are labelled according to the 2 main principal components and corresponding constructs and element associations. This identification of personal constructs is further supported by quoting Dorothy's comments, recorded as field notes in the grids, when asked to explain particular construct to element ratings, especially the 'extremity' ratings (See quotes on page 136). These 'comments' show the validity of the labelling of the core personal constructs, combined with the plotted principal component analysis in Figure 3.

The following diagram is the bi-plot as explained on page 132. In case study one, Figure 3, the main principal component is plotted as the horizontal line and accounts for 61.46% of the variance. Against this are plotted the diabetes-related constructs in the form of arrows and within the oval line are the elements (people) plotted as red dots. This allows easy observation of how strongly the constructs are correlated against each other – in Dorothy's case these all have a relevance to her personal constructs in a lesser (shorter arrow) or greater (longer arrow) degree. When looking at the elements (red dots) in Dorothy's case, it can be seen that apart from herself and her husband, all the other elements are located to the left of the main principal component line and the constructs are directed away from these. This means that these elements are negatively correlated to the principal component lines and this reflects the low ratings that Dorothy gave them in the grid. Therefore these elements do not have much relevance to Dorothy's core personal constructs, principal component 1, but may have some relevance to her second significant principal component , represented by the vertical line.

to elements and principal components 1 & 2 axes, for case study 1, completed DDGT



Principal Component 1 (61.46% of total grid variation):-

Personal Construct (Label): 'Diabetes Interdependence'.

The analysis of the ratings Dorothy has given to the elements and constructs in the grid is illustrated Figure 3, which shows the correlations of all the constructs to all the elements by plotting theses as angles and distances against the 2 main principal components. This means that where the groupings of arrows are on the diagram, directed towards a particular element, shows how dependent or independent Dorothy is with that person in living and managing her diabetes. In Dorothy's case, Figure 3 shows that for principal component 1 (61.46%) all the diabetes – related constructs (the left hand column of the grid- Table 7) are closely correlated towards Dorothy rating herself and her husband. The angles between the construct arrows represent how closely all the constructs are correlated with each other and the 2 main elements nearest the principal component 1 line-which are Dorothy and her husband. Therefore it appears reasonable to label this personal construct diabetes interdependence as the strongest correlation is between herself and the constructs. These are all positive correlations and therefore validate the strong principal component variance of 61.46%, which shows this as the main, 'core' construct for Dorothy.

The following is an extract of the field notes, from Table 7, noted in the 'comments' section of Dorothy's completed DDGT. These notes were made from Dorothy's explanation of a particular construct to element rating, when asked by the investigator. These comments support the detailed INGRID analysis to identify Dorothy's personal constructs and demonstrate the validity of the analysis. The notes provide support for the explanation of the correlations in Dorothy's case by highlighting her relationship with her husband and her perceived self-efficacy in managing her diabetes.

Table 9: Extract, with included field notes.

Construct	**Element**	**Transcript quote**
Diabetes self-management	Self Rating = 8	*"I manage alright by myself. I think I manage OK, I mean I'm not doing too badly...I look after my diabetes, it doesn't cause me any problems".*
Diabetes management support	Self Rating = 0	*"I don't need support- I manage myself totally.. I haven't found it a problem sorting things out for the diabetes by asking others to help me".*
Emotional support	Self Rating = 10	*"I am very strong I think..." I feel happy and I only worry about the future".*
Education	Self Rating = 7	*"I am mainly self-taught about diabetes. I can find things out for myself, read books, magazines. I know what I am doing with my diabetes".*

However, also within this construct are the issues related to the strength of her relationship with her husband and these have a high positive correlation to her living with diabetes. The theme of this issue is centred on anxiety about the future and development of complications which may have an impact on her husband and his ability to care for her. There is also a construct vector (arrow direction) which suggests that any changes in Dorothy's behaviour would not occur without her husband's involvement. This is supported by Dorothy's comments made during the interview and confirms the personal construct as one of interdependence rather than independence. This is apparent by looking at Figure 3 where it is clear that the construct arrows point to Dorothy's husband and are all positively correlated to the principal component 1 (closeness of the angles to the horizontal line in Figure 3).

Table 10: Extracts with included field notes: these support the personal construct of 'diabetes interdependence', associated with Dorothy's relationship with her husband and the way in she perceives his support in the various diabetes–related constructs:

Construct	**Element**	**Transcript quote**
Diabetes complications	Husband Rating = 10	*"I do get worried about hypo (hypoglycaemic) attacks and I worry about going too high (hyperglycaemia). I and my husband sort these out when they happen but I don't know what I'd do if he could not help me".*
Social pursuits	Husband Rating = 10	*"It's only I and my husband. We do things together and we plan if the diabetes is involved.. you know if we are going out for a meal he (husband) will check that I am not going to be given something sweet".*
Altering behaviour	Husband Rating = 3	*"At my age I'm not going to change the way I think and the way I am and neither is my husband. If he said though, let's stop going out as much then I would do that".*
Future thinking	Husband Rating = 10	*"I do worry about my blood pressure and if that goes up what effect later that will have on my health and so does my husband. I know he worries about that and wants to know what it was when I was at the Doctors".*
Emotional support	Husband Rating = 10	*"He supports me in everything- helps me when I worry about something with the diabetes".*

Within this personal construct there are also some ratings which suggest that Dorothy does have an interdependent relationship concerning her diabetes with other people outside of her marital relationship. However, as evidenced in Figure 3, these are not positively associated with her main personal construct and can be labelled in association with principal component 2. These elements (people) are closer (more correlated) with this lesser variance significance (vertical line in Figure 3).

Principal Component 2 (19% of total variance):-

Personal Construct (Label) 'Interdependence Insufficiency - healthcare professional intervention.'

The straight vertical line in Figure 3 represents the principal component identified by the analysis procedure, which accounts for 19% of the variance. This shows that this is not as strong as her main construct of diabetes interdependence with her husband, but has some significance for her interdependent (or insufficient interdependent) relationship with the healthcare professionals she comes in contact with associates with her diabetes. By observing Figure 3 it can be seen that all of the constructs are directed away from principal component 1, showing the negative correlations the constructs have to the elements situated to the left of the vertical, principal component 2 line. These are the healthcare professionals involved in Dorothy's care, but in her grid analysis have negative interdependent correlations. The closest constructs to the vertical line, whilst still negatively correlated, are 'future thinking' and 'diabetes care'. This is supported by examining Dorothy's ratings in the grid and her comments, taken from the field note transcripts. This analysis suggest that whilst Dorothy has a main personal construct of independence and interdependence with her husband she does consider that there may be some benefit to healthcare professional intervention in her diabetes management, and how they may help her to avoid complications in the future.

This first extract of the field notes demonstrates and supports Dorothy's generally negative view of healthcare professionals in her diabetes care.

Table11: Extracts with additional field notes: these support the personal constructs of healthcare professional negative interdependence in Dorothy's case.

Construct	Element	Transcript quotes
Diabetes self-management	Diabetes Specialist Nurse (DSN) Rating = 0	*"I manage alright by myself, although I know I could improve. I don't think the doctor or the nurses can help me with looking after the diabetes myself- its down to me isn't it?"*
Altering behaviour	GP Rating = 0	*"At my age I am not going to change the way I think- I do worry about the diabetes though. I don't think the doctor is going to change my ways- he may tell me to do different things but I think I am doing alright now."*
Future thinking	GP/ DSN Rating = 0	*"I worry about if I will get high blood pressure and what that will do to me. But I don't get told about that at the doctors, just that they check it and tell me if it's high. "*

Further support for the label of this personal construct for Dorothy and which suggest that she does perceive some possible benefit from healthcare professional intervention is by her ratings and explanations for 'diabetes care'.

Table 12: Extract with included field notes, explaining why Dorothy may well perceive the need for a greater interdependent relationship with healthcare professionals, in this case her GP and the diabetes specialist nurse:

Construct	Element	Transcript quote
Diabetes care	GP Rating = 8 DSN Rating = 6	*"I don't miss appointments ever. They do check everything but they don't tell you much when you are there. I think it would help me if they explained things more, why they are changing something or what will happen if I don't do it."*

This appears to match the goals of self-management of a long-term condition as the most effective way of living with diabetes to maximise health outcomes. It may be that there is a distinct deficiency of service provided, supported by some of Dorothy's comments explaining her grid ratings; “I’m mainly self-taught about diabetes”, “manage myself totally.”

After exploring some of the ratings with Dorothy, the reasons behind them and performance of an initial manual visual analysis, the researcher and Dorothy agreed to a further interview to attempt the laddering process using open, unstructured grids.

Focused DDGT

In the next interview Dorothy completed 2 focused or laddered dependency grids. At the start, discussion ensued about the previous interview and Dorothy was shown her completed DDGT. The researcher gave her a broad outline of the analysis without identifying the labelled personal constructs which had derived from PCA. Dorothy was asked if she herself could identify 2 constructs and the most important elements related to those issues from the grid, based on looking at her original ratings. It was suggested that she could complete a grid focusing on those. Dorothy identified that "worry or anxiety" was a serious issue for her and that "making alterations to her life" had also had an impact. She then chose 4 elements (people) whom she considered most related to those two constructs. She then rated these accordingly:

Table 13: Completed ratings for focused grid 1: case study 1 with included transcript quotes taken from the field notes:

Construct	**Element**	**Transcript quote**
Anxiety	Husband Rating = 4	*"I worry more about my husband than myself when it comes to what he would do if I collapsed or something. I worry that if I get complications which means I can't do things as well, like cooking or driving, he will not be able to cope."*
	Self Rating = 3	
	GP Rating = 5	*"He (GP) told me I had diabetes and at that time he told me all about the possible complications - well that scared me and made me worry."*
	Son Rating = 0	
Making alterations	Husband Rating = 5	*"Whatever I do I talk about it with my husband, we make the decisions together, he's very concerned about the diabetes and wants to help".*
	Self Rating = 3	
	GP Rating = 3	*"I think the GP is good at looking after the basics but for me to change I think it needs more of an expert, like the consultant I saw for insulin, she told me why this was happening and was good at talking to me."*
	Son Rating = 0	

When asked to explain her ratings in this grid, Dorothy stated that her husband had more of an impact than herself on her state of anxiety as she worried what he would do if she became ill or worse, if she died and was left to manage for himself. The researcher queried with Dorothy why she had rated her GP as highest in the impact on constructs and she stated that he was the person who told her the diagnosis and the 'dire' consequences of having the condition if she did not alter her lifestyle. She also stated that she was then frightened of what he might tell her. Her husband had been the greatest help in making such lifestyle alterations, more so than herself, she perceived. Her son whilst concerned, had no impact on these constructs and this did not cause Dorothy anxiety.

Dorothy was encouraged to explain why she perceived the GP had this impact when in the first grid the GP had been rated as having fairly negative correlations to her life with diabetes and care. Dorothy explained that she perceived the GP had no impact after diagnosis on her care, only when he referred her to the hospital to see the consultant due to changing from oral hypoglycaemic agents (OHA) to insulin therapy, which also initiated a visit by the diabetes specialist nurse.

The nature of alterations required to live with diabetes were discussed and Dorothy revealed that she viewed the emotional changes, and the changes to the way she had to think, as having the greatest impact in terms of her life. She also viewed the consultant intervention, as having a larger impact than the GP, because she was an expert and had more knowledge.

It was then discussed and agreed that exploration could be made with another focused grid with the elements self, husband and consultant with the constructs adaptation to diabetes and emotions (anxiety). The 0 rated son was omitted from this grid as irrelevant.

On observation, the ratings in the second focused grid are identical to the first focused grid except that the son is omitted as a biasing element. This provides validation for the findings and reliability to some extent for Dorothy's results, as they are consistent with her identified personal constructs and her interdependence in living with diabetes. There was therefore no need for corresponding explanations from Dorothy as this second focused grid was confirmatory of the first 2 PCA's.

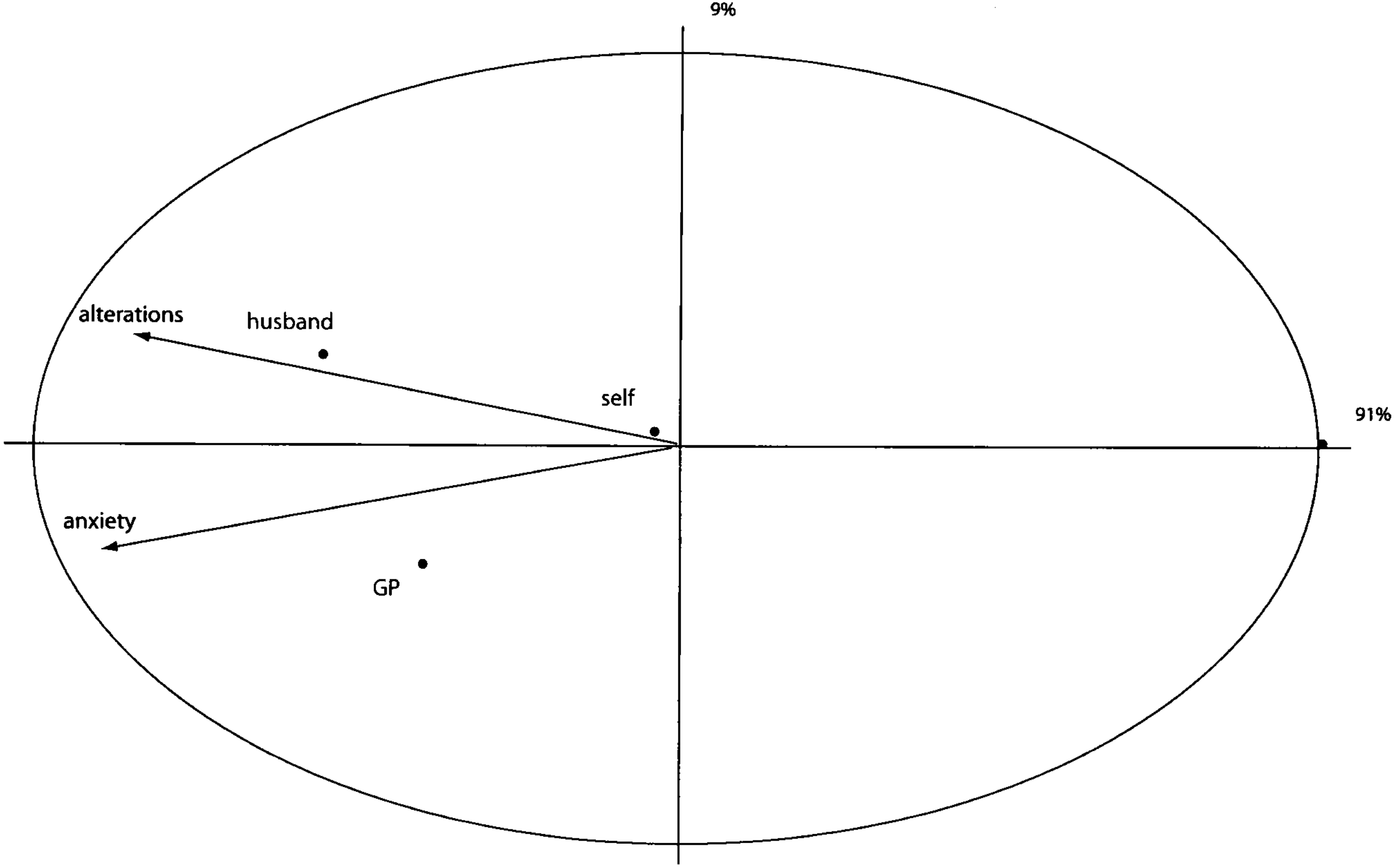
Table 14: Completed ratings for focused grid 2: case study 2

Construct	**Element**		
	husband	self	consultant
Anxiety	4	3	5
Adaptation	5	3	3

INGRID analysis: Case study 1: Focused grid 2

Figure 4 illustrates that for Dorothy, the main personal construct of interdependence for living with diabetes is with her husband and independence to some aspects. Anxiety and making alterations are key constructs that she wanted to discuss and rate. It appears from the analysis of the first full DDGT, and subsequent focused grids, that she does not want her husband or herself to worry about the future. In addition, by making alterations in her therapy, helped by healthcare professionals, she may benefit from their intervention to a limited extent.

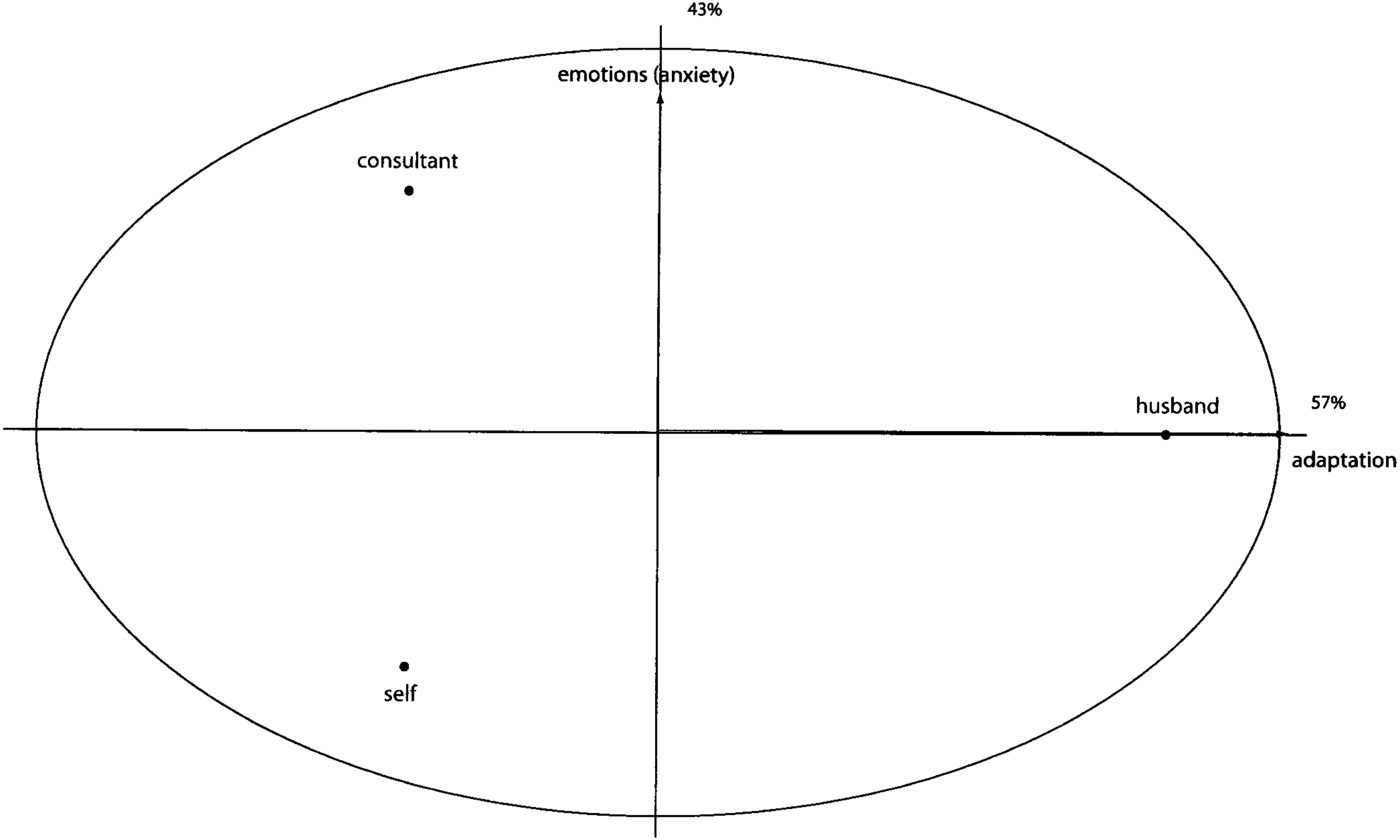
and principal components 1 & 2 axes,for case study 1,completed 1st focused grid.



In focused grid 1 there is only one principal component of note which accounts for 91% of the variance. The two constructs of "making alterations" and "anxiety" are virtually equidistant and have the same angles related to Dorothy as herself at the main correlation. Her GP negatively correlates with anxiety, and her husband more positively correlates with making alterations.

In the second focused grid there are two absolute principal components that account for 57 and 43% of the variance.

Figure 5: INGRID Bi-plot illustrating the correlation of the constructs to elements and principal components 1 & 2 axes, for case study 1, 2nd focused grid.



In Figure 5, it can be seen that in Dorothy's interdependent relationships, her 'husband' is correlated to help with 'making alterations' and this was supported by her earlier quoted comments. There is still some doubt in Dorothy's perception as to whether the 'consultant' will help or increase with 'feelings of anxiety', demonstrated in the diagram by the closeness of the consultant element to the anxiety construct.

Discussion of analysis: Case Study 1

The aim of this study was to investigate personal constructs in adults with type 2 diabetes. The findings of case study one demonstrate that by using a modified situational grid analysis it is has been possible to identify, explore and examine the relationships between constructs. Furthermore it has provided in-depth, previously unexplored, data on the nature of personal constructs, interdependence and meanings of living with this condition. This first case study illustrates the complexity of living with a chronic condition, which is increasingly recognised in the literature (Department of Health 2005). Pertinent to this statement is the presentation of analysis within case study one, which demonstrates the interdependent relationship Dorothy has with her family and the healthcare professionals involved in her diabetes care. This discussion of the findings is in relation to case study one and is presented with support from the literature, advantages of the method and limitations.

This case study has revealed the complex nature of living with diabetes which has resonance with Tilden, Charmaz, Sharples & Fosbury (2005) who argue that intricate associations and complexities of relationships within a chronic condition are best explored by the case study method. They presented a case study of an adolescent with type 1 diabetes who had difficulties with adherence to treatment and, by analysing interview data from a series of sessions, determined that identity perception by others can have a detrimental effect on condition management and outcomes. Both Yin (2003) and Tilden et al. (2005) demonstrate and support the use of various methods of data collection within a case study to achieve in-depth exploration. Particularly relevant to case study one's findings is the argument that the method is the most suitable when it is difficult to separate phenomena from context (Yin 2003).

In Dorothy's findings there is a clear relevance to self-efficacy theory and strength of perceptions of 'self' having the greatest impact on coping and living with a chronic condition. The centrality of self in coping with conditions was first explored and identified by Mead (1934) but has received relatively little attention in diabetes.

However, related work was performed by Strauss and Glaser (1975) in a range of chronic conditions. Research in diabetes has demonstrated that people reject being identified by their condition (Kelleher 1988, Charmaz 1991), which has been recently supported by Tilden et al.'s (2005) case study. Another, earlier case study PhD thesis in adult type 1 diabetes mellitus, presented by Oram (1992) also explored the central nature of self as a pivotal identification of coping mechanisms in chronic conditions. Charmaz (1987) further examined this phenomena and concluded that, as the condition took over life perceptions, then the sense of self as a healthy person diminished.

Dorothy's case study is particularly relevant to today's focus on people's health beliefs and how they affect management; the self-regulation theory (Leventhal et al. 1981). Dorothy viewed herself as being independent in managing her condition, however, deeper analysis reveals more association of this self-management ability as an interdependence with her husband. Dorothy's findings have some relevance to Cohen et al's. (1994) study as she has a different interpretation of her life with diabetes than that of the healthcare professionals involved in her care.

Dorothy's results highlight this important interdependent close relationship having an impact on the condition experience. Handron & Leggett (1994) identified in their retrospective analysis of participants' counselling sessions in 6 people with type 2 diabetes, that there was a co-dependency on a significant other in coping with the demands of the condition.

On visual examination of Dorothy's grid ratings it is convenient to assume that it is a presentation of 'normal' adjustment, coping and perception of living with a chronic condition. Indeed the literature would tend to support this interpretation and Dorothy herself supports this. If in the context of healthcare the aim is for self–management of long-term conditions and achievement of expert patients, it is argued that deeper understandings of individual coping mechanisms, psychological outcomes and perceptions are required. Utilising the combined method approach in the dependency grid analysis technique provides a method of identifying such deeper issues, by presenting a person's personal constructs and the connectivity between them. This then provides a picture of meaning which is illuminating to associated people involved, but also to the person themselves. This is apparent in Dorothy's case study presentation and the process of working through the first DDGT and subsequent focused grids.

Case Study 2 (DRG006/ A011)

This second case study is a presentation of a 59 year old white male who has had type 2 diabetes diagnosed for 10 years and for the purposes of the presentation is given the pseudonym 'Brian'. At the time of the interviews Brian was only under primary care for his condition management and regularly attended his general practice where he was seen by the GP, practice nurse and podiatrist.

He controlled his condition by taking Metformin and Glicazide daily which he 'self-adjusted' according to his blood glucose readings which he monitored himself; exercise (walking and cycling) and dietary restrictions. At the time of the second interview he suffered form peripheral neuropathy in both his feet, had a BMI of 28 (overweight), BP 120/71, HbA_{1c} 5.6% and considered himself in good health and in "control" of his condition.

Brian had taken voluntary redundancy from a career in engineering partly due to restructuring and 'fatigue' at the age of 56. He was now involved in voluntary work mainly with a patient self-help group and other patient representative groups. He lived with his second wife; they had been married for two years.

The first exploratory interview was followed 9 months later with a DDGT interview during which 2 further focused grids were completed. The second interview to complete the DDGT began with an explanation of the technique and the rating system. The first two steps were completed, exploring the appropriate constructs and elements to Brian's life with diabetes. As Brian stated that he felt he was in good health and did not have any problems we agreed to discard the construct labelled 'other health problems'. The elements (people) Brian identified as important were himself, his wife, mother, GP, practice nurse, podiatrist and the 'self-help group' he helped to run. Brian was particularly keen to include the group as an element despite being made up of a group of people as opposed to a single element person. The reason he explained would be apparent when he applied his ratings in the grid.

Table 15: Brian's completed DDGT grid, showing the ratings for each construct against the elements.

Construct	**Element**						
	wife	mother	self	GP	practice nurse	podiatrist	self help group
Diabetes self-management	8	3	9	6	5	5	7
Diabetes care	9	0	10	6	6	5	4
Diabetes complications	3	0	9	2	1	8	1
Diabetes management support	5	0	7	0	0	0	2
Social activity	9	5	10	0	0	0	8
Meaningful work	8	0	10	0	0	0	9
Exercise	8	0	10	0	0	0	2
Diet	10	2	10	1	2	0	6
Emotional support	9	0	7	7	6	4	7
Altering behaviour	8	0	6	2	2	0	5
Changing lifestyle	5	0	9	3	3	3	7
Future thinking	7	3	7	5	5	5	7
Education	2	0	10	8	5	7	9

After the rating was completed the researcher encouraged Brian to explore some of the scores, particularly focusing on the extremities. Brian had rated himself as 9 and his wife as 8 for diabetes self-management, and he stated he was confident in managing his condition himself. He said he had been married for 2 years and "knows more" than his wife about diabetes but she was closely involved and interested in taking part and helping him with his condition. However, he only rated his wife as 2 compared to himself as 10 for diabetes education, stating "my wife is interested but she has not got the knowledge". None of the healthcare professionals were rated highly in Brian's grid, other than the podiatrist who he saw regularly for his neuropathy problem.

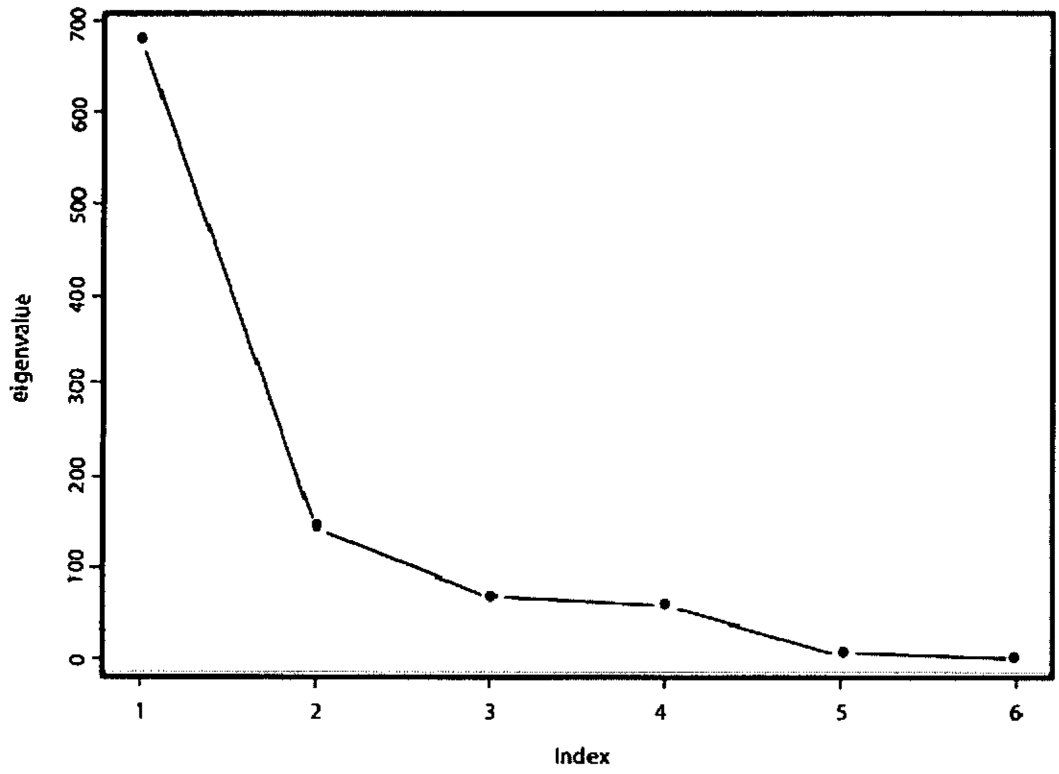
INGRID analysis: Case study 2: DDGT

PCA revealed two main components accounting for 71% and 15% of the total variance, giving a total of 86% which reliably indicates that there are two main personal constructs within Brian's living with and managing his condition.

Table 16: INGRID computed variance values (PCA) for DDGT: case study 2

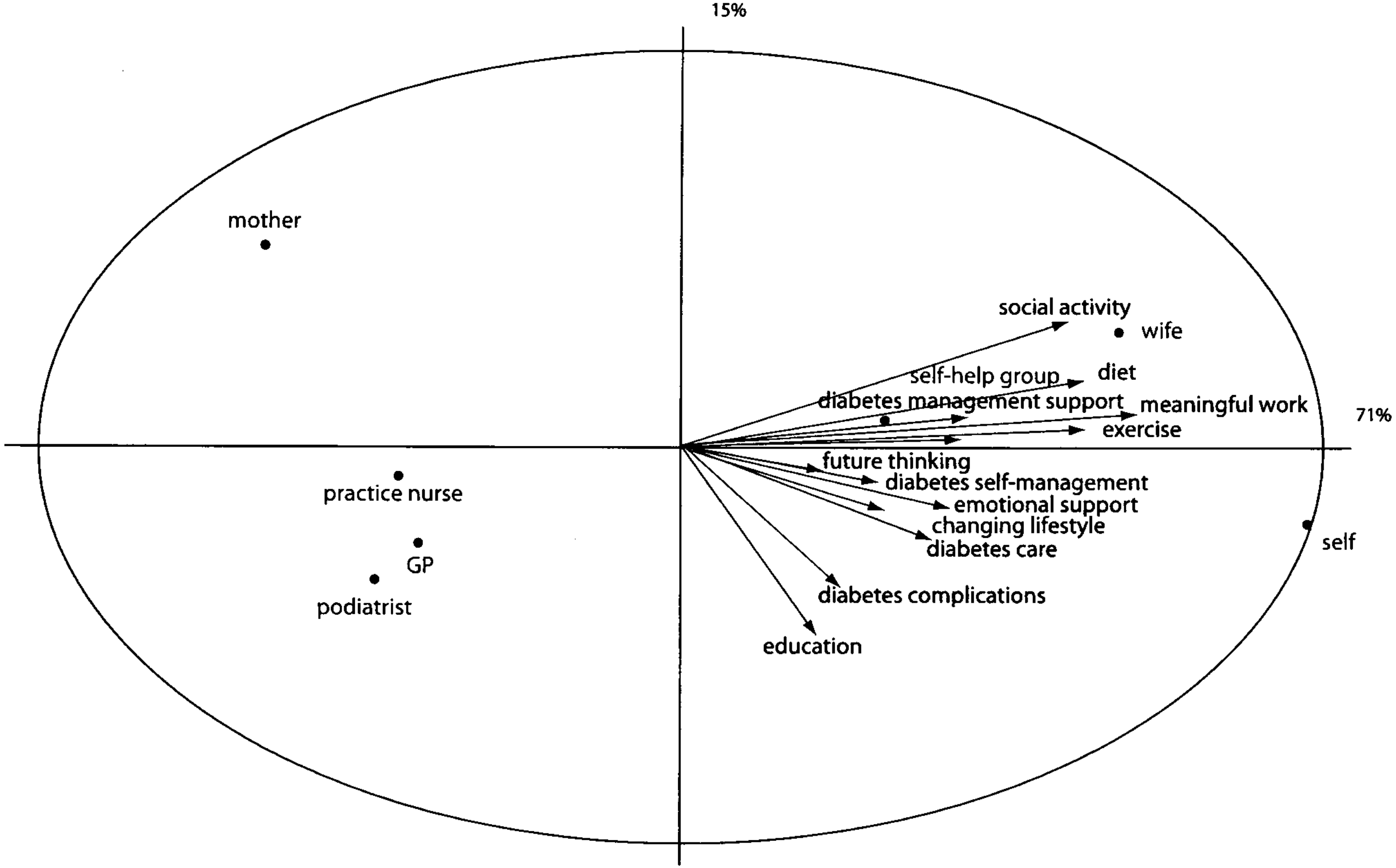
Principal Component	Eigenvalue	Percentage	Cumulative percentage
PC1	678.45	70.67	70.67
PC2	146.73	15.28	85.96
PC3	67.21	7	92.96
PC4	59.16	6.16	99.12
PC5	6.8	0.71	99.83
PC6	1.65	0.17	100

Graph 2: Scree plot of the above Eigenvalues for successive components (only the first 2 have % variance above 10%)



In figure 6 the main principal component is plotted as the horizontal line and accounts for 71% of the variance. Against this and the vertical, second, lesser variance principal component 2 line, are plotted the diabetes-related constructs in the form of arrows and within the oval line are the elements (people) plotted as red dots. This allows observation easily of how strongly the constructs are correlated against each other- in Brian's case theses are very closely grouped together, suggesting that most of the constructs are correlated with each other. In the diagram, 3 elements are positively correlated with Brian's personal constructs; himself, his wife and the self-help group he attends regularly. Negatively associated are the healthcare professionals in Brian's care - these are situated in the bottom left hand quadrant.

to elements and principal components 1 & 2 axes, for case study 2, completed DDGT



Principal Component 1 (71% of total variance)
Personal Construct (Label): Diabetes Independence – family interdependence.

