

FACTORS AFFECTING LABOUR PAIN

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to Helen Martin Niven
and Eric Edward Brodie

CONTENTS

PAGE NUMBER

	List of tables	1
	List of figures	111
	List of appendices	1v
	Abstract	v
Part 1		
Chapter 1	INTRODUCTION	1
1 1 1	General introduction	1
1 1 2	Pain	2
1 1 3	Labour pain	10
1 1 3 1	The process of childbirth	11
1 1 3 2	The sources of noxious stimulation	14
1 1 3 3	The assessment of factors which affect the amount of noxious stimulation	18
1.1 4	The current study	22
1 1 4 1	The assessment of labour pain	29
1 1 4 2	Summary of aims	36
Chapter 2	METHOD	38
1 2 1	Subjects	38
1 2 2	Setting	39
1 2 3	The normal routine of labour management in SRI	39
1 2 4	Procedure	41
1 2 4 1	Interview 1 The labour interview	41
1 2 4 2	Interview 2 The first post-natal interview	42
1 2 5	Statistical analysis	45
Chapter 3	LABOUR PAIN	46
1 3 1	The assessment of labour pain	46
1 3 2	The intensity and nature of labour pain	48
1 3 2 1	Introduction	48
1 3 2 2	Results	50
1 3 2 3	Discussion	52
1 3 3	Recall of labour pain	60
1 3 3 1	Introduction	60
1 3 3 2	Results	61
1 3 3 3	Discussion	61
1 3 4	The relationship between the different measures of pain	65
1 3 4 1	Introduction	65
1 3 4 2	Results	66
1 3 4 3	Discussion	66
Part 2		
Chapter 1	OBSTETRIC VARIABLES	70
2 1 1	General introduction	70
2 1 2	The degree of cervical dilation	70

CONTENTS (Continued)

	PAGE NUMBER	
2 1 2 1	Introduction	70
2 1 2.2	Results	72
2 1 2 3	Discussion	72
2 1 3	Duration of labour	74
2 1 3 1	Introduction	74
2 1 3 2	Results	75
2 1 3 3	Discussion	75
2 1 4	Parity	78
2 1 4 1	Introduction	78
2 1 4 2	Results	79
2 1 4 3	Discussion	81
2 1 5	Induction and acceleration of labour	85
2 1 5 1	Introduction	85
2 1 5 2	Results	88
2 1 5 2 1	ARM	88
2 1 5 2 2	Syntocinon administration	89
2 1 5 3	Discussion	91
2 1 5 3 1	ARM	91
2 1 5 3 2	Syntocinon administration	93
2 1 6	Complications of birth	93
2 1 6 1	Introduction	93
2 1 6 2	Results	94
2 1 6 3	Discussion	95
2 1 7	The weight of the baby	96
2 1 7 1	Introduction	96
2 1 7 2	Results	96
2 1 7 3	Discussion	97
2 1 8	General discussion	97
Chapter 2	ANALGESIC USE AND OTHER NON PSYCHOLOGICAL VARIABLES	 101
2 2 1.	General introduction	101
2 2 2	Analgesic use	101
2 2 2 1	Introduction	101
2 2 2 2	Results	102
2 2 2 2 1	Pethidine	102
2 2 2 2 2	Entonox	105
2 2 2 3	Discussion	105
2 2 3	The health of the baby	108
2 2 3 1	Introduction	108
2 2 3 2	Results	108
2 2 3.3	Discussion	109
2 2 4	Factors related to obstetric outcome	110
2 2 4 1	Complications of pregnancy	111
2 2 4 1 1	Introduction	111
2 2 4 1 2	Results	111
2 2 4 1 3	Discussion	112
2 2 4 2	Age	114
2 2 4 2 1	Introduction	114
2 2 4 2 2	Results	114
2 2 4 2 3	Discussion	115
2 2 4 3	Social class	115
2 2 4 3 1	Introduction	115

CONTENTS (Continued)

	PAGE NUMBER
2 2.4 3 2	Results 115
2 2 4 3 3	Discussion 116
2 2 5	General discussion 117
Chapter 3	PSYCHOLOGICAL VARIABLES 118
2 3 1.	General introduction 118
2 3 2.	The desirability of pregnancy 118
2 3 2 1	Introduction 118
2 3 2 2	Results 119
2 3 2.3	Discussion 119
2 3 3	Expectations of childbirth 119
2 3 3 1	Introduction 120
2 3 3 2	Results 120
2 3 3 3	Discussion 121
2 3 4	Ante-natal training 125
2 3 4 1	Introduction 125
2 3 4 2	Results 127
2 3 4 3.	Discussion 130
2 3 5	The presence of the husband 131
2 3 5 1	Introduction 131
2 3 5 2	Results 132
2 3 5.3	Discussion 136
2 3 6	General discussion 137
Chapter 4	PREVIOUS EXPERIENCE OF PAIN 141
2 4 1	Introduction 141
2 4 2	Results 143
2 4 2 1	Previous pain related to childbirth 143
2 4 2 2	Previous pain unrelated to childbirth 147
2 4 3	Discussion 159
2 4 3 1	Previous pain related to childbirth and levels of labour pain 159
2 4 3 2	Previous pain unrelated to childbirth and levels of labour pain 160
2 4 3 2 1	No previous pain 160
2 4 3 2 2	Low and high previous pain 161
2 4 3 3	Previous dysmenorrhoea and levels of labour pain 162
2 4 3 4	Explanations of the relationship between previous pain experience and levels of labour pain 163
2 4 3 4 1	Contrast effects 163
2 4 3 4 2	The psychological effects of experiencing severe pain 165
2 4 3 4 3	Pain coping strategies 167
2 4 3 4 4	Physiological factors 169
2 4 3 5	Summary 170
1/2	Review 171
Part 3	
Chapter 1	THE SECOND POST-NATAL INTERVIEW INTRODUCTION AND METHODOLOGY 175

CONTENTS (Continued)

	PAGE NUMBER	
3 1 1	Introduction	175
3 1 1.1	Previous pain experience, strategy use and levels of labour pain	175
3 1 1 2	Strategy use and the modulation of pain	176
3 1.1 3.	The current study	178
3.1.2.	Method	180
3.1 2.1	Subjects	180
3 1 2.2	Setting	181
3 1 2 3.	Timing of the Interview	181
3 1 2 4	Procedure	182
3 1 2 5	The Questionnaire	182
3 1 2 6	Analysis of response	185
Chapter 2	THE AMOUNT OF PREVIOUS PAIN	187
3 2 1	Introduction	187
3 2 2	Results	187
3 2 3	Discussion	189
3 2 4	Previous pain experience (intensity and amount) and levels of labour pain	192
Chapter 3	COPING STRATEGIES	194
3 3 1	Introduction	194
3 3 2	The nature and use of specific coping strategies	194
3 3 2 1	Results	194
3 3 2 2	Discussion	198
3.3 3.	The acquisition of coping strategies	202
3 3 3 1	Results	203
3 3 3 2	Discussion	205
3 3 4	The use of single coping strategies and levels of labour pain	209
3 3 4 1	Results	209
3 3 4 2	Discussion	215
3 3 5	Multiple strategy use	217
3 3 5 1	Results	217
3 3 5 1 1	The total number of strategies used in labour	218 221
3 3 5 2	Discussion	221
Chapter 4	STRATEGY USE AND PREVIOUS EXPERIENCE	224
3 4 1	Introduction	224
3 4 2	Transfer of strategies use and transfer of strategies and previous experience of pain	224
3 4 2 1	Results	224
3 4 2 2	Discussion	228
3 4 3	The total number of strategies used in labour and previous experience of pain	228
3 4 3 1	Results	228
3 4 3 2	Discussion	229
3 4 4	Conclusion	229
4 1	General conclusions	232
REFERENCES		239

LIST OF TABLES

	PAGE NUMBER	
1 1 1.	Psychological factors examined	27
1 1 2 a	Obstetric factors examined	27
1.1 2 b	Related factors examined	27
1 1 3 1	Methods and results of studies on labour pain	49
1 3 2	The intensity of labour pain	51
1 3 3.	MPQ categories selected by 50% of subjects	55
1 3 4	Correlation coefficients for labour pain scores	62
2 1 1	Correlations between dilation of the cervix and the intensity of first stage labour pain	73
2 1 2	Correlations between post-interview duration of labour and the intensity of first stage labour pain	73
2.1 3	Correlations between the duration of labour and levels of labour pain in Primips and Multips	76
2 1 4	Levels of labour pain in Primips and Multips (Analysis of co-variance with Pethidine and Entonox as co-variables)	80
2 1 5	Levels of labour pain in Primips and Multips (Duration of second stage as co-variables)	80
2 1 6	ARM and levels of labour pain	90
2 1 7	First stage pain levels in Primips who subsequently had assisted deliveries	95
2 1 8	Summary table	98
2 2 1	Pethidine use and levels of labour pain	103
2 2 2	Pethidine use and Apgar scores	104
2 2 3	Entonox use and levels of labour pain	106
2 2 4	Complications of pregnancy and levels of labour pain	113
2 3 1	Correlations between expectations of childbirth and levels of labour pain	122
2 3 2	The relationship between ante-natal class attendance and levels of labour pain	126
2 3 3	Levels of labour pain and current, or previous ante-natal class attendance	127
2 3 4	The relationship between attendance at ante- natal classes and social class and age	128
2 3 5	Levels of labour pain and ante-natal class attendance (age, social class and expectations of birth as co-variables)	129
2 3 6	Levels of labour pain in subjects accompanied or not accompanied by their husbands	133
2 3 7	Levels of labour pain in subjects accompanied by 'helpful' husbands compared with those of all other subjects	135
2 3 8	Summary table	138
2 4 1	Correlations between the intensity of pain experienced in previous births and the intensity of pain experienced in the current birth	144
2 4 2.	Correlations between the intensity of pain experienced during pregnancy and the intensity of pain in the current birth	145

LIST OF TABLES (Continued)

	PAGE NUMBER	
2 4 3	Varieties of pain experienced previously	145
2 4 4	Correlations between the intensity of previous pain unrelated to childbirth and the intensity of pain in the current birth	148
2 4 5	Levels of labour pain and the intensity of previous pain Primips only	151
2 4 6	Levels of labour pain and the intensity of previous pain Multips only	152
2 4 7	Significant differences in labour pain levels for subjects with differing intensities of previous pain	153
2 4 8	Correlations between the intensity of previous pain and pain related variables	155
2.4 9	Levels of labour pain for subjects who experienced differing levels of Dysmenorrhoea	158
3 2 1	Levels of labour pain and the amount of previous pain	188
3 2 2	Correlations between the amount of pain previously experienced and the intensity of previous pain and its specific characteristics	190
3 3 1	The nature of strategy use	195
3 3 2	Agreement between the two independent raters on assessment of strategy use, transfer of strategies and desirability of pregnancy	196
3 3 3	Coping strategies used in pain, stress and labour	197
3 3 4	Coping strategies used in labour and previous attendance at ante-natal classes	203
3 3 5	Coping strategies used in labour and their previous use in response to pain and stress	204
3 3 6	Strategy use and differences in labour pain	211
3 3 7	Strategy use and levels of labour pain	212
3 3 8	Significant differences in labour pain levels associated with the interaction between trusting the staff and analgesic use	213
3 3 9	Trusting the staff and levels of labour pain (Pethidine and Entonox as co-variables)	214
3 3 10	Correlations between the number of strategies used in labour and levels of labour pain	218
3 3 11	Correlations between the use of specific strategies in labour and the total number of strategies used in labour	221
3 4 1	Correlations between the number of transferred strategies used in labour and levels of labour pain	225
3 4 2	Levels of labour pain and the use of a number of transferred strategies	226
3 4 3	The number of strategies used to cope with previous pain and the intensity and amount of pain experienced	227
3 4 4	The total number of strategies used in labour and the intensity and amount of previous pain experienced	229

LIST OF FIGURES

	PAGE NUMBER
1 1 1	6
1 1 2	7
1 1 3	8
1 1 4	12
1 1 5	14
1 1 6	15
1 1 7	17
1 1 8	32
1 1 9	35
1.2 1	43
1 3 1	50
1 3 2	53
1.3 3	53
1 3 4	54
1 3 5	59
1 3 6	59
2 1 1	82
2 1 2	83
2 1 3	87
2 3 1	123
2 3 2	134
2 4 1	146
2 4 2	147
2 4 3	150
2 4 4	154
2 4 5	156
2 4 6	157
3 1 1	183
3 1 2	184
3 3 1	210
3 3 2	219
3 3 3	220

LIST OF APPENDICES

	PAGE NUMBER
Appendix 1 Midwife's questionnaire	258
Appendix 2 Criteria for scoring coping strategies	259
Appendix 3 Rationale for adopted methodology and analysis	261
3 1 Retrospective versus prospective methodology	262
3 2 Modification of the VAS	263
3 3 The analysis of interactions	264
3 4 References	265
Appendix 4 The role of anxiety	267
4 1 Introduction	267
4 2 Discussion	267
4 3 Conclusions	278
4 4 References	279

ABSTRACT

The labour pain experienced by 101 women giving birth in a Scottish hospital was assessed by the McGill Pain Questionnaire and Visual Analogue Scales during active first stage labour and post-natally. Labour pain was found to be on average severe, but not intensely negatively affective. Its intensity varied considerably and was related to parity and the duration of the first stage of labour reflecting underlying differences in levels of noxious stimulation. Other obstetric and pharmacological factors which might affect noxious stimulation were not significantly related to pain scores. Induction was related to higher, and complications of pregnancy, to lower levels of pain attributable to psychological modulation. The desirability of pregnancy, positive and accurate expectations of birth, ante-natal training and the welcomed presence of the husband at the birth were associated with significantly lower levels of labour pain, particularly of non-sensory pain.

A few subjects had very minimal previous experience of pain. These subjects had the lowest levels of pain in childbirth, perhaps because they were relatively insensitive to noxious stimulation. Subjects whose previous experience of pain had been extensive had significantly lower levels of labour pain than subjects whose previous pain experience had been more limited. Subjects who had extensive experience of pain used a larger number of strategies to cope with that pain than subjects whose experience had been more moderate. They used more strategies during labour, a greater proportion of which they had used previously. The use of a number of strategies in labour, either in combination or in sequence was related to lower levels of

labour pain but not to painless childbirth. So too was the use of strategies which had been previously utilised. The relationship between previous pain experience and levels of labour pain was mediated by the differential use of coping strategies.

PART 1

CHAPTER 1 - INTRODUCTION

"In sorrow though shalt bring forth children "

Genesis Chapter 3, verse 16

Eufeme MacFarlane was buried alive on Castle Hill
for seeking the assistance of Agnes Sampson for
the relief of pain at the birth of her two sons.
Edinburgh City Records 1891

"The strengthening and purifying effect of the
period of intense pain which preceeded it lent
great significance to the birth "

Patient of Dr Grantly Dick Read (Dick Read 1947).

"The patient relates that she was not really aware
of any discomfort or pain in her labour "

Midwife's report on patient in Stirling Royal
Infirmary 1979

1 1 1 GENERAL INTRODUCTION

The pain associated with human childbirth is unusual and interesting.
Pain is an unpleasant experience which commonly evokes distress and
the desire to escape from or be rid of the stimulus which caused it.
It is usually associated with tissue damage, disease or functional
disorder It is an event which has great personal significance for
those involved It is part of normal female physiological functioning
The pain associated with childbirth is therefore unusual in being a
form of pain which is associated with a natural and highly positive
event

Another unusual feature of labour pain is that it appears to be unique to the human species of primate. It is generally considered that non-human primates do not suffer much pain when giving birth (Rushton and McGrew, 1980, Linberg, 1982). These considerations, while the subject of recent controversy (Lefebure and Carte, 1985, Gijbers and McGrew, 1985) have led some people to expect that humans should, and could, have similarly pain free 'natural' labours (Dick Read, 1947). However, in humans the pelvic girdle to fetal head ratio is such that there is a much 'tighter fit' than is the case in non-human primates (Linberg, 1982). This is due to the evolutionary development of the large human cerebral cortex giving a large fetal head and to the reduction in the dimensions of the birth canal associated with bipedal gait. Consequently birth in humans is more likely to invoke potentially painful stimuli.

Perhaps the most fascinating aspect of labour pain is its variability. The experience of labour pain varies tremendously (Dick Read, 1933, Velvoski, 1954, Llewellyn-Jones, 1977, Oakley, 1979, Begley et al, 1980, Myles, 1981). Some women experience excruciating pain while others suffer little or no discomfort. Childbirth is a complex physical, emotional and psychological event. Social, cultural and religious views of birth and the pain associated with it are also complex and vary considerably, as indicated by some of the quotations given above. It might be hypothesised that differences in any of these factors could affect the woman's experience of labour pain. It is the possibility that psychological factors may affect this experience which makes labour pain of great interest to psychologists and which prompted this study.

1 1 2 PAIN

Scientific theories of pain have changed dramatically over recent years

It used to be thought that noxious stimulation was transmitted directly from a receptor to some 'pain center' in the brain (Descartes, 1644, von Frey, 1895, McCarty and Drake, 1956) This transmission of noxious stimulation was not open to any physiological or psychological modulation and it was therefore held that there was a direct relationship between the intensity of the stimulation and the intensity of perceived pain - the more noxious stimulation, the more pain (Mayer and Watkins, 1984)

This view implied that any variations in perceived pain must be due to variations in the amount of noxious stimulation occurring Therefore variations in, for example, the intensity of burn pain were directly related to the extent of the burned tissue, the intensity of pain resulting from a cut was solely related to the extent of the incision, the intensity of pain resulting from an electric shock was directly related to the intensity of the shock For the same reasons it was held that variation in the intensity of labour pain could only result from variation in the amount of noxious stimulation occurring This variation being affected by the position and size of the baby, the strength of uterine contractions, the degree of dilation of the cervix etc

Reports of pain which could not be related to variation in noxious stimulation, eg pain in the 'phantom limb' of an amputated leg, were attributed to hysteria, malevolence or some other kind of psychological disturbance People who reported that they felt no pain when an adequate noxious stimulation had occurred, eg soldiers injured on the battlefield or rugby players who hadn't noticed that they had broken their legs till the match was over, were considered brave, ie

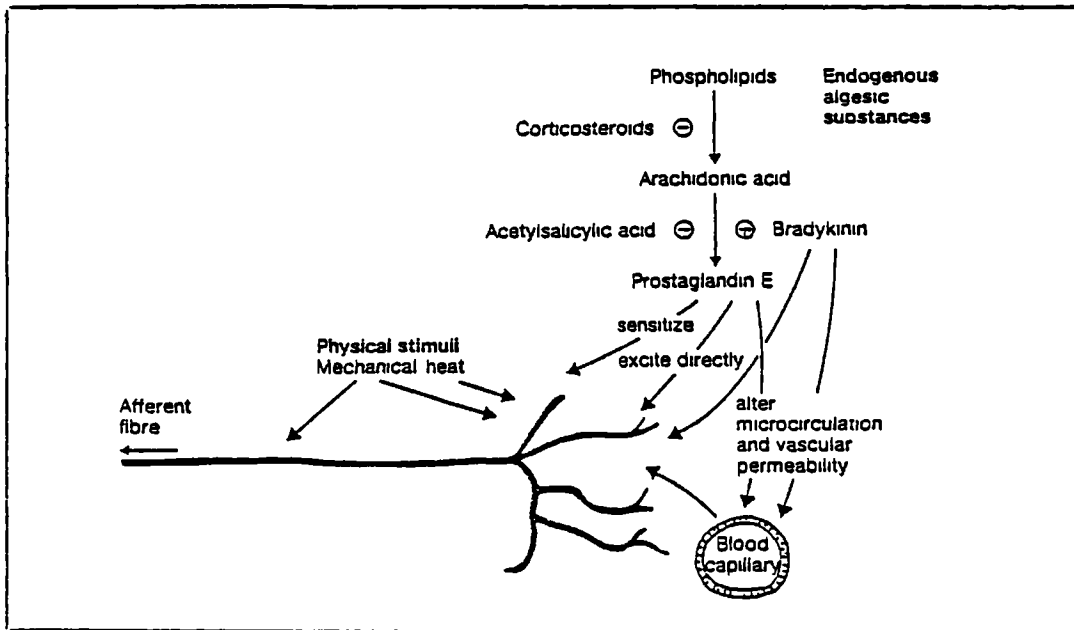
to be experiencing pain but not reporting it, or in extreme cases, eg Joan of Arc, to be in receipt of Godly intervention

As early as 1933, Dick Read was hypothesising that some of the variation occurring in the perception of pain in childbirth was due to psychological factors. Specifically he claimed that high levels of anxiety were the cause of intense labour pain (Dick Read, 1933, 1947). However, the then current model of pain transmission only allowed him to explain this contentious supposition by means of inferring an accompanying increase in noxious stimulation. He hypothesised that increased anxiety led to contraction of the cervix, through the actions of the sympathetic nervous system. The pressure of the baby's head being forced down on to the contracted cervix during uterine contractions produced high levels of noxious stimulation and hence high levels of labour pain (Dick Read, 1947). It is now known that the cervix contains very little contractile tissue and that the cervix is more likely to be dilating than contracting during periods of maximal labour pain (Bonica, 1975, Bonica and Akamatsu, 1975). Therefore Dick Read's hypothesis concerning the mechanisms of labour pain transmission in conditions of high maternal anxiety has been brought into question. However, his belief that the intensity of labour pain can be reduced by relieving anxiety through improving expectations and knowledge of childbirth has become firmly established (Kitzenger, 1962, Dickason and Schult, 1975, Myles, 1981). This has led to the widespread use of 'Preparation for childbirth' classes designed to achieve these ends. The apparent effectiveness of these classes does not nowadays have to be explained in terms of a decrease in noxious stimulation because changes have occurred in the conceptualisation of pain transmission and perception.