The analysis of the ratings Brian has given to the elements and constructs in the grid is illustrated in Figure 6. In Brian's analysis the direction of the construct arrows shows that Brian has an independent self-management of his diabetes but does have some interdependence with his wife and self-help group. The self-help group however is closer to principal component 2 and therefore will be discussed in relation to this. There clearly is little, or no, correlation of his personal constructs to the healthcare professionals involved in his care. Also in the analysis it can be seen that Brian rates himself highest and the constructs are correlated to 'myself,' which would suggest a high level of perceived self-efficacy.

The above analysis is supported by the following transcript quotes, taken as field notes when the investigator asked Brian to explain his ratings.

Table 17: Extracts with transcript quotes taken from field notes recorded during the DDGT interview.

Construct	**Element**	**Transcript quote**
Diabetes self - management	Self Rating = 9 Wife Rating = 8	*"I can manage the diabetes fine by myself. I know what I am doing and can do all the things needed, you know, adjust my tablets, take the blood sugar readings, my own blood pressure."* *"I know more than my wife about It - she's learning and wants to get involved more I think."*
Diabetes complications	Self Rating = 9	*"I know I may be developing a problem with neuropathy in the fee t- I am having checks with the podiatrist. This is down to me - I need to get the control better and my weight down so that doesn't happen."*

Brian perceives that his dietary management and exercise are important for his diabetes management and rates these constructs highly for himself as having the greatest impact. He also rates his wife quite highly and these key constructs appear closely related to his relationship with his wife. Brian stated that his wife is actively involved in preparing the 'right' foods and encouraging him to partake in regular exercise. An interesting revelation made by Brian was in relation to his dietary management and exercise. The dietary management construct was extremity rated as 10 for both himself and his wife. Exercise was rated as 10 for himself and 8 for his wife. When I asked about these constructs he related a behaviour which he himself identified as problematic. He related this behaviour to his ongoing problem with weight control and had good knowledge that being overweight affected his diabetes management. Brian stated that he took regular exercise cycling with a friend, however, during the journey he would stop and eat 'unhealthy' foods at a café that they cycled to, typically eating a fried breakfast or cream cakes. He stated that he did not reveal this to his wife who cooked meals according to his diabetes dietary advice and knowledge. Brian stated that because of this he always felt guilty about going for a cycle, as his wife's perception was it was doing him some good, but his secret eating habits were, he perceived, 'unhealthy'. He knew that he was classed as overweight and wanted to lose weight – his wife was actively helping him by preparing appropriate foods but 'she is puzzled' as to why it is not working. Brian viewed his weight as a problem but stated he got too much pleasure from cycling and eating out with his friend to consider giving it up, at this point he referred to his behaviour as 'binge eating.' He also stated he felt guilty about this behaviour. The researcher suggested that Brian could examine this aspect of guilt and exercise/diet within the completion of a focused grid. By viewing Figure 6 it is apparent that this is a main issue for Brian as the dietary construct arrow is closely directed and angled towards his wife. This is supported by the following transcript quotes.

Table 18: Extracts with field notes to support the family interdependence aspect of Brian's main personal construct.

Construct	**Element**	**Transcript quote**
Dietary management	Wife Rating = 10 Self Rating = 10	*"I know shouldn't do it but I do occasionally what I call binge eat. I go out cycling with a friend and we stop off for things like full cooked breakfasts, cream cakes. At home my wife is really good with cooking the right things for me and the diabetes. But I haven't told her about the binge eating."* *"I do rely on her (wife) to cook healthy food and I think she feels she is doing something to help with the diabetes ... it's something she can do."*
Exercise	Self Rating =10	*"I do like to go cycling and I also go fell walking now and again. I do feel guilty when I go cycling because of the chance to eat more unhealthy stuff".*

Brian believes himself very knowledgeable about his condition and considers others less knowledgeable, including the healthcare professionals that are peripherally involved in his care. Through his binge eating behaviour Brian is testing, and finding lacking, his trust and confidence in himself as being independent and positively motivated in his diabetes management. The secret eating could also be an aspect of denial or defiance against a strict regime, largely imposed by himself. The aspect of Brian having little confidence in the healthcare team can be viewed in Figure 6 by the healthcare professional elements being plotted away from the constructs. It also is supported by the explanations Brian gave.

Table 19: Extracts with transcript quotes to support low ratings for healthcare professional intervention.

Construct	Element	Transcript quote
Diabetes management support	Self Rating = 7 GP/practice nurse Rating = 0	*"I don't bother the GP or the nurse with much about my diabetes. I sort it out for myself- I change the amount of my glibencamide as I need to, you know if my blood sugars have been up."*
Altering behaviour	Self Rating = 6 GP/practice nurse Rating = 2	*"Like I said its down to me to change things. I know I've got to do something about my weight and I will if I can stop binge eating. I know I'll never tell the GP or practice nurse- I mean they're not going to help with that are they?"*

Principal Component 2 (15% of variance)
Personal Construct (Label): Peer support interdependence

In Figure 6, the wide-angled spaces between the construct arrows are directed towards the principal component 2 vertical line. This suggests that this is not a central construct for Brian's life with diabetes, and therefore accounts for only 15% of the variance; reflective of the lower grid ratings Brian made in the DDGT.

The aspect of peer group support and the negative placement of the healthcare professional elements within the INGRID analysis bi-plot suggest that Brian has a construct associated more strongly with a shared interdependence with his support group and himself for his diabetes management, than with the healthcare professionals.

This analysis is supported by the following transcript quotes, which were given in explanation of his ratings of the support group.

Table 20: Extracts with transcript notes.

Construct	Element	Transcript quote
Education	Self-help group Rating = 9	*"I really enjoy going to the support group meetings. I've learnt a lot from them and I feel I can now help others when I go. You do learn a lot by listening to other people who have got diabetes and from the speakers who are experts."*
Meaningful work	Self-help group Rating = 9	*"I want to do something interesting and useful- doing voluntary work with the self-help group is really good for me, gives me a focus and like I said I feel I am helping people with diabetes."*

Focused DDGT

Brian decided he wanted to explore and discuss the constructs of dietary management and weight associated with his secret 'binge' eating. The following is Brian's ratings for the first completed focus grid using the self-labelled constructs of secret binge eating, self-management and weight against the elements; wife, self, self help group.

Table 21: Completed ratings for focused grid 1: case study 2

Construct	Element		
	wife	self	self-help group
Secret eating	4	9	0
Self-management	3	9	6
Weight	7	9	2

The ratings pertain to the perceived impact of these elements on the constructs. For secret binge eating Brian rated himself as 9, his wife considerably less at 4, and the self-help group as no impact at 0. Brian gave the following explanations for these ratings.

Table 22: Extract with transcript quote from the first focused grid.

Construct	**Element**	**Transcript quote**
Secret eating	Self Rating = 9 Wife Rating = 4	*"I've never told anyone before about this- the only person who knows is my friend whom I go cycling with- I feel very guilty about it but I can't tell my wife-she would be upset as she tries really hard with cooking the right things for me."*
Weight	Self Rating = 9 Wife Rating = 7	*"I'm my own worse enemy I know-it's up to me to sort it but I don't know how to stop eating-full cooked breakfasts and cream cakes are the things I go for when I am out cycling."*

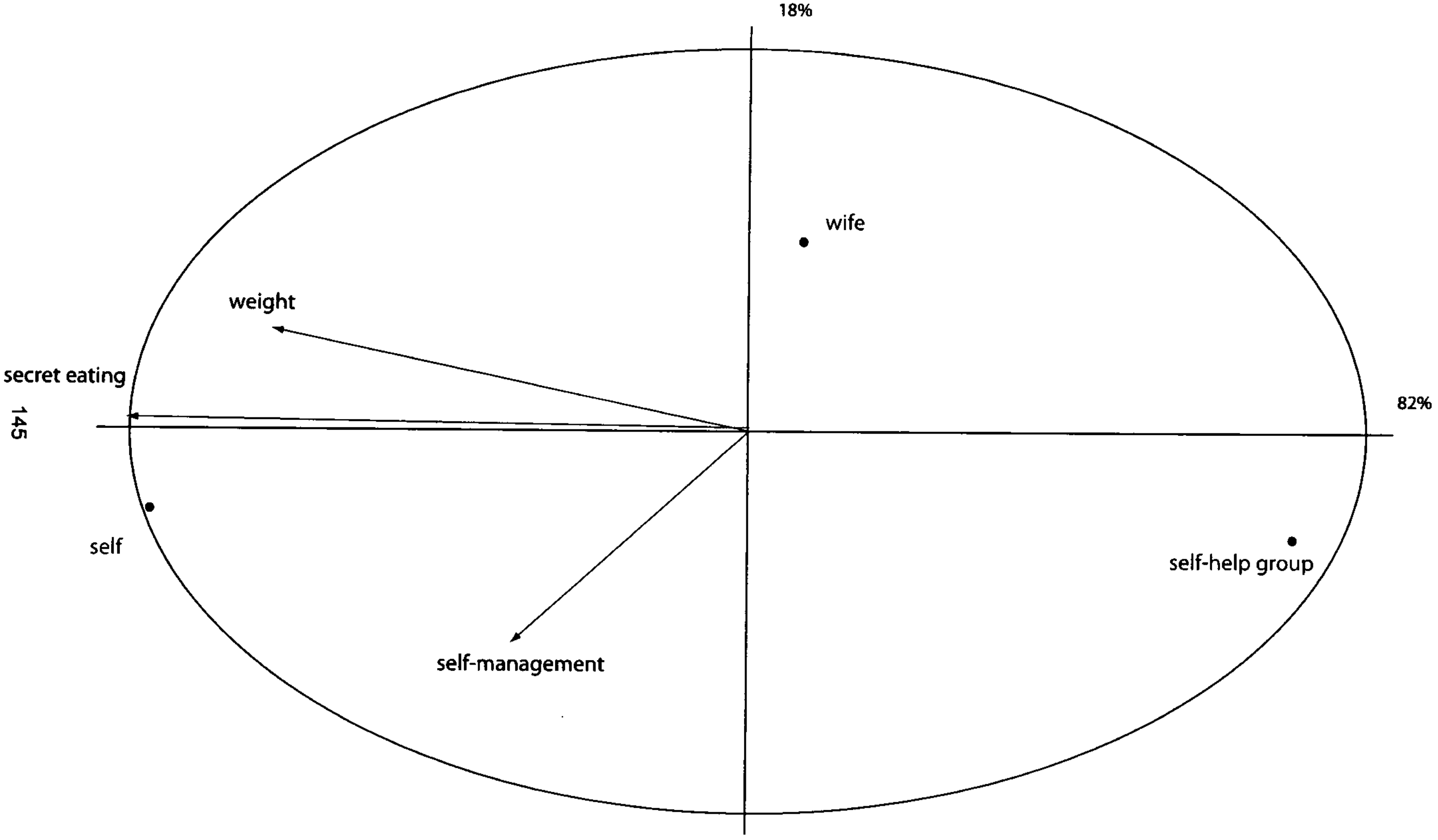
INGRID analysis, focused grid 1

Principal component analysis of the first focused grid revealed 2 main components, of 82% for principal component 1 and 18% for principal component 2. The following is the table of eigenvalues.

Table 23: INGRID computed variance (PCA) values for focused grid 1: case study 2

Principal component	Eigenvalue	Percentage	Cumulative Percentage
PC1	69.84	82.49	82.49
PC2	14.82	17.51	100

to elements and principal components 1 & 2 axes, for case study 2, 1st focused grid.



This analysis reveals that the construct arrows are directed towards Brian as himself, secret eating, weight and self-management. The secret eating and weight constructs are closely angled to the main horizontal principal component line, which suggest that this is a personal construct for Brian without association to his relationship with his wife. This is in contrast to the earlier findings of the DDGT, where Brian related his guilty feelings concerning his wife. This would support the analysis and naming of the principal components from DDGT that the personal constructs for Brian are centred on himself as 'diabetes independence'. This also supports that Brian has a high perception of his ability to self-manage his condition, his self-efficacy, but also feels guilty when he does not achieve personal goals of self-management.

Focused Grid 2: case study 2

After completion of focused grid 1 Brian requested to explore the revealed constructs of guilt and adverse behaviour in relation to his diabetes management and interestingly at this point Brian said that he would like to explore and discuss how he could use the grid to change his behaviour and find solutions to his dilemma. He decided to rate the issue of guilt and changing behaviour with his wife, self and 'professional help' as the elements.

Table 24: Completed ratings for focused grid 2: case study 2

Construct	**Element**		
	wife	self	professional help
guilt	6	8	1
changing behaviour	1	5	8

The ratings again support the DDGT interpretation that the personal constructs for Brian are centred and correlated to him and he perceives himself as an independent in his diabetes management. There is some interdependence with his wife. These focused grid analyses are confirmatory of the first DDGT analysis and also, as Brian wanted to rate professional help, reveal that he does see the benefit of having healthcare professional intervention in his case.

In discussing the ratings Brian stated with regard to his construct of guilt:

"I need to sort out why I'm feeling guilty but also change my eating habits - I see that now".

In relation to the construct of changing behaviour Brian stated:

"I suppose that a psychologist might help me change - maybe I just need to go cycling with my wife, .. but it makes me think.

INGRID analysis: focused grid 2

PCA revealed two components of 82 (PC1) and 18% (PC2). The following is the resulting Bi-Plot.

to elements and principal components 1 & 2 axes, for case study 2, 2nd focused grid.

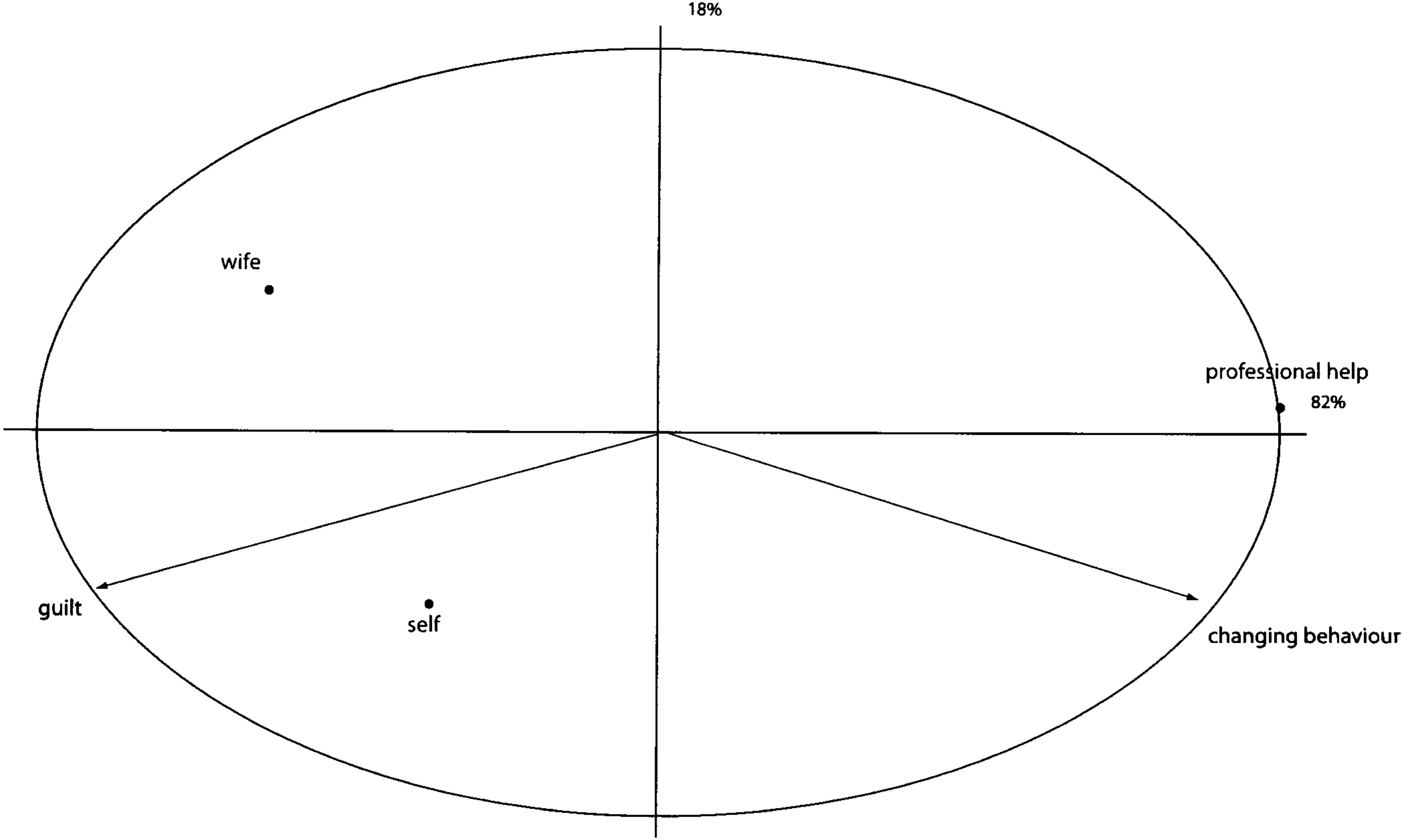


Figure 8 supports the focused grid analysis that Brian perceives professional help may help him to change his eating behaviours and alleviate the feelings of guilt he has with his wife. This would suggest a shift of his interdependence, being less independent with his management of his diabetes.

Discussion of analysis: case study 2

During the interview and grid processes it was clear that Brian began to recognise his constructs for himself and where they had led him in terms of his behaviour and management of his condition. He described the research method as a very revealing process which he enjoyed and which made him think.

In relation to the validity of the findings in case study 2, there are some associated, supportive findings in the diabetes literature particularly in relation to self-efficacy (Leventhal. et al 1980, Hampson et al. 1995, Hampson 1997). There is supportive literature that has determined non-concordance levels to treatment and dietary regimes imposed by medically focused intervention, which has support for Brian's findings in relation to his (self-perceived) eating behaviour (Vermeire et al. 2002).

Although Brian described his eating habit whilst exercising as 'binge eating', there appears to be no association with the clinical definition of that term in relation to the reports of problems in predominantly young people with diabetes and eating disorders (Marchesini et al. 2003).

In Brian's case, there was a low interdependent correlation with the healthcare practitioners involved in his care. This aspect is supportive of findings in studies that have examined the patient provider relationship and how patients have differing views of diabetes mellitus than that of their healthcare professionals (Cohen et al. 1994, Murphy & Kinmonth 1995).

In this case study's findings, Brian realised that behaviour change may be initiated by healthcare professional intervention which requires Brian to move his interdependence relationship and his perception of the benefits of working with diabetes services.

Case Study 3 – (DRG001/ A020)

This case study is a presentation of a 60 year old white female with type 2 diabetes, who for the purposes of confidentiality and anonymity has been given the pseudonym 'Hazel'.

Hazel has had type 2 diabetes for 12 years at the time of the DDGT interview. She is currently treated with dietary restrictions and recommended exercise which she stated consisted of a cardiac rehabilitation exercise programme at a local leisure centre. Her patient held records showed an HbA_{1c} of 5.5% at her last test performed one month prior to the DDGT interview. Her BMI was calculated at 37, which indicated the obese level and associated health risks. She stated that she was also currently being treated for hypothyroidism, ischaemic heart disease and hypertension, having suffered 4 years previously from a stroke (current BP 120/70). She stated she had never smoked cigarettes.

Hazel stated she was retired from a clerical assistant job and cared for her two grandchildren occasionally when her son and daughter–in-law needed help. She was widowed 6 years previously, having been married for 34 years.

The first DDGT interview was completed in one hour, followed by a second interview completed in 45 minutes, 4 weeks after the first. The previous exploratory phase interview had taken place 9 months earlier. One full DDGT was completed followed by one focused grid at the second interview.

Following discussion, Hazel included all 14 construct labels as having an impact in her condition and chose the elements (people) to rate: son, self, consultant diabetologist, GP, practice nurse. Although Hazel was predominantly under her GP for diabetes care she still attended the local hospital diabetes centre once a year to see a consultant specialist. She had previously attended more frequently during acute phases of complications, and following hospital admissions of which she had numerous occasions. After explanation of the procedure, Hazel completed the ratings, displayed in the following grid:

Table 25: Completed ratings for the DDGT: case study 3

Construct	**Element**				
	son	self	consultant	GP	nurse
Diabetes self-management	0	10	9	0	0
Diabetes care	0	0	10	0	2
Diabetes complications	0	10	10	0	0
Other health problems	0	0	10	0	0
Diabetes management support	0	0	10	0	3
Social activity	0	10	0	0	0
Meaningful work	0	6	0	0	0
Exercise	0	7	2	0	0
Dietary management	0	10	10	0	0
Emotional support	0	10	9	4	2
Altering behaviour	0	3	10	3	1
Changing lifestyle	0	3	10	2	2
Future thinking	0	10	10	3	2
Education	0	8	2	2	3

Once the rating was completed Hazel was encouraged to discuss the scores, particularly focusing on the extremities. Of interest was Hazel's rating of her son - 0 for all the constructs. When asked why she had rated him as 0 across the grid she stated that he had no understanding or sympathy towards her condition and that they did not have a close relationship, despite living near each other. Hazel also on occasions cared for his children, although she stated he did not work, only his wife.

The two highly rated people in Hazel's condition life were herself and the consultant diabetologist. This was surprising given that she only attended the consultant clinic on an annual basis. Hazel rated herself highly for diabetes self-management and the consultant, stating in explanation that she looked after herself at home totally, she had no-one to help her since her husband died, however the person who had most helped her to self–manage was the consultant- *"he's the expert, the most knowledgeable - I trust him and follow what he says."*

This is supported by Hazel's rating of herself as 0 concerning diabetes care, indicating that the consultant was the one responsible for her care. The GP Hazel rated as 0, having no perceived impact and also for the practice nurse; "well she takes my blood, that's all really..."

The pattern of ratings continued to be similar for all the constructs, however of interest was the rating for 'emotional support, 'altering behaviour', 'changing lifestyle' and 'education'. The scores for her are clear, in that Hazel relies very much on herself and does not have a close emotional support network from family or friends. She also rated the consultant as 9 for emotional support and when asked to explain this she stated that he always listened to her, told her not to worry and was 'reassuring'. (Field note observation: Hazel during this interview displayed anxiety traits; talking at speed, repeating herself, wringing her hands and fidgeting, although this could be related to nervousness at having to complete a reflective process).

For the construct 'altering behaviour' Hazel rated herself as low and the consultant as high, explaining that she did "as she was told" and did not feel that she was responsible for changing her behaviour according to her condition. Similarly she explained that changes to the way she lived were as a result of the consultant's "orders". In contrast to this Hazel stated the consultant told her little about her condition and development generally, and that she tried to find out information for herself by reading books, articles and 'Balance' (Diabetes UK patient journal).

The primary care team involved in Hazel's care was consistently rated extremely low for all of the constructs. When asked about this, Hazel explained that *"they no nothing (about her condition)...well they're not experts are they? They're not trained in diabetes."*

Hazel appeared to be satisfied and happy with her condition management and life with diabetes, but she stated she wouldn't be able to cope if 'they' decided to discharge her from the consultant clinic as the GP and practice nurse did not provide the diabetes care she needed.

Although Hazel appeared anxious throughout the interview she stated that she was happy with her life, but had been in and out of hospital too many times from complications of diabetes, and now wanted to make sure she did not have any more admissions.

After completion and discussion of the grid, Hazel agreed to complete a focused grid, to explore the issues and extremity ratings which would contribute to identification of personal constructs and super-ordinates that were revealed in the first DDGT.

INGRID analysis: Case study three: DDGT.

Cluster and subsequent PCA revealed 2 main components accordingly of 70% and 28% of the variance giving a total of 98% which indicated there are two core personal constructs worth interpretation and delineation in Hazel's living with type 2 diabetes.

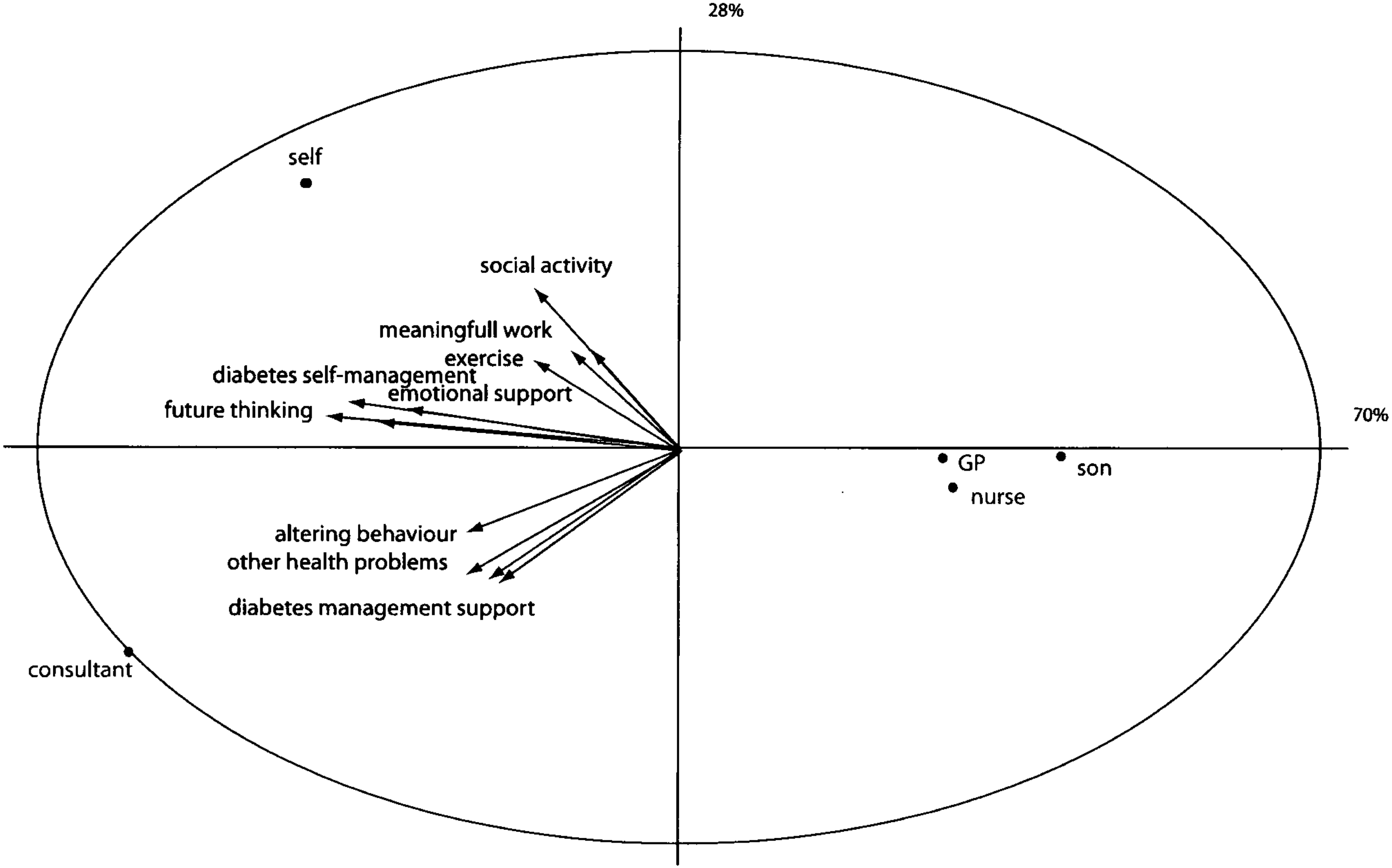
The Eigen and percentage values of all the identified principal components are listed in the following table:

Table 26: INGRID computed variance values (PCA) for DDGT: case study 3

Principal Component	Eigenvalue	Percentage	Cumulative percentage
PC1	730.23	69.87	69.87
PC2	291.18	27.86	97.72
PC3	14.39	1.38	99.1
PC4	9.4	0.9	100

The resulting bi-plot generated by the modified INGRID programme of the construct and element loadings, distances and angular distances is presented to illustrate how the two main principal components contribute to the identification of Hazel's personal constructs in relation to dependency and living with diabetes.

to elements and principal components 1 & 2 axes, for case study 3, completed DDGT



Principal Component 1 (70% Total variance)

Personal Construct (Label): 'Diabetes Singular Dependency'

In the bi-plot Hazel has one distinct closely rated grouping of constructs closest to the 70% principal component horizontal axis directed towards herself. There is also a group of constructs more angularly spaced and less close to the 70% line, vectored towards her consultant. However, both these groupings are negatively correlated in the DDGT, suggesting that all Hazel's constructs and in particular consultant loadings, have a negative dependency aspect or have a distanced association between them which may or may not have a bearing on her personal constructs.

The construct groupings in principal component 1 are vectored more towards the consultant than Hazel rating herself which suggest a clear level of dependency Hazel has towards her consultant diabetologist for the diabetes' associated constructs of; altering behaviour, other health problems, diabetes management support and changing lifestyle. This dependency relationship demonstrated by two clear groupings of constructs vectored towards consultant initiated intervention could be defined and interpreted within principal component 1 'diabetes singular dependency' as two distinct personal constructs within the component 1 core construct in Hazel's living with diabetes:

Principal Component 1: Grouping a: *A process and psychosocial interdependence* between Hazel as herself and the consultant for emotional support to self-manage her conditions and promote positive future contemplation.

Principal Component 1: Grouping b: *A process only orientated dependence* on Hazel's consultant that provides a mechanism for self-deferred actions and behaviour (changing lifestyle, altering behaviour, management support).

Although these personal constructs were delineated after the DDGT interview through formal analysis, Hazel identified that she wished to continue in a second interview to focus on some of the issues raised.

Principal Component 2 (28% variance)
Personal Construct (label): 'Self-orientated social interdependence'

Although it is difficult to delineate from principal component 1 there is clearly a variance that suggests there is another core personal construct for Hazel's perception of condition experience and impact of others or herself. Although Hazel cannot disassociate herself completely from dependency on 'powerful' others she does view herself as important in achieving a socially active and meaningful work conducted life with her condition. She also perceives that partaking in exercise is a largely independent activity for her.

Focused grid 1: case study 3

In the second interview Hazel completed one focussed grid. After examining the first full DDGT, Hazel discussed some of the issues in relation to her ratings. Hazel was particularly expressive after working through the initial findings from visual cluster analysis with the researcher. It is important to note that at this point Hazel had consistently related that she was currently happy with her diabetes and did not have many problems, although she stated she had "been through a lot."

Despite asking Hazel to identify two or three constructs and important elements to focus on in the next DDGT, Hazel identified other constructs which she perceived as underlying the personal constructs (principal components revealed in analysis).

Hazel related how she had feelings of anxiety and worried about her future health and that she did not really have anyone close to talk to about them. Related to this was Hazel's self-stated "fear of the unknown." She stated she was not sure what was going to happen to her health in the future.

Hazel perceived that an issue for her was her "lack of self respect and respect from others- "diabetes has replaced everything else" (that Hazel feels valued for and respected for). Hazel also felt that her self-coping mechanisms had been affected since her husband's death and wanted to explore this in the focused grid.

The following is Hazel's completed focused DDGT.

Table 27: Completed ratings for focused grid 1: case study 3

Construct	Element		
	son	consultant	self
Worries	0	7	8
Support	0	10	0
Fear of the unknown	0	9	9
Self-respect	6	5	7
Self-coping	0	10	0

After completion Hazel and the researcher explored the construct to element ratings. In terms of dealing with worries and the impact that a person (element) can have on Hazel's anxiety she rated herself and the consultant similarly. She rated her son as no impact, despite including him as an important element. Hazel stated in explanation of this, *"I think my son loves and cares for me but has no relationship to my health- I can't talk to him about my worries."*

On examination of all the focused grid ratings they all appear interrelated with the elements, particularly Hazel as herself and the consultant diabetologist. Of note was the rating of herself as 0 for support (diabetes and emotional) and the consultant as 10, which is in contrast with her previous full DDGT ratings in the prior interview. Hazel explained that she has no confidence in her self-management and she felt she needed to be confident to the consultant in order to appear "in control", stating "*my confidence affects the attitude of the Doctor...I want his respect and he tells me what to do...I don't question it.*"

Again Hazel rated highly the impact of herself and the consultant on her 'fear of the unknown' - what's going to happen to her health in the future stating "I don't want to feel vulnerable." This is an interesting paradoxical statement, given that according to management outcomes the course of complications in diabetes is predictable, as is the risk reduction ratio and concomitant treatment protocols to ensure that the future *is* known. The issue could be one of lack of communication of this by her consultant to Hazel. This is evidenced by the low education score Hazel gave her consultant in the first DDGT. This issue could be pivotal in Hazel's living with diabetes and the high level of dependency she has with her consultant.

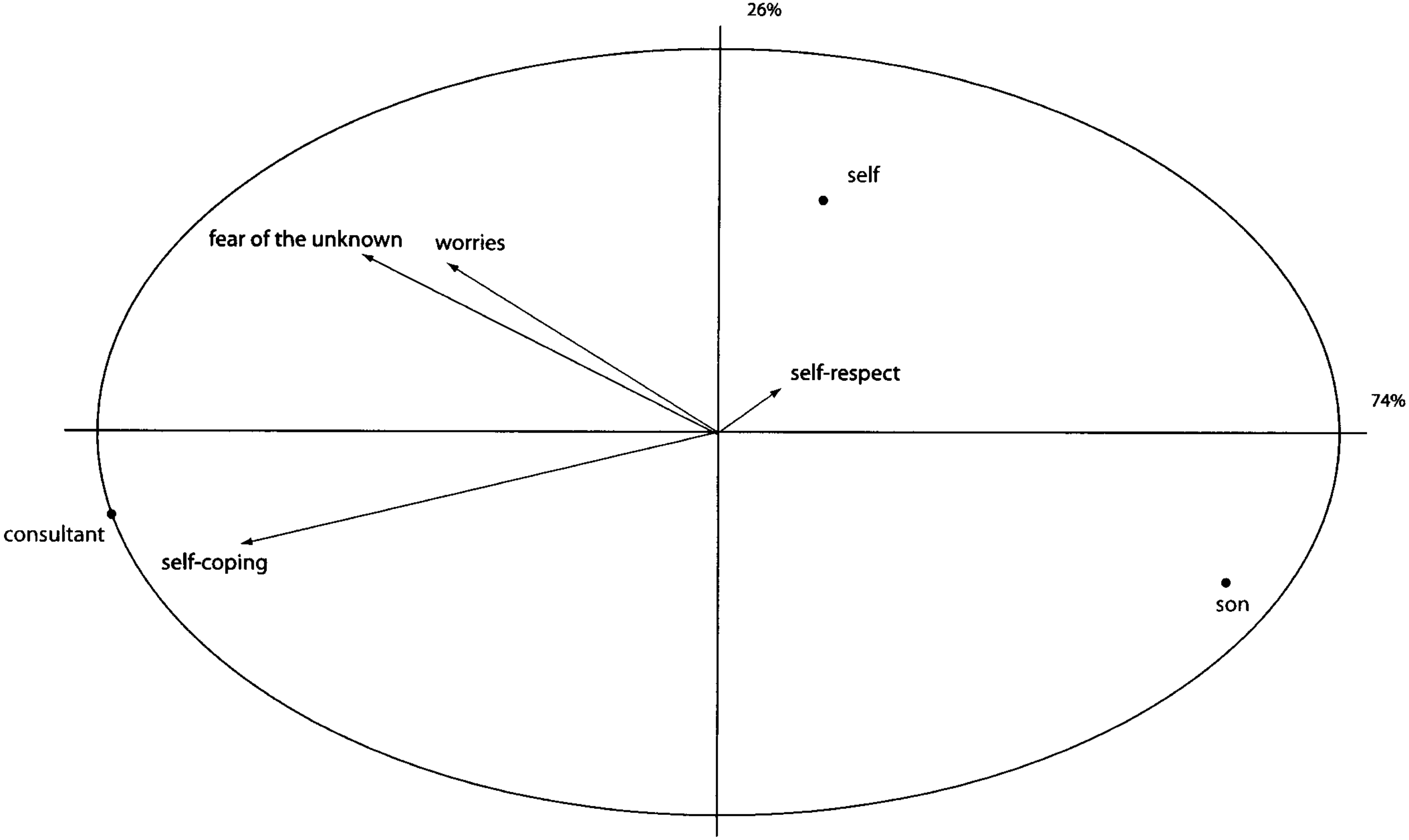
INGRID analysis: Case study 3: Focused grid 1

Principal component analysis of the first focused grid revealed 2 main components, of 74% for PC1 and 26% for PC2. The following is the table of Eigen values.

Table 28: INGRID computed variance (PCA) values for focused grid 1: case study 3

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	168.23	74	74
PC2	59.11	26	100

to elements and principal components 1 & 2 axes, for case study 3, 1st focused grid.



The analysis of the focused grid reveals an interesting but complex representation of Hazel's personal constructs and super-ordinate connectivity in her diabetes life. The constructs of self-coping and support are clearly directed towards her consultant which supports the earlier principal component labelling of 'diabetes singular dependency'. However, in addition suggests that Hazel's coping mechanism and ability to self-manage her condition are deferred through a negative dependency to her consultant. This also supports the interpretation for this focused grid as Hazel's personal constructs in living with diabetes are based on prior experience which would suggest that they were related to self-efficacy. This is illustrated in the bi-plot as the shortest vector distance from the variance of self-respect vectored towards Hazel as herself. This can be interpreted as the main way in which Hazel maintains some self-respect and identity through her condition and the external intervention she receives because of it.

Hazel also views her worries and fear of the unknown (future) as having equal responsibility between herself and her consultant in this focused grid analysis. The implication of these two construct groupings is that they are both correlated within the negative to the principal component lines. This suggests that although Hazel considers these personal constructs important, they are contributing to her reduced self-efficacy in being able to live with and manage her condition.

Discussion of analysis: Case study 3.

Hazel's completed DDGT and subsequent focused grid has, through INGRID analysis, revealed complex and challenging personal construct identification which has some relevance to her past experiences of life. There is also a relationship with her current situation with family members on the identification of Hazel's personal constructs and experience of living with her condition. The aspect of Hazel having a singular dependent relationship with her consultant is complex, and is supportive of some of the previous empirical work conducted by the author. Gillibrand & Flynn (2001) theorised from exploratory interviews in type 1 and type 2 diabetes that some patients felt forced to give responsibility for their conditions management to 'powerful others' in locus of control terms and this could be a facet of the impact of the consultant in Hazel's living with her condition.

Case Study 4 – (DRG013/ A04)

This case study is a presentation of a 60 year old white male with type 2 diabetes, who for the purposes of confidentiality and anonymity has been given the pseudonym 'Harold'.

Harold has had type 2 diabetes for 12 years recorded at the time of the DDGT interview. He is currently treated with dietary restrictions, oral hypoglycaemic agents and recommended exercise; which he stated was golf very occasionally. His memory of his diabetes outcomes was not complete, and Harold stated he did not know his blood pressure or his HbA_{1c} level. His BMI was calculated at 22, which indicated a healthy level of weight associated with height. He stated that he had a pacemaker fitted for a 'heart problem' but could not remember when, only 'some time ago'. Harold also related how he thought he had hypoglycaemic attacks as sometimes he felt "dizzy." He stated he had never smoked cigarettes.

Harold stated that he had retired within the last 10 years from a good electrical engineering job, after having been managing director. He was married, lived with his wife and they had been together for 35 years.

The first DDGT interview was completed in one hour and 50 minutes, followed by a second interview completed in 35 minutes, 2 weeks after the first. The previous exploratory phase interview had taken place 12 months earlier. One full DDGT was completed, followed by two focused grids at the second interview.

Following discussion, Harold included all 14 construct labels as having an impact in his condition and chose the elements (people) to rate: wife, self, GP and practice nurse. After explanation of the procedure, Harold completed the ratings displayed overleaf.

Table 29: Completed ratings for the DDGT: case study 4

Construct	**Element**			
	wife	self	GP	practice nurse
Diabetes self-management	3	8	5	6
Diabetes care	5	4	4	6
Diabetes complications	6	3	3	7
Other health problems	2	3	5	6
Diabetes management support	3	3	6	8
Social activity	4	0	0	0
Meaningful work	4	5	4	4
Exercise	1	1	1	1
Diet	8	1	1	4
Emotional support	3	1	1	3
Altering behaviour	2	1	1	3
Changing lifestyle	2	2	1	5
Future thinking	3	5	1	4
Education	1	4	5	6

Once the rating was completed Harold was encouraged to discuss the scores, particularly focusing on the extremities. However, on initial visual analysis of the grid there are few extremity scorings apart from when Harold rated himself, the GP, and practice nurse as 0 for social activity. When asked to explain this Harold stated that he had no social activity outside of the home apart from when his wife encouraged him to go to a friend's house which was not very often. Harold stated that he felt too tired to engage in any social activity and often could not be bothered. A similar explanation was given for the 1 rating for exercise, with the feeling of tiredness preventing Harold from playing golf.

Harold rated himself as 8 for diabetes self-management which he perceived to be directly related to his performing blood glucose monitoring, stating that he was meticulous in keeping a record of the readings in a diary (shown to the researcher). Harold was particularly concerned about his perception of suffering episodes of "hypos" stating that he became frightened with the shaking and dizziness. He had rated the practice nurse as 7 explaining that she was always reassuring and knew what to do telling him to take a sugary drink.

Of note were the low ratings for the construct emotional support, particularly for himself and the healthcare processionals. When asked to discuss this, Harold admitted to feeling a "bit depressed" and he related this to always feeling tired, being confined to the house most of the time, and not being able to play golf. Harold also explained that he was worried about the future, to some extent if things were to get worse. A consistent mid range rating was for meaningful work and Harold explained that he viewed the diabetes as his work now where, although he was retired, he still wanted to do something useful. However, his condition negated that, therefore it became his 'work.'

Harold stated that he found the practice nurse very supportive and gave him useful information about his condition, but he also read for various publications in diabetes for himself.

The initial visual cluster analysis of the grid revealed low to mid ratings for most of the constructs to elements suggesting that although Harold has some psychological issues, they appear not to be severe or have a major impact on Harold's perceptions and living with his condition.

After completion and discussion of the grid, Harold agreed to complete a focused grid, to explore the issues and extremity ratings which would contribute to identification of personal constructs and super-ordinates that were revealed in the first DDGT.

INGRID analysis Case study 3: DDGT.

Cluster and subsequent PCA revealed 3 main components accordingly of 53%, 33% and 13% of the variance giving a total of 100% which indicated these are three core personal constructs worth interpretation and delineation in Harold's living with type 2 diabetes.

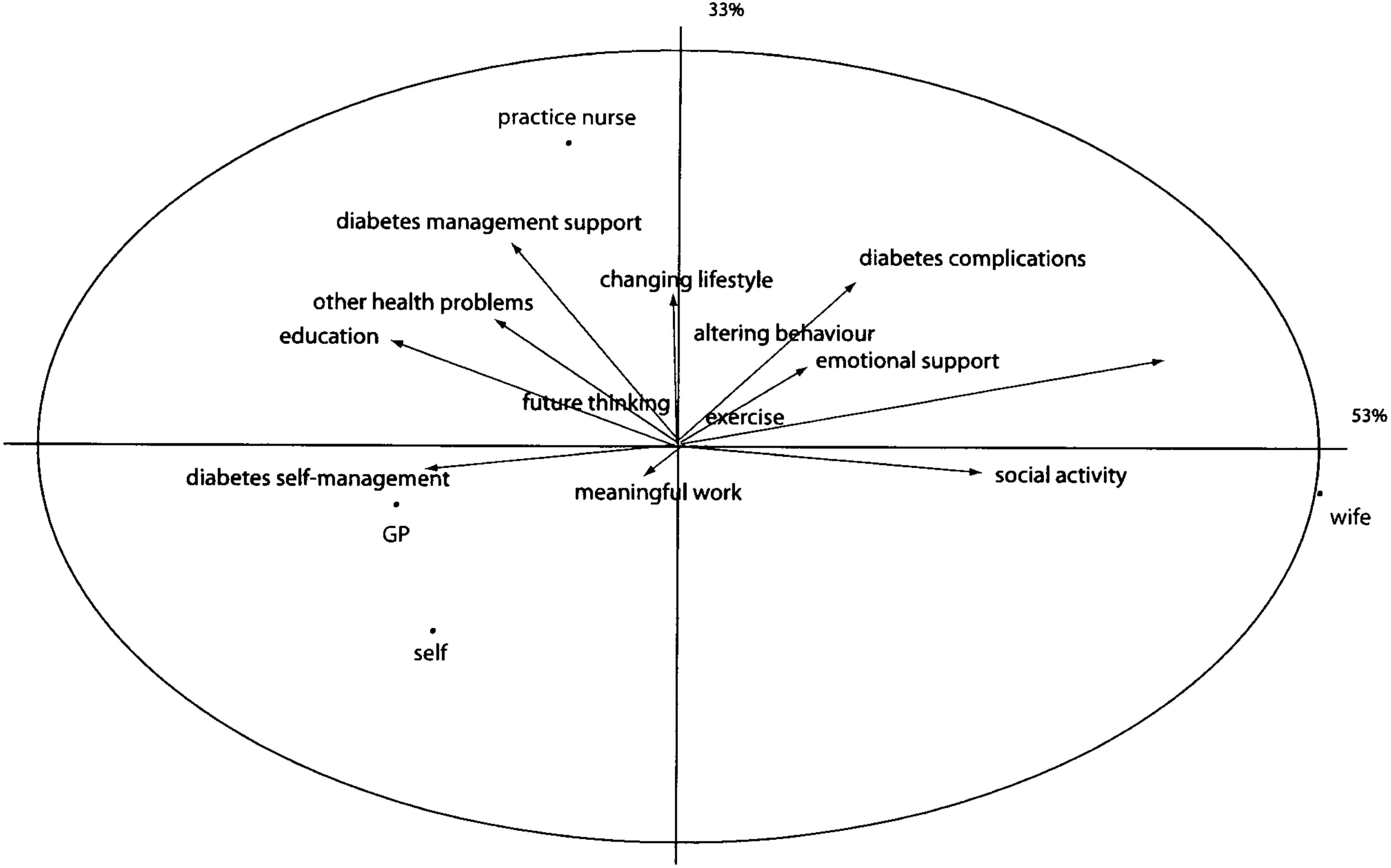
The entire Eigen and percentage values of all the identified principal components are listed in the following table:

Table 30: INGRID computed variance values (PCA) for DDGT: case study 4

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	75.05	53.32	53.32
PC2	46.87	33.3	86.62
PC3	18.83	13.38	100

The resulting bi-plot generated by INGRID of the construct and element loadings, distances and angular distances is presented to illustrate how the two main principal components contribute to the identification of Harold's personal constructs in relation to dependency and living with diabetes. (INGRID does not plot more than two principal components, as this is a two dimensional plot).

to elements and principal components 1 & 2 axes, for case study 4, completed DDGT



Principal Component 1 (PC1, 53% Total variance)
Personal Construct (Label): 'Core Cognitive Interdependence'

In the modified INGRID generated bi-plot it is apparent that there is a wide-angled spacing of all the constructs and distinct but short distance vectoring towards individual elements. This overall picture suggests a general interdependence that Harold experiences and construes as living with his condition. Closest to the 53% principal component1 line are the constructs of meaningful work, exercise, future thinking, social activity and diabetes management. However, these are widely spaced and vectored towards Harold as himself, the general practitioner and Harold's wife. This suggests that there is no clear singular dependence and no delineated dependence - rather a shared interdependence. These constructs also appear to be related to Harold's perceptions and cognitions of his condition, i.e. those issues that he thinks about as having an impact on his life. The closet vectored construct is that of meaningful work which would support Harold's earlier explanation that his condition is now his 'work.'

The distinct arrows demonstrate that there is no dependence to one construct or vector grouping. However, there are clear associations; Harold's GP is perceived as central to his ability to self-manage his condition. Any social activity pursued is directly associated with the intervention of his wife. Future thinking, exercise and meaningful work are associated with Harold as himself. He perceives that these issues would be answered through his own perceptions of his ability to achieve an independent association with them.

Principal Component 2 (PC2, 33% total variance)
Personal Construct (Label): 'Process Interdependence'

Although there is wide-angle spacing between the constructs there is enough grouping within and towards the vertical principal component 2 line to determine that there is a personal construct for Harold associated with his therapeutic relationship with the practice nurse. The constructs are those that are within a definition of process orientated issues; diabetes management support, other health problems, education and changing lifestyle. Harold has clearly rated these constructs as a group vectored towards the practice nurse however the wide-angled spacing suggests that this is in an interdependence with Harold as himself, the GP and the practice nurse, therefore the label of principal component 2 as process interdependence appears appropriate and valid.

Principal Component 3 (PC3, 13% total variance)
Personal Construct (Label): 'Associated Interdependence'

Principal component 3 accounts for 13% of the variance indicating that although it is classed as significant, and worthy of labelling, it does not have a large impact or bearing on Harold's personal constructs in living with diabetes. Also it is difficult to delineate as INGRID does not plot a low variance principal component and only plots the two main principal component's. However, examination of the computed inter-element distances, Euclidean distances, inter-construct distances and factor loadings, leads to an interpretive analysis of 'associated interdependence.' This personal construct encompasses visual obvious associations of Harold's wife having responsibility for the dietary management of Harold's condition (she does all the cooking), and less obvious issues. The constructs 'diabetes complications,' 'altering behaviour' and 'emotional support' appear to be vectored away from any element and principal component line in the bi-plot. Detailed examination of the numerical calculations indicates that these constructs are accountable for principal component 3. This is explained by the low ratings Harold has given generally to his perceived hypoglycaemic problem. Also, his perception that he has little or no emotional support and his perceived impact of the condition as making him feel 'depressed'. This added to by his continued feelings of fatigue and inability to perform social activity, exercise, or meaningful work not associated with his condition. However, these issues are not totally disassociated from the elements hence the label of associated interdependence.

After completion, visual analysis and discussion, Harold agreed to a further interview to attempt focusing of the DDGT to delineate further his personal constructs and possible identification of a super-ordinate connecting these.

Focused Grid: Case Study 4.

In the second interview Harold completed 2 focused grids. After examining the first full DDGT, Harold discussed some of the issues in relation to his ratings. He was particularly keen to focus the grid on 2 associated constructs of his feelings of tiredness and 'depression'. Asked who might have an impact on these constructs he identified himself, the practice nurse and his wife.

The following is Harold's completed focused DDGT.

Table 31: Completed ratings for focused grid 1: Case study 4

Construct	**Element**		
	self	wife	practice nurse
Depression	10	3	4
Tiredness	10	4	4

After completion Harold and the researcher explored the construct to element ratings. Of note was the rating of himself as 10 for both tiredness and depression. Harold stated in explanation that he felt tired most of the time and had no energy. This led him to feel "down...depressed." When the researcher asked Harold to explain this he said that maybe it was his age and that it was normal, but he felt it had something to do with his condition. When asked why he had rated his wife as fairly low he responded by stating that "she has enough to worry about." Harold also explained that whilst the practice nurse was very good at listening and helping he only saw her every 6 months.

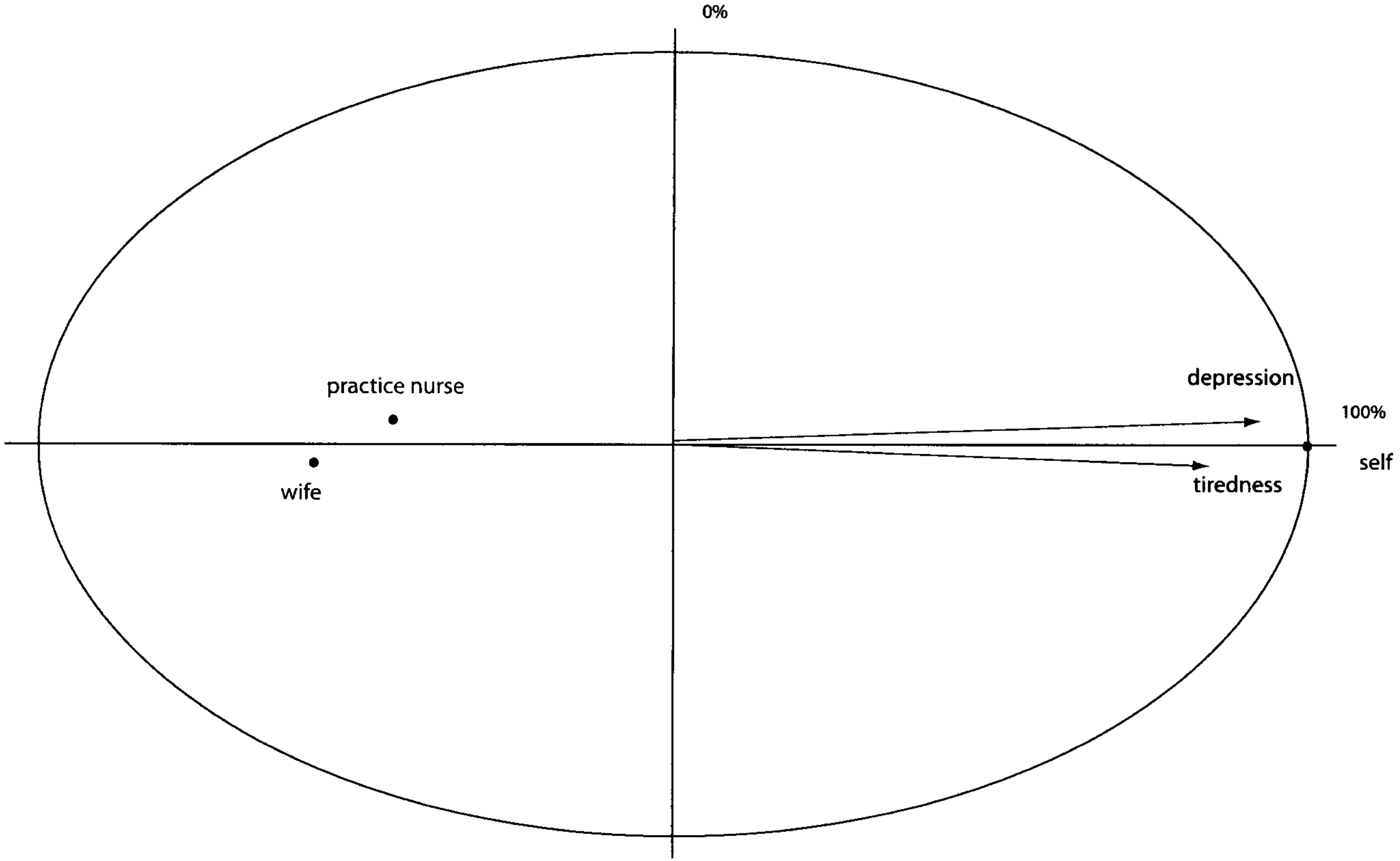
INGRID analysis: case study 4: focused grid 1

PCA of the first focused grid revealed 1 main component accounting for 99.57% of the variance. The following is the table of Eigen values.

Table 32: INGRID computed variance values (PCA) for focused grid 1: case study 4

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	52.44	99.57	99.57
PC2	0.23	0.43	100

to elements and principal components 1 & 2 axes, for case study 4, 1st focused grid.



The analysis of focused grid 1 reveals a component accounting for all of the variance within PCA which is a clear association of Harold perceiving all the responsibility for his condition outcome of tiredness and 'depression.' These two constructs are not mutually exclusive in that emotional mood changes have a relation to fatigue. Harold clearly has an independent perception of these issues which he feels is not impacted upon, or aided, by his wife or practice nurse. This focused grid does not support the initial DDGT findings where there was a clear interdependence in Harold's living with diabetes with his primary healthcare team, his wife, and himself.

This finding was apparent on visual analysis of the focused grid 1 ratings and therefore the researcher encouraged Harold to complete another focused grid, this time attempting to explore why Harold felt that he was responsible himself for managing and living with his tiredness and mood changes.

The following is Harold's completed second focused grid which follows from focused grid 1.

Table 33: Completed ratings for focused grid 2: case study 4

Construct	**Element**		
	self	wife	nurse
Self-help	3	1	3
Seeking help	5	6	7

In explaining the ratings Harold stated that for the construct 'self-help' he did not know what he could do to help himself, but did not want to talk to his wife about this as he perceived that she could not give him advice to help himself. He also perceived that it would be similar for the nurse. The impact ratings for seeking help from others as an external intervention were higher. Here Harold perceives that the nurse or his wife will intervene on his behalf to gain external help with his mood changes and tiredness:
"My wife will say "go and see the doctor if you're not feeling well," but I don't often go…If I see the nurse she will talk to me about how I feel and I think that's trying to get me to help myself. She also has said that she can ask the doctor to send me to see a specialist but I'm not mad, it seems a bit drastic doesn't it?"

Discussion of analysis: case study 4.

Harold's social and employment history has a bearing on the personal constructs discovered and explored in the interview DDGT process described. Having been a managing director and active golfer until retiring and then developing diabetes, has had an impact on his life experience and in particular his mood. This however has not resulted in a deficiency or problem, rather Harold perceives generally that he has a shared dependence or true interdependence with his significant others in his condition life and himself. The 'scattergun' spread on the initial DDGT INGRID bi-plot supports the three principal component labels of core cognitive interdependence; where Harold's thinking about his condition is affected by others and the outcome impact of such is shared; 'process interdependence' where condition orientated activity is shared in impact and intervention and; 'associated interdependence,' where other constructs are again shared.

Harold, it appears, knows he is suffering from mood change and associated tiredness and examines himself for the cause and solution. However Harold's core personal constructs are clearly associated with interdependence and it may be that there is an underlying rationale to the independence aspect investigated in the focused grids. A plausible connectivity, or explanation, is that he is suffering from a condition specific fatigue from insulin resistance. This should be able to be rectified by treatment management. This is supported by Harold's DDGT analysis where it is visually apparent that there are no adverse dependency issues illustrated in his DDGT bi-plot.

Harold's case study using the DDGT has highlighted mainly the interdependent relationship in his condition experience. The social and limiting effects that having type 2 diabetes can have on a person's life has not been chronicled to any extent but there are some relational experiences. Paterson, Thorne & Dewis (1998) synthesised all qualitative studies in diabetes over a specified period of time and overall could identify one overriding theme that was common to many of the studies; that people with diabetes wanted to achieve a sense of 'balance' in their lives between living a 'normal' way and living with diabetes. The use of the term 'balance' was also delineated to describe issues of self-management, counter-balanced against healthcare professional direction and treatment regimes. Balance was also described in the context of trying to achieve good control of the disease processes, i.e. normoglycaemia and prevention of complications, with continuing lifestyle choices.

Handron & Leggett (1994) noted that no studies had been conducted in people with type 2 diabetes on psychological factors or stressors. They were particularly interested in exploring how these factors impacted on self-management of conditions. Perhaps the most important finding from their study was the sense of isolation from other family members that participants experienced, and also the co-dependency on a significant other in living with and coping with the demands of the conditions. They also found that everyday family stressors, external to their conditions, had a negative impact on their diabetes coping strategy and were noted in the form of adverse use of defence mechanisms, i.e. consistent denial and low-self-esteem which could lead to pathology, (e.g. depression).

Case Study 5 - (A008/ DRG 004)

This case study is a presentation of a 64 year old white woman with type 2 diabetes who for the purposes of confidentiality and anonymity is given the pseudonym Ethel.

Ethel has had type 2 diabetes for 15 years, treated with exercise, diet, Metformin, Glicazide and Acarbose. Her self-reported HbA_{1c} was 7.5% at the time of the first grid testing interview. Her BMI status was 21, indicating normal weight to height ratio. Ethel reported that she had triple bypass heart surgery for ischaemic heart disease which was as a consequence of her type 2 diabetes. Her other reported health problem was psoriasis. Her blood pressure was a reported 120/70 at the last test prior to the interview.

Ethel had been widowed for 2 years and now lived with her daughter. She stated she had retired from employment as an office worker, and now occasionally worked voluntarily for a local charity.

The DDGT was completed with the focusing process during one interview, taking one hour to complete, with the previous exploratory phase interview occurring 9 months before. Including the first full grid, 2 grids were completed overall with the focusing process.

During stage one and two of the DDGT, Ethel and the researcher explored the construct labels within the grid and identified those pertinent to her life with diabetes; discarding 'other health problems' and 'diabetes management support' as not relevant to her situation. We then explored and discussed the elements (people) who were involved and important in her life with diabetes. Ethel listed her daughter she lived with, her second daughter, herself, her general practitioner, the practice nurse, and a friend.

The unfilled grid was then modified to take into account the constructs and elements Ethel had identified. The researcher then explained how the rating scale worked and asked Ethel to rate each of the constructs against each of the elements with impact perception by her on living with diabetes.

Table 34: Completed ratings for the DDGT: case study 5

Construct	**Element**					
	daughter1	daughter2	self	GP	practice nurse	friend
Diabetes self-management	1	5	9	10	10	8
Diabetes care	1	5	9	10	10	8
Diabetes complications	1	1	9	10	10	8
Social activity	1	5	9	1	2	5
Exercise	1	2	9	7	7	5
Diet	0	4	9	5	5	5
Emotional support	2	9	5	10	3	10
Education	3	3	9	5	5	3

After completion of the grid ratings the researcher and Ethel discussed the scores, in particular focusing on the extremities. An initial visual cluster analysis was performed by the researcher to aid this process.

Ethel rated the daughter who lived with her as having low impact on her diabetes life, explaining that she struggled to cope as her daughter had multiple sclerosis and was currently suffering with depression. She provided care for her daughter who did not work and who lived with her. The daughter was 32 years old. Ethel rated her second, younger, daughter highly for emotional support as someone who helped Ethel with her first daughter, and as someone she could talk to. In relation to exercise, Ethel attended yoga classes regularly and rated herself as having the main impact in this area. For the process orientated diabetes related constructs, Ethel consistently rated her GP and practice nurse as the highest. Ethel perceived herself largely responsible for her dietary management but admitted to liking to eat out. The visual cluster analysis revealed that there was a distinct negative rating towards her first daughter. This traversed fairly consistently through her second daughter and her friend, towards the highest ratings for herself and her primary care team with the most highly rated constructs in the areas of diabetes related issues. One notable exception to this was the rating of 10 for her GP for emotional support and her friend similarly.

INGRID analysis: case study 5:

Cluster, and subsequent principal component, analysis revealed 3 main components accounting for 68%, 16% and 14% of the variance respectively, giving a total of 98% of the variance. This indicates that there are three main issues in Ethel's living with diabetes, which may formulate Ethel's personal constructs in living with diabetes related to situational (people) interdependence.

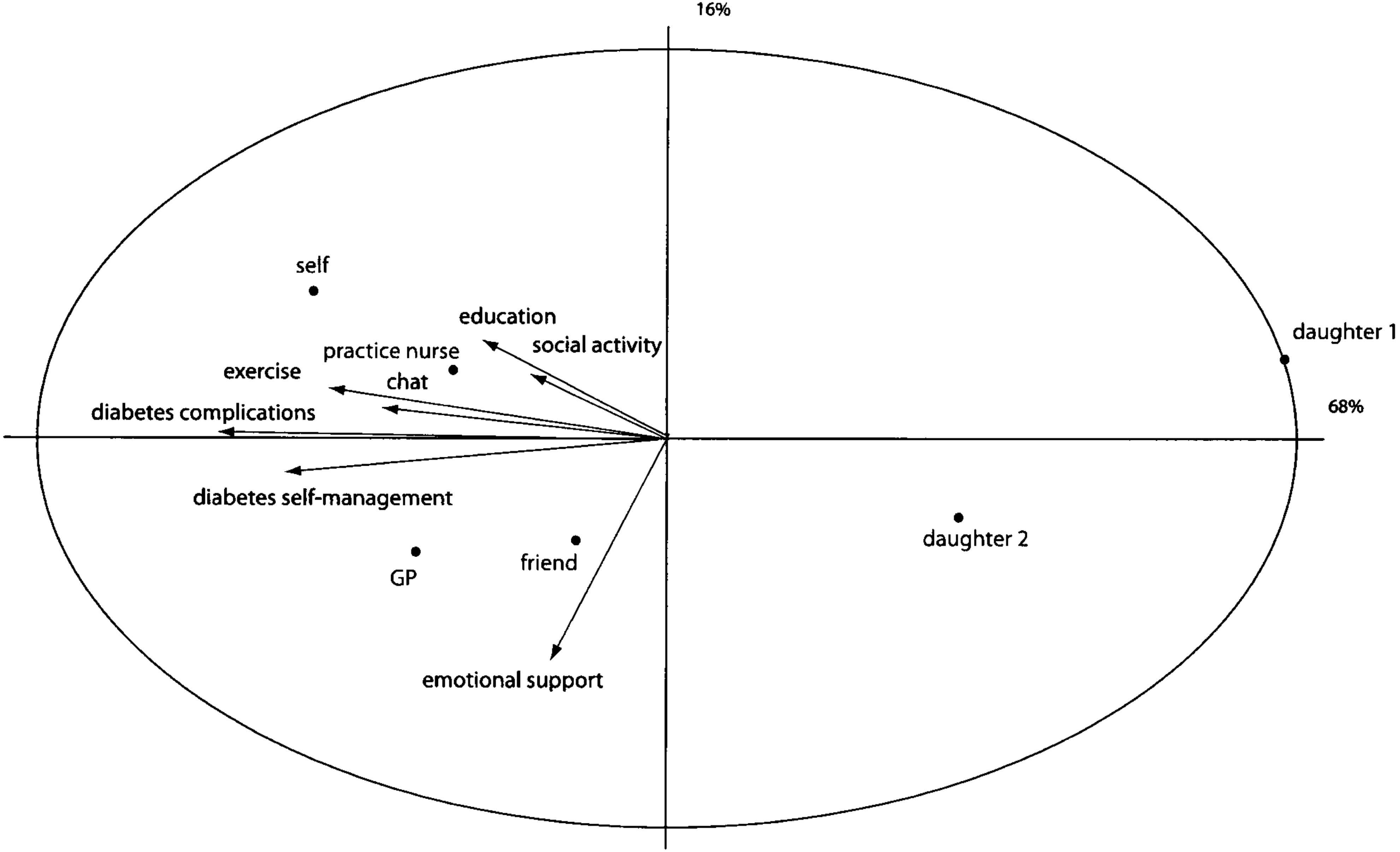
The entire Eigen and percentage values of all the identified principal components are listed in the following table:

Table 35: INGRID computed variance values (PCA) for DDGT: case study 5

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	304.96	67.62	67.62
PC2	71	15.74	83.36
PC3	64.67	14.34	97.7
PC4	5.83	1.29	98.99
PC5	4.55	1.01	100

The resulting bi-plot of the construct and element loadings, distances and angular distances is presented to illustrate how the two main principal components contribute to the identification of Ethel's personal constructs in relation to dependency and living with diabetes. INGRID does not plot three principal component's as this would require 3-dimensional illustration, however the third principal component will be delineated through analysis of the numeric values calculated for the inter-element distances, construct vector loadings and angular spacing between constructs and elements to principal component percentage.

to elements and principal components 1 & 2 axes, for case study 5, completed DDGT



Principal Component 1 (68% of total grid variation):-
Personal Construct (Label): 'Diabetes Interdependence'

The distinct cluster of constructs closest to the 68% principal component 1 plot line in the diagram indicates reliably that this is a major personal construct for Ethel's living with her condition. This principal component cluster is vectored closest to her practice nurse as having the greatest impact, and also uni-directionally to herself. The constructs angled closely together are centred on issues directly relevant to Ethel's self-management of her condition, therefore the label of 'diabetes interdependence' appears appropriate and valid. Given Ethel's home situation, and the high regard she places on the primary care team, this appears a reliable analysis and indicates a fairly positive correlation to Ethel's satisfaction with her condition management and life.

Principal Component 2 (16% of total variance):-
Personal Construct: 'Emotional Dependence'

This principal component indicates, to a lesser degree, correlation in terms of dependency and diabetes and more in relation to Ethel's general coping mechanism in dealing with her daughter's health problems. From the bi-plot analysis, Ethel clearly relies, and is dependent, on external sources of emotional support from her GP and her friend. These are people she can "talk to and they listen". In the same, but more positive correlation, is her second daughter who, whilst more distance angled from the other 2 elements, has an impact on Ethel's support network. However, to provide a valid interpretation, principal component 2 appears more concerned with Ethel's first daughter rather than Ethel's living with her own condition. The question arises whether this personal construct has had an affect, or whether there is connectivity between this and Ethel's personal constructs in her condition. On the bi-plot it is clear that daughter number 1 is distanced from Ethel's personal construct in living with diabetes, which suggests that although they live together, Ethel has no immediate support in the home. This may be why Ethel relates feelings of inability to cope with her daughter and her condition.

Principal Component 3 (PC3, 14% total variance)
Personal Construct: 'Education independence'

In order to examine this principal component it is necessary to refer to the numeric calculations as it is not plotted by the modified INGRID programme in the bi-plot. There is one distinct construct which has the greatest Euclidean distance from the mean of the variance, that of 'education.' On examination of the DDGT it is clear that Ethel rated herself as having the greatest impact in this area. Information and knowledge acquisition which may have an impact on Ethel's condition management is largely engendered by Ethel herself. This would suggest, given the low but correlated scores for the other elements that this is a 'healthy' personal construct for Ethel.

Focused Grid 1: case study 5

After the discussion, an open grid was filled in with the constructs 'coping' and 'stress' against the elements of daughter (1), Ethel as herself, and the practice nurse.

Table 36: Completed ratings for focused grid 1: case study 5

Construct	Element		
	daughter	self	practice nurse
Coping	1	1	3
Stress	9	8	4

After completion the researcher and Ethel discussed the ratings and Ethel was encouraged to attempt to explain them.