Current theories of pain transmission and perception hold that there are a number of different kinds of cutaneous receptors which are capable of transmitting noxious stimulation. Some of these receptors are only activated by intense stimulation (Perl, 1984) while others are activated by a range of stimuli which lie within and above the normal physiological range (Wall, 1984). Some receptors are sensitised or activated by the presence of certain biochemical substances (Zimmerman, 1981) (See Fig 1 1 1). Visceral receptors have been less extensively studied than cutaneous receptors. They are generally regarded to be similar in typology and function to those of the skin though some differences have been noted (Perl, 1984). Transmission of noxious stimulation from cutaneous and visceral receptors proceeds via the dorsal horn of the spinal cord through a number of ascending pathways to a variety of brain areas (see Fig 1 1 2).

At the level of the spinal cord, mainly within the substantia gelatinosa, there is considerable potential for modulation of pain transmission. The pattern of stimulation transmitted via small and large diameter sensory fibres affects the further transmission of this stimulation from cells in the spinal cord (T cells) through direct excitation of these cells and by modulation of this excitation by a gating mechanism (see Fig 1 1 3). This gating mechanism is influenced by descending inhibitory controls from the brainstem and from higher brain regions (Melzack and Wall, 1965, Wall, 1978). These descending controls may incorporate inhibitory links which utilise one of the endogenous opiate biochemicals recently discovered (Hughes et al, 1975). They may also utilise non-opiate substances such as serotonin and nor-adrenalin (Rivot et al, 1984). Modulation of the transmission of

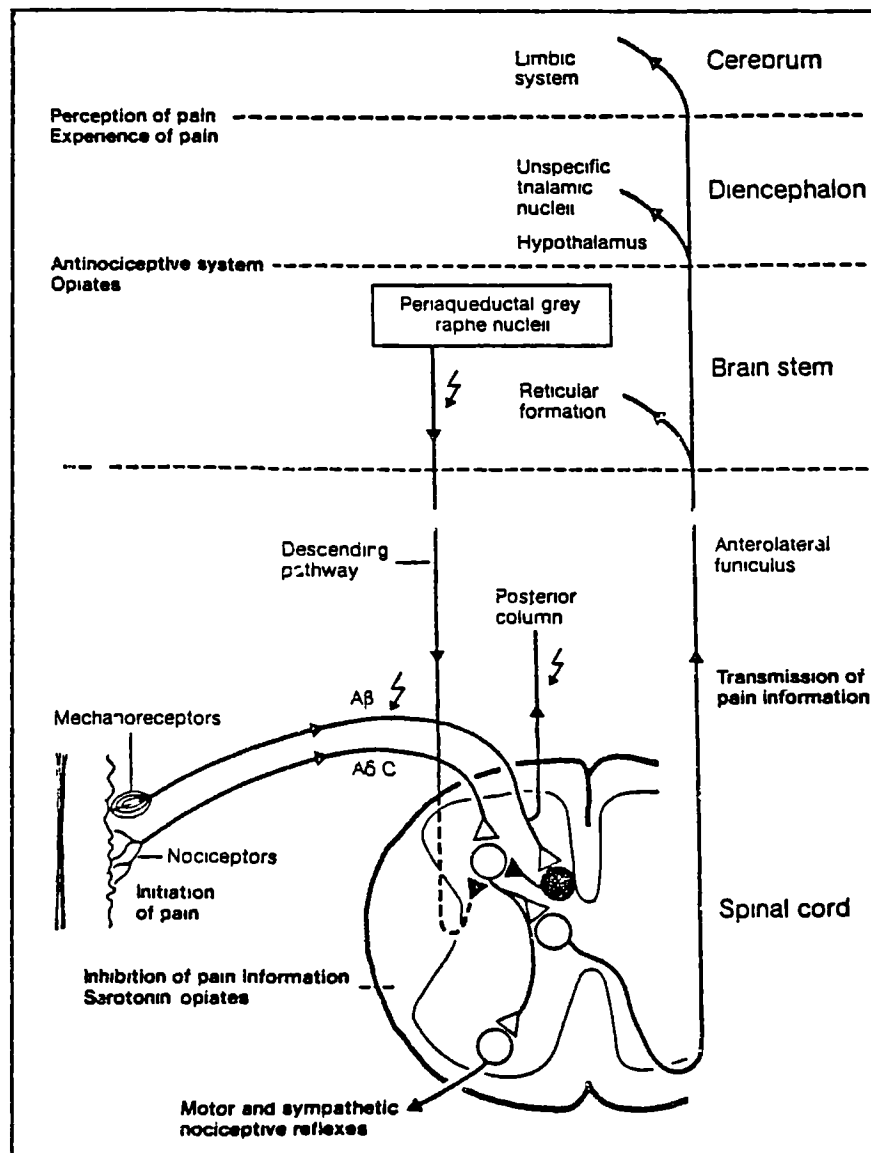
Fig 1.1 1. The nociceptor and its environment



The nociceptor, represented anatomically as the terminal arborization of an afferent fibre, is excited or has its excitability influenced by physical stimuli and endogenous algesic substances. The action of the algesic substances on the nociceptor can also be indirect; it may, for instance, operate through the influence exerted on microcirculation and vascular permeability. The action of various algesic substances can be intensified. One example is the facilitation (+) of prostaglandin synthesis by bradykinin. The action of peripherally active analgesics can in part be explained by their inhibition (-) of the synthesis of prostaglandin E.

Modified from Zimmerman (1981) *Physiological Mechanisms of Pain*
Triangle Vol 20, No 1/2

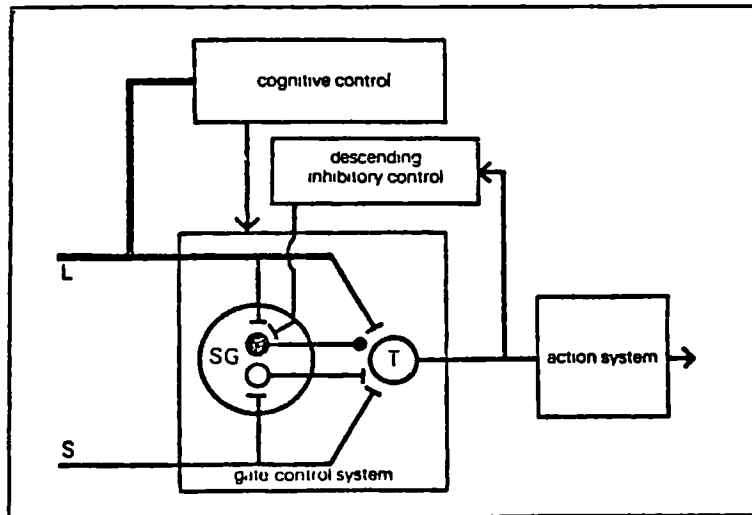
Fig 1 1 2 Functional survey of the processing of noxious stimuli in the spinal cord (schematic diagram)



Afferents from nociceptors (A δ C fibres) excite via synapses spinal neurons, these being the links to sympathetic and motor reflexes, and ascending pathways (antero-lateral tract) The information from the nociceptors is conducted via the ascending pathways to several regions of the brain which constitute neurological substrates of pain perception and pain-related behaviour. The spinal cord neurons can be inhibited, symbolized here by inhibitory synapses (black) Inhibition proceeds from spinal neurons (black) and from the brain stem via descending pathways The zigzag arrows indicate from where inhibition of pain information (ie analgesia) can be induced by electrical stimulation The white areas indicate some functional and pharmacological correlations with the anatomy

Modified from Zimmerman (1981) Physiological Mechanisms of Pain
Triangle Vol 20, No 1/2

Fig. 1 1 3 Schematic diagram of the gate-control theory of pain (Mark 2)



L, the large-diameter fibres; S, the small-diameter fibres. The fibres project to the substantia gelatinosa (SG) and first central transmission (T) cells. The inhibitory effect exerted by SG on the afferent fibre terminals is increased by activity in L fibres and decreased by activity in S fibres.

There are excitatory (white circle) and inhibitory (black circle) links from the substantia gelatinosa (SG) to the transmission (T) cells as well as descending inhibitory control from brainstem systems. The round knob at the end of the inhibitory link implies that its action may be presynaptic, postsynaptic, or both. All connections are excitatory, except the inhibitory link from SG to T cell.

Modified from Melzack and Wall (1982) *The Challenge of Pain*

noxious stimulation at levels above that of the sensory synapses in the spinal cord is also possible (Ralston, 1983, Fields, 1984)

Opiate and non-opiate descending inhibitory systems can be activated by artificial means such as by electrical stimulation in man (Reynolds, 1969) or foot shock in rats (Lewis et al, 1984) Naturally occurring analgesic states have also been noted, for example in soldiers removed from the battlefield (Beecher, 1959), in sportsmen during play and in a proportion of people admitted to hospital following accidents (Melzack et al, 1982) It is assumed that these totally analgesic states have been brought about by activation of endogenous analgesic mechanisms (Wall, 1984)

Modern theories of pain, and the gate theory in particular (Melzack and Wall, 1965) would predict that cognitive and emotional factors could modulate the transmission of noxious stimulation through descending inhibition and by influencing gating mechanisms at the level of the spinal cord (see Fig 1 1 3). Both facilitation and inhibition of transmission could occur through these mechanisms so the perception of pain could be increased or decreased by the effects of psychological factors

There is considerable evidence that cognitive and emotional psychological factors can modulate pain The use of psychological coping strategies such as distraction has been shown to be associated with the amelioration of experimental and clinical pain (Tan, 1982) Expectations of pain have been found to relate to the intensity of perceived experimental pain (Hall and Stride, 1954, Leventhal et al, 1979) and fearfulness in subjects has been found to relate to the perception of

intense pain under experimental (McCaul, 1980) and non-experimental (Martinez-Urrutia, 1975) conditions. Attending to a painful stimulus has been shown to increase the perception of pain when attention was drawn to the frightening qualities of the stimuli (Nisbett and Schacter, 1966) but to lessen it when the subjects were instructed to attend to the 'non-emotionally arousing' qualities of the stimulus (McCaul and Haugtvedt, 1982)

1 1 3 LABOUR PAIN

Differences in levels of labour pain could be due to differences in the intensity of noxious stimulation occurring during childbirth, or to the modulation of that stimulation by psychological factors or by analgesic drugs. Variation in obstetric factors, eg the size and position of the baby, the strength of uterine contractions, the rate of cervical dilation are obviously important in determining the amount of noxious stimulation which occurs in labour. While new theories of pain transmission would predict that the level of perceived pain will not be an exact reflection of the amount of noxious stimulation occurring and that psychological factors could be involved in its modulation they would not predict that the intensity of the stimulus would be unimportant. Certain cases have been cited where intense noxious stimulation occurs but is apparently totally controlled through psychological modulation, eg fire walking, lying on beds of nails. These bizarre activities are usually undertaken as part of some religious rite and typically involve the participants putting themselves into a specific psychological state commonly known as a trance (Nathan, 1985). There have also been reports of women who have undergone extensive prepared childbirth training (PCT) being able to control the pain of childbirth so thoroughly that they could achieve a pain free birth without the use of any pharmacological

analgesia (Kitzenger, 1962) These cases may be the obstetric equivalent of fire walking, but just as few ordinary British citizens could walk on red-hot coals without suffering, so few women would be able to deliver a full term baby without experiencing some pain

The primary source of pain in childbirth is likely to be the noxious stimulation which results from the mechanisms of labour and delivery Variation in the operation of these mechanisms will be reflected in differences in obstetric factors In order to understand the contribution that obstetric factors make to labour pain we need to understand something of the processes of childbirth and of the nature of the noxious stimulation which occurs during these processes

1 1 3 1 THE PROCESSES OF CHILDBIRTH

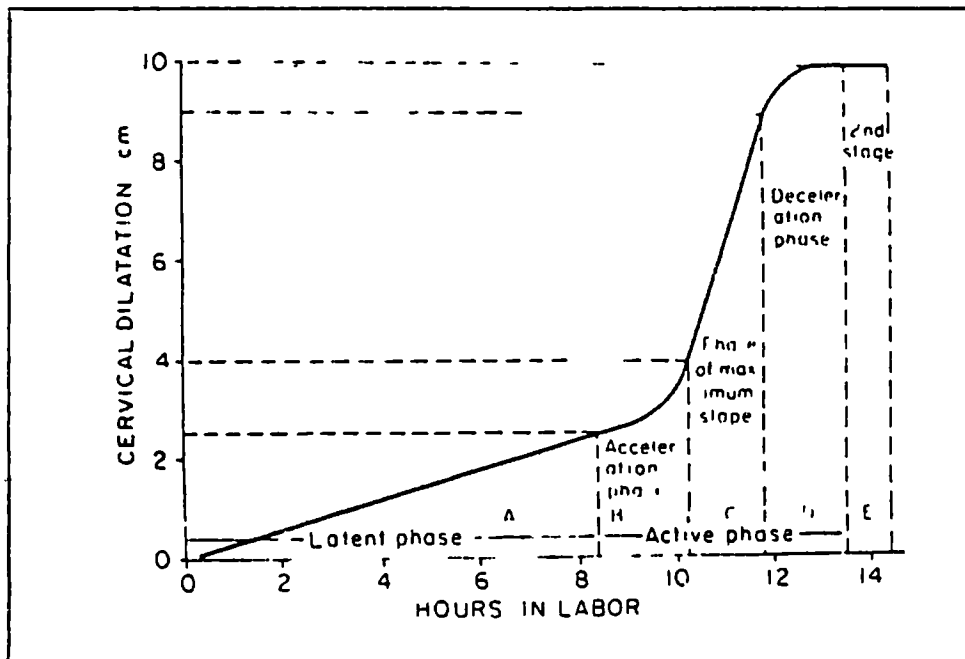
Birth occurs in three distinct stages The first stage of labour consists of the dilation of the cervix from the pre-labour stage of non-dilation to the maximal dilation of 10 cms (see Fig 1 1 4)

This involves the smooth well co-ordinated contraction of the uterine muscles which serve to pull the softened cervix outward and upward

The uterus contracts powerfully against its taut ligamentous supports which are anchored to the skeleton This anchorage limits upward traction of the cervix and the lower part of the uterus, and further contractions serve to expel the fetus in the downwards direction The time taken to achieve full cervical dilation varies In primiparous women (women giving birth for the first time), stage 1 is usually completed in 8-12 hrs but it is almost always shorter in subsequent deliveries

The second stage of labour begins when complete cervical dilation is

Fig 1 1 4 The Friedman labour curve of primigravidae, developed by plotting cervical dilatation versus time



The latent phase, which extends from the onset of labour to the start of the active phase, is very slow and consumes two-thirds of the time for the first stage. The start of the active phase is characterised by a rather sudden change in the rate of dilatation which becomes even more rapid during the phase of maximum slope. The labour curve for multigravidae is similar except that each stage consumes only 60 per cent of the time shown above.

Modified from Bonica (1975) Obstetric Analgesia and Anaesthesia

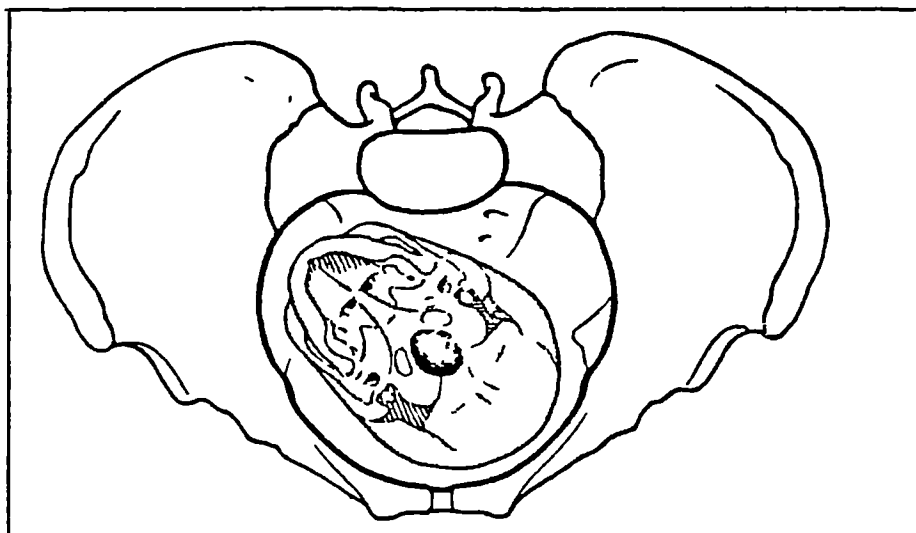
achieved and ends when the baby is delivered. When the cervix is fully dilated and the head has descended into the pelvic canal the parturient experiences a desire to 'bear down', so as to push the fetus from the uterus down through the cervix and pelvic outlet and so to the exterior. This urge to 'bear down' may be stimulated prematurely before complete dilation has occurred. Under these circumstances it is inadvisable to bear down as cervical damage may occur. Thus the woman is urged to disist from pushing which is difficult. This 'transition' stage as it is known varies in duration from a few minutes to as long as half an hour (Myles, 1981)

Bearing down is a valsalva manoeuvre, in which expiration is made against a closed glottis so that intra-abdominal pressure is raised. The conscious efforts of the mother to bear down amplify the intrinsic expulsive mechanisms. The stretching of the cervix also initiates a powerful local feedback effect to enhance myometrial activity directly and stimulate the secretion of oxytocin from the posterior pituitary. Oxytocin has contractile effects on the myometrium and it is possible that its secretion may also stimulate the release of prostaglandins from the endometrium, thereby increasing the local concentration of smooth muscle spasmogens still further (Begeley et al, 1980)

In the normal labour where the fetal head is the presenting part and where the pelvis is adequately shaped, the head engages transversely and descends into the mid-pelvis as stage 2 labour commences. Thus the head fits the pelvic inlet most advantageously (see Fig 1 1 5). The head then rotates to avoid the ischial spines and advances as the hind-parts of the fetus are squeezed down by uterine contractions. The fetus negotiates the pelvic curve by head extension, moves downwards,

distends the vulva and appears at the exterior - 'crowning'.

Fig 1 1.5. Position of the fetal head in the pelvic inlet



Vertex-left occipito-anterior, showing the advantage of an anterior position. The biparietal diameter occupies the roomy anterior part of the pelvic brim.