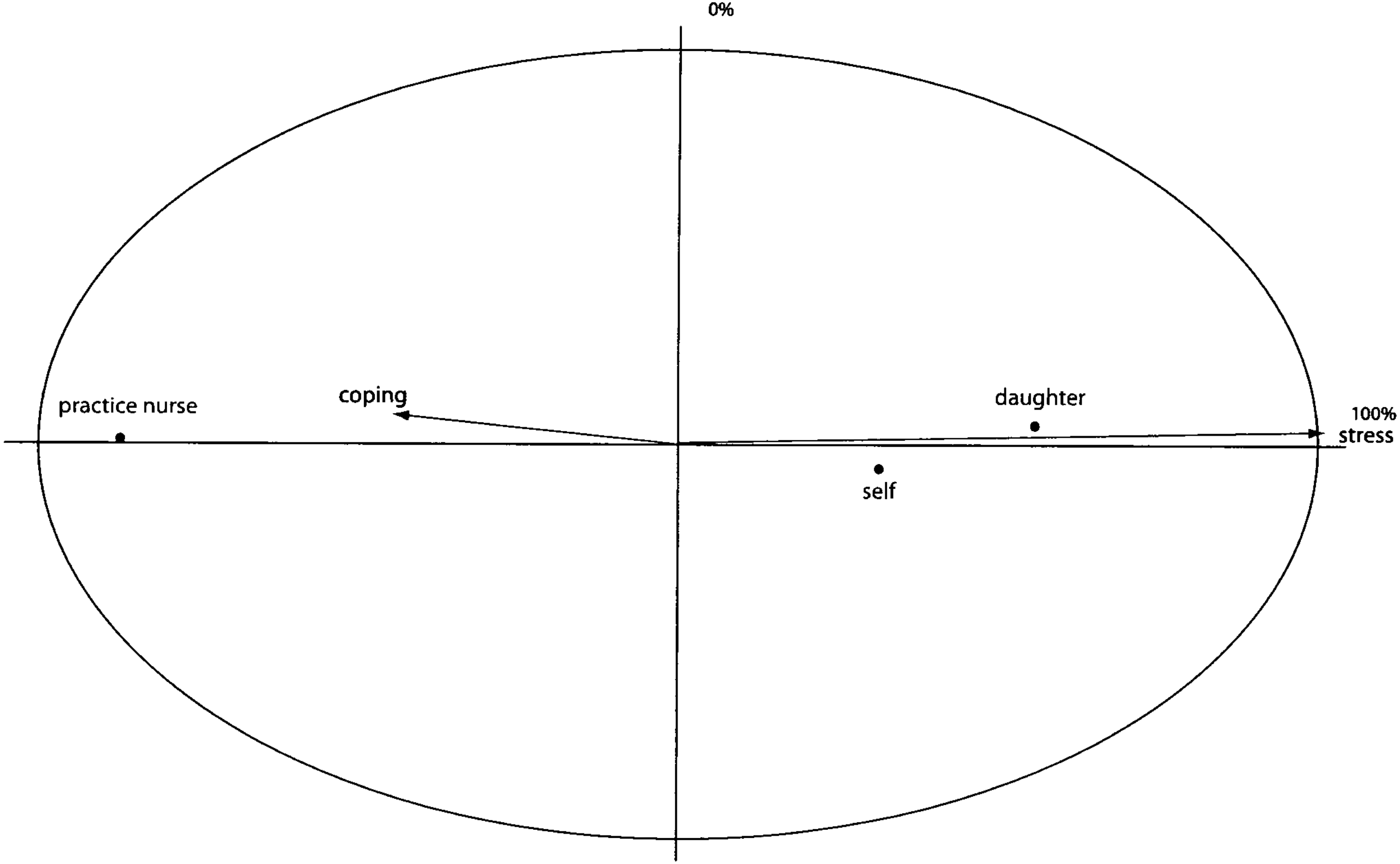
The ratings for coping were consistently low, as Ethel had viewed this construct as a positive rather than negative impact, i.e. daughter (1) was rated as a low impact as Ethel did not perceive that she helped with her coping mechanisms and contributed to her sense of failing in coping with her home situation. The practice nurse was rated slightly higher but still a low positive impact. Ethel stated in explanation, "I don't cope very well at the moment, I think talking about the things with the nurse helps sometimes."

When asked to explain the ratings around 'stress' this was completed with a negative reference, i.e. how much her daughter contributed to her feelings of stress. Ethel also discussed how she herself contributed to her stress levels by worrying about her daughter. The practice nurse was rated as the lowest as she helped with the feelings of stress but not in a significant way. Ethel stated in explanation, *"I think I put a lot of pressure on myself…worry about my daughter and what would happen if something serious happened with my diabetes, like having a hypo."*

INGRID Analysis: case study 5: focused grid 1.

PCA revealed one principal component associated with this grid accounting for 99.5% of the variance.

to elements and principal components 1 & 2 axes, for case study 5, 1st focused grid.



The bi-plot of focused grid 1 illustrates the ratings and explanations by Ethel in the focused grid. There is a clear correlation between Ethel's perceptions of stress associated with the daughter she lives with, and the association of how Ethel herself adds to those feelings. The coping style that Ethel employs to help with this personal construct is her talking to the practice nurse, although this is not a strong correlation as evidenced by the vector to element distance. Given the acute angle of these constructs and elements to the principal component line in the bi-plot it would support the validity and reliability of the DDGT method in Ethel's case as determining her personal constructs of 'diabetes interdependence' and 'emotional dependence.' What has not been explored in the focusing technique and not as substantiated, is Ethel's lesser personal construct of 'education independence.'

Discussion of analysis: case study 5.

Ethel appears to have a healthy and positive relationship with her primary healthcare team which enables her to live and manage her condition in an interdependent and balanced way. Her home situation in having to deal with her daughter's problems appears to have resulted in a construct of 'emotional dependence' which again could be viewed as 'healthy' if Ethel rates her friend, herself or the practice nurse highly in helping to deal with her perceived stress and coping mechanisms.

The super-ordinate or connectivity within Ethel's personal constructs are related to Ethel in recognising when to seek help and recognising how she can help herself (education independence). A valid and reliable interpretation would be that coping style is Ethel's connectivity.

Ethel's case study DDGT analysis demonstrates an emotional dependence and their related aspects independence in living with type 2 diabetes. These findings are related to those studies in diabetes which have focused on coping styles, whereby people with diabetes employ different coping styles according to changes in context and changes in the way people feel. Also related to Ethel's case study is the issues and research in levels of informal network support.

Aalto, Uutela & Kangas (1996) performed a large survey in people with type 1 and type 2 diabetes, and normal population controls, and found that there were no differences in levels of social support available to all three groups. Those patients in the disease groups, and in particular the people with type 2 diabetes, had perceived lower quality of life, were less likely to pursue healthy behaviour, and therefore had an increased burden placed on those social support resources. This finding requires further scrutiny to determine why this occurs, in what context, and in which aspects of the relationships within the social network.

Studies have previously determined a correlation between levels of social support and perceptions of self-care and behaviour in people with type 2 diabetes. Wang & Fenske (1996) determined some aspects of the nature of the social support by examining and comparing groups who had different aspects of social support, i.e. those with friends and family, those without, and those with family and peer support. The best support network appeared to be those subjects who had friends and family involved in their lives and conditions, with the support systems overall accounting for a quarter of variance for the aspects of self-care of type 2 diabetes.

Case Study 6 - (DRG007/ A019)

This case study is a presentation of a 69 year old white male who has had type 2 diabetes diagnosed for 3 years and is given the pseudonym 'Norman'. At the time of the interviews Norman was solely under primary care for his condition management, and regularly attended his general practice, where he was seen by the GP and dietician.

He controlled his condition by following dietary advice and taking exercise. He had a stationary cycling machine in the house and went walking with his wife. At the time of the second interview he suffered from an irregular heart beat, raised blood pressure and raised cholesterol levels. Norman did not know his HbA_{1c} level or his current blood pressure reading and had a BMI of 29 (overweight).

Norman is a retired pig farmer who lives with his wife in a rural location, and had a rudimentary level of education until he was 14. He then worked as a farm labourer.

The first exploratory interview was followed with a DDGT interview, after which a further three focused grids were completed during a third interview which took place 4 weeks after the first DDGT. The second interview to complete the DDGT began with an explanation of the technique and the rating system. The first two steps were completed, exploring the appropriate constructs and elements to Norman's life with diabetes. As Norman had retired and was enjoying his retirement, did not partake in any voluntary work, he discarded 'meaningful work' from the construct list. The elements (people) Norman identified as important were himself, his wife, GP, practice nurse and dietician.

Table 37: Completed ratings for the DDGT: case study 6

Construct	Element				
	wife	self	GP	dietician	friend
Diabetes self-management	10	9	10	9	0
Diabetes care	10	2	10	8	0
Diabetes complications	5	6	9	6	0
Other health problems	5	6	9	2	0
Diabetes management support	4	9	8	3	0
Social activity/ support	8	8	0	0	9
Exercise	6	8	4	5	4
Diet	10	3	6	10	2
Emotional support	8	6	2	0	0
Altering behaviour	8	6	7	5	0
Changing lifestyle	6	6	6	5	0
Future thinking	8	9	6	2	0
Education	4	5	4	4	0

After the rating was completed, the researcher and Norman explored some of the scores, particularly focusing on the extremities. Norman had rated himself as 9, his wife and GP as 10 for diabetes self-management, and he stated he was not as confident in managing his condition himself, as he was confident in his GP and his wife.

Norman stated that he did not do any of the cooking and that his wife makes sure he eats the "right stuff". She followed the dietary advice given to them when they attended Norman's appointment with the dietician together.

For emotional support, Norman had rated himself and his wife similarly, stating in explanation that his wife had helped him to adjust to his diagnosis in particular with the change in foodstuffs they had had to make. *"It took me along time to adjust...I missed eating what I wanted at first but now it doesn't bother me. Makes you think about things - your health and how long you are going to live for...things like that."*

Linked to this construct rating was Norman's explanation of ratings for 'future thinking'," *"I and my wife worry about the future and if I will get any problems."* (complications).

Norman was not particularly interested in his knowledge of diabetes, stating that he had got a lot of information at the start and now felt he had enough, particularly as he saw his GP and the dietician regularly. Agreement was reached to continue the interview using the focusing method after initial visual analysis and discussion of the completed DDGT.

INGRID analysis : case study 6: DDGT.

Cluster and subsequent PCA revealed three main components accounting for 61%, 24% and 12% of the total variance, giving a total of 97%. This reliably indicates that there are three main personal constructs within Norman's living with and managing his condition.

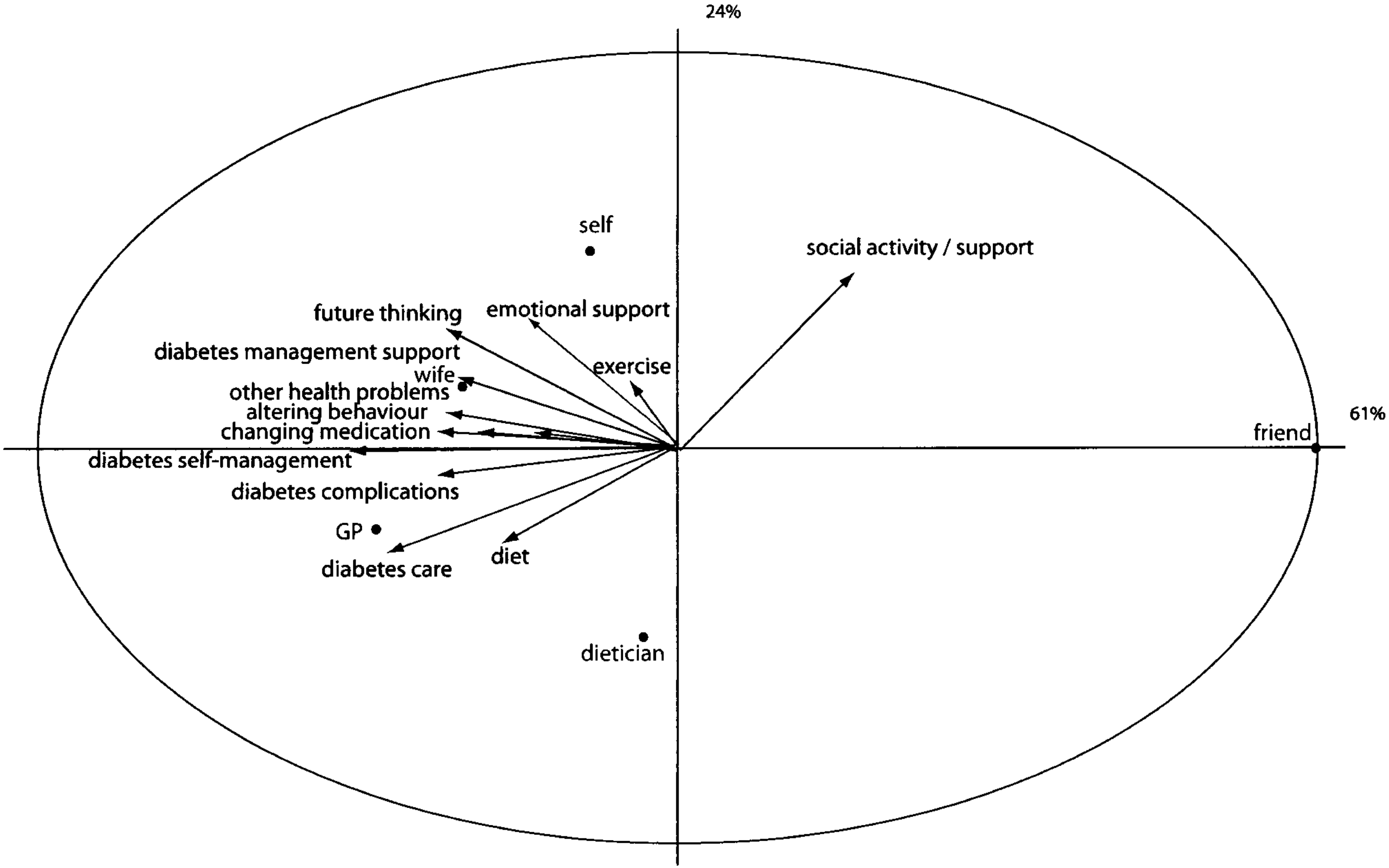
The entire Eigen and percentage values of all the identified principal components are listed in the following table:

Table 38: INGRID computed variance values (PCA) for DDGT: case study 6

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	396.5	60.63	60.63
PC2	158.92	24.3	84.93
PC3	77.28	11.82	96.74
PC4	21.3	3.26	100

The resulting bi-plot of the construct and element loadings, distances and angular distances is presented to illustrate how the two main principal components contribute to the identification of Norman's personal constructs in relation to dependency and living with diabetes. (INGRID does not plot three components as this would require a three-dimensional illustration).

to elements and principal components 1 & 2 axes, for case study 6, completed DDGT



Principal Component 1 (PC1, 61% total variance)
Personal Construct: 'Diabetes Interdependence'

The bi-plot illustrates a wide-angled spread cluster of nearly all the construct to element loadings, in particular between Norman and his wife, grouped around the principal component 1 horizontal line. This indicates that for most of the constructs in Norman's living with his condition, he has a stable level of interdependence with his wife, and less significantly with his GP; particularly for diabetes self-management and complications.

This illustration reliably supports what the DDGT demonstrated, that there is a strong and confident relationship between Norman and his wife, and this has transferred into condition living and management. Of note was the longest vector distance for the construct future thinking, equi-distant between Norman as himself and his wife. This suggests there may be a shared worry about the future of Norman's condition.

Principal Component 2 (PC2, 24% total variance)
Personal Construct: 'Exercise Independence'

A clearly important construct for Norman is his perceived need for regular exercise for his health and diabetes management. Although Norman stated he liked walking with his wife, the bi-plot reveals that he perceives the responsibility for engaging in exercise lies with himself.

Principal Component 3 (PC3, 12% total variance)
Personal Construct: 'Advice Dependence'

Norman is confident of, and trusts, the advice given to him by his GP and dietician, and therefore appears happy that a dependent relationship exists between himself and his primary healthcare team. Although he stated in the DDGT that the information about diabetes had been given at the start, however, this appears to have been reinforced. This could be construed as passivity, Norman's higher percent principal component 2 personal construct concerning exercise would negate this interpretation.

Following the first DDGT the researcher explained the nature and process of focusing on issues revealed in the first grid to rate in another grid, which Norman stated he would like to complete.

Focused grid 1: case study 6.

Norman stated that he would attempt rating his shared feelings of worry about the future with his wife, the possible need for further education and how important it was to make time for exercise. He rated only 2 elements to these constructs; himself and his wife.

Table 39: Completed ratings for focused grid 1: case study 6

Construct	**Element**	
	wife	self
Worry	9	8
Time for exercise	3	4
Education	1	2

For each of the constructs Norman rated himself and his wife similarly, explaining that they both worried about the future and he considered that as he worried *"this has a knock on effect on my wife."* Although he rated similarly for himself and his wife for making time for exercise, he still perceived that the responsibility was with him *"it's hard to get myself going sometimes. You know... I may try the treadmill once and then I don't touch it for a month or two."*

Norman rated both himself and his wife low for impact of education about diabetes stating *"After the first lot of stuff we got, we haven't read or looked at anything since. To be honest neither my wife or me knows much about the ins and outs of it."* Related to the first full DDGT, it would appear that diabetes education is not a central personal construct for Norman.

INGRID analysis: case study 6: focused grid 1.

PCA of the first focused grid revealed 1 main component accounting for 100% of the variance. This represents a complete and exact correlation between both the rated elements to constructs and therefore does not result in an INGRID analysis bi-plot as there are no variances in the Eigenvalues. This supports the personal construct for

Norman of interdependence for his condition, life between himself and his wife, and is an exact match for worry, exercise and education.

Focused grid 2: case study 6.

Following completion of the first focused grid, Norman and the researcher discussed continuing the laddering process in order to further delineate the issues and connectivity between Norman's identified personal constructs, in particular, exploring the underlying reasons for worry about the future. Norman was keen to explore at this point how his and his wife's worry could be alleviated by being "more positive."

The following is Norman's second completed focused grid.

Table 40: Completed ratings for focused grid 2: case study 6

Construct	**Element**	
	wife	self
Learning to live with diabetes	3	4
Looking forward to the future	2	2

In explanation of the fairly low, but similar ratings, for himself and his wife against the constructs, Norman stated; *"I think if we talked to other people with diabetes that would help and if there were specialist helpers who could talk to people our age."*

On rating 'looking forward to the future' Norman was less positive but perceived that if *"they did not have to worry so much then they may be able to get out more...do things."*

INGRID Analysis: case study 6: focused grid 2

Again PCA did not reveal any variance between element and construct loadings on a principal component. This indicates that Norman perceived that he and his wife had the same views and experiences which resulted in the same parameters. Therefore INGRID had no variance to plot: this was not a personal construct for Norman.

Focused Grid 3: case study 6.

During the first 2 focused grids Norman had identified a third element for himself which he perceived could have a positive intervention outcome for his wife and himself in terms of their shared psychological outcome of 'perceived anxiety.' Therefore, Norman included 'professional help' as a person element in this final grid completion. He was unclear about whether this third element would be his GP or another healthcare professional.

Table 41: Completed ratings for focused grid 3: case study 6

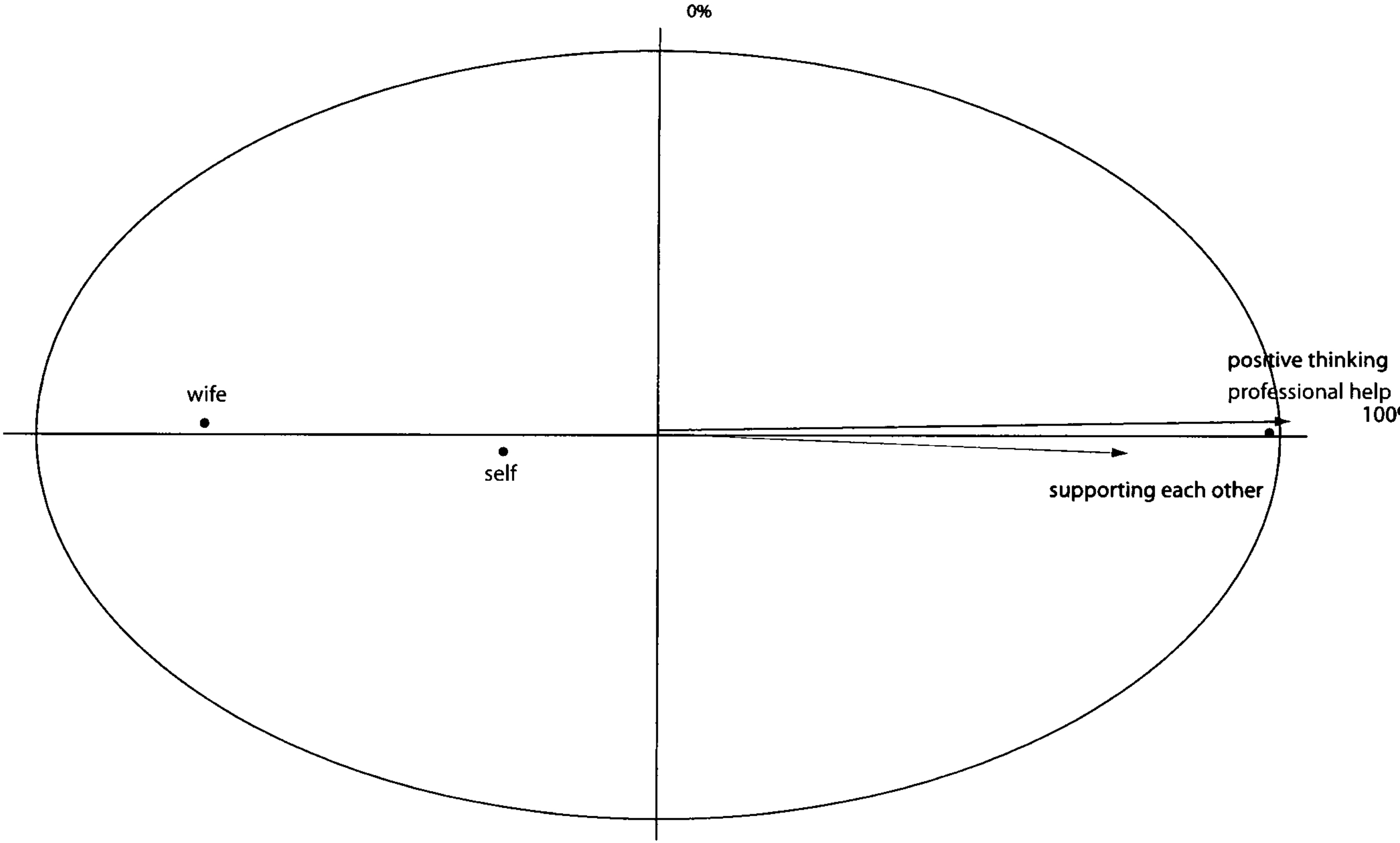
Construct	**Element**		
	wife	self	professional help
Supporting each other	5	6	8
Positive thinking	3	4	7

Norman stated in explanation of the similar ratings for 'supporting each other'; *"We (Norman and his wife) should talk to each other about things – the professional could help with that."* Norman perceived that the healthcare professional could have a good impact on his and his wife's anxiety and help to increase positive thinking about the future; *"We have been too much afraid of seeing someone… they could help in looking forward."*

INGRID analysis: case study 6: focused grid 3.

PCA revealed one main principal component of 100% of accounting for all the variance, however, in this instance INGRID did produce the bi-plot with the three elements.

to elements and principal components 1 & 2 axes, for case study 6, 3rd focused grid.



From the analysis it is clear that for both Norman and his wife, in order for them to support each other and alleviate their anxiety, then external healthcare professional intervention will be beneficial as opposed to relying on the strength of their relationship.

Discussion of analysis: case study 6

The INGRID analysis of Norman's DDGT demonstrated that Norman is happy with his condition life, has little psychological issues of note which is based on his strong and supportive relationship with his wife. In dependency testing, this personal construct can be defined as 'shared interdependence'. This core construct is supported consistently through the 3 further focused grids produced by the laddering process.

The super-ordinate for Norman's living with diabetes is the 'wholeness interdependence' experienced within his marriage. Any other element's impact is consequential contextually, rather than explicitly manifest in a dependent continuum. However, Norman has perceived that his, and his wife's, anxiety with regard to future thinking requires external intervention. This may result in either a dependent or interdependent therapeutic relationship to help in their positive outlook on their future life.

Norman's findings are supportive of previous work in the fields of altered emotional states and how spousal support can influence outcomes. Koch, Kralik and Somachs (1999) discovered issues of social exclusion related to having type 2 diabetes. They reported that men found being supported with their condition helpful. This somewhat mirrors and is supported by Peyrot et al.'s (1988) earlier findings, that there is a marital adjustment and adaptation to adult diabetes by both people in that relationship.

Case Study 7- (DRG 005/ A001)

This case study is a presentation of a 67 year old white female who has been diagnosed with type 2 diabetes for five years. For the purposes of confidentiality and anonymity she will be referred to as 'Helen'. Currently under primary care for her condition, she was treated at the time of the interviews with Metformin, exercise and dietary restrictions. Her BMI was 32 (obese), blood pressure and HbA_{1c} not known by Helen. Helen had smoked cigarettes until the age of 52 and then given up. Her exercise consisted of walking to the shops.

Helen had been widowed for 2 years and had a son and daughter who lived away from home. After a standard state education until 16 years of age, Helen had worked as a shop assistant after the children had gone to full time school, and was now retired.

The first exploratory interview was conducted 12 months prior to the 2 further interviews of 1 hour 36 minutes and 45 minutes respectively, with a total of 4 grids completed (full DDGT and 3 focused grids using the laddering technique).

After discussion and explanation of the procedure by the researcher, Helen listed 13 of the constructs. The elements (people) Helen listed are detailed in the following table.

Table 42: Completed ratings for the DDGT: case study 7

Constructs	**Elements**						
	son	daughter	self	GP	nurse	dietician	neighbour
Diabetes self-management	0	1	8	4	7	6	3
Diabetes care	0	0	3	6	8	7	4
Diabetes complications	0	0	4	7	8	4	0
Other health problems	0	2	5	8	6	2	1
Social activity/ support	1	4	3	0	6	3	9
Meaningful work	0	0	2	0	1	0	2
Exercise	0	0	1	0	2	7	1
Diet	0	2	6	1	1	10	4
Emotional support	0	8	1	0	2	0	8
Altering behaviour	0	1	4	2	6	6	2
Changing lifestyle	0	2	3	2	5	7	3
Future thinking	1	3	2	4	7	6	2
Education	0	2	5	2	8	8	2

After discussion, Helen was encouraged to explain her ratings, particularly the extremities. For 'process-orientated' constructs associated with Helen's management of her condition, visual cluster analysis revealed that Helen rated herself as having the main impact with the practice nurse and dietician contributing; she stated in explanation, *"I do my own blood sugars and help myself."*

Helen's main rating for social activity was with her neighbour, attending bingo together and going shopping. For emotional support Helen rated her neighbour and daughter highly compared to a very low rating for herself, *"I'm not good at coping and not good at motivating myself."*

Helen rated herself as low for diabetes education and knowledge stating, *"I'm not good at picking things up... the nurse and doctor have good knowledge... the dietician's very good."*

Overall visual cluster analysis demonstrated a low to moderate rating for Helen as herself, her son and her daughter (apart from 'emotional support') with the higher impact ratings for the healthcare professionals and Helen's neighbour).

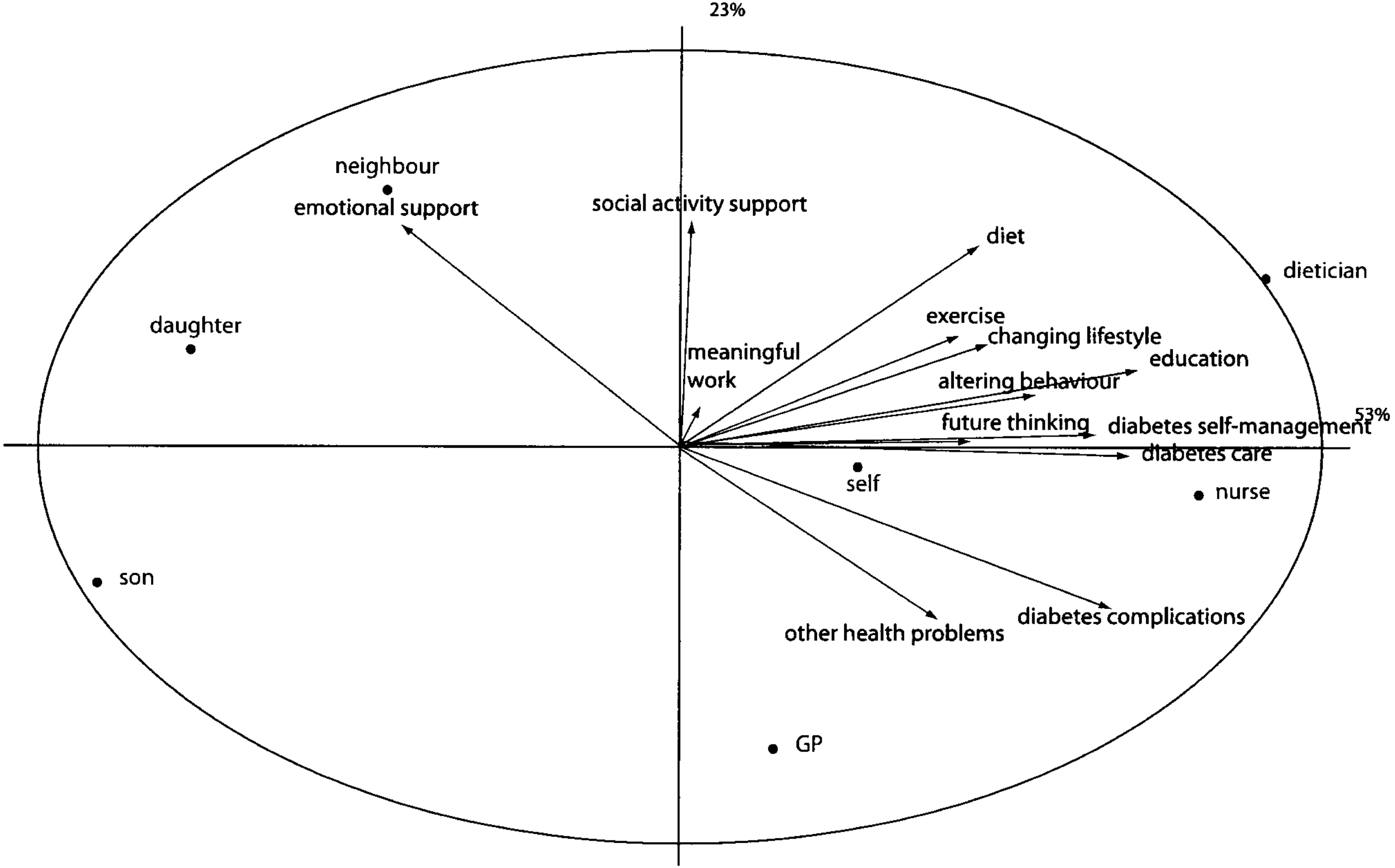
INGRID analysis: case study 7: DDGT.

PCA revealed 3 principal components of significance accounting for 53% , 23% and 14% with a further 3 principal component's not achieving the 10% level.

Table 43: INGRID computed variance values (PCA) for DDGT: case study 7

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	343.48	52.91	52.91
PC2	150.22	23.14	76.05
PC3	90.91	14	90.06
PC4	32.99	5.08	95.14
PC5	18.2	2.8	97.94
PC6	13.36	2.06	100

to elements and principal components 1 & 2 axes, for case study 7, completed DDGT



Principal Component 1 (PC1, 53% total variance)
Personal Construct: 'Diabetes interdependence'

This principal component 1, although only accounting for 53% of the variance, lies within the positive correlation figures between the elements and constructs. The constructs vectored and grouped angularly together in this principal component are associated with the physical and psychological 'self' focused issues, i.e. 'altering behaviour', 'changing lifestyle', 'exercise'. This principal component group of constructs vectors is directed predominantly towards the dietician, as this person had received the highest rating of 10 (closer to the variance value 1 is Helen as herself, which suggests the dietician vectoring could be skewed). This analysis demonstrates that for all of the 'self' orientated aspect of living with her condition, Helen has a shared dependency or interdependence between herself and her dietician, however this can be questioned.

This personal construct is important to Helen when it is considered that she is under dietary management for her weight problem, and perceives the need for exercise through altering her behaviour and lifestyle.

Principal Component 2 (PC2, 23% total variance)
Personal Construct: 'Social Interdependence'

The 23% vertical principal component 2 line in the bi-plot clearly demonstrates that social activity is a construct which Helen perceives she is responsible for but in which her neighbour has a shared impact. The shortest vector angled construct of 'meaningful work' suggests that this is of lesser importance to Helen's living with her condition.

Principal Component 3 (PC3, 14% total variance).
Personal Construct: 'Coping dependence'

Helen rated herself low for 'herself' as having an impact on her emotional state, explaining that she relied on her daughter and neighbour to give support in this area. This construct is clearly vectored in a positive correlation towards her neighbour and less so with her daughter. Helen using her close support network for emotional support, suggests a ‘coping dependence’ when she needs in particular to talk about and share her feelings about her condition.

Following the discussion of the initial visual analysis of the DDGT, Helen decided to continue with laddering process in a series of focused grids.

Focused Grid 1: case study 7

Helen had decided to focus on five constructs from the original DDGT however changed ‘meaningful work’ to ‘voluntary work’ as she had explained in the first interview how she wanted to do “something useful”. Helen also particularly wanted to rate herself and her neighbour, however also wanted to focus on her son, who she revealed lived next door but they *“did not get on.”*

Table 44: Completed ratings for focused grid 1: case study 7.

Construct	**Element**		
	son	self	neighbour
Diabetes support	0	2	3
Emotional support	0	2	8
Diabetes complications	0	3	3
Voluntary work	0	2	2
Diabetes education	0	1	1

After completion the researcher asked Helen to explain the 0 ratings for her son, across the constructs. Helen stated: *“ He won’t help me...he wouldn’t know what to do ...my son wouldn’t go out of his way to learn about diabetes.”* Helen also rated herself low for these constructs repeating the findings of the first DDGT that she did not cope very well emotionally, *“I don’t learn things very well.”*

INGRID Analysis: focused grid 1: case study 7.

INGRID PCA analysis revealed one main principal component accounting for 90% of the variance, indicating reliably that there are issues pertinent to Helen’s living with her condition and dependency within the focused grid 1 constructs and elements.

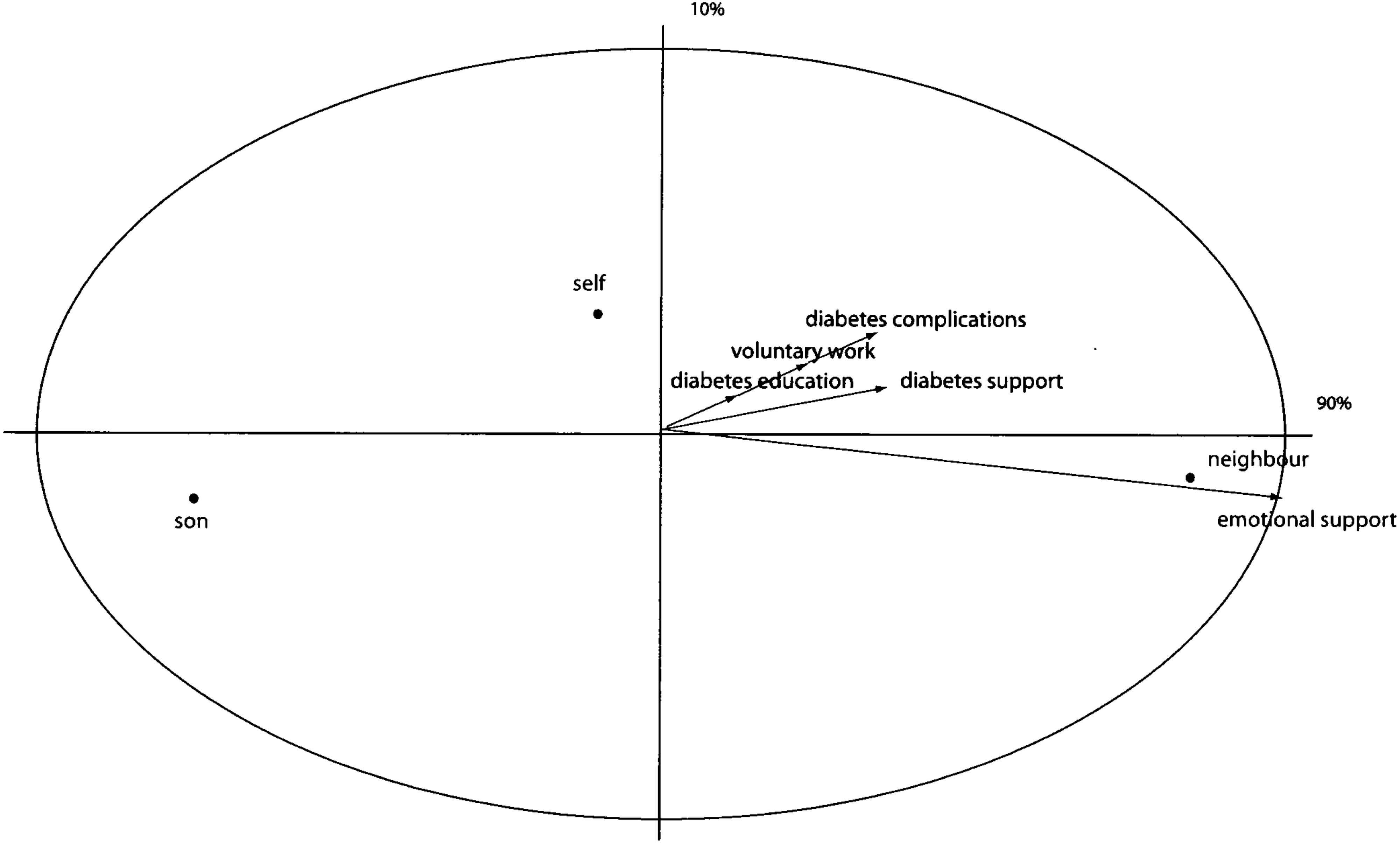
Table 45: INGRID computed variance values (PCA) for focused grid 1: case study 7

Principal Component	Eigenvalue	Percentage	Cumulative percentage
PC1	43.98	90.38	90.38
PC2	4.68	9.62	100

Visual analysis of the focused grid, performed during the interview led Helen and the researcher to discuss completion of a second focused grid, continuing with the laddering process.

The following bi-plot from INGRID PCA analysis demonstrated a personal construct for Helen of 'interdependence' of core diabetes related constructs between self and Helen's neighbour. However, the grouped vectors suggest that each element provides a dependent role 'self or neighbour,' demonstrating that Helen may have low self-confidence in these areas, related to her mechanism of coping. However, the neighbour is again reliably shown to be supportive of Helen for emotional support; Helen is dependent on this support (informal network).

to elements and principal components 1 & 2 axes, for case study 7, 1st focused grid.



Focused grid 2: case study 7.

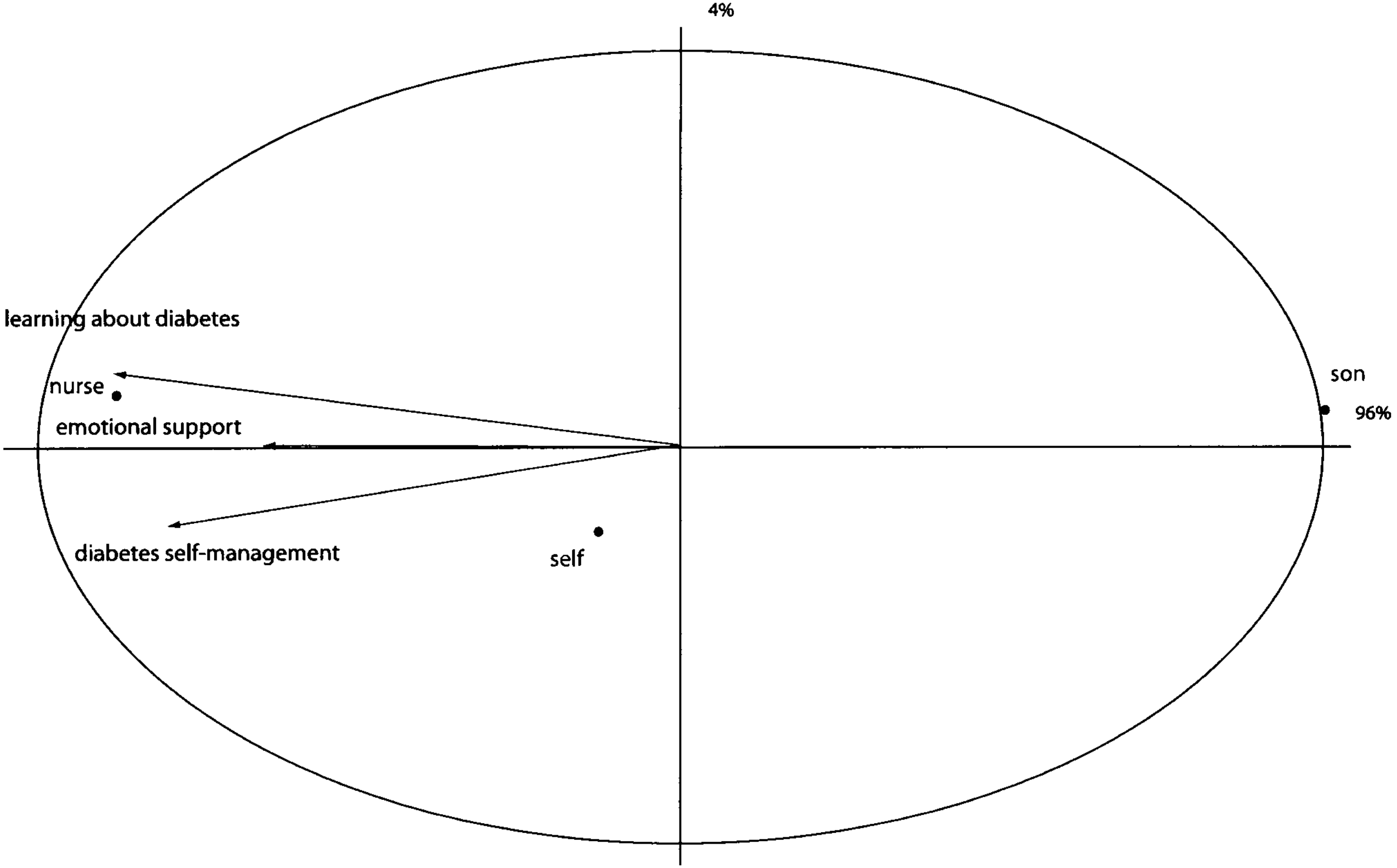
After exploring the ratings in focused grid 1, Helen stated that possibly a healthcare professional could help with more constructive ways in her emotional support. This may also help with her coping and her perceived self low impact on condition management.

Table 46: Completed ratings for focused grid 2: case study 7

Construct	**Element**		
	son	self	nurse
Emotional support	0	3	5
Self-management of diabetes	0	5	6
Learning about diabetes	1	4	8

INGRID analysis of focused grid 2 revealed one principal component accounting for 96% of the variance which in the following bi-plot demonstrates Helen's recognition that in order to improve her confidence in managing her condition, she perceives that the practice nurse can help, not only through education but emotional support as well.

Figure 19: INGRID Bi-plot illustrating the correlation of the constructs to elements and principal components 1 & 2 axes, for case study 7, 2nd focused grid.



Following this focused grid 2, Helen requested of the researcher to explore more in-depth her personal construct of coping and talking to people together with her perception that she needed to "look after herself."

Table 47: Completed ratings for focused grid 3: case study 7

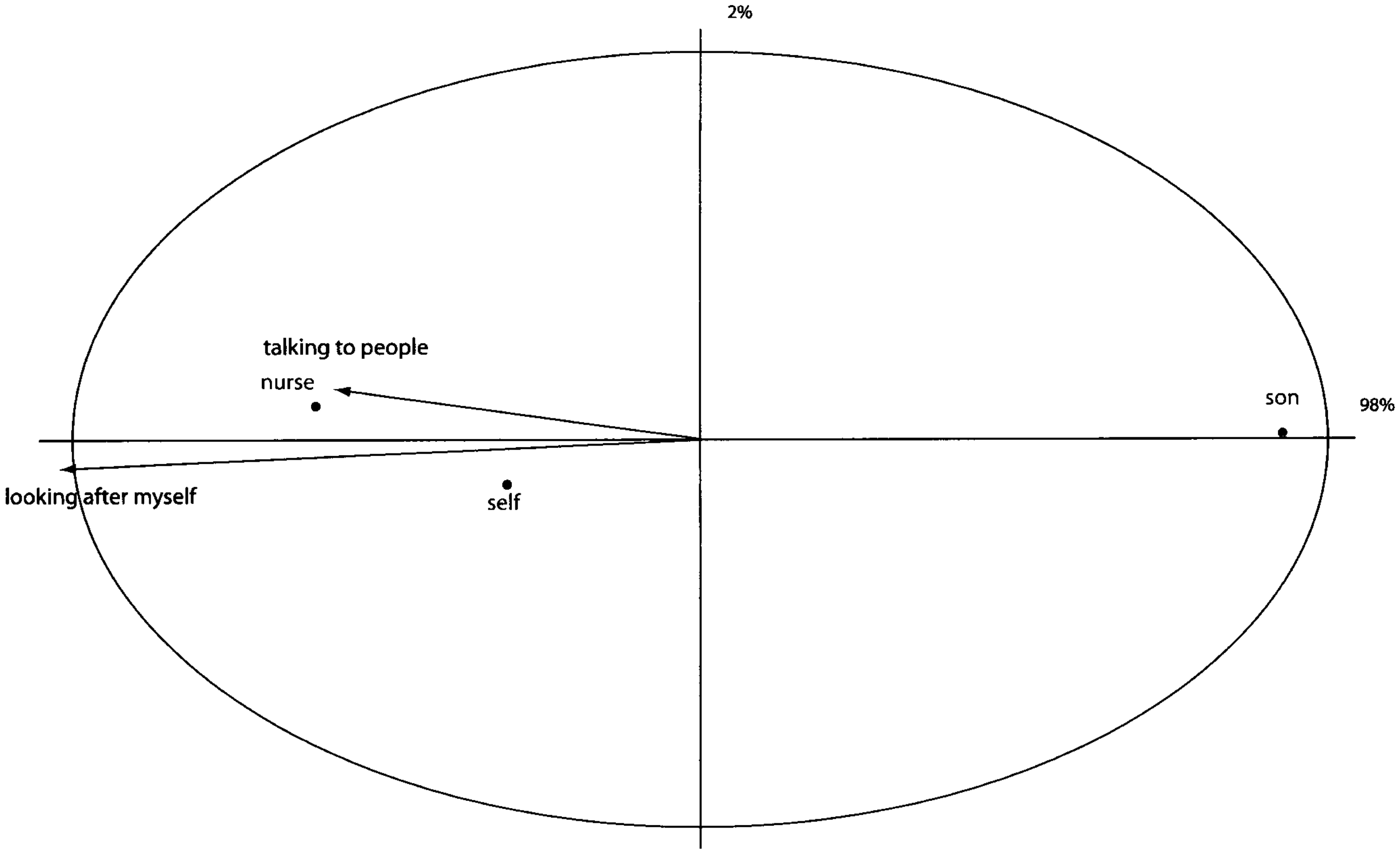
Construct	**Element**		
	son	self	nurse
Talking to people	3	6	8
Looking after myself	1	8	9

In exploring her ratings Helen stated *"Well I think I've got to get off my behind and open up to people…you never know my son may even start to talk to me." "If I learn from the nurse maybe I can improve the way I am coping."*

INGRID analysis: focused grid 3: case study 7.

PCA revealed a principal component of 98% accounting for nearly all of the variance in this focused grid.

to elements and principal components 1 & 2 axes, for case study 7, 3rd focused grid.



This bi-plot illustration of the element/construct loadings demonstrates Helen's realised perceptions that attempting to talk to others (healthcare professionals) rather than her low supportive family network, will increase her ability to self-manage and live with her condition.

Discussion of analysis: case study 7.

During this longitudinal process of investigation with the DDGT method, it is apparent that Helen has perceived within herself her reduced ability to cope. This may have the benefit of accepting intervention outside of her negative dependent relationship with her family. Therefore the laddering process in this case study has supported the first DDGT analysis that Helen's personal constructs in type 2 diabetes are centred on being able to share dependency between herself and 'expert' others rather than a 'non-expert' informal network. Through this process Helen has recognised that transferring her 'coping dependence' from her neighbour to a healthcare professional may improve her condition experience whilst retaining her social interdependence for other non-condition related activity. This may also help Helen to achieve a sense of worth, in for example performing voluntary work.

Helen recognises that focusing on the negative dependency relationship with her son will result in a personal construct of low self-worth and coping. She perceives that a positive outcome is to utilise formal support networks for coping and continue to utilise formal intervention for dietary management. This would constitute a coping dependency with a positive outcome perception for Helen.

Therefore the connectivity or super-ordinate of Helen's personal constructs is a utilisation of condition specific emotional and functional interdependence.

Helen's case study DDGT analysis, particularly with the laddering process, has demonstrated the complex nature of living with type 2 diabetes. It also has demonstrated how the DDGT is a revealing personal construct identification method which can transfer into therapeutic realisation benefit.

Helen's case study has relational aspects to the already presented literature in family network support, and in coping strategies employed presented in discussion of previous case studies findings (Peyrot et al. 1988, Chesla et al. 2000, Macrodimitris & Endler 2001).

In addition, there is an indication that as Helen perceives the therapeutic nature of the DDGT, that formal intervention to aid in her coping and self-management may exist. There are some indications in the literature that evidence exists to support the use of formal interventions in empowerment and other psychological interventions (Glasgow et al. 1999, Norris, Engelgau & Narayan 2002).

Case Study 8 - (DRG 015/ A022)

This case study is a presentation of a 70 year old Afro-Caribbean man, who has had type 2 diabetes diagnosed for five years. He was treated at the time of the interviews with dietary restrictions, exercise and oral hypoglycaemic agents. For the purposes of this case study he is referred to as the pseudonym 'Alan'. In terms of health status, Alan stated he knew he had raised blood pressure, last reported as 140/80. He did not know his HbA_{1c}, stating when asked that he did not understand what that was. His BMI at interview was 30, indicating the overweight/obese level. Alan did not smoke but had had a *"few in the past."* When asked if he had any complications his response was negative.

Alan was a retired manual labourer who had worked in the building trade. He had no educational background other than the church in Jamaica. He had moved to England after the Second World War and had been married to his wife for 34 years. The first exploratory interview took place 10 months before the second interview, where one full DDGT was completed, and one focused grid through the laddering process. The interviews were conducted with Alan's wife and daughter present.

Alan and the researcher discussed the nature of the grid testing and the constructs and elements were listed. ('Diabetes complications' was only rated after the daughter and wife had left the room and was associated with Alan's revealing he had an erectile dysfunction problem which he had not associated with his condition).

Table 48: Completed ratings for the DDGT: case study 8

Construct	Element				
	wife	daughter	self	GP	diabetes specialist nurse
Diabetes self-management	4	6	2	5	5
Diabetes care	5	7	1	6	5
Diabetes complications	4	5	1	1	1
Other health problems	3	4	3	4	5
Diabetes management support	5	7	1	3	6
Social activity	4	4	0	0	0
Exercise	2	3	0	0	4
Diet	8	8	1	1	5
Emotional support	4	4	3	0	2
Altering behaviour	4	3	1	0	5
Changing lifestyle	3	4	1	1	4
Future thinking	5	5	6	2	3
Education	4	5	0	1	6

Visual, cluster analysis demonstrated a consistent mid to low rating for all constructs to elements, the lowest ratings associated with Alan as himself. The higher ratings were towards his daughter and the healthcare professionals for process-orientated condition specific associates. One distinct higher rating for Alan as himself was 6 for 'future thinking,' were he stated in explanation, *"I worry about the diabetes."* There was a direct link between his daughter and 'diabetes care,' where his daughter explained in the DDGT interview that she did Alan's blood sugar reading and gave him his tablets. Alan did not rate 'meaningful work' at all perceiving that this had no impact on his life and his condition as he was retired.

Alan stated he did no exercise, but by rating the diabetes specialist nurse as 4 had been *"told about it."* For education Alan stated *"I don't know much...my daughter looks after it all."*

When the DDGT had been completed and the interview was ending, Alan asked to speak to the researcher privately stating that he had a problem with his sex life which he wanted to discuss when his wife and daughter had left the room. He related to the researcher an erectile dysfunction problem that he had experienced for a "few" years but had not talked about it with anyone. He had not identified it as a diabetes-related problem. The researcher suggested that Alan could rate this and explore this problem in a focused grid as Alan had also stated he was "*a bit depressed about it.*"

INGRID Analysis: case study 8: DDGT.

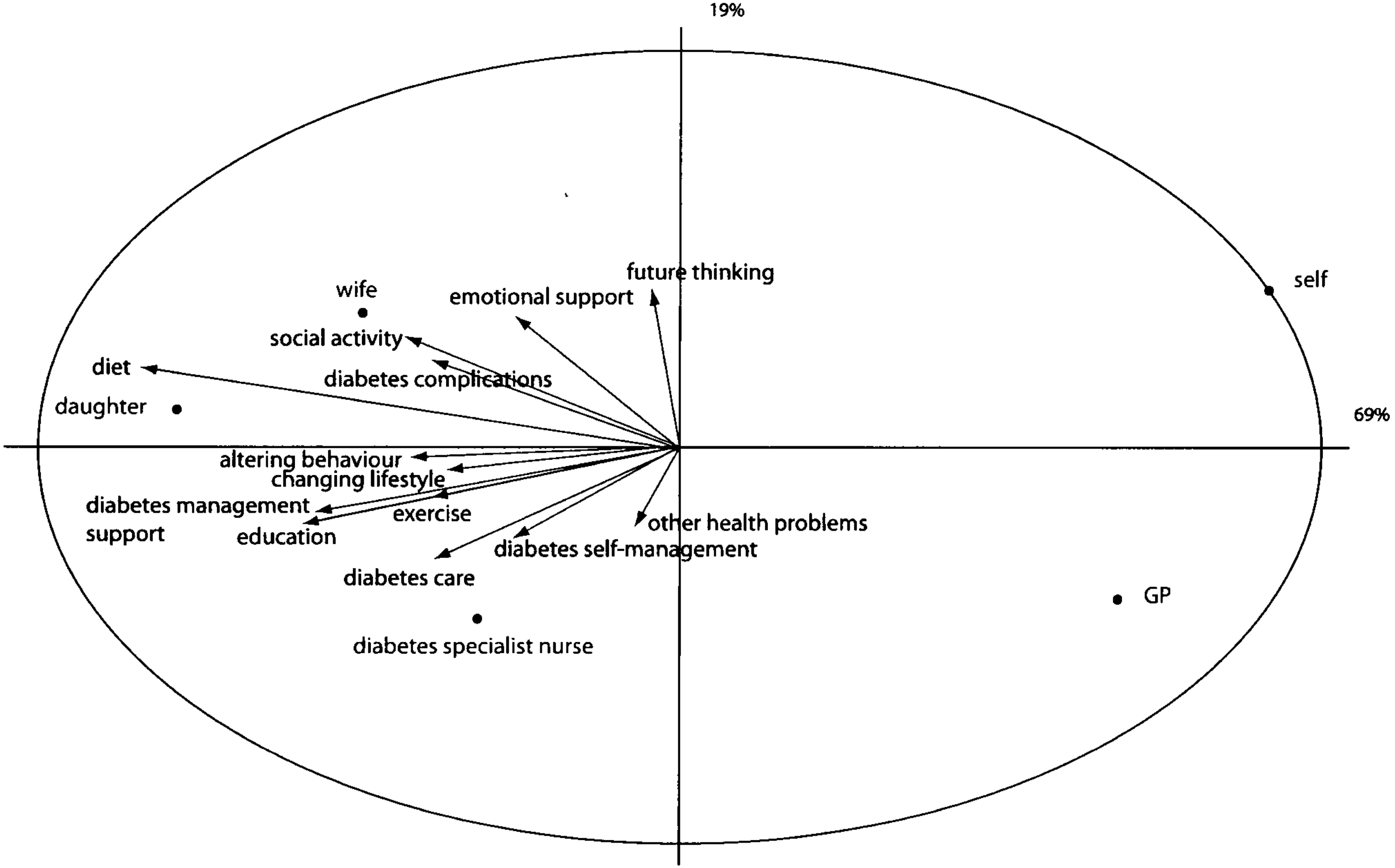
PCA revealed 3 main components of interdependence related personal constructs in Alan's condition experience; principal component 1 (69% variance); principal component 2 (19% variance); principal component 3 (11% variance).

Table 49: INGRID computed variance values (PCA) for DDGT: case study 8

Principal Component	Eigen value	Percentage	Cumulative percentage
PC1	156.92	68.94	68.94
PC2	42.64	18.73	87.68
PC3	24.89	10.94	98.62
PC4	3.15	1.38	100

The following bi-plot of principal component 1 and principal component 2 illustrates Alan's personal constructs in relation to his condition living experience and dependency.

to elements and principal components 1 & 2 axes, for case study 8, completed DDGT



Principal Component 1 (PC1, 69% total variance)
Personal Construct: 'Diabetes Dependence'

The bi-plot illustrates all of Alan's constructs vectored away from himself (complete peripheral vector) and his GP to a lesser degree. There is some angular spread to suggest that not all the constructs are grouped within dependence, and further delineation revealed that whilst all are negatively correlated, some are less so than others, according to the element associated constructs vector directions.

The groupings vectored towards Alan's wife and daughter, which have a slightly more positive correlation to principal component 1 are associated with Alan's feelings and family-orientated diabetes management which is interpreted as a strong family support network on which Alan is dependent.

The more negative groupings below the principal component 1 line are vectored towards the central healthcare professional (diabetes specialist nurse). They are associated with those aspects of condition living that Alan most dissociates himself from and 'transfers' the dependency away. This is an aspect of denial of issues which Alan does not address, or want to consider, as part of his condition experience; altering behaviour, changing lifestyle, education and care.

Within the principal component 1 grouping there is also the element of Alan's family network (wife and daughter) upon whom he is dependent for 'dietary management' and 'emotional support.'

Principal Component 2 (19% total variance)
Personal Construct: 'Anxiety Isolation'

This component is intriguing as the closest 2 constructs to the principal component 2 line are Alan's thoughts about the future and his 'hidden' problem of erectile dysfunction, or his 'other health problem' of raised blood pressure. The closest vectored element appears to be the diabetes specialist nurse, although this person is more associated in Alan's first personal construct of diabetes dependence. This then can be interpreted as an isolation of dependency, and where Alan's worry about the future has no dependency variation associated with a person. However, as in principal component 1 Alan as himself is distanced completely from this principal component.

Principal Component 3 (PC3, 11% total variance)
Personal Construct: 'Disassociated independence'

Although this is not plotted on the INGRID bi-plot principal component 3 can be delineated through examination of the numeric element and construct loadings and Euclidean (inter-element) distances. Alan, it appears, has little or no relationship of his condition to his perception of himself as living with and being able to manage it. This disassociation from his condition is as a result of two polar personal constructs; complete condition dependence with other people and complete independence from a condition identity. This could be viewed as healthy, but is only correlated at 11% as Alan recognises in himself the need to accept that aspects (in particular his secreted erectile dysfunction) of his condition are not a desirable outcome for Alan himself (manifest as feelings of mood change).

Following visual cluster analysis and Alan's revelation concerning his problem (which he understood as the term impotence rather than erectile dysfunction and was therefore the term he used), Alan agreed to complete a focused grid using the laddering technique.

Focused grid 1: case study 8: focused grid 1.

In determining the focused grid construct and element labels, Alan discussed his 'impotence' problem and how this makes him feel 'depressed'.

Table 50: Completed ratings for focused grid 1: case study 8

Constructs	**Element**		
	wife	daughter	self
Impotence	0	0	1
Anxiety	0	0	8
Depression	6	4	9

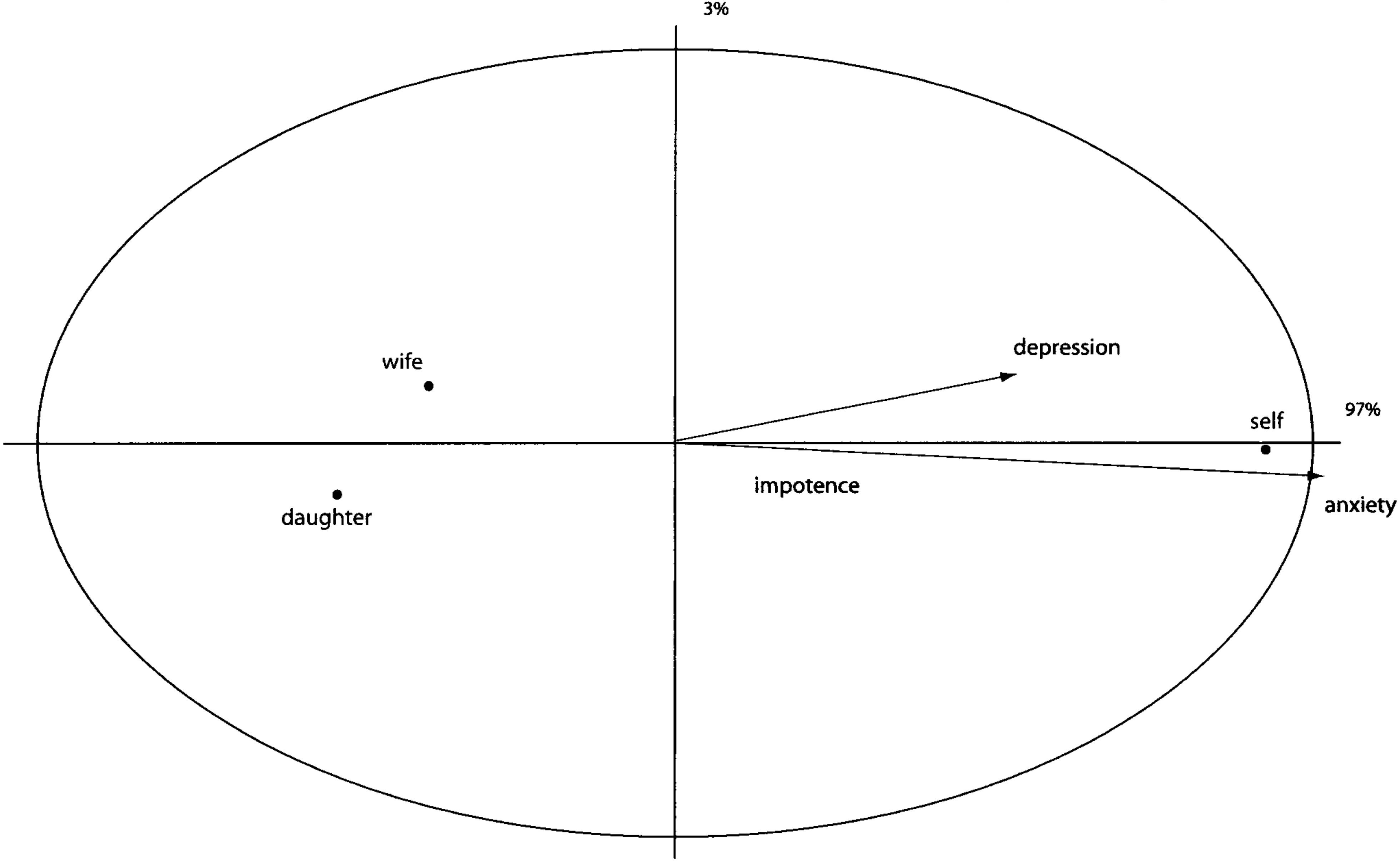
In explanation of the ratings on element to construct impact Alan explained again that he had kept his problem from his wife, and they had not had sex for a long time, to which they had both attributed this to age. Alan did not feel he could talk to his daughter about the problem, and felt there was little he could do himself. When asked why he did not go to see his GP, Alan stated that he very rarely went and he could not talk to the diabetes specialist nurse as she was a woman.

For 'worry' Alan thought that this was focused on himself and the feelings of mood change he attributed to fatigue and *"the problem downstairs…."*

INGRID analysis: focused grid 1: case study 8.

PCA revealed one principal component accounting for 97% of the variance and the following is the INGRID bi-plot generated for this principal component.

Figure 22: INGRID Bi-plot illustrating the correlation of the constructs to elements and principal components 1 & 2 axes, for case study 8, 1st focused grid.



In the analysis, the underlying issues and super-ordinate to Alan's identified personal constructs are revealed. All three constructs are vectored towards Alan as 'himself', in distinct contrast to the full DDGT. Indeed Alan as himself is correlated absolutely on the 97% PC1 line. Alan perceives the association between his feelings of mood change and his erectile dysfunction which are overridden by his anxiety. Therefore, the findings of PC3 from the DDGT of disassociated independence and principal component 2 of anxiety isolation are reliable and internally valid to Alan's living with his condition. That this super-ordinate is converse to his overall diabetes constructs, where he is clearly dependent, suggests that this could be detrimental for Alan's condition experience and mental health state.

Discussion of analysis: case study 8.

To reiterate the findings from focused grid 1, Alan has a dissociation independence from his feelings with his diabetes dependence concerning his management. The connectivity between the two personal constructs is Alan's perception of dependent need to solve his erectile dysfunction problem and his associated mood change.

Alan has an independent perception which has little association with his dependency concerning his condition. On appearances he could be 'happy' with this, however the focused grid suggests that Alan has an alternative personal construct which has a negative connotation for his mental health. The positive correlation in the analysis would support this.

Alan's case study findings are supportive and suggest an association with research into altered mood states and complication development in diabetes mellitus. However, these studies have not focused on type 2 diabetes. Studies have determined that mood change and disorder are more prevalent in diabetes patients than in the general population (Garvard, Lustman & Clouse 1993, Peyrot & Rubin 1999). Depression levels have been measured across varying diabetes typology, different cultural and contextual aspects, and found to be consistently high. In some cases three times the current prevalence in a non-diabetes mellitus population (Peyrot & Rubin 1999, Fisher et al. 2001).

Clearly, Alan relies, and is dependent, on a close family support network. However, in Alan's case this has not particularly resulted in positive outcomes. It has ensured that he follows a treatment regime at a process, functional level. It does not appear that Alan is approaching self-management of his condition.

Case Study 9 - (DRG 003/ A023)

This case study is a presentation of a 67 year old white woman who will be referred to as Margaret.

Margaret had been diagnosed with type 2 diabetes for 15 years at the time of the first interview, treated with dietary restrictions, Metformin and exercise. She considered, but did not know conclusively, that she had peripheral neuropathy in her feet as a condition complication. Her BMI was 26 (overweight by one point on the scale). Margaret did not know her blood pressure reading and her HbA_{1c} she reported as 6.4%. Her other health problem was a previously raised blood cholesterol level which was controlled by dietary restrictions. Margaret stated she had never smoked.

Margaret had been married for 42 years, had a daughter and son, both of whom were now living away from home. She was retired from work as a playgroup supervisor, having worked after her children had grown up.

Two grids were completed during one interview of 1 hour and 20 minutes duration, completed 3 weeks apart, one year after the initial exploratory interview. The researcher explained the DDGT process and Margaret listed the constructs and elements pertinent to her condition experience.

Table 51: Completed ratings for the DDGT: case study 9

Constructs	**Element**							
	husband	son	Daughter (with diabetes)	self	GP	practice nurse	dietician	close friend
Diabetes self-management	3	0	4	10	8	8	0	7
Diabetes care	10	4	10	5	10	10	0	10
Diabetes complications	3	0	5	10	7	7	5	8
Other health problem	10	10	10	10	8	8	5	2
Exercise	0	0	4	10	0	0	0	0
Diet	0	0	5	10	1	2	4	8
Emotional support	10	10	10	1	7	5	0	7
Altering behaviour	0	0	5	10	5	3	3	5
Education	0	0	1	9	9	7	9	9

Focusing on the extremity ratings, Margaret explained that she looked after her diabetes herself, but had good support from her GP and practice nurse in order to achieve her self-management. On visual cluster analysis all process-orientated and self-orientated condition management aspects were rated highly in positive impact associates. Margaret rated her daughter with diabetes as having a high impact for emotional support.

INGRID analysis: case study 9: DDGT.