Modified from Myles, M. (1981) Textbook for Midwives

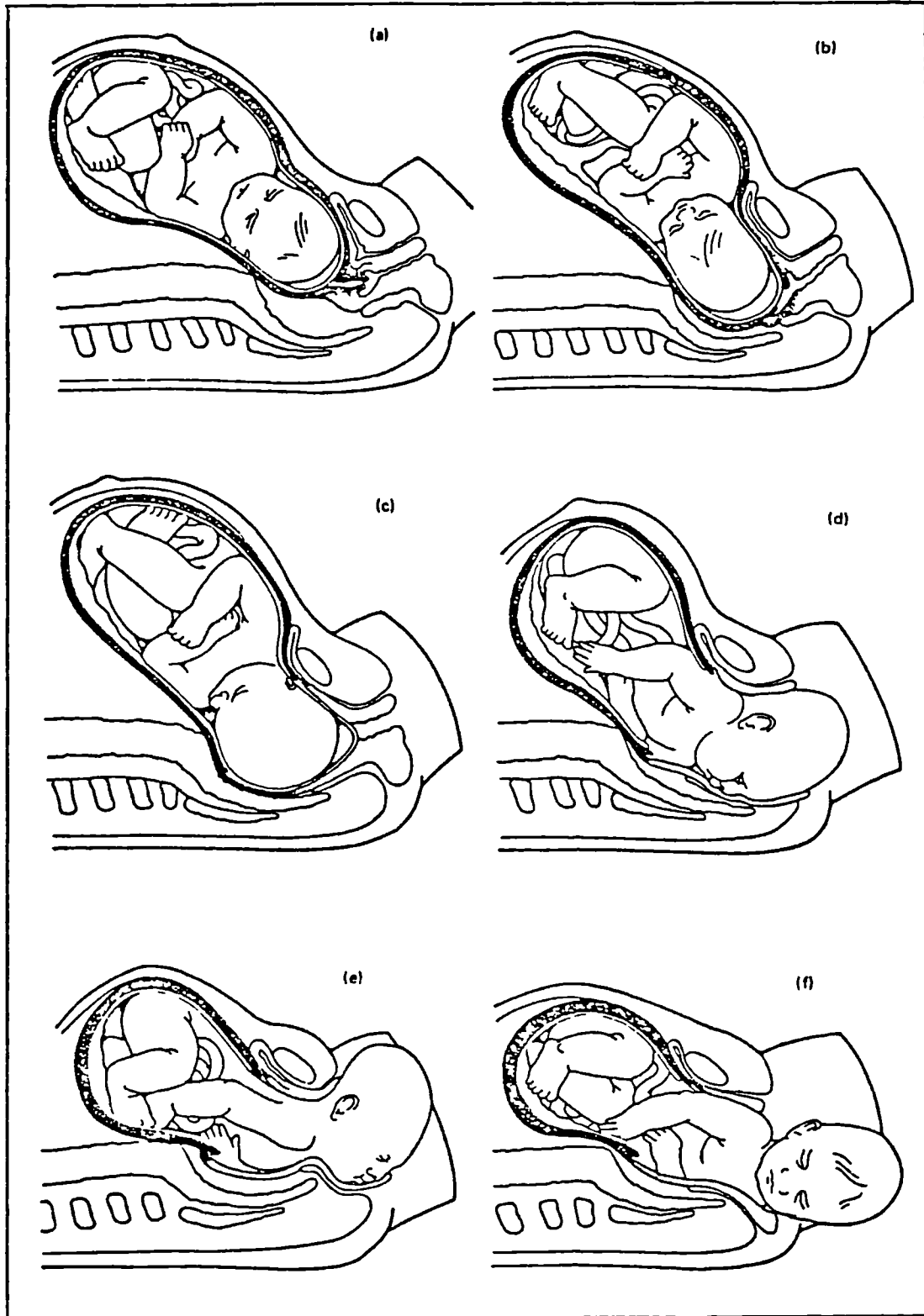
The shoulders tranverse the pelvis obliquely, the head turns to orient with the trunk and the baby is delivered (see Fig 1 1 6). This birth process generally takes about 50 minutes in a primiparous woman and 20 minutes if she is multiparous (having her second or subsequent child). Prolonged stage 2 labour necessitates active medical intervention (forceps or caesarian section delivery) as both the mother and the baby are endangered (Llwellyn-Jones, 1977, Myles, 1981)

The third stage of labour involves the delivery of the placenta and is usually achieved in a few contractions.

1 1 3 2 THE SOURCES OF NOXIOUS STIMULATION

The most probable sources of the noxious stimulation occurring during

Fig 1.1.6 Delivery



Modified from Begeley, Firth and Hault (1980) Human Reproduction and Developmental Biology

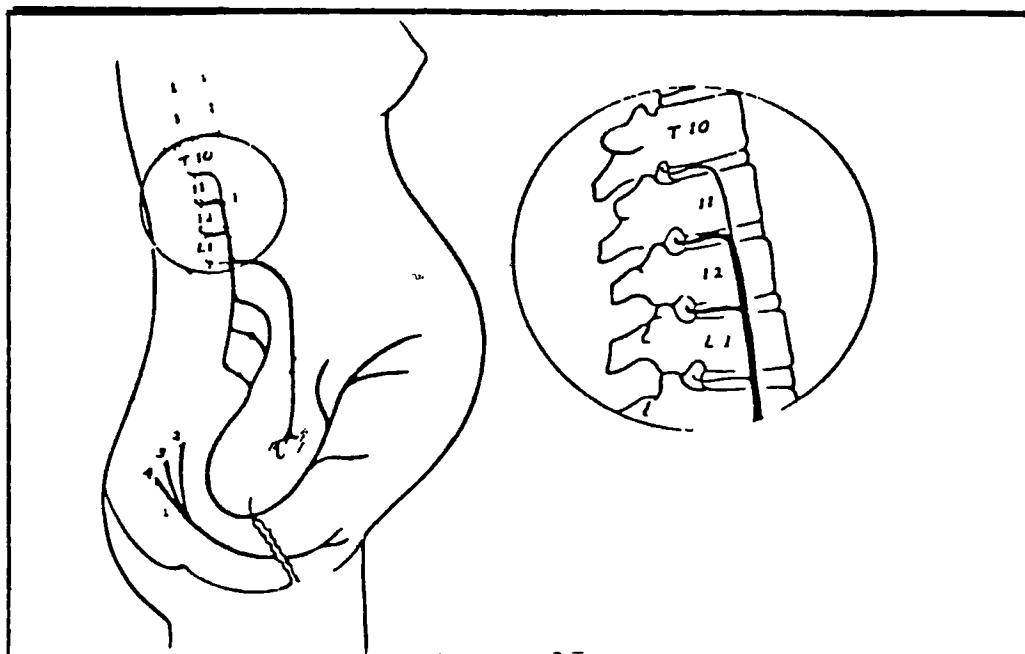
the first stage of labour are the dilation of the cervix and the contraction of the uterus. Research on human subjects has shown that dilation of the cervix in pregnant and in non-pregnant women produces pain similar in quality and spatial distribution to that produced during labour (Theobald, 1946, Javert and Hardy, 1950, Klink, 1953, Paul, 1956, Bonica and Akamatsu, 1975). The more rapid the dilation (induced artificially by means of inflating a small balloon inserted into the cervix) the more intense the pain (Bonica and Akamatsu, 1976). Thus dilation of the cervix unaccompanied by contractions of the uterus produces pain which resembles labour pain.

Uterine contractions do not typically become painful until 15 to 20 seconds after their onset (Bonica, 1975). This time lag corresponds to the amount of time needed for the contraction to produce a uterine pressure sufficient to distend the lower uterine segment and cervix (Caldeyro et al, 1960, Bonica, 1975). Therefore, uterine contractions do not seem to be associated with pain unless they coincide with dilation of the cervix. It is probable however, that the contraction of the uterine muscles does produce some noxious stimulation since high pressure mechano-nociceptors have been found in muscle (Mense et al, 1981). Furthermore, contraction of the uterine muscle may cause the release of algescic substances (eg prostaglandin) which directly or indirectly stimulate chemo-nociceptors (Bonica, 1975, Zimmerman, 1981). The distention and superficial traumatization of the vagina and perineum which occurs during the second stage of labour, together with traction and pressure on pelvic nerves, organs and fascia add additional sources of noxious stimulation at that time.

Thus there are a number of sources of noxious stimulation in childbirth,

transmission of which has been investigated in woman by use of selective blocking of varying spinal cord segments during the course of labour (Klink, 1953, Bonica, 1975) The pathways are described diagrammatically in Fig 1.1.7

Fig 1.1.7 Parturition pain pathways



The uterus, including the cervix, is supplied by sensory (pain) fibres which pass from the uterus to the spinal cord by accompanying sympathetic nerves in the following sequence: uterine, cervical, and pelvic plexuses, the hypogastric nerve, the superior hypogastric plexus, the lumbar and lower thoracic sympathetic chain, and thence through white rami communicantes and posterior roots. The primary pathways (shown in thick lines in the inset) enter the 11th and 12th spinal segments while the secondary auxiliary pathways enter at T10 and 11. The pathways from the perineum pass to the sacral spinal cord via the pudendal nerves.

Modified from Bonica, J J (1967) Principles and Practice of Obstetric Analgesia and Anesthesia

Analgesic drugs can be used during childbirth to block the transmission of noxious stimulation at the level of the spinal cord. This epidural

anaesthesia requires the skilled administration of potent drugs directly into the spinal canal (Bonica, 1975) Alternative analgesic regimes in childbirth involve the use of a variety of analgesic agents such as Demerol, Pethidine or Entonox (nitrous oxide and oxygen) These operate at higher levels of the CNS (see Fig 1 1 2) The use of systemic drugs is limited by their effects on the baby, respiratory depression in the baby for instance, being an acknowledged side effect of late Pethidine administration (ie Pethidine given within three hours of delivery which crosses the placental barrier and affects the baby's first attempts at respiration) (Brazelton, 1961) The use of powerful analgesic drugs may also affect the rate of progress in labour

1 1 3 3 THE ASSESSMENT OF FACTORS WHICH AFFECT THE AMOUNT OF NOXIOUS STIMULATION OCCURRING DURING LABOUR

In order to determine the relative contribution that psychological factors make to the experience of labour pain, the amount of noxious stimulation occurring needs to be assessed Such assessment would allow differences in the intensity of labour pain to be attributed to differences in the intensity of noxious stimulation or to the modulation of that stimulation by diverse factors Precise and continuous information about the rate of dilation of the cervix and the strength of uterine contractions would need to be available if the amount of noxious stimulation occurring during labour was to be assessed accurately The degree of cervical dilation is measured routinely during labour Unfortunately it is only measured intermittently, usually at 2 or 4 hourly intervals Therefore a direct measure of the degree of cervical dilation is not continuously available The average rate of cervical dilation can be calculated from the difference between the measure of

cervical dilation obtained on one occasion and that obtained on the next occasion 2-4 hours later. The cervix however does not dilate at a steady rate (Llewellyn-Jones, 1977) so it is not possible to say that the cervix was dilating at a given rate at the time a certain intensity of pain was being experienced. The strength of uterine contractions are assessed periodically by the midwife by abdominal palpitation. This yields a gross measure of contraction strength. They can also be recorded more precisely by electronic monitoring equipment which is used for some patients in labour.

There are numerous factors which affect the amount and rate of cervical dilation and the strength of uterine contractions. Parity (the number of births experienced by a subject) will affect cervical dilation since the cervix of a woman giving birth for the first time (Primip) is more rigid than the cervix of a woman giving birth to her second or subsequent child (Multip). This results in the cervix being already partially dilated at the beginning of a Multip's labour and in the rate of dilation being more rapid (Llewellyn-Jones, 1977, Myles, 1981). The strength of uterine contraction necessary to achieve a given degree of dilation is therefore likely to be less in the Multip.

The duration of labour will obviously affect the rate of cervical dilation, a rapid first stage necessitating more rapid dilation. However, as the rate of dilation is not consistent throughout labour, this more rapid dilation may occur at any time during the first stage and it cannot be assumed that the pain experienced at one point during a rapid labour will be a reflection of a concurrently rapid cervical dilation.

The diameter of the presenting part of the fetus and its position in the

birth canal relative to the diameter and shape of the birth canal may also affect the strength of uterine contractions and the rate of cervical dilation. If the presenting part is not too large and is optimally placed in a normally shaped birth canal, the contractions of the uterus will serve to shorten and dilate the cervix efficiently and in the second stage of labour will propel the presenting part through the birth canal (see Fig 1 1 6). If the presenting part is abnormally large as in a very big baby or where the buttocks not the head are presenting (breech birth) or if the presenting part is misplaced relative to the optimal dimensions of the birth canal, then the contractions of the uterus will not dilate the cervix efficiently and the first stage of labour will be prolonged, the rate of cervical dilation will be slow but the uterine contractions will not be as weak as the rate of dilation would suggest. If the above conditions prevail, or if the birth canal is misshapen and narrowed, then during the second stage of labour the uterine contractions will not propel the baby efficiently along the birth canal and a prolonged second stage will result. This complicated state of affairs is made more so by the fact that weak uterine contractions will also produce prolonged first and second stage labour and by the involvement of the voluntary 'pushing' efforts of the mother in the second stage, which can compensate for or exaggerate the effect of weak involuntary uterine contractions or some fetal/maternal disproportion. The strength of uterine contractions may also be affected by a number of medical interventions. Artificial rupture of the membranes surrounding the baby and the administration of Syntocinon, a synthetic form of oxytocin, result in the commencement of labour (induction) at a time prescribed by the medical practitioner, not by nature. These procedures have the effect of increasing the frequency

and strength of uterine contractions (Llewellyn-Jones, 1977)

The exact size of the presenting part cannot be measured till after delivery, though ultra-sound scanning can give a good indication of the dimensions of the head etc while the baby is still in utero. As the fetal skull bones overlap during delivery however, the exact dimensions of the head as it passes through the birth canal cannot be known. The weight of the baby gives some gross indication of size, a very heavy baby being likely to have a bigger head than a very light one. The position of the presenting part is similarly difficult to gauge exactly though abdominal and vaginal palpation is used to give gross information on this factor. The position of the presenting part also changes during labour and delivery as the force of the contractions and the shape of the channel act upon the inert infant. The dimensions of the birth canal can be measured exactly by use of pelvic radiometry, but the procedure carries risks to the mother and fetus and so is only undertaken in special cases.

Many of the factors which will affect the rate of dilation of the cervix and the strength of uterine contractions and thus the intensity of the noxious stimulation occurring during childbirth are therefore difficult to quantify precisely. Gross measures of parity, duration of labour and weight of the baby can be obtained. Medical records of induction, or of prolonged labour or assisted delivery will also yield information about possible differences in the amount of noxious stimulation occurring.

The modulation of noxious stimulation by systemic analgesic drugs can be assessed by considering the timing of their administration and the amount of the drug used. Entonox is given by inhalation, the duration of which is controlled by the parturient herself. The precise dosage of

Entonox is therefore unobtainable

1 1 4. THE CURRENT STUDY

The aim of this study was to examine the role played by a number of psychological factors in modulating labour pain. A number of studies have been carried out which purport to show that labour pain can be modulated by psychological factors. The majority of these studies have concerned the use of prepared childbirth training (PCT). This ante-natal training involves education about the mechanisms of childbirth, the encouragement of positive attitudes to and expectations of, childbirth and training in the use of 'psychoprophalactic' breathing and relaxation techniques. The exact form of the training varies from trainer to trainer and from country to country, British ante-natal training emphasising 'passive' relaxation, while the American PCT emphasises 'active' relaxation, the use of more complex breathing techniques and the participation of the husband as a labour coach. However, Chertok who has undertaken an extensive review of these different forms of training (Chertok, 1959) has concluded that the similarities between them outweigh the differences and that it is feasible to consider all forms as involving the essential features outlined above.

A number of studies have demonstrated a significant relationship between participation in PCT and a more positive birth experience. Huttel et al (1972) found that prepared women were more co-operative in labour than unprepared women. Flowers (1962) reported that they required fewer obstetric interventions and Shapiro and Schmitt (1973) that there was a significant reduction in the length of their labours. While some of these studies have shown that PCT was associated with lower levels of labour pain (Hommel et al, 1972, Cogan et al, 1976, Worthington, 1982)

others have found no relationship between these variables (Davenport-Slack, 1975, Nettlebladt et al, 1976) The empirical design of many of the studies of PCT has been criticised (Chertok, 1959, Bonica, 1967, Beck & Hall, 1978) since few utilise adequate control groups This deficiency may be unavoidable since there are ethical problems associated with the random assignment of subjects to PCT or no-PCT groups The establishment of a causal relationship between participation in PCT and lower levels of pain may thus have to rely on the findings of experimental studies, such as those carried out by Worthington and Martin (1980), where the effectiveness of the various components of PCT are assessed under controlled conditions The use of clinical studies will still however be essential in establishing an association between class attendance and the actual experience of labour pain Since many of the studies on the effects of PCT were carried out in North America where participation in such training is less widespread (6-8%) than in Britain where it is available on the NHS, subject numbers tend to be small and the subject populations to be biased in terms of age and social class. These variables have themselves been linked to obstetric outcome (Aladjem, 1972) so the effects of PCT may be confounded by them

This study aimed to examine the association between ante-natal class attendance (as PCT is termed in Britain) and levels of labour pain in a substantial number of subjects, broadly representative of British par-
turants Potentially confounding variables such as age and social class were considered so as to allow for statistical control of their effects.

The PCT movement has had considerable influence on obstetric practice. One notable result of this has been to encourage the presence of the husband at the birth In North America the husband of a 'prepared'

woman acts as her labour coach, timing her contractions and encouraging her in the use of psychoprophalactic techniques. His presence as coach has been associated with significantly lower levels of labour pain (Henneborn and Cogan, 1975, Cogan et al, 1976) However the practice of having the husband at the birth has become widespread and the benefits of his presence have been related to factors other than pain Tanzer (1967) for instance has found that the woman's experience of the birth was more positive if her husband was present and Parke (1981) has found that the interaction between mother, father and baby was improved by his presence at the birth These factors may be associated with a modulation of labour pain which is not due to the coaching efforts of the husband Ante-natal training in Britain does not utilise the husband as coach, nor does obstetric practice in Britain prescribe the role of the accompanying husband A study carried out in Sweden where practices are similar to those in Britain (Nettlebladt et al, 1976) found no relationship between the husband's presence and levels of labour pain However, this study used an atypical subject population of highly educated women This study aimed to examine the relationship between the husband's presence and levels of labour pain in a more representative sample of British women

Two further psychological factors have been examined in relation to labour pain These relate to expectations of birth and the desirability of pregnancy Previously it had been considered that both these factors were related to the marital status of the parturient, unmarried mothers having unplanned and unwanted pregnancies and consequently negative expectations of birth Thus an association between single status and high levels of labour pain (Eysenck, 1961) was not unexpected Changes in societal practice regarding marriage and parenthood and the availability

and acceptability of effective contraception may have altered the relationship between marital status, the desirability of pregnancy and expectations of childbirth so that these factors need to be examined separately. The desirability of pregnancy has been separately examined by Chertok in 1969 and Nettlebladt et al in 1976. They found that lower desirability was associated with higher levels of pain. Nettlebladt, working in 'liberal Sweden', also found that negative expectations of childbirth were related to negative attitudes to pregnancy (Nettlebladt et al, 1976). The desirability of pregnancy was assessed in these studies by ante-natal interview. However, a detailed study of attitudes to pregnancy carried out in Britain has found that attitudes to pregnancy and to its desirability change markedly over its nine month course (Wolkind and Zajicek, 1981). It might therefore be argued that an overall evaluation of the desirability of pregnancy obtained post-natally would be more accurate than evaluations obtained at any one stage of pregnancy. This study evaluated the desirability of pregnancy post-natally and related differences in desirability to levels of labour pain. Expectations of childbirth were also related to pain in childbirth.

Eysenck, in her study of labour pain assessment in married and unmarried mothers (1961) found that Extraverts had more pain in labour than Introverts, and thus concluded that personality factors were associated with the experience of labour pain. However, Bond and Pearson (1969) have shown that the relationship between Extraversion and high levels of pain was more a function of their tendency to spontaneously complain of pain. If both Introverts and Extraverts were required to report their experience of pain there were no differences between them. Thus

Eysenck's results may have reflected differences in the reporting of labour pain not in its experience. The results of a recent study of labour pain which found an "inconsistent association between personality factors and labour pain measures" (Reading and Cox, 1985, p.313) may support this supposition.

The results of studies which have examined the relationship between psychological factors and labour pain therefore suggest that ante-natal training, positive expectations of childbirth and attitudes to pregnancy, and the presence of the husband at the birth are associated with lower levels of labour pain. However a number of these studies suffered from methodological weaknesses, some of which can hopefully be overcome in this study. Many of the studies were carried out in North America (which in itself is no fault). Their results however may not be applicable to British subjects giving birth in British hospitals. While many of the studies considered a few of the potentially confounding non-psychological variables such as parity, consideration of the large number of factors related to the mechanisms of childbirth (see 1.1.3.3) was rare. Therefore underlying differences in the levels of noxious stimulation occurring during childbirth may have affected these results but gone undetected. Analgesic use was often considered as a dependent variable (Huttel, 1972, Cogan et al, 1976), but not as a confounding modulator of labour pain.