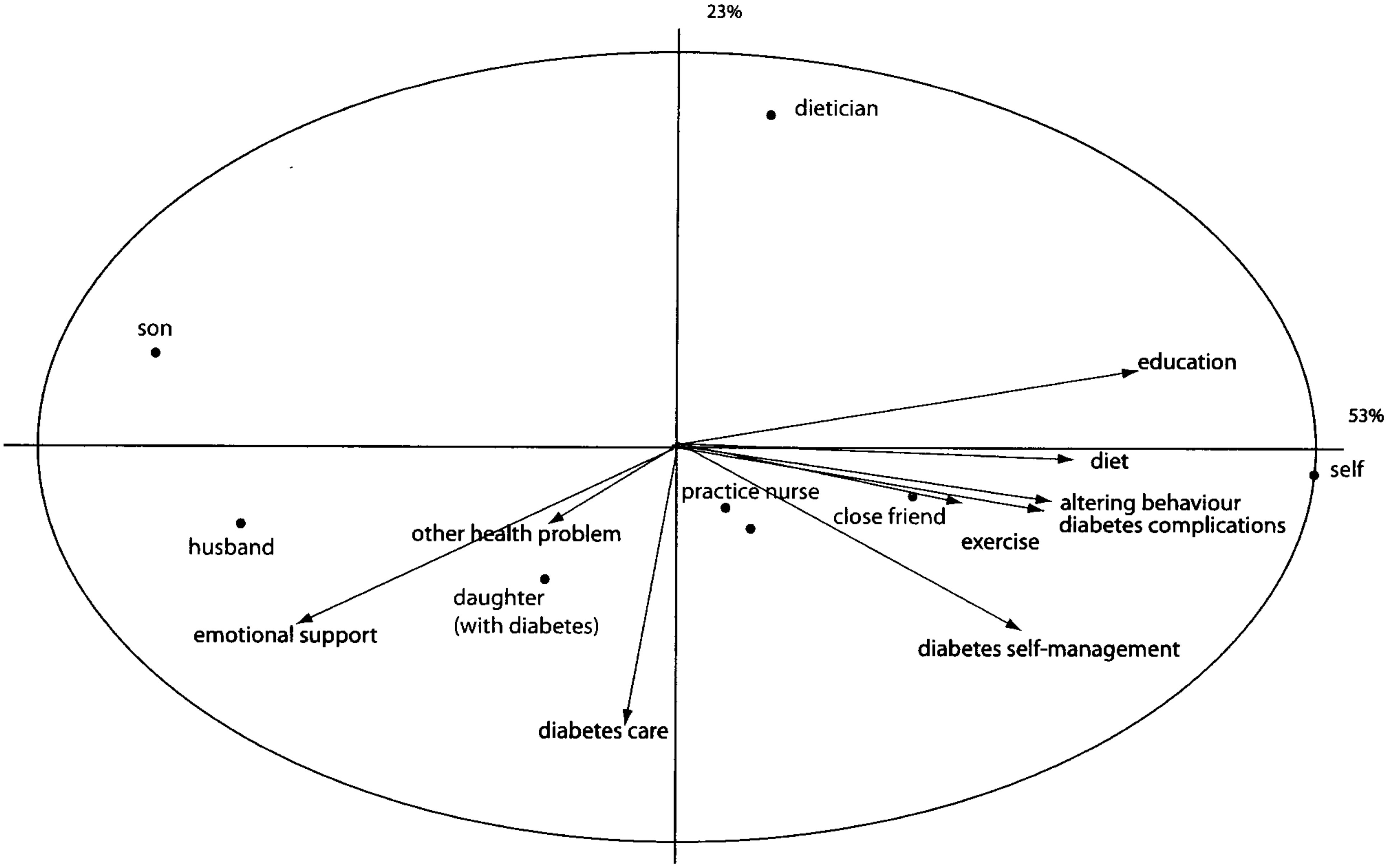
PCA revealed three main principal components of principal component 1 (53% variance); principal component 2 (23% variance): principal component 3 (16% variance). The following is the entire variance distribution calculated by PCA for Margaret's first full DDGT.

Table 52: INGRID computed variance values (PCA) for DDGT: case study 9

Principal Component	Eigenvalue	Percentage	Cumulative Percentage
PC1	449.02	53.33	53.33
PC2	193	22.92	76.25
PC3	135.69	16.12	92.36
PC4	50.71	6.02	98.39
PC5	9.11	1.08	99.47
PC6	4.23	0.5	99.97
PC7	0.24	0.03	100

INGRID analysis presented the following bi-plot illustration of the element to construct loadings on the first two principal component lines.

to elements and principal components 1 & 2 axes, for case study 9, completed DDGT



Principal Component 1 (PC1, 53% total variance)
Personal Construct: 'Condition Interdependence'

The wide-angled distribution on the elements to construct loadings with Margaret closest to the principal component 1 (53%) line suggests that most, if not all, aspects of Margaret's condition experience are shared with herself as the primary focus and her healthcare professionals and family. This would suggest a balanced 'interdependence' for Margaret's condition and life with a 'healthy' perception of her own independence in 'maintaining her lifestyle,' 'behaviour towards her condition' and 'dietary management.'

Principal Component 2 (PC2, 23% total variance)
Personal Construct: 'Diabetes specific emotional dependence'

There is a less positive correlation, but a clear association, between Margaret's emotional support and her daughter, linked with her relationship with her husband. Her husband has the greatest value correlation for impact on Margaret's emotional support within her marriage and her life. Specifically, Margaret has a dependent relationship with her daughter concerning her diabetes care and health associated with her condition.

Principal Component 3 (PC3, 16% total variance)
Personal Construct: 'Peripheral support independence'

This principal component can be delineated from examination of the construct and vector loadings within the numeric values analysed via the modified INGRID programme. Margaret has an independence from others within her family network and within her formal healthcare professional service. In particular, Margaret has no dependence with her son and has dependence from her dietician, despite having regular contact with these two elements.

One aspect of principal component one, which was also identified through visual cluster analysis, was when Margaret was asked to explain her ratings concerning dietary management. Margaret explained that on regular occasions she had *"dietary excursions"* with her friend and felt guilty about this. Margaret explained that she would dine out with her friend, and she would not follow her dietary restrictions when she did this, only feeling "slightly" guilty as all the rest of the time she followed the restrictions.

After explanation of the laddering process Margaret agreed to attempt completion of a focused grid.

Focus Grid 1: case study 9.

Margaret was keen to explore her emotional support network impact on her condition life and if there was any therapeutic relationship to her guilty feelings from dietary excursions.

Table 53: Completed ratings for focused grid 1: case study 9

Construct	**Element**		
	husband	self	close friend
Support	9	8	8
Guilty feelings	2	4	3

In explanation of her ratings Margaret stated *"I feel very good about my diabetes...I have great support from my husband...he would do more if I asked him to."*

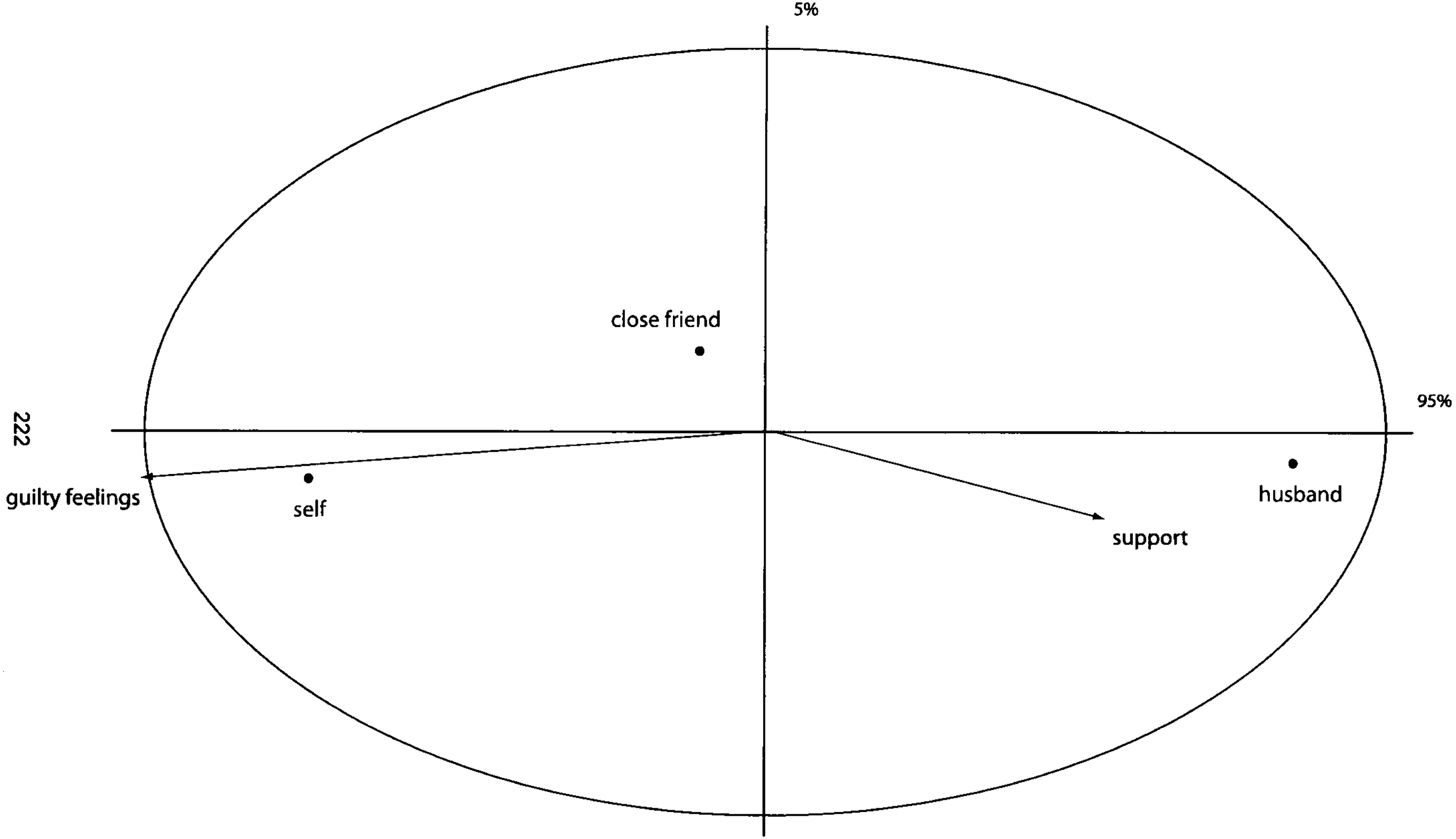
The fairly low impact ratings of feeling guilty were more visually apparently associated with Margaret herself, and she stated in explanation of this, *"sometimes I feel guilty when I eat something I shouldn't but it's not often...I don't worry about it."*

INGRID analysis; focused grid 1: case study 9

PCA revealed two principal components, however only one of significance accounting for 95% of the variance.

The following is the INGRID generated illustration for Margaret's focused grid.

to elements and principal components 1 & 2 axes, for case study 9, 1st focused grid.



Examining the bi-plot the principal component 1 line of 95% clearly indicates that there is a personal construct of Margaret having responsibility and independence for herself for her eating habits and the resultant guilty feelings, which by this analysis are not associated with her friend. Margaret's support mechanism in this construct is her husband and this is not affected by her feelings of guilt which are vectored away from her husband.

Margaret perceives she does not need support in this construct, however uses the support of her friend to alter her eating habits with an independent feeling of guilt.

Discussion of analysis: case study 9

Margaret has an independence/interdependence in living with her condition which reveals a 'healthy' picture of her diabetes experience, where she is confident and happy with it. Margaret does not transfer in dependency terms, any guilt feelings abnormally and has a strong emotional support relationship with her husband. She has a good emotional and diabetes care relationship with her daughter and her healthcare professional team, which she perceives interdependently provides for her needs regarding diabetes management.

Margaret's case study illustrates previous studies findings that indicate good informal support networks can enable perceptions of good quality of life and good diabetes related outcomes. Previous studies in type 2 diabetes have focused on aspects of family and social support networks, including separating contextual and cultural factors, and having predictable positive outcomes on diabetes related end-points (Fisher et al. 1998, Chesla et al. 1999, Glasgow et al. 1999, Chesla & Rungreangkulkij 2001). Perhaps the most significant of these is Fisher et al.'s (1998) systematic review which determined that there are many different family and social support networks utilised by people with diabetes, and those that used them in normal, family functioning ways to aid in management of conditions had better outcomes than those that did not. Also, health intervention strategies and interventions which encompassed family member and social support networks, resulted in improved outcomes for people with diabetes in physical and psychosocial measurements (Fisher et al. 1998, Glasgow et al. 1999, Chesla et al. 2000, 2001).

It appears that in Margaret's case, the construct of achieving a 'balanced' lifestyle with a chronic condition holds true. Paterson, Thorne & Dewis (1998) synthesised all qualitative studies in diabetes over a specified period of time and overall could identify one overriding theme that was common to many of the studies; that people with diabetes wanted to achieve a sense of 'balance' in their lives between living a 'normal' way and living with diabetes. The use of the term 'balance' was also delineated to describe issues of self-management, counter-balanced against healthcare professional direction and treatment regimes. Balance was also described in the context of trying to achieve good control of the disease processes, i.e. normoglycaemia and prevention of complications, and with continuing lifestyle choices.

Case Study 10 - (DRG002/ A010)

This final case study is a presentation of the DDGT process with a 33 year old white woman, who will be referred to as Alison.

Alison had been diagnosed as having type 2 diabetes for 3 years at the time of the interviews, treated with dietary restrictions, Metformin, Glicazide and exercise. Her self-reported HbA_{1c} was 8.4%, blood pressure 132/80 (self-test machine) and her BMI was 41, (very obese). Alison explained that she was currently attending her GP and dietician for weight reduction. Alison stated that she had problems with raised blood pressure and was being treated with medication. She listed a separate, as she perceived unconnected, health problem as cellulitis in her legs.

Alison had been married for 5 years, had no children (although she stated she and her husband had been trying since marriage) and lived with her husband. She had attended school and college, continuing to study until age 19 qualifying as a nursery nurse. She stated she was currently on long-term sick leave from her employment due to *"diabetes out of control"*.

After the initial exploratory interview 12 months earlier, 2 further interviews were completed with one full DDGT grid and three focused grids produced through the laddering process.

After explanation of the procedure the elements (people) pertinent to Alison's condition life were listed in the grid, with all 14 constructs included. The following is Alison's first completed full rated grid.

Table 54: Completed ratings for the DDGT: case study 10

Constructs	**Elements**					
	husband	father	mother	self	GP	nurse
Diabetes self-management	4	6	8	3	0	2
Diabetes care	3	4	5	2	1	3
Diabetes complications	3	3	5	2	1	3
Other health problems	5	3	7	1	2	2
Diabetes management support	5	4	7	2	1	3
Social activity	8	3	8	4	0	0
Meaningful work	5	7	6	5	0	0
Exercise	2	2	5	2	0	1
Dietary management	1	3	8	2	0	1
Emotional support	3	8	9	1	0	0
Altering behaviour	2	4	7	1	1	3
Changing lifestyle	2	3	5	2	1	2
Future thinking	6	3	7	3	1	1
Education	1	3	2	1	0	3

Initial visual cluster analysis revealed the highest element ratings towards Alison's mother followed by her father, decreasing towards her husband, self and finally the lowest ratings for her GP. These ratings were consistent across most constructs apart from 'dietary management' for her husband (1) which was reported as having low impact and a high rating for dietary management for her mother, *"my mum taught me to cook and it's not healthy."* Exercise was rated low across the elements and Alison explained *"my weight is a big issue for me, it's difficult to exercise."*

For 'meaningful work' Alison explained that that she could not perform effectively at work at the moment due to a number of diabetes, weight-related and in-vitro fertilisation issues. This she explained was partly due to her workplace having little knowledge of her condition, and not providing any support. In addition, she 'suggested' she was unable to control her blood sugar level whilst at work (perception).

The researcher queried with Alison why she had rated her father highest for 'meaningful work' and she stated "my dad thinks I should be at work - I have always had to live up to him."

Alison explained that she found it difficult to talk to her husband about her weight and condition issues, hence his low impact rating for 'emotional support.'

When asked to explain why Alison had rated her GP as 0 or very low, she stated vehemently *"my GP has a bad attitude to me...he hates me."*

When rating 'altering behaviour' and 'changing lifestyle' Alison stated that currently she *"didn't feel strong enough to change... I'm not confident."*

Following lengthy discussion, and joint visual analysis, Alison was enthusiastic to attempt the laddering process.

INGRID Analysis: case study 10: DDGT.

Principal component analysis revealed two principal components of 78% (principal component 1) and 11% (principal component 2) variance.

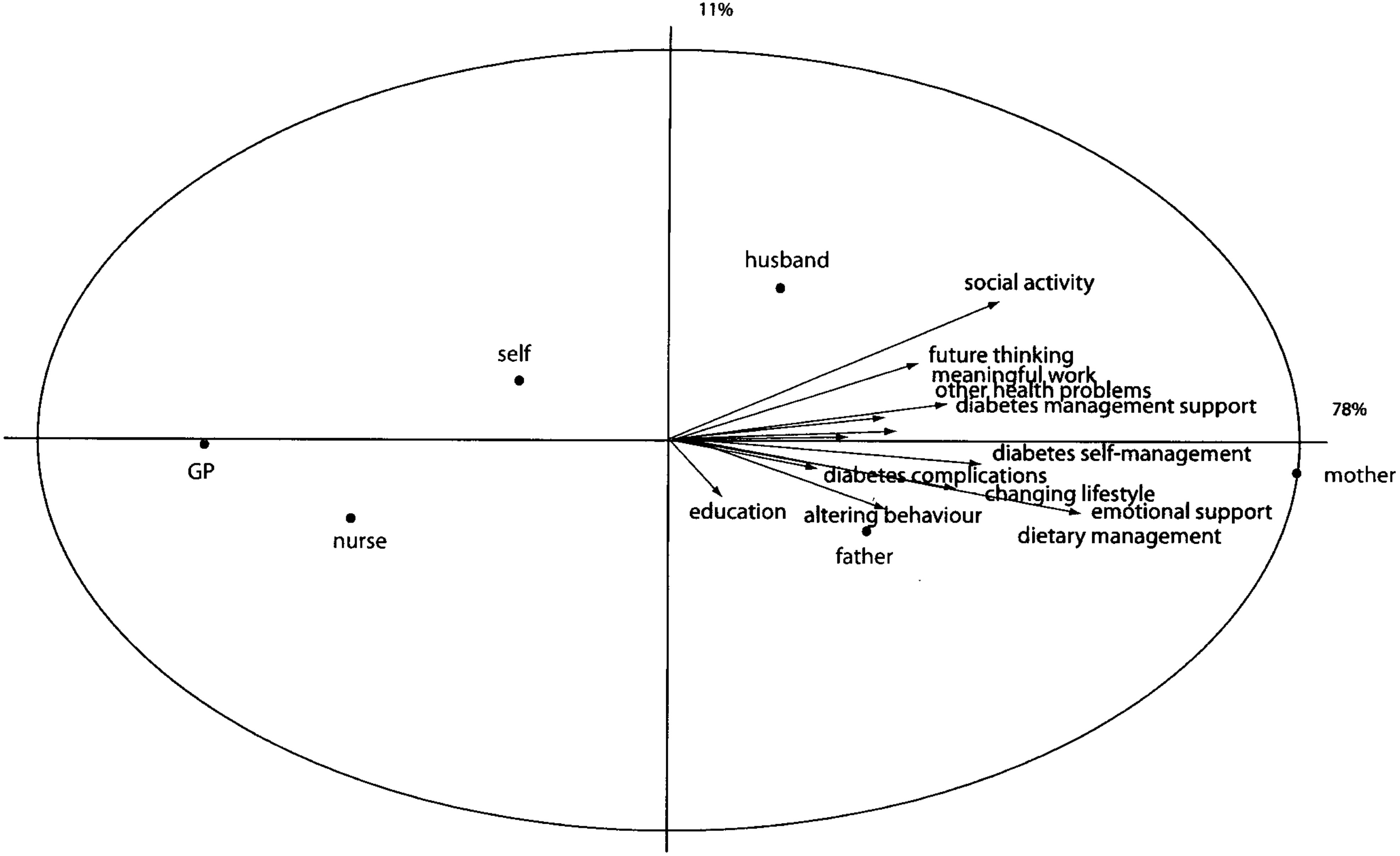
The following is the entire principal component values obtained by PCA of the first full grid.

Table 55: INGRID computed variance values (PCA) for DDGT: case study 10

Principal component	Eigenvalue	Percentage	Cumulative percentage
PC1	336.59	78.03	78.03
PC2	47.64	11.04	89.08
PC3	29.32	6.8	95.88
PC4	9.53	2.21	98.09
PC5	8.26	1.91	100

The following is the INGRID generated bi-plot illustrating the element and construct loadings on the principal component 1 and principal component 2 lines, revealing the vector spread and personal constructs for Alison in relation to her condition experience and dependency relationships.

to elements and principal components 1 & 2 axes, for case study 10, completed DDGT



Principal Component 1 (PC1, 78% total variance)
Personal Construct: 'Condition Family Dependence'

The close angular grouping of all the constructs in Alison's rated grid suggests a distinct element dependency at the 78% level and is a core personal construct for Alison. This personal construct grouping is vectored predominantly towards her mother and father. This is a strong positive correlation suggesting a condition life dependency. Alison is almost entirely dependent on her mother and father in her perceptions of impact for living with, and the experiences of, her condition.

The vectors associated with social activity and future thinking are loosely angled towards her husband. Her mother achieves the most significant correlation (loading) with Alison's constructs, and Alison clearly relies, and is dependent, on her support, and less so with her father.

Principal Component 2 (PC2, 11% total variance)
Personal Construct: 'Self isolation'

Alison perceives herself as having little or no impact in her diabetes life, and therefore little perception of herself as any independent diabetes identity. Her condition impact she clearly associates with her relationship with her mother and father and not herself. This principal component 2 and illustration reveals how Alison is also not confident of her husband's involvement in her condition life, and this is reflected in the lack of confidence in herself.

There is no correlation with her GP and constructs, with evidently no therapeutic relationship. This element, therefore, has a distinct negative impact with Alison's principal component 1 and principal component 2 factors.

Visual cluster analysis demonstrated to Alison and the researcher, the distinct dependency 'picture.' Alison found this revealing but she stated, not surprising. Alison was enthusiastic about continuing with the laddering process to explore her personal constructs through production of focused grids. In the first instance, Alison requested to explore her work, lifestyle, feelings and inability to manage her condition (as Alison perceived it). However, Alison did not want to include herself as an element.

Focus Grid 1: case study 10.

The following is Alison first focused grid obtained through the laddering technique.

Table 56: Completed ratings for focused grid 1: case study 10

Construct	**Element**			
	husband	GP	mother	manager
Managing diabetes	1	7	8	0
Work	2	6	6	3
Lifestyle change	3	4	8	3
Attitude/feelings	8	3	3	2

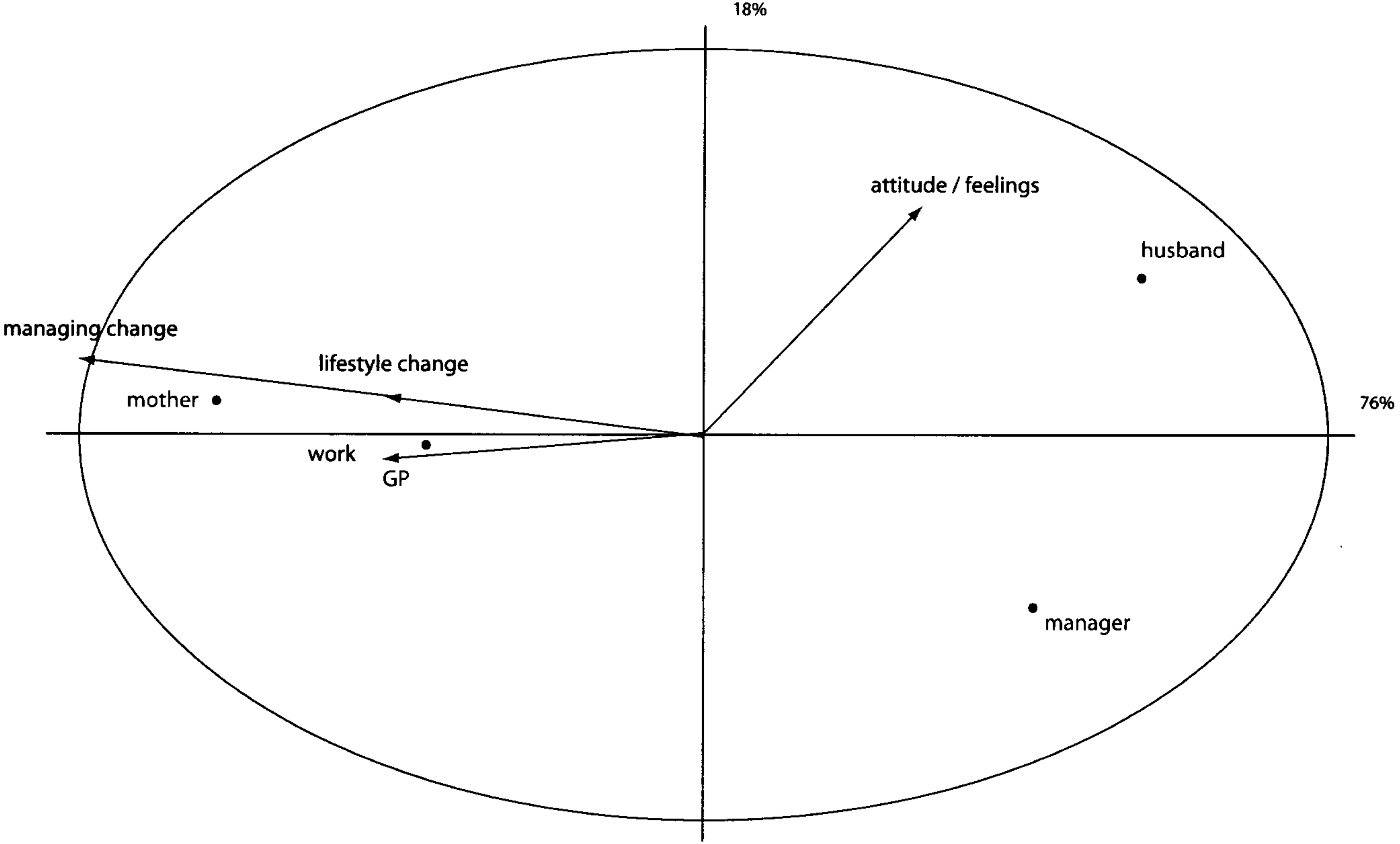
In explaining her ratings in this focus grid 1, Alison stated regarding her GP *"He's not willing to listen, he has a negative attitude...he goes through the motions...this affects me a lot."* However Alison had rated the GP 7 this time for the impact on managing her diabetes but in a negative way. Alison in part blames her GP's attitude for her self-perceived poor diabetes outcomes for control, weight and absence from work. Alison was positive towards her husband's impact on her feelings however and *stated "he's willing to listen but doesn't understand what I'm feeling."*

The manager was her employer and line manager at the private nursery. Alison rated her as a peripheral low impact explaining, as before, that there was little support for her condition in the nursery or for the current problems she was having.

INGRID PCA analysis of Focus grid 1 Revealed 2 principal components of 76% (principal component 1) and 18% (principal component 2).

The following is the resultant bi-plot illustration of the focused construct to element loadings on the principal component lines.

to elements and principal components 1 & 2 axes, for case study 10, 1st focused grid.



This bi-plot illustrates the negatively correlated construct of Alison's dependent association with her mother in her condition management, and perceived lifestyle changes Alison needs to make. Alison's GP is closely correlated to principal component 1. This is in relation to the high negative impact Alison perceives her GP has had on her condition experience. This also has had an impact on her diabetes management which has resulted in her being off work.

The manager at work is isolated and clearly has no perceived positive impact. This is a negative independent perception by Alison of her workplace, and possibly could be different if her workplace was more supportive.

Principal component 2 can be labelled 'emotional dependence' echoing the whole dependence result evidenced in Alison's full DDGT. It is clear that Alison views her husband's impact on her perceptions as improving their relationship. However she feels her condition (and adverse outcome) affects their relationship.

Focus Grid 2: case study 10

Following visual analysis of focus grid 1, Alison and the researcher discussed some of the issues which Alison stated she would like to continue in the laddering process. Alison indicated she would like to focus on her feelings and ability of her elements to listen, less as an impact but more as perceptions of need, i.e. possible therapeutic benefit within her family network.

Table 57: Completed ratings for focused grid 2: case study 10

Construct	**Element**		
	husband	GP	mother
Listening	6	1	9
Negative feelings	4	10	3
Knowledge that helps	2	2	10

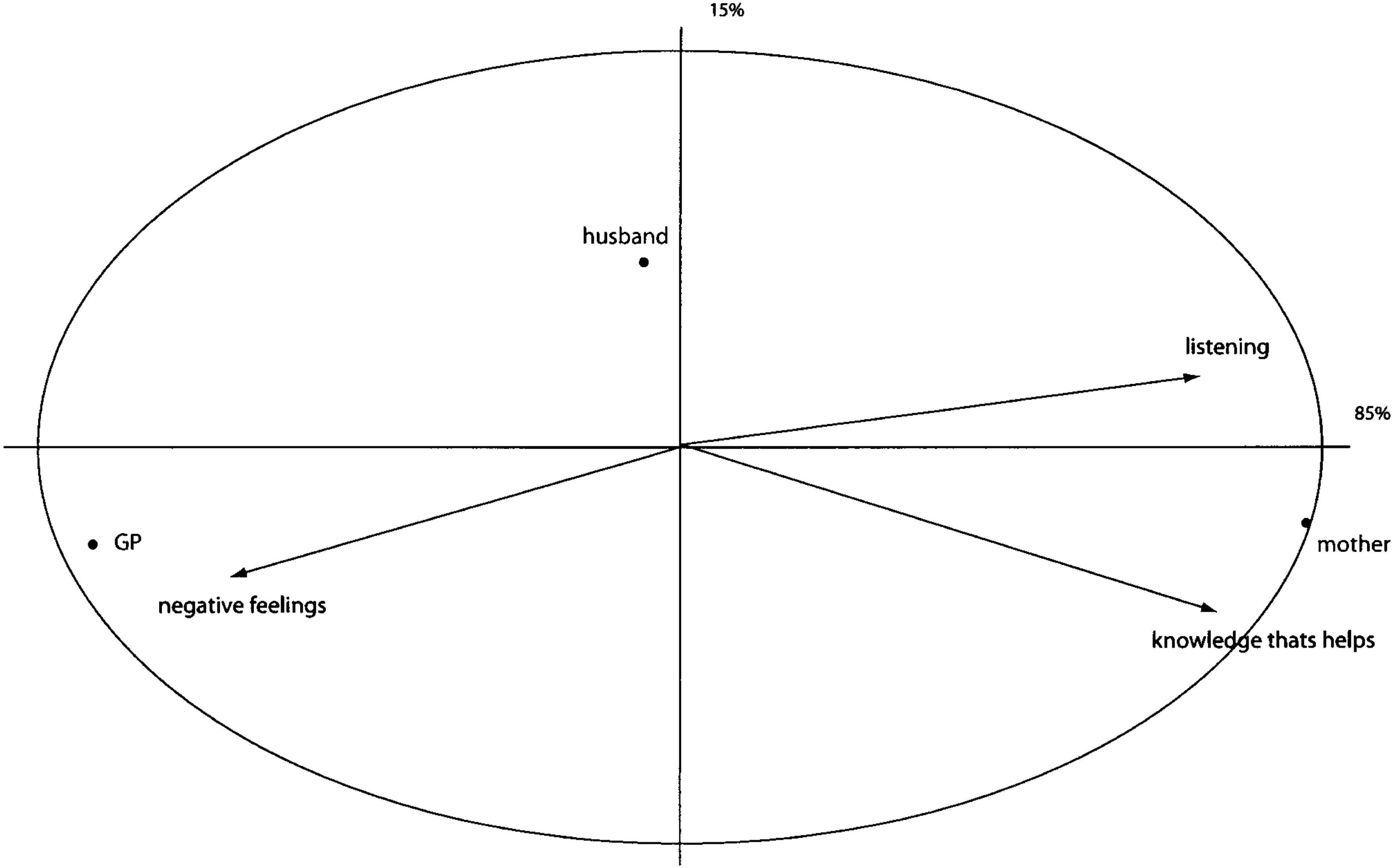
In explaining her ratings in this grid, Alison reiterated her perceived negative impact of her GP *"He puts the blame for everything on me...there is nothing good achieved when I see him...it makes me very angry."* For negative feelings the GP is rated as having the most impact and her mother the least. *"My mum is who helps me the most - if she* *wasn't there I don't know what I'd do."* Again the same picture is presented in knowledge that may help with Alison rating her mother as highest (Alison continued to refuse to rate herself).

INGRID Analysis: focus grid 2: case study 10.

PCA revealed 2 principal components accounting for 85% (principal component 1) and 15% (principal component 2) of the variance.

The following is the resultant illustration of the two principal component's generated by INGRID.

to elements and principal components 1 & 2 axes, for case study 10, 2nd focused grid.



The bi-plot representation showed clearly that Alison attributes the negative feelings and outcomes she has experienced with her condition and with her antagonistic relationship with her GP. The positive therapeutic family intervention Alison perceives originates with her mother. This represents a strong dependency on her close family and shows internal reliability with the first DDGT interpreted personal constructs in dependency terms.

Principal component 2 again supports the DDGT identified personal construct of isolation, this particular grid demonstrating construct isolation independence. Alison's husband is not correlated to any of the construct vectors, either negatively or positively. This illustrates again the problems Alison perceives in her relationship with her husband, and demonstrates her lack of confidence in the relationship as supportive of her condition outcome management.

Focus Grid 3: case study 10.

In this final focused grid, completing Alison's laddering of her personal constructs, she was still unable or unwilling to rate herself as an element in her condition life, preferring to further explore her feelings and perceptions in relation to others.

Table 58: Completed ratings for focused grid 3: case study 10

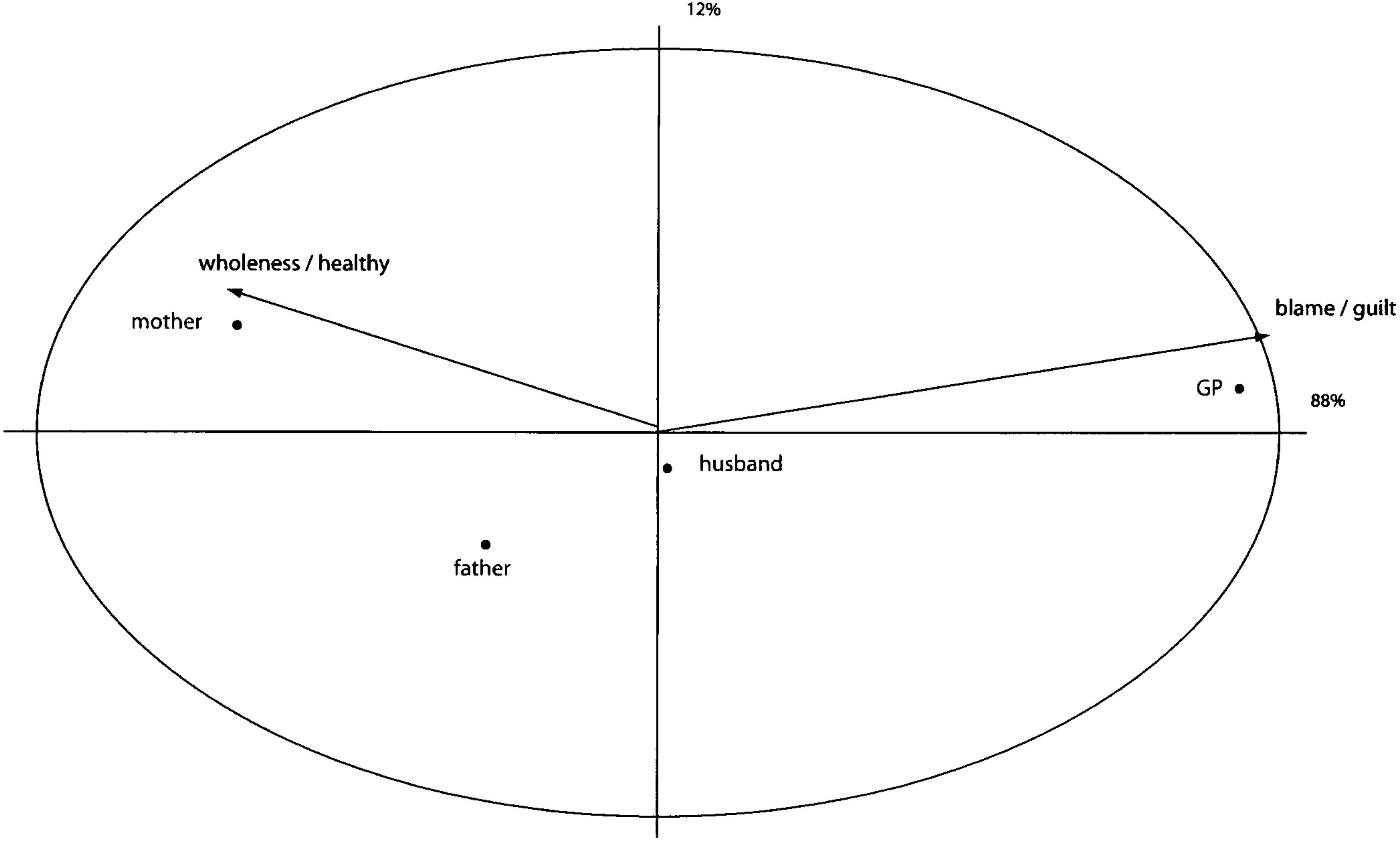
Construct	**Element**			
	GP	husband	father	mother
Blame/guilt	8	3	1	1
Wholeness/healthy	1	3	3	7

Here Alison explores and identifies her feelings of guilt, and firmly rates the GP as having the highest impact; with her perceptions that her GP blames her for her 'unhealthy state'. Alison perceives that her GP has inculcated her feelings of guilt through his attachment of blame to her actions. Alison associates the positive or perception positive construct of 'wholeness' or being 'healthy' with being able to work. This is demonstrated in focus grid 3 by Alison's rating of her father and her father's view that it is healthy to work. However, Alison's perception of being healthy is more closely associated with her relationship with her mother.