This current study therefore aimed to consider the relationship between the psychological factors listed in Table 1.1.1 and levels of labour pain in a representative sample of British subjects giving birth in hospital (the 'normal' place of birth in Britain in the '80s). The relationship between these variables was analysed with regard to the

Table 1 1 1 Psychological factors examined

Desirability of pregnancy
 Expectations of childbirth
 Ante-natal class attendance
 The presence of the husband at childbirth
 The previous experience of pain

Table 1 1 2a Obstetric factors examined

Degree of dilation of the cervix
 Duration of labour - Duration of 1st stage
 Duration of 2nd stage
 Parity - Primiparity
 Multiparity
 Number of previous births
 Induction of labour - Artificial rupture of the membranes
 Sytocinon infusion
 Complications of birth - Forceps delivery
 Ceasarian section
 Weight of the baby

Table 1 1 2b Related factors examined

Analgesic use - Pethidine
 Entonox (Nitrous oxide 50% and Oxygen 50%)
 Health of the baby - Apgar 1 and 2 scores
 Midwife's rating of baby's health at 48 hours
 post-natal
 Complications of pregnancy
 Age of mother
 Social class of mother

possible existence of underlying differences in levels of noxious stimulation. These differences were assessed as accurately as possible through examination of the obstetric factors listed in Table 1.1.2. Other potentially confounding variables such as age, social class and analgesic use were included in this analysis. Medical complications of pregnancy which have been related to peri-natal problems (Aldajem, 1972) were considered and the health of the baby at birth and later was noted. Some information on the pleasant and unpleasant aspects of birth was obtained.

One psychological factor which may affect the previous experience of labour pain concerns the parturants' previous experience of pain. The experience of pain and the anticipation of that experience is likely to evoke memories of similar experiences. The nature of these memories will thus affect expectations of pain, feelings about pain and pain behaviours. Recall may also modify current pain experience by facilitating or inhibiting the transmission of noxious stimulation through the modulatory effects of cognitive and emotional factors (Melzack and Wall, 1982). The ability to cope with pain may also be affected by previous experiences of coping with pain (successfully or otherwise). A number of eminent pain researchers have emphasised the importance of previous experience in affecting the perception of pain (Sternbach, 1968, Melzack and Wall, 1973, Bonica, 1984). Some research has been carried out into the effects of early pain experience in animals (Melzack and Scott, 1957, Melzack, 1965, 1969, Lichstein and Sakett, 1971) and humans (Savendra et al, 1982) and the psychological and physiological consequences of prolonged (chronic) pain experience have been the focus of much recent research (Bonica, 1984, Iggo, 1984, Wall, 1984). However, little is known about the relationship between a

subject's current pain experience and his or her general pain history - what kind of pain has been experienced, how often, how intense was it, how stressful

One of the main aims of this study was therefore to examine subjects' pain histories and relate these to the levels of pain experienced in labour. It would have been desirable to have examined the relationship between stress or anxiety during childbirth and the nature and intensity of labour pain, since both Dick Read (1933, 1947) and Chertok (1969) have demonstrated some relationship between these variables and since stress or anxiety probably underlies the effects of many psychological variables considered in this study. However an adequate assessment of these factors would have necessitated the administration of lengthy questionnaires which would have been impracticable during labour and would have interfered with post-natal pain assessments. The proper consideration of these variables really lay outwith the scope of this study. Expectations of childbirth, bad experiences during childbirth and levels of affective pain (see 1 1 4 1), may all give some information about stress or anxiety in childbirth, and the consideration of stress and anxiety in labour was restricted to the examination of these variables

1 1 4 1 THE ASSESSMENT OF LABOUR PAIN

Pain of all kinds is a subjective experience "A personal, private sensation of hurt" (Sternbach, 1968, p 12). As such it is not available for direct measurement. An outside observer can never experience another person's pain but can gain some information about it through the sufferer's behaviour, physiological responses and reports of the pain

Footnote The role of anxiety in pain perception is considered further in Appendix 4

We commonly infer knowledge about another's pain through observing his or her behaviour. Cries, screams, groans, grimaces, rigidity, 'guarding' all communicate that the subject is in pain. However such behaviours are difficult to quantify and are susceptible to social pressure (Zborowski, 1952), cultural norms and individual differences (Bond and Pearson, 1969). Pain behaviours and the behaviours which accompany great physical effort are rather similar (witness a tennis player serving or a weight lifter lifting). Therefore the pain behaviour and the effort behaviour of women in labour could be confused and thus observation of labour pain behaviour is not a suitable method of assessing labour pain.

The stress of being in pain invokes the normal bodily response to stress of any kind - increased adrenalin secretion, heart rate, respiration, etc. These physiological responses can be objectively measured but do not give information about the pain itself, only about pain as a stressor. In labour there are multiple potential stressors, both physiological, eg the effort of delivery and psychological, eg anxiety. Therefore physiological measures of heart rate, etc obtained during childbirth would reflect the effects of all these stressors, not just the effects of pain.

The most common assessment technique used by pain researchers involves the use of structured numerical or semantic scales. There are a large number of such scales - 3, 5 or 10 point numerical scales with or without accompanying descriptors such as "no pain", "mild pain", "severe pain", but until recently all that pain scales measured was the intensity of the pain. Such scales have been used in labour pain research, eg Klopfer et al, 1975, Cogan et al, 1976, Nettlebladt et al, 1976

However labour pain, like pain of any other kind is not simply experienced along a dimension of intensity. Pain has many different qualities, both in its sensory nature - the dull ache of a headache, the cramping of period pain, the crushing pain of angina - and in its non-sensory qualities - how frightening it is, how sickening, how unbearable (Melzack and Torgerson, 1971). Thus pain is multi-dimensional in nature and it is desirable that the assessment of pain should reflect this complexity (Petrie, 1967, Chapman, 1976, Gracely, 1979). It could be particularly important to measure labour pain in a way which reflects its multi-dimensional nature. Not only is childbirth a very complex event but it is one in which positive aspects and negative ones are mixed and to a certain extent co-exist. "The agony and the ecstasy" as Anne Oakley summarises it (Oakley, 1979, p 85), or as put by a patient in Stirling Royal Infirmary, "Giving birth was excruciating. It was like a red hot poker going through my spine. It was the most wonderful experience of my whole life." That kind of mixture of sensations can not be summed up on a 1-10 scale.

The inadequacy of the pain assessment scales used in labour pain research may have contributed to the inconclusiveness of their findings. For example PCT may affect levels of labour pain by modulating the frightening qualities of pain in childbirth. Such modulation may be too subtle to be always detectable on a simple intensity scale. The differences in labour pain levels associated with participation in PCT may thus not always be demonstrated.

Recent developments in pain research have led to the development of a pain assessment scale which reflects the multi-dimensional nature of pain - the McGill Pain Questionnaire (MPQ) (see Fig 1.1.8.) The MPQ

Fig 1 1 8 The McGill Pain Questionnaire (Melzack, 1975)

1	Flickering	S	8	Tingling	S	16	EVALUATIVE	
	Quivering			Itchy			Annoying	Troublesome
2	Pulsing	E	9	Smarting	E	17	Miserable	S
	Throbbing			Stinging			Intense	
3	Beating	N	10	Dull	N	18	Tight	N
	Pounding			Sore			Spreading	
4	Jumping	O	11	Hurting	O	19	Penetrating	E
	Flashing			Aching			Heavy	
5	Shooting	R	12	Tender	R	20	AFFECTIVE	
	Pricking			Taut			Tearing	Drinking
6	Boring	Y	13	Rasping	Y	19	Cool	Y
	Drilling			Splitting			Cold	
7	Stabbing	F	14	Sickenig	F	20	Nagging	S
	Lacinating			Suffocating			Agonising	
8	Sharp	F	15	Fearful	F	20	Torturing	E
	Cutting			Frightening			Terrifying	
9	Lacerating	C	16	Punishing	C	20		E
	Pinching			Gruelling			Cruel	
10	Pressing	I	17	Vicious	I	20		E
	Gnawing			Killing				
11	Cramping	V	18	Wretched	V	20		E
	Crushing			Blinding				
12	Tugging	E	19		E	20		E
	Pulling							
13	Wrenching	E	20		E	20		E
	Hot							
14	Burning	E	21		E	21		E
	Scalding							
15	Searing	E	22		E	22		E

PPI

0 No pain 1 Mild 2 Discomforting 3 Distressing 4 Horrible
5 Excruciating

is based on the pain transmission and perception theories of Melzack and Wall (Melzack and Wall, 1965, Melzack and Casey, 1968, Melzack, 1973, Melzack, 1975) These regard pain as a multi-faceted perception which reflects the differing brain areas involved in the reception of noxious stimulation According to this model, pain has Sensory, Affective and Evaluative components, and these dimensions of pain experience are assessed by the MPQ (Melzack, 1975) It utilises word descriptors of pain which the subjects select from groups of words derived from the clinical literature and the work of Dallenbach on pain qualities (Dallenbach, 1939) These words have been grouped into a number of categories divided into Sensory, "The temporal, spatial, pressure, thermal and other sensory qualities of pain experience" Affective, "The tension, fear and autonomic properties of pain experience", and Evaluative, "The subjective overall intensity of the total pain experience", sections (Melzack and Wall, 1982 p 61, 62) The words within a category are ranked in intensity, the first word representing the lowest intensity

The grouping and ranking of words was achieved by presenting the list of pain descriptors to groups of subjects (medical doctors, patients and students) A substantial and significant level of agreement was found on the grouping of words into categories representing the same quality of pain and on the rank ordering of these words. In one group of Evaluative words the increase in intensity was constant between each word and these words

"mild, discomforting, distressing, horrible, excruciating"

were therefore used separately as a scale of the overall intensity of pain experienced This scale, the PPI - Present Pain Intensity scale, uses both the pain descriptors and numerical markers of each point on

the scale (eg 1 = mild), whereas the remainder of the MPQ uses only semantic descriptors

Quantification of assessed pain is achieved through totalling the rank values of the Sensory, Affective and Evaluative descriptors selected by the subject to describe his or her pain (Melzack and Torgerson, 1971, Melzack, 1975) These measurements are known as the Pain Ranking Index (PRI) Thus the MPQ can be used to provide a number of different measures of pain, yielding a more complex assessment of the subject's pain experience than is available from simple intensity scales It can produce a pain profile, a description of the individual or average pain experienced in a certain condition, derived from the words or categories selected to describe the pain (eg Reading, 1979, used the MPQ to produce a pain profile of dysmenorrhoea). The total intensity of pain experienced can be calculated from the sum of the ranks of the words selected by the subject the Total PRI and the relative contribution of Sensory, Affective and Evaluative components of pain to that total score can be calculated from the sum of the ranks of the words selected from the Sensory, Affective and Evaluative categories The PPI yields a 5-point intensity scale

The MPQ has been used to describe different pains (Dubuisson and Melzack, 1976, Reading, 1979) It has been used to evaluate different treatments (Reading, 1979) It has been found to differentiate between different pain groups (Dubuisson and Melzack, 1976) It shows a high level of agreement on the intensity relationships between the pain descriptors in subjects from different cultures, classes and educational backgrounds (Melzack, 1975) A recent appraisal of the MPQ has concluded that it displays "acceptable reliability and face, construct, discriminant and concurrent validity" (Reading, 1983, p 59) Thus it should produce a

qualitative and quantitative assessment of the sensory and non-sensory dimensions of labour pain which can be related to variations in the independent variables which were examined. The MPQ has been used to assess labour pain (Dubuisson and Melzack, 1976, Melzack, 1984, Melzack et al, 1984, Reading and Cox, 1985) and has been found to be satisfactory. It was therefore used in the current study.

Some doubt has been cast upon the accuracy of the PPI measure in assessing the overall intensity of clinical pain (Melzack, 1975). So another measure of the overall intensity of pain was also used. The measure selected was the Visual Analogue Scale (see Fig 1 1 9).

Fig 1 1 9 The Visual Analogue Scale (Scott & Huskisson, 1976)



Visual Analogue Scales (VAS) have been widely used in pain research as they provide a simple, quick method of assessing the intensity of pain free from the problems (eg clustering) associated with numerical scales (Huskisson, 1974, Scott and Huskisson, 1976). The MPQ is comparatively time consuming in use (>5 mins, Melzack, 1983) and is dependent on a reasonable level of verbal comprehension. The VAS can be administered in seconds and requires no verbal or numerical comprehension at all. It has been used to assess pain during labour (Revill et al, 1976) and was found to provide an accurate assessment of pain even when subjects had received Pethidine 30 minutes previously. The VAS thus provided an alternative method of assessing pain to the MPQ and also yielded complimentary data on the intensity of labour pain.

Footnote For further discussion of the use of the VAS and its limitations, see Appendix 3

The MPQ and VAS were used to assess labour pain recorded during the first stage of labour and 24-48 hours post-natally. Whilst it would have been desirable to have recorded subjects' assessments of labour pain at various times throughout childbirth and in particular in the second stage of labour as well as in the first stage, the effort involved for the subjects was considered too great. The second stage of labour is a time when the baby is at particular risk (Llwelllyn-Jones, 1977, Myles, 1981) and therefore nothing should be done to distract the mother from her efforts in delivery. Therefore the subjects were required to recall the pain they experienced throughout labour and delivery, 24-48 hours after the birth when the immediate euphoria/exhaustion of the birth should have worn off and the 'fourth day blues' would not yet have set in. Recall of pain, assessed on the MPQ has been found to be accurate (Roche and Gijbers, 1985) for up to five days (Hunter et al, 1979). The reliability of the VAS has also been established (Revill et al, 1976), and many studies of labour pain have utilised recall measures (see Fig 1.3.1). Therefore recall of labour pain should yield a useful measure of total labour pain experience. The VAS was used to assess the intensity of previous pain experience since it has been found to provide a satisfactory method of assessing the intensity of pain distant in time (Revill et al, 1976).

1.1.4.2 SUMMARY OF AIMS .

The study aimed to assess the nature and intensity of pain in labour in some detail and to relate these to variations in ante-natal class attendance, expectations of childbirth and attitudes to pregnancy, the attendance of the husband at the birth and to the pain histories of the subjects. The subjects were intended to be broadly representative of a variety of ages and social classes, to be British and to be healthy, as the study was

to be of normal labour. Potentially confounding obstetric and anal-
gesic variables were considered so as to allow for their statistical
control. It was also hoped that the information obtained in this study
would be of some use to women giving birth in this country, and to those
who care for her and aim to reduce her suffering and enhance her exper-
ience.

PART 1

CHAPTER 2 - METHOD

1 2 1 SUBJECTS

The subjects of the main study were 101 women who gave birth in Stirling Royal Infirmary, Scotland, during 1981-82. They were all British. The distribution of social class was 11% in social class 2, 37% in class 3, 34% in class 4 and 18% in class 5. The age range was from 15-39 years, average 26 years. 4 subjects were unmarried at the time of childbirth and did not have a current partner. 58% of subjects were primiparous, 42% were multiparous - 27% having their second baby, 12% their third, and 1% each having their fourth, fifth and sixth child. (Parity denotes live births.)

Subjects were selected on the following basis. The investigator visited the Maternity Unit at Stirling Royal Infirmary (SRI) on weekday afternoons (the busiest daytime period). All patients who were in active first stage labour - +3 cms cervical dilation, contraction frequency at least 2 contractions per 10 minute interval - were asked to participate in "a study of labour pain". These criteria ensured that all subjects were in the phase of maximum acceleration of progress in labour (see Fig 1 1 4) and that one source of variation in the amount of noxious stimulation occurring - the occurrence of minimal cervical and uterine activity - was therefore excluded.

Patients who were in or approaching transition were excluded since the nature of noxious stimulation alters at this time (see 1 1 3). Patients who had anticipated complications of birth, either fetal or maternal were excluded. Patients who were receiving epidural anaesthesia were excluded as this form of analgesia was rarely used in SRI. Also excluded were

•

women who expressed the desire to participate but who appeared worried or upset about any aspect of the study. Such patients might feel that they "had" to co-operate with hospital related personnel. Only 4 women refused to participate in the study, and all subjects were extremely helpful, despite the pain they were experiencing and the drowsiness many of them felt.

1 2 2 SETTING

The catchment area of SRI comprises one small town (population approximately 37,000) a number of rural and industrial villages, farmland and Stirling University. SRI's Maternity Unit is new, well equipped and well staffed. The initial interview was conducted in the labour room - a single room. The second interview was carried out in the post-natal ward.

1 2 3 THE NORMAL ROUTINE OF LABOUR MANAGEMENT IN SRI

As the medical and nursing care of the mother in childbirth varies somewhat from hospital to hospital, a description of what is typical in the unit studied - Stirling Royal Infirmary - will be given.

When the mother goes into labour she is admitted directly to the labour unit. If the baby is overdue, or if the mother or baby are considered at risk, labour may be induced, usually by means of artificial rupture of the membranes (ARM) or by intravenous drip administration of oxytocin, which stimulates contractions. Sometimes a labour which has started spontaneously is accelerated by these methods if it is prolonged or the condition of the mother or baby deteriorates. If the labour is considered at risk, the fetus is monitored electronically by means of an electrode attached to the baby's head, introduced through the cervix.

The mother is attended throughout by a midwife who monitors her progress and is with her constantly from transition, on. The midwife delivers the baby unless there are complications necessitating medical intervention by a doctor. Fathers are encouraged to be with their wives throughout.

It is usual for the mother to be offered an injection of pethidine analgesia during the first stage. The prescribed dose used in SRI is Pethidine 150 mgs, Sparine 25 mgs. The sparine counteracts any nausea caused by the pethidine and potentiates its sedative properties.

Entonox (50% oxygen, 50% nitrous oxide) is sometimes offered in the first stage of labour, always in the second stage. It is inhaled by the mother via a face mask, only during contractions, and is given in analgesic not anaesthetic concentrations. It allows full co-operation in the pushing effort.

To prevent tearing of the perineum, by the baby's head, an episiotomy is sometimes performed, just before the birth. This is a cut made behind the opening of the vagina in order to enlarge it. A local anaesthetic is injected before the incision is made. The incision is stitched up after the third stage. Although a local anaesthetic is used, this is a procedure, like ARM which is frequently complained of by mothers. Certainly the stitches tighten and become very uncomfortable in the days following delivery. They are removed in five days. After delivery the baby is given to the mother, then weighed, given a physical examination and if well, put by the mother's bed in the post-natal ward. They are together most of the time. Primiparous women go home after five days. Multiparous women can go home after forty eight hours if circumstances are suitable.

1 2 4 PROCEDURE

1 2 4 1 INTERVIEW 1 - THE LABOUR INTERVIEW

The subjects were selected as described above. Informed consent for this first interview was obtained. The MPQ was completed. The pain descriptors were read out to the subject, a category at a time. If the subject indicated that any word in that category described the pain she was experiencing during her current contractions, it was noted. She was required to select one word from the present pain index (PPI). The McGill Pain Questionnaires were completed in between contractions and so were usually interrupted at least once by a contraction. During contractions many women used structured breathing techniques to alleviate pain and so could not respond at that time. The pain descriptors were read out clearly with no emphasis given to particular words. They were repeated if necessary. Subjects sometimes 'dozed off' in the middle of the questionnaire due to analgesic induced drowsiness. If so they were gently awakened and if agreeable (most were) continued.

When the MPQ (MPQ 1) was completed the Visual Analogue Scales were given to the subject (VA 1) and to the attending midwife. The subject usually had to be assisted to see the line clearly and to mark the point which she felt corresponded to the intensity of pain she experienced during the preceding contraction. Great care was therefore taken to minimise the influence of the investigator on completion of this scale. The subject was thanked and permission obtained to visit her again after the baby was born.

The midwife completed her (or his) assessment of the patient's pain on the Visual Analogue Scale without reference to the subject's responses.

She was left a questionnaire to complete after the birth (see Appendix 1) giving details of the duration of labour (1st and 2nd stages), the baby's sex, weight and condition, analgesic use (Pethidine and Entonox) and complications of pregnancy or birth. The baby's condition at birth was assessed through the use of Apgar scores recorded at 1 and 5 minutes after birth. These recordings are made routinely in all British Maternity Units. They are based on structured assessments of respiration, colour and muscle tone. The scores range from 1 to 10, a score of 10 representing a perfectly healthy newborn (Myles, 1981). The midwife assessed the pain experienced by the subject during the second stage of labour using the Visual Analogue Scale.

1 2 4 2 INTERVIEW 2 - THE FIRST POST-NATAL INTERVIEW

The same subjects were seen 24-48 hours after giving birth. Subjects completed the MPQ and VAS for a second time (MPQ 2, VA 2). The VA 2 response recorded the "most intense period of pain". The MPQ was read out to the subjects as before, and subjects were requested to respond to "any word which describes the pain you had throughout labour and delivery". The MPQ recall data was therefore potentially concerned with the pain of both first and second stages of labour.

A series of questions were asked about sociological, obstetric, experiential and psychological factors. Details of the questions and of the criteria used to score their responses are shown in Fig 1 2 1. Previous pain - during pregnancy, previous births and during episodes of pain unrelated to childbirth was rated using separate Visual Analogue Scales. A series of probes, "Have you ever had any pain . . . Have you ever had any back pain . . . any period pain . . . any headaches, migraines . . . any operations, accidents . . . Were they painful? Have you ever had any other

Fig 1 2 1 The first post-natal interview questionnaire
Scoring criteria are noted in brackets

BABY Q How is the baby - boy or girl? Sex M/F

GENERAL QUESTIONNAIRE

Address

Tel No

Age

Marital Status

Occupation Own (Social class assessed as 1-5 according to Registrar General's classification)
Husband's (Husband's occupation used for this assessment as many subjects were currently employed in the home only)

PREGNANCY

Q How was your pregnancy?

Any medical complications? Details

Any pain? Details

VAS for pregnancy pain as in VAS for previous labour pain

PREVIOUS BIRTHS

Q Is this your first baby? Yes/No

No of previous pregnancies

Any miscarriages? Yes/No No of weeks pregnant (+36 weeks scored as stillbirth not miscarriage)

VAS INSTRUCTIONS

The line below represents pain of increasing intensity, starting at this end (indicate) with no pain at all and at the other end with pain as bad as you can possibly imagine Could you mark on this line the position which represents the intensity of your previous labour pain?

none

|-----|
S L I G H T M O D E R A T E S E V E R E

as bad as possible

Pain experience outwith pregnancy and previous births

Q Can you tell me about any pain you have had which is not
connected with pregnancy? Yes/No

For example period pains
 toothache
 headaches

Details of spontaneously reported pain

Probe

No	Cause	Detail	Frequency	VAS
1	Specific illness			
2	Surgery			
3	Accident			
4	Dysmenorrhoea			
5	Toothaches			
6	Migraine			
7	Headache			
8	Back pain			
9	Other			

(Most severe pain used for measure of intensity of previous pain)

Frequency

Q How often did you experience this pain?

VAS for any pains mentioned

none | SLIGHT MODERATE SEVERE | as bad as possible

Q What did you do to relieve this pain?

No	Strategy	Details	Success
1	Take pills		
2	Relaxation		
3	Distraction		
4	Pleasant thoughts		
5	Keep busy		
6	Other		

Was this pain stressful? 1-10

PRESENT BIRTH

Preparation

Q Did you attend ante-natal classes? Yes/No/Yes but in previous pregnancy

Where? Details

Expectations

Q Did you find the prospect of giving birth (again)

Fearful (2) and/or were you Confident
 Frightening (3) Eager (1)
 Terrifying (4) Excited

(Scoring was intended as in brackets, but see 2 3 3 2)

Birth

Q How was your labour?

Was it what you expected? Yes/No

How was it different? Was it better) Details
 or worse)

Were there any parts of giving birth which you found distressing or upsetting rather than painful?

Probe

No	Procedure	Fearful (1), frightening (2) terrifying (3)	Upsetting (1) miserable (2) unbearable (3)
1	ARM		
2	IV infusion		
3	Monitoring		
4	Stitches		
5	Forceps		
6	Other		

(Scoring = No of distressing events X level of distress associated with each score as in brackets)

What was the most painful part of giving birth?

Q What were the parts of giving birth which gave you pleasure or excitement?

No	Details
1	Onset of labour
2	Breaking of waters (spontaneous)
3	Onset of second stage
4	Feeling of descent of head
5	Pushing baby out
6	Seeing baby
7	Touching baby
8	Feeding - breast
9	Pain
10	Husband there

Q What do you think is the best way of coping with labour and the pain involved in it? (Imagine you were advising someone close who was just about to have a baby)

Q What did you do to relieve labour pain?

Q Did it work?

Probe

No	Details	Success
1	Breathing exercises	
2	Relaxation	
3	Distraction	
4	Pleasant thoughts	
5	Special position	
6	Other	

What drugs were you given during labour? Did it/they work?

Drug	Success
Pethidine	
Entonox	
Other	

Would you do it again?

Thank you

kind of pain?", were designed to prompt subjects' recall of painful incidents or conditions. Details of the type, frequency, intensity and stressfulness of previous pain were obtained (see Fig 1 2 1.).

The use of coping strategies (eg relaxation, distraction) during childbirth and during other episodes of pain was assessed on a yes/no basis in response to direct questioning. Many subjects found it difficult to respond to the questions regarding their previous use of coping strategies. Their recall of the use of coping strategies seemed to require considerable time and effort and to be interfered with by the momentous events of the previous 48 hours. The use of coping strategies was consequently elicited during a second post-natal interview conducted some time later at the subject's own home. A full description of that interview is given in Part 3, Chapter 1. Questions concerning the desirability of pregnancy were deferred until the second post-natal interview as it was felt that the subjects could respond to these questions more accurately and comfortably at that time.

The subject was given a general outline of the second post-natal interview, and asked if she would be willing to be visited at home in 3 to 4 month's time. The baby was admired and genuine gratitude was expressed for the mother's co-operation.

The first post-natal interview was often interrupted by nursing needs (the baby needed to be nursed or the nursing staff needed to treat the mother). Occasionally this meant that the interview could not be completed, then or later. It was decided not to exclude these subjects since the majority of their data had been collected, nor to exclude cases where the midwife had not completed the post-natal questionnaire. Information on some dependent variables is therefore missing in a few cases.

Subjects who had required delivery by Caesarian Section (N=5) did not complete MPQ 2 or VA 2 since their second stage had been incomplete and so was not comparable with that of other subjects. Therefore the N for recall data is always less than for first stage data.

1 2 5 STATISTICAL ANALYSIS

The data reported was analysed using parametric statistics. Because the distribution of pain scores was somewhat skewed, non-parametric analysis was also undertaken. Only a very small percentage of results were altered by non-parametric analysis. Results which were significant when parametric tests were used, were not significant under non-parametric analysis in <4% of cases.

The tests used were one and two way analysis of variance, analysis of covariance (Dixon and Massey, 1969), the student's t-test and Pearson's correlation. Levene's test for equal variances was used in the analysis of variance (Brown and Forsythe, 1974a). When variances were unequal an analysis of variance which does not assume equal variances, the Welsh statistic (see Brown and Forsythe, 1974b) was computed. Bonferroni corrections were used to test for the significance of multiple t-tests.

Footnote Rationale for adopted methodology and analysis is laid out in Appendix 3

PART 1

CHAPTER 3 - LABOUR PAIN

This chapter will outline the assessment of labour pain as carried out in this study. It will describe the nature and intensity of labour pain recorded during the first stage of labour and on recall. The methods used to assess labour pain will be discussed and the relationship between these various measures of labour pain detailed.

1.3.1 THE ASSESSMENT OF LABOUR PAIN

The MPQ was found to be easy to administer, despite the drowsiness of many of the subjects during the first stage of labour. The "ah yes", recognition of a specific pain descriptor, reported by MPQ users, (eg Melzack, 1975) occurred frequently. Very few words were not understood, with the exception of "lacinating". It was frequently confused with "lacerating", and was dropped from the MPQ because of this. Before it was omitted, it was never selected by any subject, an indication that subjects did not select descriptors at random.

Some subjects found the dual number/word assessment of the PPI difficult to use (Is your pain - 1 mild, 2 discomforting, 3 distressing, 4 horrible, 5 excruciating?) Most subjects appeared to treat it as an extension of the rest of the MPQ and to respond to the pain descriptors, not the numbers. A few subjects (N=7) found it too confusing and so did not complete the PPI.

The Visual Analogue Scale was found to be more difficult to administer than the MPQ during the first stage of labour. Many subjects found it hard to focus on the line and select the appropriate point which would mark their current pain. 22% of subjects could not manage to fill in

these scales. It might be suspected that these were the subjects with the highest pain levels, since it has been suggested that concentration decreases as pain intensity increases (Hebb, 1949). Furthermore the subjects who were in the most pain would receive the largest amounts of analgesics and would therefore be drowsiest.

An attempt was made to have subjects recall the pain associated with the first and second stages of labour separately, in order to obtain a clear measure of second stage pain. When the MPQ was used this was generally found to be impossible, except that subjects could recollect and clearly identify a few sensations specifically connected with delivery (eg tearing, splitting, wrenching). Mostly however they would recognise descriptors as characterising the nature of the pain they had experienced at some point during labour and delivery but could not specify at which stage this had occurred. The majority of subjects reported that they could clearly recall the intensity of the worst pain experienced throughout childbirth (during the second stage for 88% of subjects) and could assess it on the VAS (VA 2), the only problem encountered at this time being the restricted nature of the scale, some subjects wanting to represent their pain as being beyond the end of the line. Some subjects (N=56) also attempted to recall the intensity of the pain they had experienced in the first stage of labour but reported that the task was very difficult as their recall was dominated by the memory of more intense pain. The remaining subjects indicated that to attempt such an estimation would be futile. The assessments of recalled first stage pain, termed VA 1R must therefore be regarded with extreme caution and are not reported outwith this chapter.

1 3 2 THE INTENSITY AND NATURE OF LABOUR PAIN

1 3 2 1 INTRODUCTION

A number of different methods have been used by researchers to assess the amount of pain associated with childbirth. These are summarised in Table 1 3.1 along with information pertaining to their findings. The techniques used to assess the pain and the methodology used to select the subjects and to collect the data vary extensively and make comparison between studies difficult. However the general impression gained from these studies is that childbirth is intensely painful. It would therefore be expected that the results of this study would show labour pain to be on average intense, but that as discussed in 1 1 1., its intensity may vary considerably.

The nature of labour pain has been systematically examined in a previous study of labour pain which used the MPQ (Dubuisson and Melzack, 1976). This study showed that subjects selected a large number of pain descriptors from the MPQ when they experienced the pain associated with childbirth. Research involving the MPQ indicates that subjects suffering from a distinct type of pain such as labour pain, on average select similar MPQ categories and words to describe this pain (Melzack and Torgerson, 1971, Melzack, 1975). It is therefore likely that the nature of labour pain as experienced by the subjects of this current study will be similar to that recorded by other subjects suffering labour pain, bearing in mind that different obstetric regimes, etc may affect subjects' opportunity to experience labour in similar ways. For example, subjects would not experience any sensation during part of their labour if they received epidural anaesthetics. Thus their description of labour pain would be expected to differ from that of subjects

Table 1.3 1 Methods and results of studies on labour pain

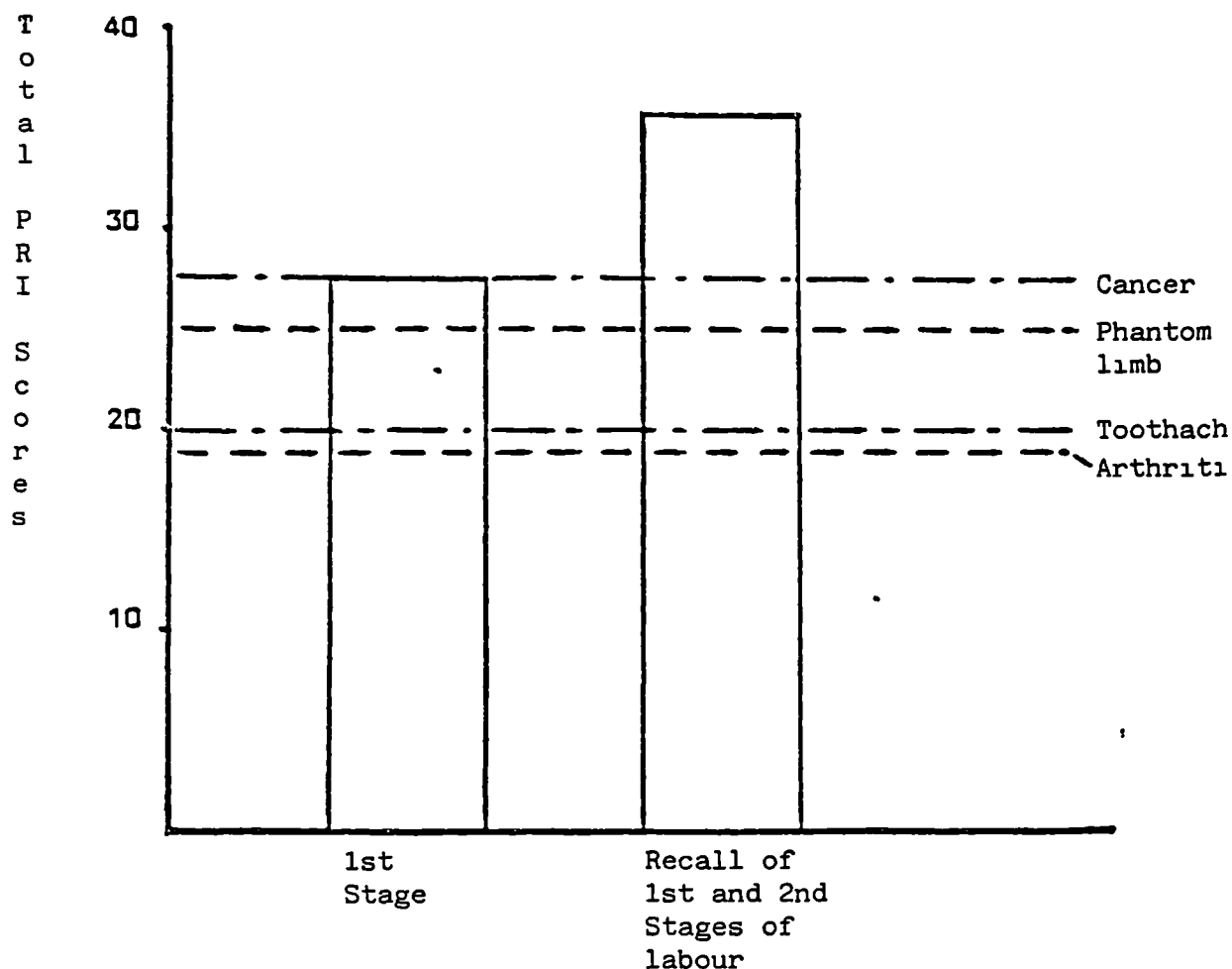
AUTHORS	N	PLACE	SUBJECTS	TIMING	SCALE	RESULTS
Eysenck 1961	200	Britain	Married and unmarried Primips	Post-natal recall	5-point scale	Married = 2 9 Unmarried = 3 1
Henneborn & Cogan 1975	49	USA	"Childbirth without pain" class attenders	Post-natal recall	6-point scale	Pain = 4 5 - 5
Klopfer, Henneborn & Cogan 1975	292	USA	"Childbirth without pain" class attenders	Probably post-natal recall	6-point scale	Pain = 4 -5
Nettlebladt et al 1976	78	Sweden	Primips	Recall 24-48 hours post-natal	Condensed to a 3-point scale	28% moderate pain 37% severe pain 35% intolerable pain
Scott-Palmer & Skevington 1980	34	Britain	General population	Hourly during labour	VAS (10-point)	3 at 10 hours previous to birth 5 5 at 4 hours previous to birth 8 at delivery (See Fig 1 3 6)
Astbury 1980 a, b	90	Australia	General population	During "est- abished labour"	4-point	49% mild pain 53% severe pain
Worthington 1982	22	USA	Lamaze trained (PCT)	One month post-natal	10-point pain 10-point distress	\bar{X} pain = 5 \bar{X} distress from 3 1 (no epidural) to 4 5 (early epidural)

who did not receive an epidural

1 3.2 2 RESULTS

The average intensity of labour pain recorded during the first stage of labour was 26.8 on the Pain Rating Index of the MPQ (Total PRI 1), and 5.5 on the Visual Analogue Scale. When labour pain was recalled 24-48 hours later the Total PRI 2 score was 32.4, and the Visual Analogue Score (VA 2) was 7.9 (see Table 1 3 2.) These scores represent severe pain, as can be seen from Fig 1 3 1. where they are contrasted with the pain of various clinical disorders, 60% of subjects reporting that it was the most severe pain they had ever experienced

Fig 1 3.1. Pain levels in labour (MPQ)



(Data on clinical disorders from Melzack, 1975)

Table 1.3 2 The Intensity of Labour pain

LABOUR PAIN MEASURE	N	1st STAGE	SD	N	LABOUR PAIN MEASURE	RECALL OF 1st AND 2nd STAGES	SD	t	P
Sensory 1	101	20 1	8 2	94	Sensory 2	23 4	10 3	4 32	0 0000****
Affective 1	101	4 2	3 8	94	Affective 2	6 0	3 9	5 74	0 0000****
Evaluative 1	101	2 4	2 9	94	Evaluative 2	3 2	1 7	3 89	0 002****
Total PRI 1	101	26 8	12 0	94	Total PRI 2	32 4	14 1	5 43	0 0000****
PPI 1	96	2 5	1 0	93	PPI 2	3 0	1 1	2 89	0 0049**
VA 1	79	5 5	2 3	82	VA 2	7 9	1 7	7 40	0 0000****

PRI = Pain Rating Index

PPI = Present Pain Intensity

VA = Visual Analogue

* = significance level <0 05

** = significance level <0 01

*** = significance level <0 001

Although the pain experienced during labour was on average intense, it varied greatly from subject to subject. First stage scores ranged from 5 to 59 on the Total PRI scale of the MPQ and from 0 to 9.5 on the VAS. Recall scores ranged from 4 to 67 on the PRI, and from 1.5 to 10 on the VAS. As 0 = "no pain" and 10 = "pain as bad as possible", on the Visual Analogue Scale, it can be seen that the variation was extreme. Figs 1.3.2 and 1.3.3 show the distribution of pain scores. Approximately 8% of subjects had very little pain in labour, whereas 16% recalled labour pain as being "as bad as possible". MPQ 2 and VA 2 scores were significantly higher than first stage scores (see Table 1.3.2). The majority of subjects, (88%), reported that the second stage of labour was more painful than the first stage.

Fig 1.3.4 shows a profile of the labour pain recorded during the first stage of labour and recalled 24-48 hours later. These profiles are based on the frequency with which subjects selected the various categories of the MPQ, and so describe the nature of their experience of labour pain, rather than its intensity. Every category has been selected by at least one subject. However, certain categories were frequently selected, whereas others were very rarely chosen, eg only 2 subjects chose words from category 19 - Cool, Cold, Freezing. The categories used by 50% of the subjects and the words typically selected from these categories, are listed in Table 1.3.3.