INGRID Analysis: focus grid 3: case study 10.

PCA revealed 2 principal components of 88% (principal component 1) and 12% (principal component 2) accounting for all the variance in this grid rating.

to elements and principal components 1 & 2 axes, for case study 10, 3rd focused grid.



The bi-plot illustrates the ratings Alison has applied consistently in this investigation and again demonstrates the two distinct principal components in focus grid 2.

Discussion of analysis: case study 10.

Alison's living with, and experience of, her condition is complex and closely interrelated with her continued dependence on her mother and father as the supportive people in her life. Alison has not disassociated this dependence after her marriage, as her condition occurred soon after and produced self-perceived negative outcomes of her obesity, infertility and imbalance for diabetes control. Alison may have reverted to her childhood support mechanism when diagnosed with type 2 diabetes as she had reduced confidence in her husband's ability to cope, and her own confidence in their relationship is not strong.

Unfortunately, Alison perceives that rather than give support, the healthcare professional intervention has reinforced Alison's low self-esteem and confidence, thereby extending her dependency onto her parents. This has also resulted in an isolation of Alison's condition from her sense of self and ability to cope, and is perhaps why Alison did not rate herself in the grid process.

Alison is not clear about her perception of her husband being able to help. This is rooted in her lack of confidence in their relationship, which may have origins in her inability to conceive (although this was not explored explicitly). This has reinforced Alison's dependency on her pre-existing relationship with her parents (who in Alison's perception have little understanding of her condition and its complex management). The super-ordinate for Alison in this personal construct is a balance between negative and positive dependency, and currently is not able to achieve her own goals of weight loss, control and pregnancy. This has put considerable pressure on her relationship with her husband, such that he, she perceives, has been independent from her condition.

Although there are a number of important personal constructs for Alison's living with her condition, and these are difficult to separate for analysis to indicate appropriate intervention, there is some relevant work in the literature. This case study however illustrates succinctly the new information uncovered in this thesis relating to personal constructs of interdependence. Perhaps Handron & Leggett's (1994) study has some relational aspects, where they noted that no studies had been conducted in people with type 2 diabetes on psychological factors or stressors. They were particularly interested in exploring how these factors impacted on self-management of conditions. This issue of co-dependency and isolation was demonstrated in the transcript data pertaining to dietary aspects of managing the condition and the medical regimes imposed (Handron & Leggett 1994). They also found that everyday family stressors, external to their conditions, had a negative impact on their diabetes coping strategy and were noted in the form of adverse use of defence mechanisms, i.e. consistent denial and low self-esteem which could lead to pathology, (e.g. depression).

Chapter 7

Discussion and Recommendations

7.1 Introduction to the chapter

This chapter will firstly discuss the contribution of the findings presented in the thesis to knowledge in the domain of health sciences and nursing. The implications for policy and service design are discussed, in particular, the limitations the participants identified in having primary care services. The limitations of the thesis will be presented with a critical appraisal of the internal and external validity of the method, and the internal reliability. Particular focus will be placed on discussion of the internal reliability and validity of the methods and findings. Possible alternative methodologies that could have been employed in this thesis are discussed. Each case study findings in the determinant phase of the results has previously been critically discussed. The chapter will conclude with a critical analysis of the implications of the research to clinical practice, healthcare service delivery and policy, and recommendations for further research are made.

7.2 Original Contribution to Knowledge

The findings of the series of case studies demonstrate that adults with type 2 diabetes have constructs (i.e. meanings of experience), that are related to issues of how they interact with others. Therefore, we know from this research, and previous work, that people with a chronic condition may have complex personal factors which have an impact on self-management. These factors will have an influence on how a person reacts to a situation or events that happen in their lives. The systematic use of a modified dependency grid method has provided new insights into the notion of 'interdependence'. This finding has been described through analysis of the results in terms of how a person with type 2 diabetes can be more or less dependent/ independent, depending on how they view their condition. The interdependence is also affected by how and where they may get help, and how those helpers are perceived to view the condition. This contribution to the development of theory in chronic conditions, can be summarised within a continuum of interdependence where the continuum represents how people can move from dependence to independence according to their "elements "and how they relate to the "constructs".

In summary, the contribution this thesis makes is explained by the overall meanings analysed from the case studies, which are individual and reflect the person's perceptions, interpretation and previous life experiences within the context of their condition. The person's own individual constructs are interrelated in a complex interdependent relationship with the other people involved in the experience. Interdependence depends on the person's view/perception of how constructs relate to these other people. The channelling and consideration of alternate views of a person's constructs and disease management (e.g. diabetes care) issues which have not previously been studied or presented in adult type 2 diabetes have been investigated and explored in this thesis. The findings add knowledge and understanding of the experiences of the condition from an individual's perspective. This knowledge could be discussed in continued development and training to reflect on how knowledge of an individual's perspective might influence healthcare service delivery by nurses and other healthcare professionals involved in the diabetes care of individual patients. This thesis has investigated how, shortly after diagnosis of diabetes has been confirmed to the person, that the people presented in the case studies have complex interrelated personal constructs. These constructs impact on their everyday lives, perceptions, relationships with others and living with their condition.

7.3 Limitations of the Study

This section presents a critical discussion of the limitations identified from the research presented in this thesis. Both the exploratory and determinant phases are analysed, from the research presented, for internal validity and reliability. The issues covered are detailed in terms of sampling; combining and experimenting with applying a modified methodology in a novel way; the relationship between research and therapy when conducting enquiry with patients; issues of non-participation and drop-out; reliability issues of the modified method and how they were addressed within the study.

7.3.1 Population and sample considerations

The population sampled was that of a local focus, due in part to time and funding restrictions. As the study's aims and objectives were largely investigative and explorative utilising a modified dependency grid analysis (DDGT) method, then it is argued this was appropriate. Given increased resources it may have been possible, and even useful, to investigate more people with type 2 diabetes, although we cannot say if this would have given any further new information. Whilst the findings from the final sample of ten case studies presented may prove difficult to generalise, new information has been found, which requires further exploration of how it may impact on practice/policy. A range of different condition experiences in an adult type 2 diabetes population were explored, predominantly, from the perspective of people managed in primary care health services. A limitation of the study was the self-reported data obtained regarding socio-economic status, and any co-morbidity present. The participants stated variously, whether they had any other health problems, or diabetic complications, and in future studies, it is recommended that this data is checked via case note records. It is acknowledged, that clearly the presence of co-morbidity in some of the case studies, may have had an effect on their perceptions, and consequent ratings in the dependency grid test. The longitudinal nature of the DDGT strengthened the in-depth analysis and exploration, as opposed to a simple measurement method and thereby increased the internal validity of the sample.

7.3.2 Combining statistical representation and descriptive, observed findings

The method utilised in section 2 of the results (the determinant phase of the enquiry) is experimental in application. It is a developed, novel technique, which has not been used before, and was designed specifically for the purpose of the study's stated aims. Using an arbitrary, perception derived rating scale within the DDGT process has given the opportunity to provide statistical, principal component analysis and representation of personal constructs in people with type 2 diabetes. As in factor analysis this requires an interpretive analysis rather than merely the reporting of a measurement or score.

By using this method as representation and description as well as correlation and analysis of the participant experience, overall interpretation can be made. This interpretation utilises the qualitative derived data integrated with the statistically interpreted DDGT results. This is the accepted technique of analysing data in personal construct work, either when using Kelly's (1955) methods, or when using more complex analysis developments (Slater 1965, Fransella & Bannister 1977). However, the internal reliability of this method is only argued at the level of a subjective, interpretive analysis by the investigator.

7.3.3 Therapeutic nature of investigative research

It is apparent from analysing the case study results, that some participants recognised the possible therapeutic intervention benefit of the DDGT method and process. This phenomenon within the research process is not unusual in investigative, exploratory enquiry with individual participants (Morse 1991). In terms of ethical considerations, this was considered non-maleficent. By having a reflective de-briefing session, participants were enabled to discuss issues outside of the analysis, and were given the opportunity for post-analysis support, although this was not requested by any participant.

7.3.4 Non-participation in the laddering process

There are a number of plausible and possible explanations why nine of the nineteen participants who completed an initial DDGT interview did not proceed to completing focused grids through the laddering process, detailed in Chapter 6:

- Time limitations of the participants (not the researcher).
- Concentration and energy limitations of the participants.
- The educative nature of the DDGT process.

Although the participants knew and were informed that the methods of enquiry were to discuss psychological and social issues and to explore their condition experience, they may not have realised that the nature of their relationships with others would be explored in-depth. This may have led to some participants to decline further participation after completion of the first DDGT. It is apparent that those participants who did complete the laddering process did want to explore their deeper issues, and some stated how revealing they found the process.

7.3.5 Reliability of the DDGT method

Reliability within a repertory or dependency grid analysis refers to how the method can effectively investigate and describe an experience (Fransella & Bannister 1977). The verbal explanations of ratings given by the participants supported the ratings they gave to the elements and constructs in the grid.. The principal component analysis used in completing the DDGT, and the visual cluster analysis used by the investigator to aid in the laddering process, demonstrate the validity of the findings to each participant's condition experience, and interdependence with others. The completion of the focused grids in the majority of the case studies supported and confirms previously identified issues.

The use of a modified INGRID analysis package to determine PCA and bi-plots of personal constructs further helps to confirm the reliability of the findings to each case. The reliability of the interpretations of results to formulate 'labelled' personal constructs is also confirmed.

By involving the participant in all stages of the analysis and in the setting of the constructs and elements, Kelly's (1955) method has been shown, in this study, to be reliable in investigating personal constructs and the meaning of living with adult type 2 diabetes, in individuals.

The use of further focusing of the grids, aids assessment of the reliability of the findings, in the first DDGT. INGRID analysis also determines the trustworthiness of the participants self-reported perceptions and comments regarding their living with the condition. The use of extremity ratings is particularly important as it signals an absolute, determinant marker to a personal construct, as opposed to more standard approaches in factor analysis where extremity ratings are avoided (Landfield 1968).

Assessing all the results, and combining them to make an interpretation, provides a measure of the validity of the case study's results to an individual's meaning of experience.

7.3.6 Limitations of the situational dependency grid method as a research/ clinical tool

It is clear from the methods and results section of this thesis that the dependency grid method developed and applied in this research has limitations. These limitations are due to the lengthy and educative nature of the process which makes it unwieldy in research and probably limits its use in clinical practice. It is not envisaged, from this exploratory work, that clinicians, or perhaps even other researchers, would want to utilise this method and the developed DDGT. However, it may be possible to deliver the first full DDGT only, and analyse that to determine useful indicators of interdependence. This then may help in developing a therapeutic or supportive relationship in that person's diabetes life. Because of the nature of the method and the individual results, case studies appear to be the most appropriate way of presenting the results. However, case studies do not readily affect clinical practice or policy unless there is a profound effect observed which requires immediate action to prevent a reoccurrence, i.e. the cases in social work child abuse or in mental health services.

7.3.7 Alternative Methods

A criticism of using the modified dependency grid method is that it is complex and unwieldy. Therefore it is necessary to examine possible alternative methods. However, alternate methods may not specifically address an aim of investigating personal constructs in relation to dependency.

The exploratory phase of this research utilised a qualitative approach, and method of unstructured interviews with the participants, and it could be argued that continuation of the interviews and transcribing may have produced some information concerning deeper, personal experiences of type 2 diabetes mellitus. It could be argued that identifying and investigating personal constructs in adults with type 2 diabetes is an aspect of the lived experience of the condition. It is further critically considered that given the results presented in this thesis, the open-ended, or even semi-structured interview, would not have revealed the complex, correlated interactions between constructs and interdependence with people which identify adults personal constructs in relation to dependency in type 2 diabetes.

There is currently debate concerning narrative enquiry as a distinct method to elicit insights of people's experiences through examination of discourse (Hinchman & Hinchman 1997). The movement towards consideration of narrative as a method appears to rest within a sociological approach, as it is argued that narrative is inherently a social activity (Elliott 2005). Support for this approach is based on the argument that narrative enquiry is a suitable paradigm to adopt when attempting longitudinal work, and when longitudinal data is available. Therefore, narrative could have been a suitable framework for the enquiry presented in this thesis. Indeed when one considers the results in Chapter 6 in relation to interdependence and self as an identity, previous work has utilised narrative to explore this construct in chronic illness (Charmaz 1991). Longitudinal studies utilising narrative in chronic illness have also identified the 'illness career' which has a relationship to the 'diabetes identity' identified in some of the case studies in those participants with a dependency on their sense of self (Case studies Dorothy, Alison). However, one needs to critically examine whether there is a distinct sociological domain to narrative enquiry, or if psychological parameters can also be explored through this method.

Interestingly, Elliott (2005) makes the argument that narrative is essentially a sociological pursuit, however, she lists quantitative analysis, i.e. measurement of variance and causality as a possible component of narrative research. Cautionary notes are given by Elliott (2005) to relying on narrative solely to consider data beyond cross sectional multivariate techniques. This, she explains, is because such analysis used in narrative to examine causality and temporal dimensions (indeed she cites dependencies as an example) is variable rather than case-centred. Therefore narrative enquiry in a quantitative context may only have produced 'trend' analysis and statistically significant associations to explain causality. Elliott (2005) argues that this approach would produce 'extensive' rather than 'intensive' data. The results presented in this thesis, whilst derived from arbitrary statistics, are 'intensive' individual accounts relating to interdependence. If narrative enquiry had been used in a quantitative analysis context, then these results may not have been uncovered as the focus would have been on 'extensive evidence' rather than individual analysis.

7.4 Relevance of the findings to healthcare policy

The shift of care in the UK NHS services from secondary to primary care is well documented but that has given rise to debate over the suitability of this in terms of enhancing or decreasing standards of patient care. There is also the political sensitivity of this shift which needs considering in diabetes services. Traditionally diabetes care has been seen as a speciality with specialist consultants and nurses providing specific services. However, this can be viewed as an erosion of standards, when resources are diverted into less 'expert' services, i.e. general practice. A number of the case study participants had personal constructs of interdependence with their family members, and demonstrated independence from the primary healthcare team. Their comments demonstrated that they had little confidence in the GP's or practice nurses ability to help manage their condition.

If this 'negative interdependence' could be demonstrated in larger samples, then this may indicate that the shift to primary care is not entirely beneficial to people with diabetes. On an individual level, it may be that people need the choice of whether to access secondary services as they will benefit more from this. This would fit with current drives in healthcare policy to make services more patient-centred and aid in empowering people to make choices which are right for them.

Another recent healthcare service re-design has a bearing on whether individual patient-centred services can be delivered in primary care. The new GMS contract whilst possibly ensuring that population targets are met, does not allow room for individually tailored interventions, and even less so on interventions based on a person's personal constructs. However, from the results of this study, it can be argued that developing interdependent relationships with healthcare providers may be beneficial to some patients.

Within current healthcare policy, for example the NSF in Diabetes, there is an emphasis on developing and maintaining partnerships in care, between the patient and the multi-disciplinary team. Some of the participants in this study expressed their lack of confidence in some parts of the diabetes team, particularly in primary care. Indeed, some expressed not only a lack of confidence but anger in the way they had been cared for. This may be due to a lack of expertise in primary care of which the patient becomes aware, or it may be the perception that there is less emphasis on a partnership between the patient and primary care services. It could also mean that there is simply not the specialist services and resources available to people with diabetes in primary care, e.g. diabetes specialist nurses, clinical psychologists. The recommendations in the NSF Diabetes on creating diabetes networks in local areas and having 'diabetes champions' may address who is responsible for ensuring appropriate partnerships in care are delivered. On an individual basis it is the healthcare practitioner who comes into contact with a person with diabetes. This healthcare practitioner is responsible for developing such a partnership and creating an meaningful interdependent relationship.

Currently there is considerable emphasis being placed by governmental guidelines in the UK on focusing healthcare services in chronic conditions on the patient rather than the healthcare professional perspective (Department of Health 2001b, 2005, 2006). Recognition is made within the Expert Patient Programme (Department of Health 2001b) and structured patient education for diabetes (Department of Health 2005) that more data is needed on the individual patient experience on their conditions. Indeed in 2005, this statement appeared written by leading experts (including patients) in the field of diabetes and education:

> "Bio-medical data have long been paramount as primary outcomes, and remain the main markers in diabetes research. However, these are not necessarily the most helpful means of opening up the patient experience to general understanding. More qualitative studies are needed alongside the traditional scientific trials to explore areas critical for the development of structured education..." (Department of Health, 2005, Pg 35).

This statement and approach to care is critically limiting in recognising the patient perception, complexity and chronic nature of a condition such as type 2 diabetes. The findings presented in this thesis whilst not generalisable, give information to formulate a theory of understanding in dependency, personal constructs and relationships in type 2 diabetes. The findings suggest that there are other facets to healthcare intervention and policy than just structured education and formalised treatment-orientated healthcare interventions. Indeed interventions should encompass individual patient condition experience perceptions.

It is equivocal whether group-based educational interventions in type 2 diabetes, as exampled in the Expert Patient Programme (Department of Health 2005) will completely address individual psychosocial issues. Government policy further suggests that patients should be given choices in terms of interventions available. In addition, that there should be greater service-user involvement in the decision making process and promoting peer support. This peer support could be effected through utilising patient expertise as a means of helping people cope and learn to self-manage their chronic condition (Department of Health 2001b, 2005).

7.5 Implications for nursing practice

It is of course presumptive at this early stage of discovery, through developing investigatory methods of enquiry, to determine clinical practice implications from this research. However, clearly, theoretical understanding has been gained and therefore more understanding of the patient condition experience can be useful to engender healthcare professional, family and informal network understanding and empathy with these issues. The complex nature of interactions and dependencies developed as a result of these interactions requires recognition and indeed identification by formal (and to some extent informal) networks of support. Perhaps only then will people with type 2 diabetes be able to achieve mutually desirable condition, and life-orientated goals. Patient experiences and the personal constructs presented in the findings in this thesis suggest in some cases that these goals may be achieved without an interdependent relationship with a healthcare service delivery system. This requires a change in cognitively developed research and practice guidelines which have originated from a healthcare professional perspective and instigation.

Research which examines in-depth individual psychosocial issues, will add to the theoretical frameworks which underpin further research endeavour and approaches to care in health imbalances. Critical discussion has been presented in this chapter of the current calls for theory driven practice and derived research findings taken from exploring the patient perspective. Considered together with current policy, this should form the correct framework for a patient-centred approach to diabetes health service delivery. This argument is derived from the central focus and possible paradigm that people will achieve the best desired outcomes for themselves when they self-manage their condition. This can be attained with suitably informed practitioners using a patient-centred framework of intervention. The findings presented in this thesis contribute to, and strengthen, the above argument for care delivery.

At an individual level, nurses and other healthcare professionals should be aware, and have understanding of, the interdependent relationships and the complex personal constructs that contribute to how an adult with type 2 diabetes lives with and manages their condition. More importantly perhaps practitioners should be aware that these constructs exist and are individual, therefore requiring individual assessment and consideration in formulating a patient-centred shared care plan. This would aid the practitioner's ability in creating the right partnership with the patient, and aid service delivery to achieve health-orientated and personal goals, for example improved perceived quality of life.

Practice nurses and diabetes specialist nurses have an important role to play in delivering individual shared care to people with diabetes. It is recommended that nurses should receive training in patient-centred interventions in diabetes and techniques to elicit these and take appropriate action. In relation to this, it is also recommended that diabetes nurses understand the role of the clinical psychology and clinical psychiatry services so that appropriate referrals can be made. It is also suggested that diabetes nurses could be trained in psychosocial interventions, so that they could deliver them to people with diabetes who need them. However, these diabetes nurses would need close and appropriate clinical supervision and evaluation. It is also recommended that diabetes specialist nurses should take the lead in this initiative to train others, and provide enhanced support services to more general nurses, i.e. practice nurses.

7.6 Implications for further research

There are a number of important specific recommendations for further research related to this enquiry, and less specific recommendations for future analysis of chronic conditions generally. However, given that the findings presented in this thesis are as a result of a modified 'experimental' method, then it appears appropriate to continue the theory driven location of findings and exploratory work. Therefore, it is argued that a priority for further research would be to test the method as a useful means of eliciting personal constructs in relation to interdependence issues with further participants before commencing on actual application and evaluation work. As a method of enquiry the Diabetes Dependency Grid Test (DDGT) and less specifically the process of enquiry with individuals within the personal construct psychology framework needs further testing and exploration.

Within this research priority is also the need to theoretically model alternative methods of analysis, and interpretation, gained from such enquiry methods to achieve further understanding of the meanings of analysis. Based on the self-efficacy model, for example, it is possible to hypothesise, how self-efficacy, locus of control and dependency (personal construct psychology) are associated with each other, and may be useful, in understanding health-related behaviour, in people with type 2 diabetes. It may be hypothesised, that a person with a low self-efficacy belief, may have a high external locus of control, and, then it may be that they will have a high dependency with others to manage their type 2 diabetes. If a person has a good sense of self-efficacy, they may have a high internal locus of control and perceived high independence in living with type 2 diabetes. This would logically indicate that this person may achieve good self-management of their condition. If a person has perceived interdependence in living with type 2 diabetes, then they may have moderate internal/external locus of control beliefs, and a fair sense of self-efficacy. These hypotheses could be tested in future empirical work.

Further work should also be undertaken, which was beyond the scope of this thesis, to theoretically locate and understand the concept of interdependence in relation to other chronic conditions. This could then lead to a firm grounding of the important finding of interdependence within an emerging paradigm in diabetes, and possibly other chronic conditions. This would require investigation into conditions for example, other diabetes typology, arthritis, stroke, cancer and chronic heart conditions.

In the process of determining personal constructs, it is apparent in the results of some of the case studies, that there are some interesting references to emotional changes and responses to interactions and perceived impact of the condition. These emotional 'overtones' have been presented and discussed in the individual case study analyses, however these were not the focus or aim of the study presented. Therefore, it appears appropriate to recommend further research or further analysis of this data to explore these emotional experiences that the participants voiced. This could be done via a secondary analysis, specifically designed to identify these in the data presented and/or a new investigation with a specific, sensitive tool, or through more in-depth discussions.

7.7 Relevance of the findings to previous research in type 2 diabetes

Although the search strategy employed found no previous published study, which attempts to answer this thesis' aims and objectives, and no findings have been presented in dependency, personal constructs of relationships in type 2 diabetes, there are some prior parallel findings which relate to the patient experience. In particular, the findings support previous studies in diabetes research, which have utilised the self-efficacy model to underpin the methods of enquiry.

Information reviewed by patients and knowledge gained has attempted to be linked with coping in terms of ability to self-manage with limited, confusing findings (Bradley 1984b, Brown 1988). Indeed the relationship between levels of knowledge and ability to self-manage has been questioned in chronic illness research and is less clear than previously thought. In the methods section of this thesis it is clear that education and diabetes related knowledge was viewed as an important construct to be included in the modified grid. However, after completion of grids it can be seen that in some of the case studies little correlation exists between self-management strategies and education received from their interdependence with others. This perhaps represents support of the findings by Coates & Boore (1996) that there is little or no relationship between coping and knowledge levels. Further to this and other research (which was in type 1 diabetes) Coates & Boore (1998) asserted that “greater insight into the strategies used successfully or unsuccessfully ... to achieve successful management will be helpful in modifying the educational approaches used by nurses in diabetes care in the future”.

In relation to independence, there is work previously presented in the literature to support the personal constructs associated with some of the participants in the case studies, where they did not perceive any benefit from accessing healthcare professional intervention. Coates & Boore (1998) found that clinic attendance in people with insulin dependent diabetes (type 1) was not considered as important by the participants, as healthcare professionals viewed it. This was suggested as an indication of self-management behaviour. The authors of this study argued that nurses needed to examine "carefully what their therapeutic contribution to patient care was in the clinic setting" (Coates & Boore 1998). Therefore it appears consistent that not all people with diabetes will have personal constructs orientated towards perception of positive benefits to their experience and coping with their condition by accessing nursing (and general practitioner) intervention. Lawson et al. (2004) also found in people with type 1 diabetes that patients not seeking regular care were more likely to view their illness negatively and this was correlated with perceptions of the effectiveness of treatment.

Furthermore, the results presented by Coates & Boore (1998) indicate that neither perception of control, nor health beliefs, have an effect on disease management and outcomes in diabetes. Whilst advocating robust measurement of constructs they also indicated that person-centred approaches to research needed to be employed to gain understanding of people and their behaviour. Results from research of this nature, they argue, would confirm the importance of psychosocial variables in diabetes management. They also asserted that there were current gaps in knowledge regarding how care should be tailored for individual requirements and how that knowledge will develop nursing care based on understanding the needs of people living with chronic conditions. In a recent major review Knight, Dornan & Bundy (2006) determined that educational interventions in diabetes were unlikely to achieve all desired outcomes without behavioural interventions included. This provides support for the intentions of the research presented in this thesis, such that more complex interventions can be developed, which are grounded in the appropriate theoretical framework and answer complex human needs.

Various aspects of people expressing confidence and independence in their management and living with type 2 diabetes were explored in the case studies presented in Chapter 6 (case studies: Dorothy, Brian, Norman). These findings have relevance to previous work by Mitchell (1998), however, the typology of diabetes studied was not specified. In Mitchell's (1998) findings, the theme of 'harmonising appraisals energise self-directedness' relates to participants wanting to take control of their lives using statements of "keeping things in check," "talking to oneself" and "taking charge." This theme is related to the findings of this thesis of 'diabetes independence' as an example, where the participants have expressed, through their grid rating, their perception that they do not need others to help in their living and managing with their condition. Furthermore, Mitchell's (1998) theme of "rebellious decisions shift vigilant intentions" is supportive of the findings of interdependence related to behaviour and subsequent guilt in Brian's unhealthy (self-perception) eating habit (Case study: Brian).

When consideration is made of some of the results presented in this thesis, specifically related to the general construct of dietary management as a process-orientated function of condition management, there is some resonance with the aspect of concordance generally with treatment regimes in type 2 diabetes, which has been examined by Vermiere et al. (2002). In their systematic review Vermiere et al. (2002), whilst not determining effective interventions in improving adherence to treatment, did state that a more appropriate 'patient-focused' theoretical framework would be more useful in delineating interventions aimed at improving adherence to treatment regimes. They describe possible theoretical frameworks based on empathy and 'matching thought' with a patient rather than the healthcare professional being the decision maker, although they had not found empirical data to support this premise.

Paterson, Thorne & Dewis (1998) identified from their synthesis of qualitative studies in diabetes, one theme of patients wanting to achieve a sense of 'balance' in their lives between living normally and with diabetes. This aspect of balance is included in the main aspect of process-orientated activity; self-management strategies, healthcare professional direction, treatment regimes, achieving good disease control e.g. normoglycaemia and prevention of complications. However, the thesis findings demonstrates that this aspect of 'balance' is not a dichotomous process where normal life and diabetes life are separated; these two aspects are inter-linked on the interdependence continuum.

The sometimes diverse and disassociated experience and personal construct of independence from healthcare professional intervention identified in some of the case study findings, has an association to Cohen et al.'s (1994) findings from qualitative enquiry. Although Cohen et al. (1994) studied patient and healthcare professional perspectives in type 2 diabetes, the result of the two differing explanatory models have relevance. Healthcare professionals' explanatory models were focused on functionality versus the patients' explanatory models of conditions focused on psychological issues. This is supported by the findings presented in this thesis, in the independence disassociation from healthcare professional intervention and service, evidenced in some of the participants' DDGT analysis. However, Cohen et al.'s (1994) study was not aimed at investigating dependency or personal constructs.

A similar study in terms of dependency, using a different methodology to this thesis, was that of Handron & Leggett (1994) who found that a participant would be co-dependent on a significant other and felt isolated when asked to consider the dietary aspect of managing type 2 diabetes and the medical regimes the patients were required to follow. Their study however was particularly focused on coping rather than personal constructs.

Murphy & Kinmonth's (1995) enquiry, where the patient-provider relationship was explored, examined the physical aspects of the disease, despite professing to explore patient focused issues. However, it has some resonance with functionality and process orientated aspects of living with type 2 diabetes. This finding was largely due to the implicit bio-medical framework employed by Murphy & Kinmonth (1995) which focused on outcomes of disease. Similarly, Hunt, Arar & Larne (1998) found in their qualitative study, that process-orientated psychosocial issues more closely related to the participant's relationship and intervention received by the healthcare practitioner. This finding was also repeated by Koch, Kralik & Somals (1999) where process-orientation was found as a focus from healthcare professionals and the participants which, in this case, led them to conclude that for women, the experience of type 2 diabetes was negative and resulted in them having a perceived poor therapeutic relationship with their healthcare provider.

The earlier studies of patient experience are supported by the arguments presented; that there are psychological issues that people perceive and these are affected and associated with informal and formal interactions with others (Strauss & Glaser 1975, Cohen et al. 1994). For example in Cohen et al.'s (1994) study, findings showed that everyday family stressors, external to a patient's conditions had a negative impact on their condition coping strategy. This thesis' results adds a more in-depth analysis of this issue and has uncovered new information in terms of the interdependent relationship with others, the perceived impact those people have on the person's condition experience and the changing nature of the relationship. These in application have a connection by the super-ordinate (interdependence continuum) whereby changes in the participant's interdependent relationship can manifest in independent to dependent behaviour.

Aspects of the interdependent relationship with healthcare professionals from this thesis' findings have a similarity with the findings of a study in women with type 2 diabetes, which examined the perceptions of the patient/provider relationship. More importantly, Dietrich (1996) found that support by a person's family had an impact on perceived ability to self-care their condition.

Although not related to dependency, Hunt, Arar and Larne's (1998) study found that patients felt their social power and poverty had a limiting aspect to being able to self-manage their conditions. Similarly, Koch, Kralik and Somach's (1999) discovered issues of social exclusion related to having type 2 diabetes. In terms of close relationships, this thesis has investigated the impact of the spouse's support in some of the case studies. This supports Koch, Kralik and Taylor's (2000) parallel study into men. They reported that men found being supported with their condition helpful. This somewhat mirrors, and is supported by, Peyrot et al's (1988) earlier findings that there is a marital adjustment and adaptation to adult diabetes by both people in that relationship.

Studies which have utilised a theoretical framework within the domain of personal understandings of conditions among people with type 2 diabetes provide some support for the findings presented in the exploratory phase of Chapter 6. Hornsten et al.'s (2004) focus was on condition perception as opposed to condition experience and therefore is limited to the illness aspect of the disease. Their results of interviews in 44 Swedes who were newly diagnosed, demonstrated that participants described their condition experience in terms of the diagnosis, how they view the conditions, having time and space within everyday living for their condition, and how the condition integrates with their lives. Although this study is perhaps a 'baseline' examination of psychosocial issues in type 2 diabetes, there are aspects of integration and future prospects which have similarity to the exploratory findings from this enquiry. These therefore have some bearing on the findings in the determinant phase, in that they contribute to general constructs which have been investigated more personally, exampled in the determinant case studies. The aspect of integration was found originally by Hernandez, Antone & Cornelius (1999) in their qualitative study of people with type 2 diabetes in Canada.

Previously attempts have been made to link the experience of type 2 diabetes, particularly at diagnosis to emotional responses and information giving (Beeny, Bakry & Dunn 1996, Gillibrand & Flynn 2001). Recent research has suggested that this emotional reaction was not as severe as first described and more linked to how the person was diagnosed (Peel, Parry, Douglas & Lawton 2004). Certain aspects can be summarised from these in-depth studies into personal experiences and psychological issues. The results of this thesis suggest that emotional responses are wide-ranging and have an impact on a person's coping strategy to the diagnosis and on future self-management strategies. This therefore requires careful consideration by healthcare professionals giving information and education to the patient in order for patients to achieve effective self-management. Therefore it is suggested that if healthcare professionals in consultation with patients are aware of these issues and have the means to discover personal constructs then they may be able to tailor interventions appropriately.

In the results chapter, Margaret had a daughter with diabetes and this had a perceived positive effect on the participant's emotional response to her condition and her ability to self-manage. This finding was also observed in a participant in Peel et al.'s (2004) study where an older woman commented at the time of diagnosis "I don't think it particularly upset me. My husband's a diabetic." Therefore having a close interdependent relationship with a person who has the illness themselves may help people cope emotionally with their diagnosis and future self-management.

It would be deficient of any critical examination of the literature in relation to psychological issues in chronic conditions not to discuss coping as a central tenet. A dominant theme in the literature in chronic condition research is how people cope with their illness and how this affects outcomes (Abbott 2003). This has also been examined in relation to how people view their quality of life with type 2 diabetes and how this can change through duration and events (Rubin & Peyrot 1999, Koopmanschap 2002). In diabetes, the literature has tended to focus latterly on describing coping strategies within the domain of self-management, which also encompasses perceived control, self-efficacy and adaptation. These terms have been used interchangeably depending on correct or less clear definitions of the theoretical underpinning of such research (Bradley 1984b, Sanden-Eriksson 2000). One of the main areas that have been identified in coping strategies in chronic illness is the aspect of 'normalising' condition experience through altering, or not altering, behaviour and perceptions (Paterson, Thorne & Dewis 1998, Coates & Boore 1998).

7.8 Relevance of the findings to theory

The findings presented in this thesis, particularly those from the determinant phase, have association with the relevant psychological and social theories discussed in Chapter 2. Some of the case study participants clearly demonstrated in interdependence terms, their perception of ability to self-manage their condition. This is supported by work in the area of self-efficacy in diabetes (Hampson 1997, Lawson et al. 2004, Knight et al. 2006). For example "Dorothy" and "Brian" showed how independent they were in some aspects of their condition management and related this to their confidence and knowledge plus their experiences.