1.3.2.3 DISCUSSION

60% of subjects reported that labour pain was the most intense pain they had ever experienced, "crowning" (when the head maximally distends the vaginal outlet) being the moment considered most painful by the majority

Fig 1 3 2 Distribution of pain scores (MPQ)

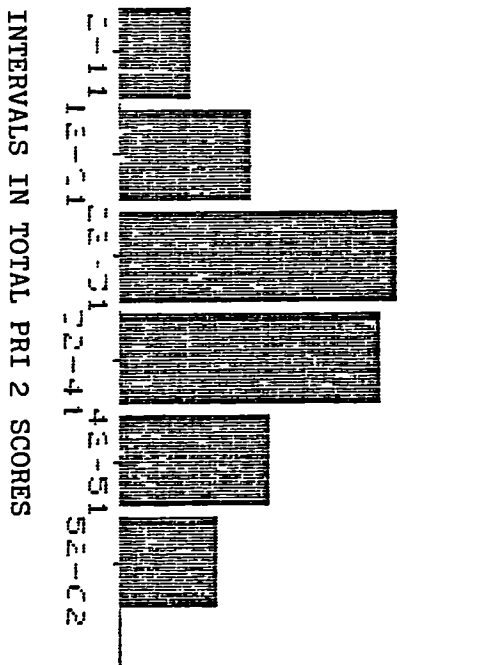
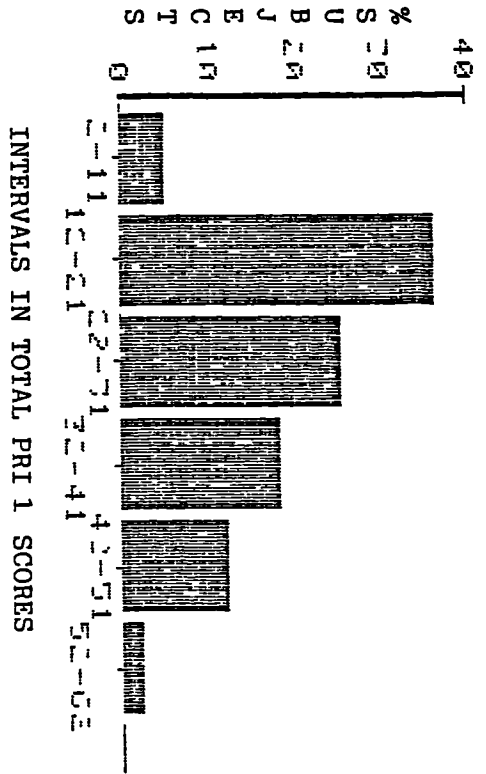


Fig 1 3 3 Distribution of pain scores (VAS)

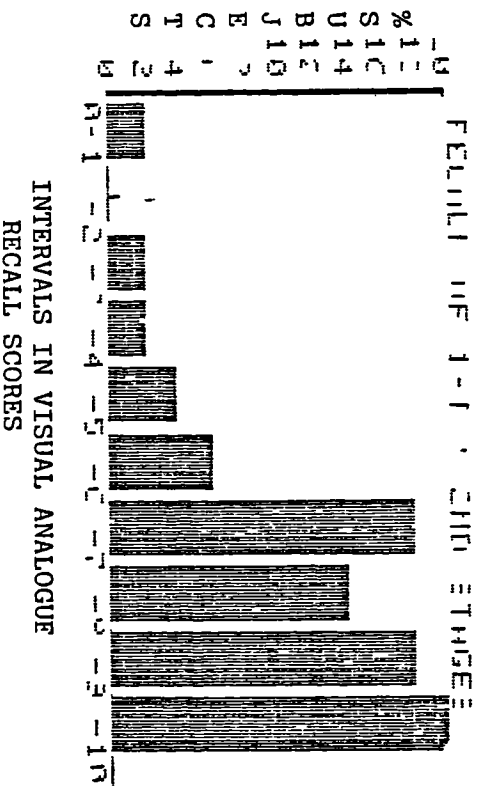
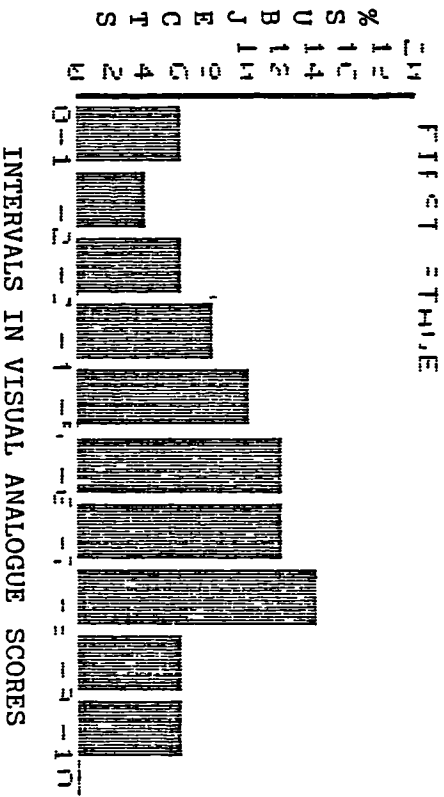


Fig. 1.3.4. Labour pain profile (constructed from the percentage of pain categories from the PRI scales of the MPQ)

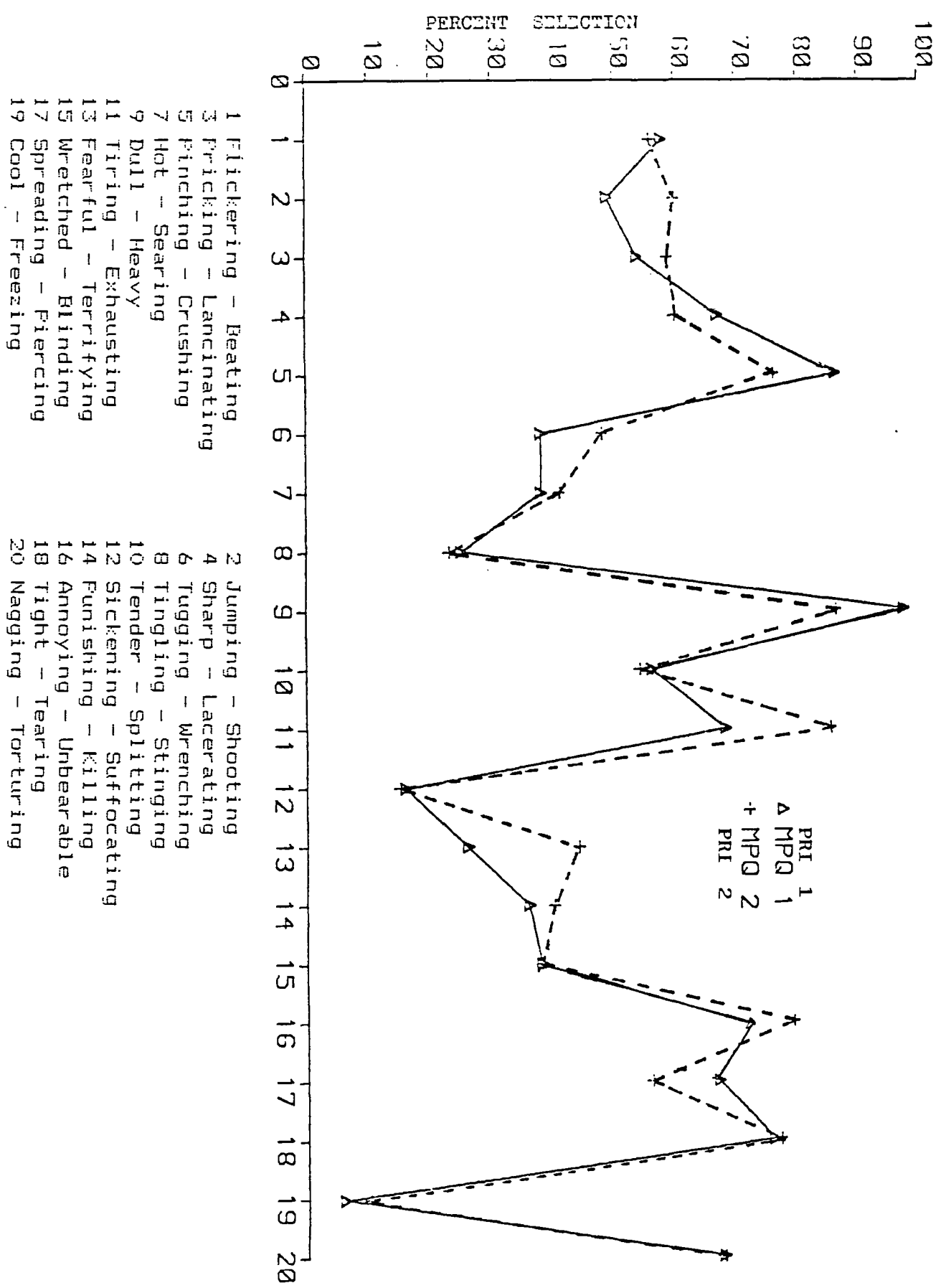


Table 1 3 3. MPQ categories selected by 50% of subjects

CATEGORY NO		MODAL DESCRIPTORS	
1st STAGE	RECALL	1st STAGE	RECALL
1	1	Throbbing	Throbbing
	*2		Shooting
3	3	Stabbing	Stabbing
4	4	Sharp	Cutting
5	5	Cramping	Pressing
9	9	Aching/Heavy	Aching
10	10	Taut	Splitting
11	11	Tiring	Exhausting*
16	16	Intense	Intense/Unbearable
17	17	Spreading/Penetrating	Penetrating/Piercing
18	18	Tight	Tearing
20	20	Nagging	Agonising

*Categories and descriptors most frequently selected by Canadian subjects in the first stage of labour (Melzack et al, 1981)

(80%) of subjects. The majority of midwives rated it as being "severely painful". The investigator considered that she was observing severe pain. These general impressions were supported by most of the pain assessment measures used. The average Total PRI scores equalled or exceeded those of subjects suffering from painful conditions such as arthritis, toothache, phantom limb pain, or cancer. The Visual Analogue rating increased from 5.5 during the first stage of labour, to 7.9, a majority of subjects recalling their labour pain as being almost as bad as pain could be (VA 2, mode = 9 see Fig. 1.3.3b). However as hypothesised the intensity of pain varied tremendously.

Despite the intensity of the pain Affective categories of MPQ pain descriptors were infrequently selected (see Fig. 1.3.4). Other types of severe pain, eg phantom limb pain, causalgia, arthritis, usually have a high Affective component (Melzack, 1975). The majority of subjects in pain during labour only used "Tiring" and "Exhausting" (category 11) to describe their pain. These words are included in the MPQ categories of Affective pain, but do not express the same degree of awfullness as, for instance, "Cruel" or "Killing" (category 14). Presumably the low use of Affective words reflects the essentially joyful nature of childbirth, despite the pain and anxiety involved. It is also likely that a limited period of intense pain is less distressing than chronic or recurrent pain, such as phantom limb pain or arthritis.

The Present Pain Intensity, (PPI) was usually reported as being "Discomforting", point 2 on the PPI 5 point scale, rather than "Horrible" point 4, or "Excruciating", point 5 (PPI 1 and PPI 2 mode = 2). This measure therefore appeared to contradict the findings of the other pain intensity assessments which showed labour pain to be intensely painful,

eg the Total PRI score and the VAS score The PPI has been shown to differ in its assessment of pain from the other components of the MPQ in a study of labour pain carried out by Melzack and others, in 1981 This study, carried out in Montreal, found that some subjects refused to use the words "Horrible" or "Excruciating" to describe their childbirth pain

"The positive experience of giving birth, they stated, prevented them from using words with such negative connotations "

(Melzack et al, 1981, p 359)

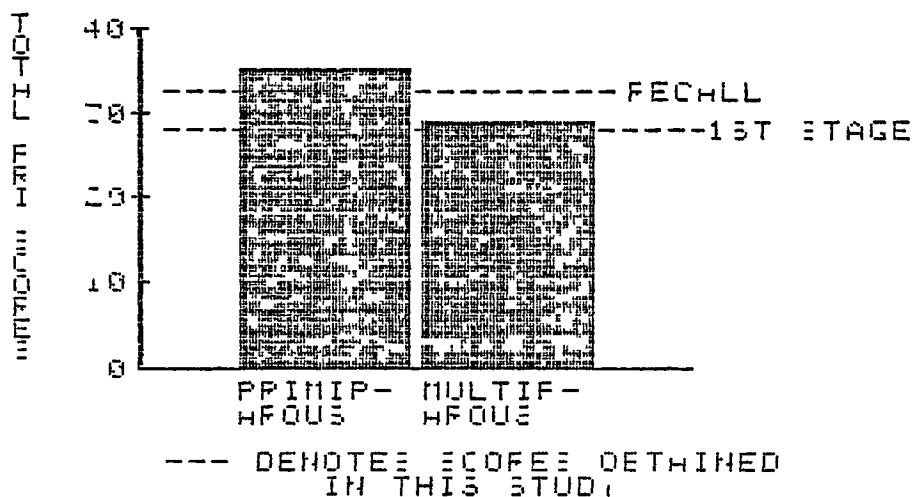
Although the subjects of this study did not state similar objections, they may have felt them, and so selected descriptors from the PPI which conveyed the positive nature of their experience The words which comprise the PPI are affective in quality, (eg "Horrible", "Distressing") and PPI scores have been shown in this and other studies to correlate highly with Affective MPQ scores (see Table 1 3 4 and Melzack, 1975) As labour pain has a comparatively small affective component, this may lower PPI scores, ie subjects may have been reporting their pain as 'not too awful', rather than 'not too sore' We might therefore conclude that the results of this study show that labour was on average, intensely painful, but that this pain does not have intensely negative affective properties (as reflected by the MPQ Affective and PPI scores)

The categories selected from the MPQ by the subjects of this study closely resemble those chosen by the subjects of another labour pain study (see Table 1 3 3) This supports the findings of Melzack and Torgerson (1971 Melzack (1975) and Grushka and Sessle (1984) which showed that subjects suffering from pain of a specific etiology selected a particular constellation of words from the MPQ to describe that pain It also

demonstrates that the subjects of this study were not unique in the nature of the pain that they experienced during childbirth.

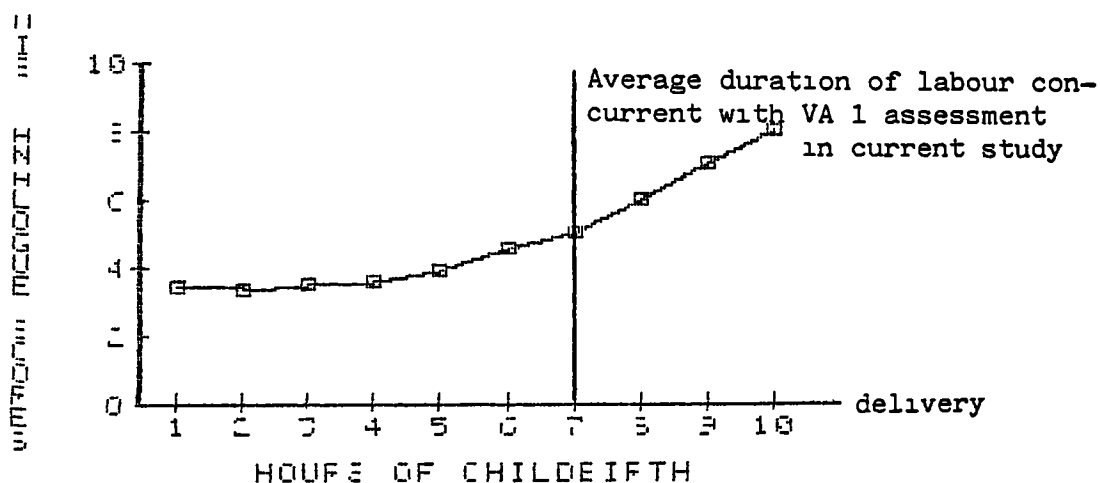
The pain levels recorded in this study are also comparable with those obtained in other studies (see Table 1.3.1. and Fig. 1.3.5.). Fig. 1.3.6. shows the average MPQ 1 and 2 scores obtained in this study compared with the results of a study carried out on 141 women giving birth in the Montreal General Hospital in Canada (Melzack et al, 1981). These Canadian subjects all received epidural anaesthesia towards the end of the first stage of labour, so their pain levels should be compared with those obtained during the first stage of the labour of the subjects of this study. As can be seen pain levels are remarkably similar (as were their pain profiles, see Table 1.3.3.). Morgan et al (1982a, b), using a British population reported average pain levels recorded 48 hours post-natally on the VAS of 5.7, if subjects had used Pethidine and Entonox, and 7 if they had received no analgesia. These levels are somewhat lower than those recorded in this study (and in Scott-Palmer and Skevington's study), which may be due to differences in analgesic regimen. The subject's who participated in Morgan's study had epidural anaesthesia freely available to them. Those who experienced high levels of pain may therefore have opted for epidurals and the remaining subjects, whose levels of pain were quoted, may have been those with the lower levels of pain. Overall, the degree of comparability between the results of this study and those of Henneborn and Cogan (1975), Nettlebladt et al (1976), Astbury (1980a,b), Scott-Palmer and Skevington (1980) and Melzack et al (1981) is sufficient to allow us to suggest that the results of this study concerning the nature and intensity of labour pain are generalisable to hospital births in western society.

Fig 1 3 6 Labour pain levels found in a Canadian study utilising the MPQ (Melzack et al, 1981) compared with those found in the current study



Modified from Melzack et al (1981) Canadian Medical Association Journal 125 357-363

Fig 1 3 5 Labour pain levels found on hourly VAS assessment in a British study (Scott-Palmer and Skevington, 1981) compared with the average VAS score recorded during the first stage of labour in the current study



Modified from Scott-Palmer and Skevington (1981) Journal of Psychosomatic Research 3 151-155.

Average VAS at 7 hours. Niven = 5.5

Average VAS at 7 hours Scott-Palmer and Skevington = 5

1.3.3. RECALL OF LABOUR PAIN

1.3.3.1. INTRODUCTION

A number of studies of labour pain have utilised recall measures of pain assessment, eg Henneborn and Cogan (1975), Nettlebladt et al (1976) Worthington (1982). The principal benefit of this methodology is that it allows the subject to recall the total pain experience of labour and/or the most intense pain experienced during labour without the need for continuous assessment, which may be impracticable or impossible (as in the 2nd stage of labour). The use of a recall measure in this study was designed to assess the pain experienced by subjects when the researcher was not present (ie that occurring after MPQ 1 VA 1) and thus to complement and supplement the data available from the subjects' assessment of first stage labour pain.

Recall of pain may however be inaccurate due to the decay of memory traces and the recall of labour pain may suffer additionally from a confusion of recall induced by the changing nature of the pain experience (from first to second stage). Revill et al (1976) have shown that repeated ratings of a pain distant in time correlated highly together, more highly indeed than repeated ratings of a random mark. Hunter et al (1979) have shown that memory for head pain assessed by means of the MPQ was "surprisingly accurate" and that it showed little decay over one, or five days. These findings would suggest that subjects should be able to accurately recall their labour pain 24-48 hours after giving birth. A small subgroup of Hunter's subjects did however significantly increase their pain scores on recall. This group was characterised by their female gender and by having had higher than average initial pain scores (as assessed on the Total and Affective PRI scales of the MPQ). It is

therefore possible that labour pain subjects (female and suffering intense pain) might also exaggerate their recall pain assessment.

1.3.3.2. RESULTS

Pain scores recorded in the first stage of labour correlated positively with pain scores recorded 24-48 hours later on the MPQ. (Sensory 1/2 $r = 0.6$, Affective 1/2 $r = 0.7$, Evaluative 1/2 $r = 0.4$, Total PRI 1/2 $r = 0.7$, PPI 1/2 $r = 0.4$). These correlations were all highly significant (see Table 1.3.4.). The correlation between VA1 and VA 1R was 0.3, and between VA 1 and VA 2 was 0.15. 71% of subjects selected the same MPQ categories on recall as they had selected during the first stage of labour. (They often selected additional categories as well.)

1.3.3.3. DISCUSSION

Ideally MPQ 2 scores should reflect accurate recall of the pain experienced in the first stage of labour (as assessed in MPQ 1) plus accurate recall of all pain experienced since then, ie the pain of late first stage, of transition (if it occurred) and of the second stage. The substantial correlations between recorded and recalled measures of labour pain, the similarity of the pain profiles constructed from Total PRI 1 and 2 responses and the 71% overlap of category selection from these measures indicate that some of what subjects recorded during the first stage of labour was recalled accurately 24-48 hours later. Subjects may however appear to recollect pain accurately when in fact they are only recalling their previous response, not their previous pain. However few people would seem able to remember 10 or 15 out of 86 words, over 48 hours (as would be required in MPQ 2) when on the first occasion they heard them, they were drugged and in pain. Recordings made on the

Table 1.3.4. Correlation coefficients for labour pain scores

LABOUR PAIN MEASURE	N	S1		A1		E1		Total PRI 1		PPI 1		VA 1	
		r	p	r	p	r	p	r	p	r	p	r	p
Sensory 1	101	1.0000											
Affective 1	101	0.6209	***	1.0000									
Evaluative 1	101	0.2887	**	0.3009	**	1.0000							
Total PRI 1	101	0.9470	***	0.8120	***	0.4337	***	1.0000					
PPI 1	96	0.4278	***	0.5811	***	0.3258	***	0.5348	***	96	1.0000		
VA 1	79	0.2694	*	0.4336	***	0.3684	***	0.3733	***	78	0.4691	***	79
Sensory 2	92	0.6183	***	0.5529	***	0.0672		0.6161	***	87	0.2893	*	71
Affective 2	92	0.5100	***	0.6895	***	0.2323	*	0.6078	***	87	0.4526	***	71
Evaluative 2	92	0.2810	**	0.3683	***	0.3681	***	0.3656	***	87	0.3340	**	71
Total PRI 2	92	0.6200	***	0.6400	***	0.1534		0.6574	***	87	0.3845	***	71
PPI 2	91	0.2431	*	0.3512	***	0.2090	*	0.3123	**	86	0.3523	**	70
VA 1	54	-0.0114		0.1123		0.3157	*	0.0724		52	0.0103		45
VA 2	80	-0.0226		0.0934		-0.0528		0.0009		76	0.0902		64

LABOUR PAIN MEASURE	N	S2		A2		E2		Total PRI 2		N	PPI 2		N	VA 1R		VA 2	
		r	p	r	p	r	p	r	p		r	p		r	p	r	p
Sensory 2	94	1	0.0000														
Affective 2	94	0.6603	***	1	0.0000												
Evaluative 2	94	0.4216	***	0.5869	***	1	0.0000										
Total PRI 2	94	0.9528	***	0.8315	***	0.5897	***	1	0.0000								
PPI 2	93	0.3545	***	0.4536	***	0.4561	***	0.4445	***	93	1.0000						
VA 1	55	-0.1245		0.0578		0.0910		-0.0484		54	0.1363			56	1.0000		
VA2	81	0.0542		0.1233		0.1326		0.0951		80	0.3487	**		46	0.0672	1	0.0000

simple Visual Analogue Scale have been shown to be easy to remember (Revill et al, 1976) but the correlations between the recorded and recalled Visual Analogue scores were lower than between the more complex (and therefore harder to remember) MPQ scores. Furthermore, subjects seemed to be recalling their experience of labour at the first post-natal interview. They described experiences which accompanied the pain and displayed considerable affect. Therefore it seems unlikely that recall scores represent recall of previous responses.

The amount of pain recorded post-natally was significantly greater than that recorded during the first stage of labour (see Table 1.3.2). This could be due to an exaggerated recall of pain as found by Hunter et al (1979) in a minority of their subjects and/or to an accurate recall of more intense pain associated with the end of the first and the second stage of labour. The difference between VA 1 and VA 2 scores reflects the difference between first and second stage pain for 88% of subjects. Therefore an increase in pain as assessed by MPQ 1 and MPQ 2 would be expected, and would reflect the increase in noxious stimulation which occurs as the cervix approaches full dilation (Bonica, 1975) and the pain associated with the delivery of the baby.

The difference in the nature of the pain as assessed by MPQ 1 and 2 (which contributed to the increase in MPQ 2 scores) also reflects these factors. Increased selection of categories was not random, only certain categories were increasingly chosen when labour pain was recalled. Category 2 - Jumping, Flashing, Shooting, (Shooting being the word most frequently selected), was more frequently chosen. Category 6 - Tugging, Pulling, Wrenching, was more frequently chosen. Category 11 - Tiring, Exhausting, was more frequently selected, "Exhausting" being the

typical descriptor, and Category 13 - typically "Frightening" was also chosen more frequently from the MPQ 2. These words seem to describe the nature of the second stage of labour. During that stage the woman is actively engaged in pushing out the baby. This involves a lot of physical effort, and follows an extended period of painful contractions. Therefore she may well feel exhausted. As previously reported, 88% of women find this stage of labour most painful. There are also real risks to the mother, and particularly to the baby, in the second stage of labour. These factors may well induce fear. The sensations of pushing the baby out, and of the head coming through the perineum, could give rise to descriptions of "Pushing", "Shooting", and "Wrenching" pain. However, the selection of different pain descriptors in MPQ 2 may also reflect inaccurate recall. If so, it would be expected that the 'new' descriptors would be selected at random, or that exaggeration of previous responses would occur 'across the board'. This did not occur - the 'new' descriptors were related to the nature of late first and second stage pain, not to the nature of pain unassociated with childbirth (eg dental pain as characterised by Category 19, the most infrequently selected category in MPQ 1 and 2) or to a random or across the board increase in word or category selection (see Fig 1.3.4).

The data presented here suggest that subjects were recalling their experience of labour pain, not just their previous responses and that most of the increase in pain recorded in the second interview can be attributed to the increase in noxious stimulation which occurred at the end of the first stage of labour and during the second stage. The accuracy of the subjects' recall of labour pain as measured in this part of the study is however fundamentally untestable, since the nature of the pain

which was to be recalled changed from the first to the second pain assessment. Recall of first stage pain as assessed by the Visual Analogue recall measure (VA 1R) was not accurate (the correlation between VA 1 and VA 1R being only 0.3), but this was probably due to the difficulties experienced in using the VAS during the first stage of labour and to the contamination of first stage recall by recall of more intense pain associated with other stages of labour. This question of accuracy could only be resolved by comparing a complete assessment of labour pain, ie of first and second stages, with the recall of that pain. This difficult procedure has not been carried out in any of the labour pain studies cited, nor in any others of which the writer is aware.

Recall measures of labour pain must therefore be considered as a useful complement to those obtained during the first stage of labour. The PRI recall measures of the MPQ probably reflect the subjects' recall of the nature and intensity of pain which occurred throughout labour and delivery, not just the most intense pain experienced - as assessed by VA 2, nor the pain of second stage alone - as assessed by VA 2 in 88% of cases. These measures cannot be regarded as of proven accuracy and therefore any results which relate solely to recall measures must be treated with some caution.

1.3.4 THE RELATIONSHIP BETWEEN THE DIFFERENT MEASURES OF PAIN

1.3.4.1 INTRODUCTION

There were two subjective measures of labour pain used in this study, the MPQ and the Visual Analogue Scale. Scores on the various subcomponents of the MPQ (Sensory, Affective, Evaluative, Total, PRI and PPI) have all been shown to intercorrelate significantly (Melzack, 1975). Visual Analogue scores have been reported to correlate significantly with scores on the

PPI scale of the MPQ (Reading, 1981, Roche et al, 1984) and with the various PRI scales (Taenzer, 1983). The current study allowed the relationship between the various subcomponents of the MPQ and VAS to be examined in detail in a substantial population of subjects suffering from, and recalling the pain of labour

1 3 4 2 RESULTS

The various first stage MPQ scores all correlated significantly with one another, and with the Total PRI 1. The VA 1 measure of labour pain recorded concurrent with MPQ 1 correlated significantly with the Total PRI 1 and with the other MPQ 1 measures, including the PPI (see Table 1 3 4)

The recall MPQ measures intercorrelated significantly. VA 2 scores correlated significantly with PPI 2 scores, but not with scores on the other MPQ 2 measures. All the MPQ measures recorded in the first stage of labour correlated significantly with their equivalent recall measures (Sensory 1 with Sensory 2, etc) but not with all the non-equivalent recall measures (eg Evaluative 1 with Sensory 2) (see Table 1 3 4). VA 1 and VA 1R scores correlated together significantly, but VA 1 did not correlate significantly with VA 2.

1 3 4 3 DISCUSSION

The main MPQ measures were all found to intercorrelate significantly in this study as in other studies (eg Melzack, 1975, Reading, 1981, Burckhardt, 1984). The PPI despite its apparent insensitivity comparative to the rest of the MPQ, correlated significantly with the other pain assessment measures used. It correlated more highly with Sensory, Affective and Total PRI measures than the Evaluative measure, when assessment was

completed during the first stage of labour, and so despite its limitations it still seemed to fulfil its function as a useful component of the MPQ. The various Visual Analogue scores did not correlate together highly. This was perhaps unsurprising given the difficulties encountered in recording VA 1 and VA 1R. The low correlation between VA 1 and VA 2 may however be additionally due to the poor relationship between the intensity of pain experienced during the first stage of labour, as assessed by VA 1, and the intensity of the most severe pain which occurred throughout childbirth, as assessed by VA 2, which was for the majority of subjects the pain of the second stage.

VAS/PPI correlations ranging from 0.29 to 0.71 have been reported for post epistotomy pain (Reading, 1981) and for experimentally induced ischaemic pain (Roche et al, 1984). VAS/PRI correlations of 0.49-0.65 have been found by Taenzer (1983) in a study of post operative pain. The correlations found in this study between VA 1 and the MPQ's PRI and PPI first stage measures thus lay within the lower end of the range found by other investigators. The correlation found between VA 2 and PPI 2 was also of a comparative but low level. However, the levels of correlation found between VA 2 and the PRI 2 measures were far below those found in other studies (see Table 1.3.4). This may reflect the fact that VA 2 assessed the intensity of labour pain at its worst, whereas the PRI 2 measures assessed the nature and intensity of pain throughout labour.

The generally low level of correlation found between the VAS and the MPQ may instead reflect some deficiency in the ability of the VAS to accurately assess pain, like labour pain, which is particularly intense, severe pain, and as Kremer et al (1981) have suggested, the effects

of drugs used to counteract it, make it difficult for subjects to complete the VAS. However Revill et al (1976) found that 20 labouring subjects, 10 of whom had received Pethidine had little difficulty in completing the VAS if its length was greater than 5 cms, as it was in this study. Revill et al do not state how advanced in labour their subjects were, since the aim of their study was to test the sensitivity and reliability of the VAS, not to assess the intensity of labour pain. Perhaps their subjects were not suffering similar intensities of pain to the subjects of this study. Certainly no mention was made in Revill et al (1976) of the problems of the VAS's restricted sensitivity to intense pain found in this and other studies (Kremer et al, 1981) (ie that there is insufficient space at the upper end of the VAS to allow adequate assessment of differences in severe pain. See 1.3.1). The VAS has been successfully used in other studies of labour pain (Scott-Palmer and Skevington, 1981, Skelton, 1984) where it was repeatedly administered. The difficulties found in the use of the VAS in this study may have been associated with the timing of its administration. Subjects had had no opportunity to familiarise themselves with the VAS before they were in severe pain as had Scott-Palmer and Skelton's subjects. The prior MPQ assessments may also have taxed their concentration and motivation, so that when the less attractive VAS assessment (Kremer et al, 1981) was to be completed, they were disinclined to make the additional effort necessary to complete it. Whatever the reason it remains true that the VAS was not found in this study to be appropriate for use during the first stage of labour, and when subjects recalled their labour pain the response to the VAS was markedly skewed (VAS mode = 9, see Fig 1.3.3b). Therefore the sensitivity of the VAS was reduced when it was used to assess labour pain at its most intense.

The various results presented in this chapter indicate that both the PPI scale of the MPQ and the Visual Analogue Scale were problematic as used in this study of labour pain. The special nature of childbirth and of the pain associated with it - a usually joyous event associated with extreme pain - disallowed proper use of these scales. The MPQ's Sensory, Affective, Evaluative Total PRI measures were found to be satisfactory in their assessment of labour pain. Thus scores obtained through the use of these measures are considered to be the best available indices of the nature and intensity of labour pain experienced by the subjects of this study.

PART 2

CHAPTER 1 - OBSTETRIC VARIABLES

2 1 1 GENERAL INTRODUCTION

This chapter will deal with the 'obstetric' variables which may affect the amount of noxious stimulation occurring during labour. The factors which will be examined are the Degree of Cervical Dilation, Duration of labour, Parity, Induction and Acceleration of labour, Complications of Birth and the Weight of the baby. Although these variables are defined as 'obstetric' in order to differentiate them from the psychological variables which will be subsequently examined, it must be emphasised that this physical/psychological dichotomy is a false one. Psychological factors will be influenced by obstetric variability and obstetric variables will have psychological concomitants. For example differences in parity will be reflected both in the physical condition of the woman during childbirth, and in her psychological functioning, a Primip for instance, being likely to be more anxious about childbirth than a Multip. Therefore associated psychological modulation of noxious stimulation may compound any direct effects that these variables have on the nature and intensity of labour pain. Other non-psychological factors related to obstetric outcome, to pharmacological modulation of labour pain, and to the health of the baby will be discussed in the following chapter.

2 1 2 THE DEGREE OF CERVICAL DILATION

2 1 2 1 INTRODUCTION

Subjects assessed their first stage labour pain when they were in the active phase of the first stage of labour. This was defined as being >3 cms cervical dilation with strong contractions occurring >2/10 mins. Subjects could therefore be assessing their pain when they were 3 cms

dilated or 10 cms This obviously is an important variable, as the amount of noxious stimulation is likely to increase as the cervix approaches full dilation (Bonica, 1975) The degree of cervical dilation as assessed by routine examination (by the attending midwife) was therefore correlated with MPQ 1 and VA 1 scores

However, the degree of cervical dilation was only assessed four hourly so this measure gave imprecise information about the exact degree of dilation corresponding to pain intensity Accordingly another measure - the duration of labour after MPQ 1 and VA 1 had been recorded - was calculated and correlated with these scores, the belief being that the shorter this duration the more advanced the subject's labour would have been at the time of pain assessment and therefore the greater would be the degree of cervical dilation This measure was also crude since the rate of cervical dilation is affected by a number of factors, eg parity, and is anyway not even and continuous throughout labour (LLwellyn-Jones, 1977) A subject might be dilating slowly from 3-4 cms at the time of her first stage pain assessments but then progress very rapidly to delivery She would thus have a shorter post-assessment duration than a subject who was 6 cms dilated when she assessed her pain but whose progress in labour then slowed down

Neither of these measures was considered to be an adequate assessment of the exact degree of cervical dilation occurring at the time of the first stage pain assessment but they are indicative of whether or not differences in pain intensity recorded by the subjects of this study were solely due to differences in advancement in labour, ie to the degree of cervical dilation. They therefore provided essential data

2 1 2 2 RESULTS

The average degree of cervical dilation as assessed at the routine examination closest in time to first stage pain assessment was 5 cms. The range was from 3-7 cms dilation. The correlations between the degree of cervical dilation and the intensity of first stage pain were not significant (see Table 2 1 1). The average post-assessment duration was 3 5 hours. See Fig 1 3 5. The post-assessment duration of labour was negatively but non-significantly correlated with the intensity of first stage pain (see Table 2 1 2).

2 1 2 3 DISCUSSION

The correlations between the available measures of progress in labour and first stage pain scores were very low. This shows that the differences in first stage pain levels experienced by subjects were not merely a function of their advancement in labour. Melzack et al (1984) have recently reported significant correlations between progress in labour and the intensity of labour pain. Their subjects were interviewed repeatedly throughout labour from 2 to 8 times. Therefore the variation in cervical dilation concurrent with pain assessment in their subjects was much greater than in this study.

It is interesting to note that no subject in this study was more than 7 cms dilated when interviewed. (Although the measure of the degree of cervical dilation used was taken from the examination nearest in time to first stage pain assessment, any measures in excess of 5 cms were recorded after the interview, not before it.) This meant that all subjects were clearly in the active phase of the first stage of labour (in the phase of maximum slope, see Fig 1 1 4). None were approaching transition. This probably accounts for the low correlation

Table 2 1 1 Correlations between dilation of the cervix and the intensity of first stage labour pain

Pain Measure	Correlation
Sensory 1	0 09
Affective 1	0 02
Evaluative 1	0 06
Total PRI 1	0 08
PPI 1	0 03
VA 1	0 02

Critical value of r at 0 05 level of significance with $N > 79 = 0 217$

Abbreviations as in Table 1 3 2

Table 2 1 2 Correlations between post interview duration of labour and the intensity of first stage labour pain

Pain Measure	Correlation
Sensory 1	-0 09
Affective 1	-0 11
Evaluative 1	-0 07
Total PRI 1	-0 12
PPI 1	-0 09
VA 1	-0 09

Critical value of r at 0 05 level of significance with $N > 79 = 0 217$

Abbreviations as in Table 1 3 2

between progress in labour and intensity of pain as the amount of noxious stimulation occurring during the active phase is not prone to the same degree of fluctuation as outwith this phase, ie prior to the active phase when there is minimal noxious stimulation and during transition and in the second stage when the nature of noxious stimulation alters (see 1.1.3) This was desirable since it was intended that differences in noxious stimulation should be minimised The elimination of subjects in or approaching transition was due to a combination of chance and clinical judgement, some potential subjects at the end of the first stage of labour being asleep or incoherent while others indicated verbally or behaviourally that they "wanted to push", a clear clinical sign of approaching transition

2 1 3 DURATION OF LABOUR

2 1 3 1 INTRODUCTION

There seems to be a general belief that a short labour is "better" than a long one (O'Driscoll, 1973, Llwellyn-Jones, 1977, Myles, 1981) However it is unclear whether a short or a long labour will involve more pain. A short labour will necessarily mean that the cervix will dilate more with each contraction This should result in more intense pain, as the amount of noxious stimulation is primarily determined by the amount and rapidity of cervical dilation (Bonica, 1975) A long labour, on the other hand, will involve the repetition of a larger number of painful contractions which may be more distressing and will be more likely to exhaust the physical and psychological coping capacities of the subject Therefore the relationship between the length of labour and the quantity and quality of labour pain is uncertain

2 1 3 2 RESULTS

The average duration of the first stage of labour was 8 hrs 16 mins - 7 6 hrs for first stage, (range 1-27 hrs), and 36 mins for second stage (range 2-120 mins) Primips had significantly longer labours than Multips

1st Stg Duration Primips=8 9hrs Multips=5 6hrs $F(1,93) = 15.87$ $p < 0.001$

2nd Stg Duration Primips=44mins Multips=22min $F(1,84) = 26.54$ $p < 0.0001$

The duration of the first stage was significantly correlated with the intensity of labour pain for Multips only. The length of the second stage was negatively correlated with labour pain, the level of correlation approaching significance on a number of Primip and Multip recall measures (see Table 2 1 3). The total duration of labour (ie of first and second stages) was not significantly correlated with the intensity of labour pain (all MPQ 2 and VA 2 correlations were less than 0.09).

2 1 3 3 DISCUSSION

The duration of the first stage of labour varied considerably. It lasted only an hour for one subject and more than a day for another. Given this variation, it is surprising that there was not a stronger relationship between the length of labour and levels of labour pain. The duration of the first stage of labour is difficult to assess in patients whose labour has started before they have come in to hospital, since the onset of labour is not a clear-cut event, especially for those who have not experienced it before. Therefore the duration of the first stage of labour may not have been accurately assessed in all cases. The positive correlation found between the duration of the first stage of labour and levels of labour pain apparently contradicts theories of the etiology

Table 2 1 3. Correlations between the duration of labour and levels of labour pain in Primips and Multips

LABOUR PAIN MEASURE	FIRST STAGE			SECOND STAGE		
	N	PRIMIPS	p	N	PRIMIPS	p
Sensory 1	56	-0 01	NS	3 9	0 14	NS
Affective 1	56	-0 01	NS	3 9	0 18	NS
Evaluative 1	56	-0 03	NS	3 9	-0 08	NS
Total PRI 1	56	-0 02	NS	3 9	0 15	NS
PPI 1	51	0 01	NS	38	0 15	NS
VA 1	45	0 07	NS	28	-0 04	NS
Sensory 2	53	0 06	NS	39	0 35	<0 05*
Affective 2	53	0 10	NS	39	0 28	<0 1
Evaluative 2	53	0 09	NS	39	0 40	<0 01**
Total PRI 2	53	0 09	NS	39	0 38	<0 02*
PPI 2	52	0 12	NS	39	0 25	<0 1
VA 2	48	0 13	NS	31	0 08	NS
				45	0 02	NS
				29	-0 33	<0 05*

Abbreviations as in Table 1 3 2

of labour pain (Bonica, 1975) which would predict that a short labour would involve higher levels of noxious stimulation than a long one. It must be remembered though that noxious stimulation does not equal pain. Furthermore transmission of the lower levels of noxious stimulation occurring with each contraction in a long labour may be facilitated by their endless repetition and the more rapid increase in dilation occurring in short labours need not have occurred during the contractions monitored by first stage pain assessments. Therefore this finding should not be regarded as challenging these theories.

The second stage of labour also varied considerably in length, from two minutes to two hours. This variation does not express the true potential range of the second stage ("Seven long days in labour lay the poor Queen Jane" Traditional song, origin unknown) because a prolonged delivery can endanger the fetus and so forceps will usually be used to hasten the birth. The duration of the second stage can however be very accurately assessed since full dilation and birth, mark its end points clearly. The relationship between a prolonged second stage and assisted delivery will be discussed in 2.1.6. Morgan et al (1982a) reported a negative relationship between the length of labour and delivery (ie first and second stages) and the amount of labour pain her subjects recalled post-natally whereas Melzack et al (1984) found no significant correlation between the total duration of labour and subjects' assessment of labour pain at various points during labour, a finding which is in agreement with the results of this study. Morgan's data on the relationship between the duration of labour and levels of labour pain was confounded by the effects of epidural anaesthesia which, she reported, both affected the duration of labour and lowered levels of labour pain in a proportion of her subjects (Morgan et al, 1982a).

2 1 4 PARITY

2 1 4.1 INTRODUCTION

The first labour a woman experiences differs from subsequent labours in many ways. The birth canal has never been fully dilated and therefore the cervix, vagina and perineum are unyielding compared to those of the multiparous woman. The cervix of a Primip is only dilated by less than 1 cm at the onset of labour, whereas the multiparous cervix is already 2-3 cms dilated. The pelvic floor muscles have less tone in Multips and so offer less resistance to the descent of the baby. These factors make the average primiparous labour considerably longer than a multiparous one (Llwellly Jones, 1977, Myles, 1981). The expectations and experience of birth will also differ. Primips will be going through an unfamiliar and often frightening experience for the first time. No matter how well prepared they are, labour is a unique experience. Multips have the advantage of "having been through it all before", psychologically as well as physically, and so should find birth less strange and frightening.