Of relevance is the theory first proposed by Rotter (1966) in locus of control. This theory has been researched in diabetes (Konen et al. 1993) and the basic tenets have a bearing on the contribution to knowledge presented in this chapter. The issue of personal constructs and interdependence can be viewed as supportive of Rotter's theory in that the participants have externally located their control to others or retained internality, according to their experience and situation. Furthermore, those theories relating to self-efficacy, dependency and social support are critically discussed to determine relevance of the findings.

In examination and critical discussion of the results in Chapter 6, it is arguably necessary to refer to the original theoretical location of the study in terms of personal construct psychology. Kelly's (1955) explanation of dependency is less focused on the interaction, and more on the personal meaning for individuals, in terms of how individuals attach meanings to experiences with others. Snyder (1963) refers to dependency, related to Maslow & Mittleman's (1941) theory; when a person is feeling helpless they may turn to others for restoration. People that he or she will turn to are friends, professionals involved in the situation (i.e. therapist) or spouse/close relatives.

Interestingly, earlier work than that of Snyder and Kelly exists in the literature which has relevance to the results found in this enquiry. In 1958, Peterson identified that within a psychotherapeutic relationship, dependency was a significant psychological problem, determined through factor analysis of a specifically designed questionnaire. Snyder and Snyder (1961) performed an important study into the nature of the psychotherapeutic relationship. They examined 20 clients with a co-morbid dependent behaviour and delineated the dependent construct, by comparing the therapist's perception and style of therapy to the client perspectives. They tape-recorded a series of interviews with each client and therapist, to elicit data through comparisons of notes. They also gave a specific questionnaire designed to measure perceptions of the therapy conducted. This technique of in-depth, longitudinal examination of client perspectives, related to dependency, is reflected in the methods of the study in this thesis. A relational work in people with type 1 diabetes mellitus was conducted by Oram (1992); she, however, focused more on issue of perceptions of self related to diabetes self-management (illness work) activity.

By delineating and exploring personal meanings in the context of personal construct theory, it is argued that greater understanding has been achieved in the patient experience of type 2 diabetes. This has contributed to a more complex, but more encompassing theoretical framework for location of the experience of type 2 diabetes. Personal constructs can be organised into patterns of independence and dependence which can be measured in terms of super-ordinate and sub-ordinate relationships. However, the examination and exploration of such issues has been complex, presented in the thesis results chapter. In therapeutic terms attempting to change the super-ordinate constructs related to self is difficult (Kelly 1955).

The debate concerning whether patient-centred care should be the over-arching approach in diabetes services continues with arguments for a paradigm shift (Anderson & Funnell 2005). Utilising Kuhn's (1970) theory of how scientific thinking can move, Anderson & Funnell (2005) present a critical review of the research literature pertaining to empowerment as the needed paradigm in diabetes care. The shift they hope to engender through critical debate, and based on prior research findings, argues a move away from an acute or bio-medical approach. There is considerable current debate into the nature and context of care for people with diabetes with two perceived opposing paradigms in contention. Criticisms of the bio-medical approach as the sole component to service delivery exist. However, the emerging paradigm of person-centred approaches also has an evidence and theoretical base. What cannot be determined at present for either is whether long-term outcomes would favour one or the other or, as clinical wisdom suggests, a combination of both.

The findings in this thesis contribute to the emerging person-centred paradigm and provide arguments for and against a complete 'scientific leap' that Kuhn (1970) proposes is required for a paradigm shift to occur. Certainly, the detailed dependency analysis illustrates and illuminates the redefining of roles and relationships between healthcare professionals and patients that Anderson & Funnell (2005) argue are required for the empowerment paradigm to be introduced in diabetes care. This, as seen in "Alan's" case, is not however, always going to answer patients' needs as they have demonstrated a distinct dependency which does not necessarily adversely affect their experience of living with type 2 diabetes. This research, and arguments presented by authors in the field, also supports the shift in perception that is required, particularly by healthcare professionals, to recognise that formal intervention may not be the major influence in a person with type 2 diabetes self-management capability.

7.9 Conclusion to Chapter 7 and overall summary

This thesis, including the final chapter, has presented a critical analysis of the theoretical, contextual and research base in type 2 diabetes. Through this appraisal framework the gaps in current knowledge were identified. Specifically, the thesis has presented an aim and objectives to the empirical work presented in Chapters 5-6, detailing the methodological theoretical perspectives and underpinnings together with a detailed description of methods employed. Chapter 6 presented the findings from the 2 phases of the study and has demonstrated in the determinant phase; a newly developed method of enquiry into patient condition experience, new information into the individual condition experience and perception of impact, new information relating to the complexity and chronic nature of living with type 2 diabetes, and new information in terms of investigating issues of interdependence, both informal and formal, in the person with type 2 diabetes

The final Chapter has critically discussed the internal reliability of the Diabetes Dependency Grid Test process as a method of enquiry in personal constructs in people with type 2 diabetes; the internal validity of the findings to the individual participant through the laddering process; the validity of the findings in relation to healthcare service delivery and policy, theory and previous patient experience research in diabetes and other conditions.

Finally, recommendations have been made for healthcare services cognisance and recognition of the important interdependence issues revealed and for further research in this domain. The confirmatory and revealing new findings presented in this thesis are that type 2 diabetes is a complex and chronic condition that can have implications for the adult who lives with diabetes. For people explored in this study, the major finding and contribution to knowledge is that interdependence is a central construct in adults with type 2 diabetes and is contextualised within individual personal constructs.

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Appendix 1

Databases:

Cochrane Library (Issue 1)
Medline
Psychinfo
Cinahl
Altavista
Synergy
Science direct
Embase

Quantitative Studies Search Terminology (All MeSH, unless otherwise stated)

1.Type 2 diabetes mellitus

2.Psychology

3.Self care

4.Self-managment

5.Psychosocial

6.Health behaviour

7.Non-attendance

8.(complianc* or adherenc*)

9.(empowerment*)

10. Cognitive therapy

11. Behav* therapy

12. Combinations and/or of above

13.Randomised controlled clinical trials

14.Controlled clinical trials

15.Systematic reviews

16.Meta-analyses

12#1 and #12 and (#13 or #14 or #15 or #16).

Additional searching:

Hand searching of reference lists and bibliographies were possible. Internet searching using 'Google' and 'Altavista'.

Qualitative/ Patient Experience: Search Terminology (All MeSH, unless otherwise stated)

1.Type 2 diabetes mellitus

2.Psychology

3.Self care

4.Self-managment

5.Psychosocial

6.Health behaviour

7.Non-attendance

8.(complianc* or adherenc*)

9.(empowerment*)

10. Cognitive therapy

11. Behav* therapy

12. Qualitative*

13. Phenomenology

14. Ethnography

15. Grounded Theory

16. Interpretive research

12#1 and #12 and (#13 or #14 or #15 or #16).

Additional searching:

Hand searching of reference lists and bibliographies were possible. Internet searching using 'Google' and 'Altavista'.

Your Ref:

LIVERPOOL RESEARCH ETHICS COMMITTEE

Appendix 2 : Ethical approval letters.

16 March 2000

Our Ref: 2K/006

Tel: 0151 285 2097
Fax: 0151 236 4493
E-mail: pauline.malone@gww.liverpool-ha.nwest.nhs.uk

Mr W Gillibrand
Dept of Primary & Community Nursing
Faculty of Health
University of Central Lancashire
Preston PR1 2HE

Dear Mr Gillibrand

THE CENTRAL LANCASHIRE & MERSEYSIDE DIABETES STUDY PROGRAMME (Phase 1)

Thank you for your letter of 6 March 2000. I am pleased to inform you that there is no ethical objection to the first phase of the study as described in your letter. We look forward to receiving the second phase of the study in the near future.

The Trust or appropriate Health Service Authority must be asked for permission for the study to proceed. Please contact Professor A Shenkin, Director of Research & Development, c/o R & D Support Office, Room 251, First Floor, Royal Liverpool University Hospital, Prescot Street, Liverpool L7 8XP.

Any proposed amendments to the protocols must be notified to the Liverpool Research Ethics Committee for approval before implementation.

Yours sincerely

P. Malone

pp Dr E J Tunn
Chairman
Liverpool Research Ethics Committee

Cheshire and Merseyside NHS
Health Authority

LIVERPOOL RESEARCH ETHICS COMMITTEE
Chair: Dr T S Purewal, BSc., MD, FRCP
Vice Chair: Professor S Frostick, MA, DM, FRCS

Hamilton House
24 Pall Mall
Liverpool
L3 6AL

Laurie Lomax (Mr), Administrator, Liverpool LREC
Tel: 0151 285 2097, Fax: 0151 236 4493
E-mail: laurie.lomax@centralliverpoolpct.nhs.uk

14 January 2003 Our Ref: 2K/006

Mr W Gillibrand
Senior Lecturer
The Clinical Nursing Practice Research Unit
University of Central Lancashire
Preston
PR1 2HE

Dear Mr Gillibrand

Re: The Central Lancashire & Merseyside Diabetes Study Programme

Thank you for your letter dated 7 January 2003, requesting amendment to the above study.

I am pleased to inform you that I find no ethical objection to your request, as detailed in your letter. My decision, taken by Chairman's Action, will require ratification at our Committee Meeting on 5 February 2003. You will only receive further correspondence if ratification is not given.

Please forward a copy of the new questionnaire to this office.

Yours sincerely

Dr T S Purewal
Chairman
Liverpool Research Ethics Committee

PRESTON, CHORLEY AND SOUTH RIBBLE LOCAL RESEARCH ETHICS COMMITTEE

elephone/Fax/Answerphone: ~~01772 710031~~ 01257 247140

Trust Headquarters ~~The Lancashire Centre for Medical~~ Studies
Chorley & South Ribble DGH ~~Royal Preston Hospital~~
Preston Road ~~Sharoe Green Lane North~~
CHORLEY PR7 1PP ~~Fulwood, PRESTON PR2 9HT~~

6 February 2001

LREC ref: 2001.1.2
Please use this reference in all future correspondence relating to this study

Mr W Gillibrand
Dept of Primary & Community Nursing
Faculty of Health
University of Central Lancashire
PRESTON PR1 2HE

Dear Mr Gillibrand

Re: Study entitled:

The Central Lancashire & Merseyside Diabetes Study Programme (Phase 1)

Thank you for your letter dated 25 January, responding to the issues raised by the Committee at the meeting held on 8 January.

I am pleased to advise that your study is now approved on the action of the Chairman, as our statistician member is happy you have satisfactorily addressed the issue relating to statistics, and you have amended the audiotaping details in the patient information sheet according to the Committee's wishes.

To comply with National guidelines, all Ethics Committees need to compile an annual report of research activity in their district. We would like to receive a report on the progress of your study in 12 months' time, and notification should the study be terminated prematurely or suspended for any reason. We would also wish to receive a final report, as well as details of any publications which may result from your study. LREC approval normally covers a period of 3 years, after which further review is necessary if the study has not been completed.

Yours sincerely

I M DRAKE, BMedSci, BMBS, FRCP
Chairman

lrec.apprlett.jan'01

PRESTON, CHORLEY AND SOUTH RIBBLE LOCAL RESEARCH ETHICS COMMITTEE

el/Fax/Answerphone: 01257 247140
-Mail: Mary.Sykes@patr.nhs.uk

Trust Headquarters
Chorley & South Ribble
District General Hospital
Preston Road
CHORLEY PR7 1PP

LREC ref: 2001.1.ii *Please include this reference in all future correspondence relating to this study*

Mr W Gillibrand
Dept of Primary & Community Nursing
Faculty of Health
University of Central Lancashire
PRESTON PR1 2HE

20 January 2003

Dear Mr Gillibrand

Re: *The Central Lancashire & Merseyside Diabetes Study Programme (Phase 1)*

Thank you for your letters dated 7 and 10 January 2003 together with:

- repertory grid analysis
- questionnaire

for the above study. The Chairman of the Preston, Chorley & South Ribble Local Research Ethics Committee has reviewed these details and is satisfied that they do not present any ethical concerns.

Members of the Committee will be notified of these details at the meeting to be held on 3 February and, in the unlikely event of any comments being raised, you would of course be notified immediately.

Thank you for keeping us advised of the study's progress.

Yours sincerely

Mary Sykes
(Administrator)
pp I M DRAKE, BMedSci, BMBS, FRCP
Chairman
(signed in absence)

apprlet.jan'01 (mins 2.03)

This application has been allocated a unique reference number; please include this on all correspondence with the REC

Appendix 3 Patient information sheet, consent form and GP letter.

INFORMATION SHEET FOR PATIENTS (1)

THE CENTRAL LANCASHIRE AND MERSEYSIDE DIABETES STUDY PROGRAMME

Questionnaire and Interview Study
Supported by Diabetes UK (BDA)

We have written this information sheet so that you can decide if you would like to take part in this research study. Please take as much time as you want and feel free to ask any questions that you can think of. Your treatment under the NHS will not be affected if you decide not to take part.

The Royal Liverpool University Hospital and The University of Central Lancashire have teamed up to run a project into looking at how you as a person with diabetes feel and cope with having diabetes. The way in which we are doing this is by asking a series of questions which we would like patients to answer as honestly as possible and to rate answers by a scoring system.

The information that we collect will be entirely anonymous and confidential and will not be seen by anyone other than the people doing the research. The interviews may be tape-recorded and if so the tape will be destroyed as soon as possible once the information has been collected and made anonymous.

Thank you for taking the time to read this information sheet. If you would like to take part, the nurse will ask for your permission to be contacted by a member of the research team, who will be in touch in due course.

Contact Telephone Numbers:-
John Hughes: 01772 893637
Warren Gillibrand: 01772 893775

OF CENTRAL
LANCASHIRE

Department of Primary &
Community Nursing
University of
Central Lancashire
Preston PR1 2HE
Tel 01772 893700/2
Fax 01772 892998
Allocations Unit
Tel 01772 892721/2
http://www.uclan.ac.uk
Head of Department
Bernard Gibbon
PhD RN RNT

Study Number:
Patient Information Number for this trial:

CONSENT FORM

Title of Project: The Central Lancashire and Merseyside Diabetes Study Programme

Name of Researcher: Warren Gillibrand
Tel: 01772 893775

Please initial box

1. I confirm that I have read and understand the information sheet for the above study. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without my medical care or legal rights being affected. ☐

3. I agree to take part in the above study. ☐

Name of Patient	Date	Signature
Name of Person taking consent (if different from researcher)	Date	Signature
Researcher	Date	Signature

1 copy for patient, 1 copy for research, 1 copy to be kept with general practitioner

Dear Dr.................

Re: The Central Lancashire and Merseyside Diabetes Study Programme

Your Patient.. Hospital No.........................
Study No..............................
DOB.....................................
Address.................................
....
....
....

The above patient has agreed to take part in a research study by written informed consent which involves answering a number of questions. The study is being run by the University of Central Lancashire and the Diabetes Centre, Royal Liverpool University Hospital.

Attached are examples of the information sheets and a copy of the signed consent form.

If you do not wish for this patient to undertake participation or are unable to provide a follow up appointment if needed after completion of the interviews, please contact the research office within seven days of receiving this letter.

Thank you for your kind attention and co-operation.

Yours sincerely,

Warren Gillibrand, Tel 01772 893775
Dr.Jiten Vora; Tel 0151 706 2000

Appendix 4

Study ID No.	
Name	
Address	
GP name & address	
DOB/Age	
Gender	
Ethnic Origin	
Diabetes Type	
Duration diabetes	
Treatment	
Complications	
Other health problems	
Smoking status	
Weight	
Height	
Blood Pressure	
HbA1c	
Religion	
Employment	
Interview length	
Marital status and dependants	
Education (general)	

INGRID analysis of repertory grid

diabetes dependency grid

In what follows, captions for the tables come immediately after them

	son	self	consultant	GP	nurse
diabetes self manage	0.00	10.00	9.00	0.00	0.00
diabetes care	0.00	0.00	10.00	0.00	2.00
diabetes complications	0.00	10.00	10.00	0.00	0.00
other health problems	0.00	0.00	10.00	0.00	0.00
diabetes management support	0.00	0.00	10.00	0.00	3.00
social activity	0.00	10.00	0.00	0.00	0.00
meaningful work	0.00	6.00	0.00	0.00	0.00
exercise	0.00	7.00	2.00	0.00	0.00
dietary management	0.00	10.00	10.00	0.00	0.00
emotional support	0.00	10.00	9.00	4.00	2.00
altering behaviour	0.00	3.00	10.00	3.00	1.00
changing lifestyle	0.00	3.00	10.00	2.00	2.00
future thinking	0.00	10.00	10.00	3.00	2.00
education	0.00	8.00	2.00	2.00	3.00

grid

	ov.max	ov.min
1	10.00	0.00

Overall observed maximum and minimum ratings

The following are the construct parameters: mean, max, min, variance, s.d., sum of squares and percent of variation

	av.c	max.c	min.c	var.c	sd.c	ssq.c	per.c
diabetes self manage	3.80	10.00	0.00	27.20	5.22	108.80	10.41
diabetes care	2.40	10.00	0.00	18.80	4.34	75.20	7.19
diabetes complications	4.00	10.00	0.00	30.00	5.48	120.00	11.48
other health problems	2.00	10.00	0.00	20.00	4.47	80.00	7.65
diabetes managmenbt support	2.60	10.00	0.00	18.80	4.34	75.20	7.19
social activity	2.00	10.00	0.00	20.00	4.47	80.00	7.65
meaningful work	1.20	6.00	0.00	7.20	2.68	28.80	2.76
exercise	1.80	7.00	0.00	9.20	3.03	36.80	3.52
dietary management	4.00	10.00	0.00	30.00	5.48	120.00	11.48
emotional support	5.00	10.00	0.00	19.00	4.36	76.00	7.27
altering behaviour	3.40	10.00	0.00	15.30	3.91	61.20	5.86
changing lifestyle	3.40	10.00	0.00	14.80	3.85	59.20	5.66
future thinking	5.00	10.00	0.00	22.00	4.69	88.00	8.42
education	3.00	8.00	0.00	9.00	3.00	36.00	3.44

Construct parameters

This the same information but sorted in order of variance accounted for by the construct

	av.c	max.c	min.c	var.c	sd.c	ssq.c	per.c
dietary management	4.00	10.00	0.00	30.00	5.48	120.00	11.48
diabetes complications	4.00	10.00	0.00	30.00	5.48	120.00	11.48
diabetes self manage	3.80	10.00	0.00	27.20	5.22	108.80	10.41
future thinking	5.00	10.00	0.00	22.00	4.69	88.00	8.42
social activity	2.00	10.00	0.00	20.00	4.47	80.00	7.65
other health problems	2.00	10.00	0.00	20.00	4.47	80.00	7.65
emotional support	5.00	10.00	0.00	19.00	4.36	76.00	7.27
diabetes managmenbt support	2.60	10.00	0.00	18.80	4.34	75.20	7.19
diabetes care	2.40	10.00	0.00	18.80	4.34	75.20	7.19
altering behaviour	3.40	10.00	0.00	15.30	3.91	61.20	5.86
changing lifestyle	3.40	10.00	0.00	14.80	3.85	59.20	5.66
exercise	1.80	7.00	0.00	9.20	3.03	36.80	3.52
education	3.00	8.00	0.00	9.00	3.00	36.00	3.44
meaningful work	1.20	6.00	0.00	7.20	2.68	28.80	2.76

Constructs in order of decreasing variance

	tot.var	bias	vari
1	1045.20	0.44	0.86

Slater's variance parameters

"Intensity" = 51.365

This was computed as 100 times the sum of squared construct intercorrelations divided by the square of the number of constructs

	diabetes self manage	diabetes care	diabetes complications	other health problems	diabetes management support	social activity	meaningful work	exercise	dietary management	emotional support	altering behaviour	changing lifestyle	future thinking	education
diabetes self manage	1.00	0.49	1.00	0.56	0.45	0.66	0.66	0.85	1.00	0.95	0.68	0.69	0.97	0.66
diabetes care	0.49	1.00	0.55	0.98	0.99	-0.31	-0.31	-0.03	0.55	0.45	0.90	0.95	0.54	-0.19
diabetes complications	1.00	0.55	1.00	0.61	0.51	0.61	0.61	0.81	1.00	0.94	0.72	0.74	0.97	0.61
other health problems	0.56	0.98	0.61	1.00	0.95	-0.25	-0.25	0.04	0.61	0.51	0.94	0.96	0.60	-0.19
diabetes management support	0.45	0.99	0.51	0.95	1.00	-0.34	-0.34	-0.06	0.51	0.41	0.87	0.93	0.50	-0.19
social activity	0.66	-0.31	0.61	-0.25	-0.34	1.00	1.00	0.96	0.61	0.64	-0.06	-0.06	0.60	0.93
meaningful work	0.66	-0.31	0.61	-0.25	-0.34	1.00	1.00	0.96	0.61	0.64	-0.06	-0.06	0.60	0.93

exercise	0.85	-0.03	0.81	0.04	-0.06	0.96	0.96	1.00	0.81	0.81	0.22	0.22	0.79	0.91
dietary management	1.00	0.55	1.00	0.61	0.51	0.61	0.61	0.81	1.00	0.94	0.72	0.74	0.97	0.61
emotional support	0.95	0.45	0.94	0.51	0.41	0.64	0.64	0.81	0.94	1.00	0.72	0.70	0.99	0.71
altering behaviour	0.68	0.90	0.72	0.94	0.87	-0.06	-0.06	0.22	0.72	0.72	1.00	0.98	0.76	0.04
changing lifestyle	0.69	0.95	0.74	0.96	0.93	-0.06	-0.06	0.22	0.74	0.70	0.98	1.00	0.76	0.06
future thinking	0.97	0.54	0.97	0.60	0.50	0.60	0.60	0.79	0.97	0.99	0.76	0.76	1.00	0.66
education	0.66	-0.19	0.61	-0.19	-0.19	0.93	0.93	0.91	0.61	0.71	0.04	0.06	0.66	1.00

Construct intercorrelations (Pearson)

The following re-expresses those correlations as angular distances, i.e. r=0 -> ang=90 or 270; r=1 -> ang=0; r=-1 -> ang=180

	diabetes self manage	**diabetes care**	**diabetes complications**	**other health problems**	**diabetes management support**	**social activity**	**meaningful work**	**exercise**	**dietary management**	**emotional support**	**altering behaviour**	**changing lifestyle**	**future thinking**	**education**
diabetes self manage	0.00	60.60	3.90	56.10	63.30	48.40	48.40	31.80	3.90	19.00	47.20	46.30	13.90	49.10
diabetes	60.60	0.00	56.80	11.50	5.90	108.0	108.00	91.70	56.80	63.30	25.60	18.70	57.30	101.10

care						0								
diabetes complications	3.90	56.80	0.00	52.20	59.60	52.20	52.20	35.60	0.00	19.50	43.70	42.60	13.30	52.50
other health problems	56.10	11.50	52.20	0.00	17.40	104.50	104.50	87.90	52.20	59.10	19.40	16.50	53.40	100.70
diabetes managmenbt support	63.30	5.90	59.60	17.40	0.00	109.60	109.60	93.70	59.60	65.80	29.90	22.10	59.70	101.10
social activity	48.40	108.00	52.20	104.50	109.60	0.00	0.00	16.60	52.20	50.10	93.30	93.30	53.40	21.30
meaningful work	48.40	108.00	52.20	104.50	109.60	0.00	0.00	16.60	52.20	50.10	93.30	93.30	53.40	21.30
exercise	31.80	91.70	35.60	87.90	93.70	16.60	16.60	0.00	35.60	35.60	77.30	77.10	37.70	25.00
dietary management	3.90	56.80	0.00	52.20	59.60	52.20	52.20	35.60	0.00	19.50	43.70	42.60	13.30	52.50
emotional support	19.00	63.30	19.50	59.10	65.80	50.10	50.10	35.60	19.50	0.00	44.10	45.50	7.90	45.00
altering behaviour	47.20	25.60	43.70	19.40	29.90	93.30	93.30	77.30	43.70	44.10	0.00	10.40	40.30	87.60
changing lifestyle	46.30	18.70	42.60	16.50	22.10	93.30	93.30	77.10	42.60	45.50	10.40	0.00	40.40	86.30
future thinking	13.90	57.30	13.30	53.40	59.70	53.40	53.40	37.70	13.30	7.90	40.30	40.40	0.00	48.90

education	49.10	101.10	52.50	100.70	101.10	21.30	21.30	25.00	52.50	45.00	87.60	86.30	48.90	0.00

Construct intercorrelations (angular distances)

The following are the element parameters. The mean is the mean element rating. SSQ is the sum of squared deviations from construct means for the element. Perc. expresses the latter as a percentage of the total.

	Mean	**Sum.dev**	**SSQ**	**Perc.**
son	0.00	-43.60	153.76	14.71
self	6.21	43.40	316.36	30.27
consultant	7.29	58.40	410.16	39.24
GP	1.00	-29.60	79.76	7.63
nurse	1.07	-28.60	85.16	8.15

Element parameters

The following is the matrix of Euclidean inter-element distances.
A Euclidean distance is the square root of the sum of squared differences between the element ratings on all the constructs

	son	**self**	**consultant**	**GP**	**nurse**
son	0.00	27.70	31.10	6.50	5.90
self	27.70	0.00	24.40	24.60	25.60
consultant	31.10	24.40	0.00	27.80	27.50
GP	6.50	24.60	27.80	0.00	4.80

nurse	5.90	25.60	27.50	4.80	0.00

Euclidean inter-element distances

The following is Patrick's "expected distance". **"Expected" distance = 22.86**

The following is the matrix of Patrick's interelement distances. It's the Euclidean distances divided by the 'expected' distances.

	son	self	consultant	GP	nurse
son	0.00	1.21	1.36	0.28	0.26
self	1.21	0.00	1.07	1.08	1.12
consultant	1.36	1.07	0.00	1.22	1.20
GP	0.28	1.08	1.22	0.00	0.21
nurse	0.26	1.12	1.20	0.21	0.00

Slater's inter-element distances

The following gives the eigenvalues for each component and, usually more comprehensible, the percentage of the total variation in the grid each contains.

	PC	Eigenvalue	Perc.	Cumulative %
1	PC1	730.23	69.87	69.87
2	PC2	291.18	27.86	97.72
3	PC3	14.39	1.38	99.1
4	PC4	9.4	0.9	100

The following gives the element vectors. These are standardised i.e. don't reflect the variance in the component

	PC1	PC2	PC3	PC4
son	0.45	-0.03	0.69	0.36
self	-0.44	0.78	0.04	-0.03
consultant	-0.64	-0.62	0.06	0.07
GP	0.31	-0.02	-0.72	0.43
nurse	0.32	-0.11	-0.07	-0.82

Element vectors

This table gives the element loadings, which are the coordinates plotted in the bipot above.

	PC1	PC2	PC3	PC4
son	12.07	-0.45	2.60	1.10
self	-11.84	13.27	0.16	-0.11
consultant	-17.29	-10.54	0.25	0.21
GP	8.39	-0.42	-2.73	1.32
nurse	8.67	-1.87	-0.28	-2.53

Element loadings

The following is th element residuals, i.e. the amount of the squared deviations from the construct means left to be accounted for after extraction of the components up that that PC

	PC1	PC2	PC3	PC4
son	8.19	7.99	1.21	0.00
self	176.26	0.04	0.01	0.00
consultant	111.19	0.11	0.05	0.00
GP	9.37	9.19	1.74	0.00
nurse	9.96	6.46	6.39	0.00

Element residuals

The following three tables are the vectors, loadings and residuals for the constructs.

	PC1	PC2	PC3	PC4
diabetes self manage	-0.38	0.13	0.26	0.09
diabetes care	-0.21	-0.37	0.13	-0.31
diabetes complications	-0.40	0.09	0.28	0.11
other health problems	-0.24	-0.36	0.17	0.23
diabetes management support	-0.20	-0.38	0.11	-0.58
social activity	-0.16	0.46	0.11	-0.11
meaningful work	-0.10	0.27	0.07	-0.07
exercise	-0.16	0.25	0.11	-0.03
dietary management	-0.40	0.09	0.28	0.11
emotional support	-0.31	0.11	-0.53	0.11
altering behaviour	-0.24	-0.24	-0.38	0.35

changing lifestyle	-0.24	-0.24	-0.21	-0.06
future thinking	-0.34	0.08	-0.33	-0.00
education	-0.12	0.27	-0.32	-0.57

Construct vectors

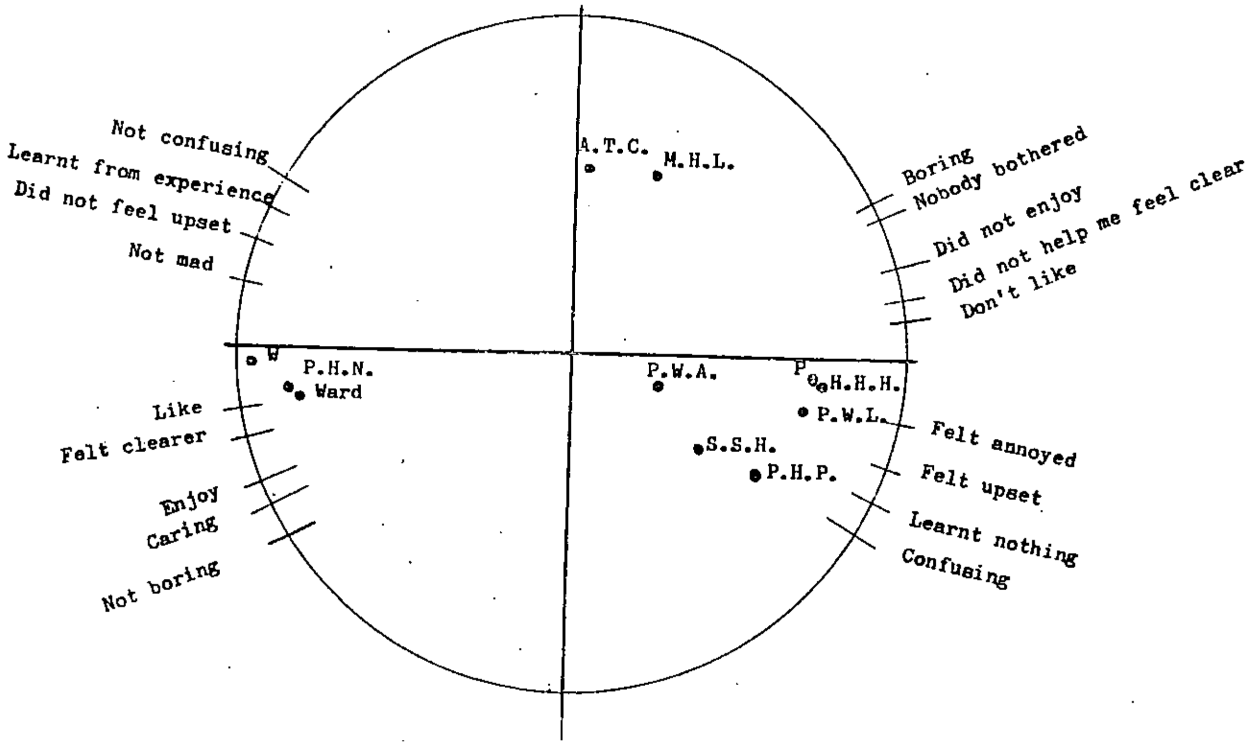
	PC1	PC2	PC3	PC4
diabetes self manage	-10.14	2.22	1.00	0.28
diabetes care	-5.76	-6.40	0.50	-0.95
diabetes complications	-10.78	1.60	1.06	0.35
other health problems	-6.40	-6.18	0.65	0.70
diabetes management support	-5.44	-6.51	0.43	-1.77
social activity	-4.38	7.78	0.41	-0.35
meaningful work	-2.63	4.67	0.25	-0.21
exercise	-4.35	4.21	0.42	-0.10
dietary management	-10.78	1.60	1.06	0.35
emotional support	-8.26	1.90	-2.03	0.35
altering behaviour	-6.46	-4.03	-1.46	1.06
changing lifestyle	-6.45	-4.11	-0.81	-0.19
future thinking	-9.21	1.31	-1.24	-0.01
education	-3.20	4.61	-1.20	-1.75

Construct loadings

	PC1	PC2	PC3	PC4
diabetes self manage	6.00	1.07	0.08	0.00
diabetes care	42.06	1.15	0.90	0.00
diabetes complications	3.82	1.25	0.12	0.00
other health problems	39.06	0.91	0.49	0.00
diabetes management support	45.65	3.33	3.15	0.00
social activity	60.81	0.29	0.12	0.00
meaningful work	21.89	0.11	0.04	0.00
exercise	17.91	0.19	0.01	0.00
dietary management	3.82	1.25	0.12	0.00
emotional support	7.85	4.23	0.12	0.00
altering behaviour	19.47	3.26	1.12	0.00
changing lifestyle	17.60	0.70	0.04	0.00
future thinking	3.26	1.54	0.00	0.00
education	25.76	4.50	3.07	0.00

Construct residuals

Figure 1.2: John's Elements and Construct Plotted Along Their Two Main Principal Components (INGRID)



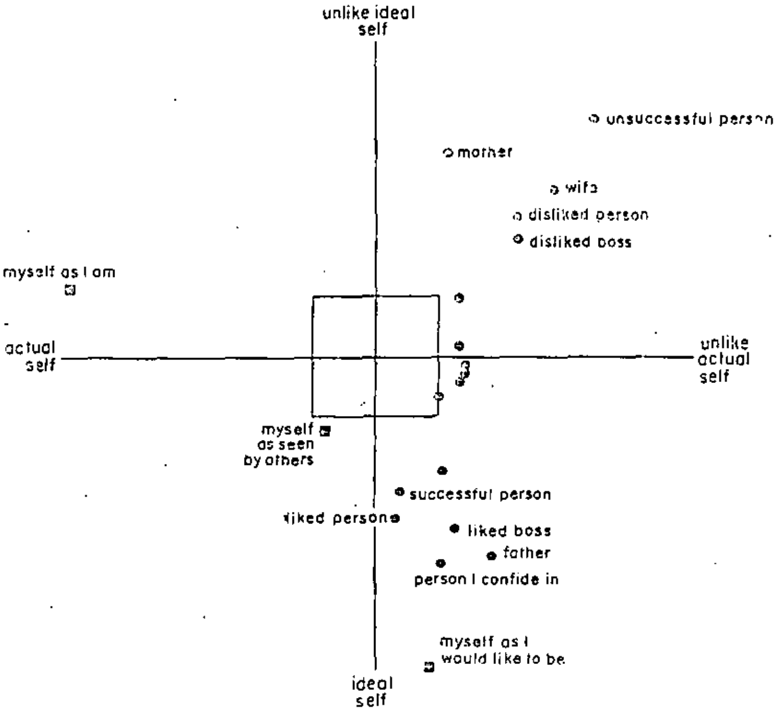


Fig. 15. Plot to show distances on a rating grid (Slater's INGRID principal components analysis) of all elements from the elements "actual self" and "ideal self" for one subject indicating actual self isolation.