As all these factors may affect the nature and intensity of the subject's labour pain, one would expect there to be a difference between the pain scores of Primips and Multips. Multips are usually held to have less pain in labour (Llwelllyn-Jones, 1977, Myles, 1981) but parity has not always been found to significantly predict lower levels of labour pain (Cogan et al, 1976). While psychological and physical factors will generally favour Multips, some other factors may serve to exaggerate their pain, eg recall of a complicated or severely painful previous birth, heavier babies (the weight of the baby tends to increase with each pregnancy, Myles, 1981), older mothers, less attention from the staff who tend to concentrate their efforts on first time mothers, believing that Multips can "get on with it by themselves". This might also result in

them receiving less analgesics. It is hypothesised that Primips will have more pain than Multips, because of the physiological advantages which accrue with multiparity which should result in Multips having lower levels of noxious stimulation. These advantages may be offset by a number of factors, discussed above, which could exacerbate Multips' pain levels. It is also hypothesised that the nature of labour pain will be affected by the physical and psychological differences associated with parity.

2.1.4.2 RESULTS

Multiparous subjects (42% of the sample) recorded lower pain levels than Primips during the first stage of labour. The average Total PRI 1 scores were Primips 27.5, Multips 24.4 $F(1,99) = P < 0.1 > 0.05$. The difference in pain levels was confounded by differential use of analgesics. Nearly all Primips (97%) received Pethidine and Entonox during labour, whereas 25% of Multips used no analgesia or only used Entonox. When the use of analgesics was controlled statistically, using analysis of co-variance, Primips had significantly more labour pain on the Sensory, Affective, Total PRI, and Visual Analogue measures of pain, recorded during the first stage of labour (see Table 2.1.4). Primips' recall of the first and second stages of labour pain was not significantly higher than Multips recall, even when the use of analgesia was controlled. As Multips had significantly shorter deliveries than Primips and as a rapid delivery was associated with more intense pain (see Table 2.1.3) the intensity of Primips' and Multips' second stage pain, an important component of MPQ 2 could have been affected by the length of their delivery and not directly by their parity. Table 2.1.5 shows that if the duration of the second

Table 2 1 4 Levels of labour pain in Primips and Multips
(Analysis of co-variance with Pethidine and Entonox
as co-variables)

LABOUR PAIN MEASURE	⁺ PRIMIP	SE	⁺ MULTIP	SE	df	t VALUE	p (1 TAIL)
Sensory 1	20.8	1.0	17.9	1.3	88	-1.63	0.05*
Affective 1	4.7	0.5	3.3	0.6	88	-1.77	0.03*
Evaluative 1	2.5	0.2	2.1	0.2	88	-1.09	0.10
Total PRI 1	28.1	1.5	23.5	1.8	88	-1.91	0.02*
PPI 1	2.6	0.1	2.4	0.1	87	-0.83	0.20
VA 1	5.7	0.3	5.1	0.4	71	-1.27	0.10
Sensory 2	24.2	1.3	22.5	1.7	88	-0.53	0.25
Affective 2	6.3	0.5	5.3	0.6	88	-1.20	0.10
Evaluative 2	3.3	0.2	2.9	0.2	88	-0.96	0.16
Total PRI 2	33.1	1.9	31.0	2.3	88	-0.70	0.24
PPI 2	2.9	1.0	3.1	0.1	88	0.20	0.81
VA 2	7.9	0.2	8.0	0.3	77	0.41	0.22

+ group means adjusted by analysis of co-variance
For abbreviations see Table 1 3 2

Table 2 1 5 Levels of labour pain in Primips and Multips
(Duration of second stage as co-variable)

LABOUR PAIN MEASURE	⁺ PRIMIP	SE	⁺ MULTIP	SE	df	t VALUE	p (1 TAIL)
Sensory 2	25.5	1.5	21.1	1.9	83	-1.65	0.05*
Affective 2	6.8	0.6	5.3	0.7	83	-1.56	0.05*
Evaluative 2	3.3	0.3	3.0	0.3	83	-0.53	0.30
Total PRI 2	35.2	2.1	29.5	2.6	83	-1.56	0.05*
PPI 2	3.0	0.2	3.2	0.2	82	-0.60	0.26
VA 2	7.9	0.3	8.0	0.4	71	0.11	0.45

+ group means adjusted by analysis of co-variance
For abbreviations see Table 1 3 2

stage is statistically controlled, Multips had significantly less labour pain than Primips on the Sensory, Affective and Total PRI measures of pain recorded 24 - 48 hrs post-natally. Therefore Multips had significantly less pain than Primips throughout labour if analgesic use and the duration of the second stage is controlled.

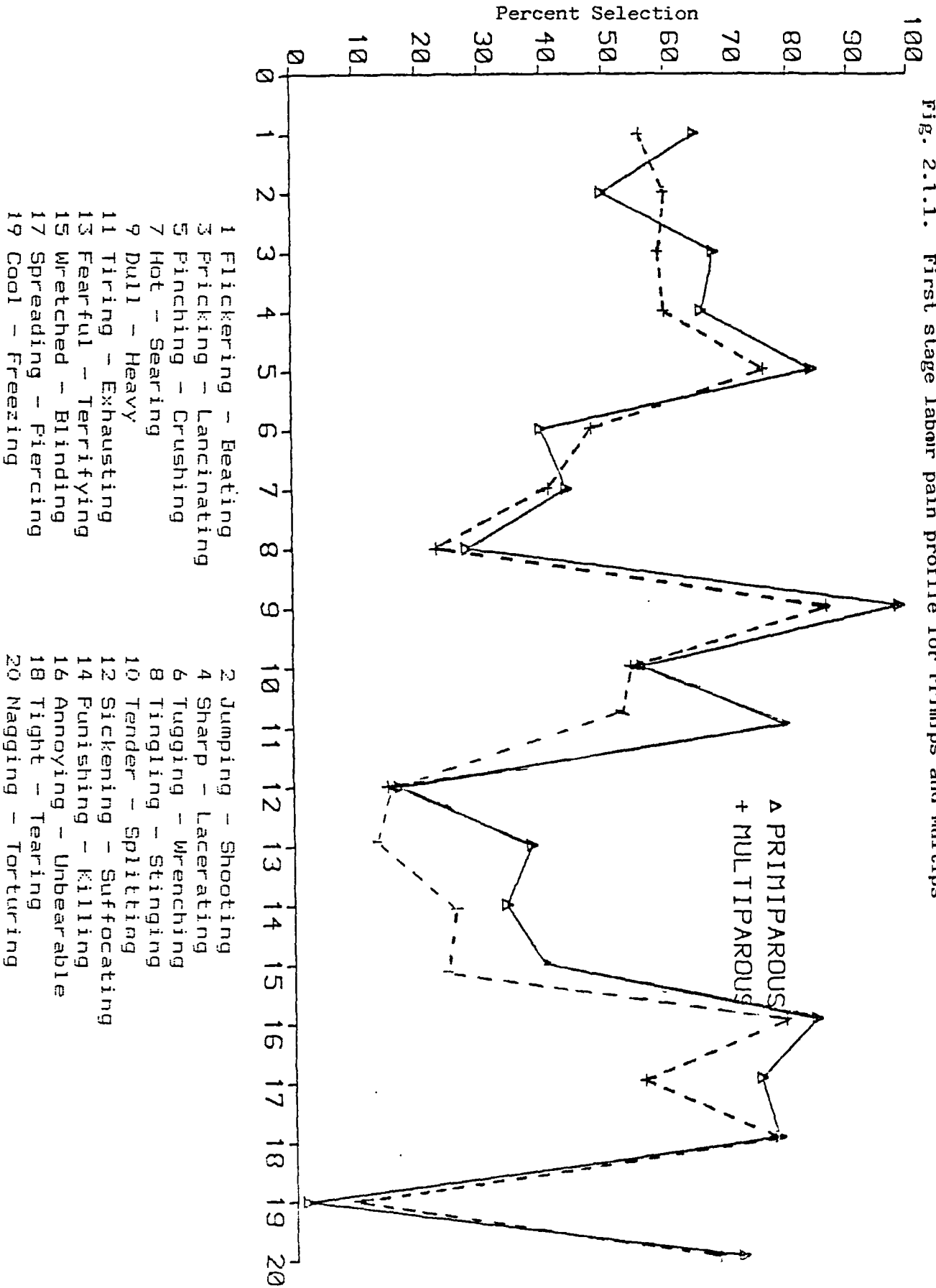
Their pain profiles were similar but Multips responded less frequently to certain Sensory categories and to most Affective categories during the first stage of labour (see Fig 2.1.1). Category selection on recall (see Fig 2.1.2) showed few marked differences between Primips and Multips. These profiles indicate that there were differences in both the Sensory and Affective nature of labour pain for Primips and Multips, but that the most notable differences occurred in their selection of Affective pain descriptors and when labour pain was being assessed as it occurred in the first stage of labour not when the first and second stages were being recalled.

27% of subjects were having their second baby, 12% their third and 1% each their fourth, fifth and sixth. The intensity of labour pain did not progressively decrease with each successive birth, ie the correlation between the number of previous births and levels of labour pain was not significant (all correlations were less than 0.19 $N = 42$ $p > 0.1$).

2.1.4.3 DISCUSSION

As reported in the literature (Llwellyn-Jones, 1977, Morgan et al, 1982a,b, Melzack, 1984, Melzack et al, 1981, 1984) labour is more painful for women giving birth for the first time. However, the results of this study indicated that the beneficial effects of parity were limited to the first stage of labour. As most Multips had a rapid second stage this led to

Fig. 2.1.1. First stage labor pain profile for Primips and Multips



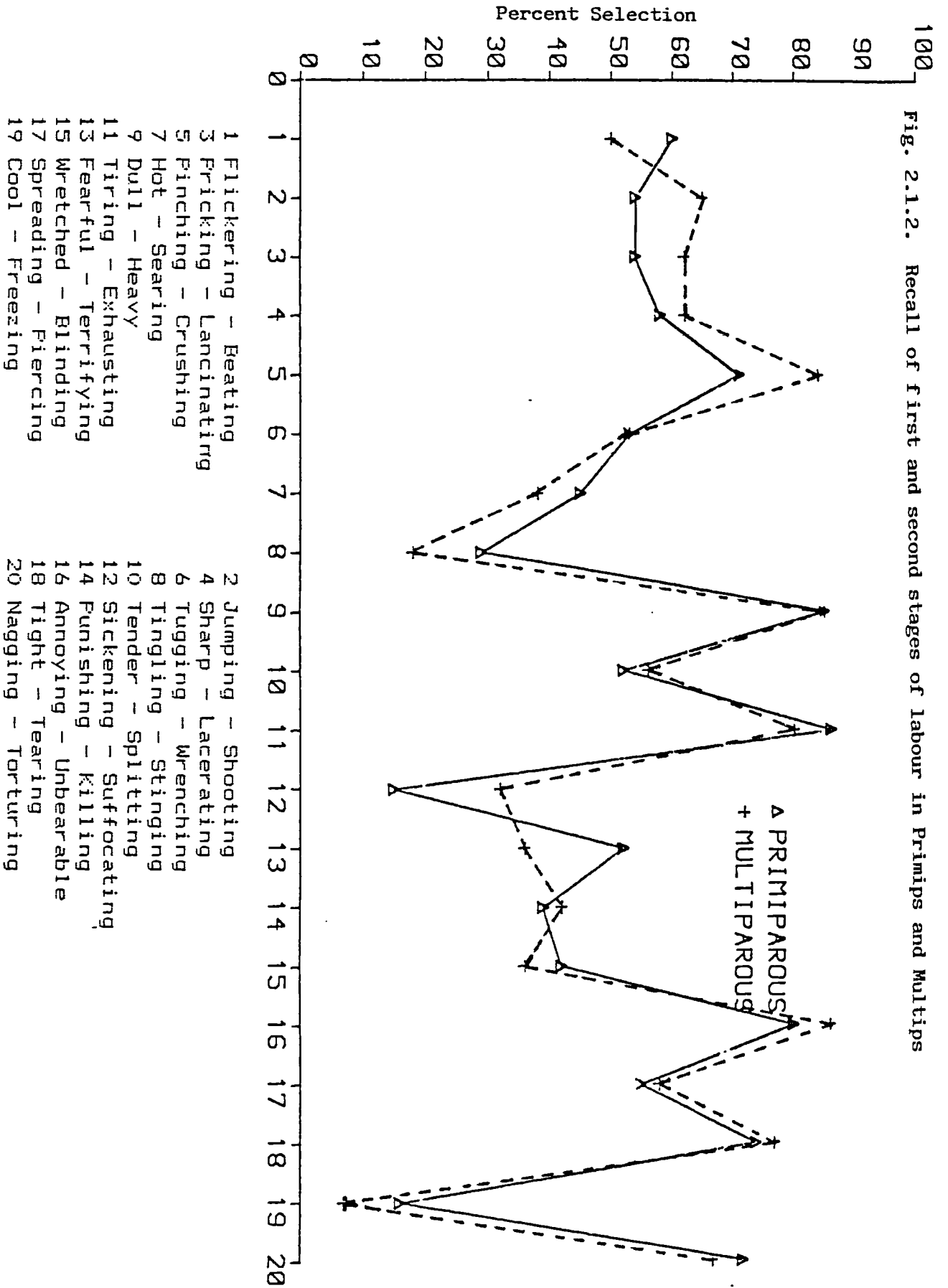


Fig. 2.1.2. Recall of first and second stages of labour in Primipars and Multips

their deliveries being as painful as for first time mothers. This was probably due to the trauma inflicted on the vagina and perineum by the rapid descent of the baby's head. These findings support the hypothesis that parity will affect the pain of labour through influencing the amount of noxious stimulation occurring in childbirth, this amount being reduced in the first stage of the multiparous, as opposed to the primiparous, birth, but being equalled or exceeded in the second stage. Psychological factors such as Multip's increased familiarity with childbirth and/or physiological factors such as their increased age and the greater weight of their babies may have contributed to these results. These factors and others associated with multiparity, eg expectations of childbirth, are dealt with in Sections 2.1.7, 2.2.4 and 2.3.3.

Not all Multips had a rapid second stage and as was shown in Table 2.1.5, if this factor is controlled statistically, Multips will have less pain than Primips throughout labour. Because of the strong likelihood that Multips will have short deliveries, it should not be stated that multiparous labour will be less painful overall than primiparous labour. Instead it should be concluded that multiparous labour will be on average less painful than primiparous labour during the first stage of labour. The second stage of labour will be as painful for Multips as for Primips because delivery is usually more rapid for Multips. This conclusion apparently contradicts the findings of Melzack et al (1981, 1984) and Morgan et al (1982a,b) which showed that Primips had significantly more labour pain in total than Multips. However, these results were based on data gathered from subjects who mostly (Morgan) or all (Melzack) received an epidural anaesthetic prior to the second stage of labour. Thus these subjects did not experience the pain of delivery. The findings

of this study also contradict those of Cogan et al (1976) who reported no significant relationship between parity and labour pain. Her assessments of pain were obtained through use of a 5-point intensity scale which may have been too insensitive to detect differences between multiparous and primiparous pain.

There was no significant relationship between the number of previous births and levels of labour pain so while the second birth will usually be somewhat easier than the first birth, the third and fourth births will not necessarily be easier than the second one.

2 1 5 INDUCTION AND ACCELERATION OF LABOUR

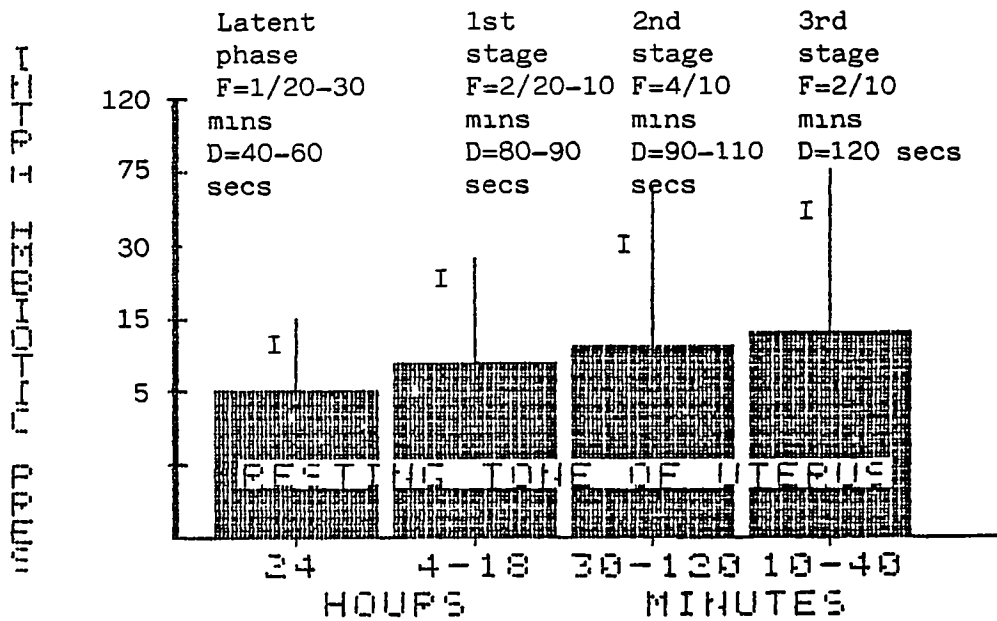
2 1 5 1 INTRODUCTION

Induction of labour involves the deliberate commencement of labour by medical means. The spontaneous commencement of labour is due to the effects of a variety of complex mechanical and hormonal mechanisms which are as yet poorly understood (Begley et al, 1980). Induction of labour can be achieved by several methods. Large doses of castor oil used to be given to induce labour with the inevitable, nasty side effects. Fortunately induction is now achieved through the rupturing of the membranes of the amniotic sac, supplemented in some cases by the use of Syntocinon, a synthetic form of oxytocin, a hormone which is involved in the normal process of labour. A labour which the doctors wish to commence at a certain time and/or which they wish to hasten will be induced or accelerated by these methods. (A labour which has commenced spontaneously may be 'accelerated', as opposed to 'induced'.) Artificial rupture of the membranes (ARM) is always carried out first, followed if necessary by the administration of Syntocinon by continuous intravenous infusion.

ARM is also performed in order to allow for electronic monitoring of the fetus via a fetal scalp electrode. There are many reasons for induction and acceleration. The most common are - because the baby is post-mature, the mother has raised blood pressure (termed 'toxaemia of pregnancy'), or the baby is in some way 'at risk' (Llwellyn-Jones, 1977, Myles, 1981). Many doctors artificially rupture the membranes solely to hasten labour, in the belief that this minimises maternal and fetal stress (O'Driscoll, 1973).

Induction of labour may affect the perception of labour pain in a number of ways. Artificial rupture of the membranes is not usually described as painful. It is however frequently described as "nasty" (Oakley, 1979). The sensations involved in the amniotic sac being 'prodded' and punctured and the experience of a procedure which necessitates the woman being placed in the lithotomy position (flat on her back, her legs apart, raised and held in stirrups) with a doctor introducing sharp instruments into her vagina, may negatively affect the subject. She may find these proceedings stressful and therefore be less relaxed when her labour commences. This may lead to more pain (Dick Read, 1933, Melzack and Wall, 1973). On the other hand she may contrast her labour with this prior experience and so find it less distressing. ARM and Syntocinon transfusion have a direct effect on the frequency and strength of uterine contractions (Llwellyn-Jones, 1977). An induced labour commences with the occurrence of frequent, strong contractions and thus proceeds more rapidly especially in the first stage, than a non-induced labour in which the contractions which characterise the latent phase of the first stage of labour (see Fig 2 1 3) are mild in strength and occur infrequently, gradually becoming stronger and more frequent as labour progresses. Although a

Fig 2 1 3 Frequency (F), duration (D) and intensity (I) of Uterine contractions during labour



Modified from Dickason and Schult (1975) Obstetrics for Nurses

more rapid first stage has been shown to affect labour pain levels in Multips only (see 2 1 3) and the criteria used in this study ensured that subjects with frequent strong contractions were not compared with subjects with infrequent mild contractions, the differential pattern of contractions which characterise induced and non-induced labours may affect the perception of labour pain in all subjects

Furthermore the rate of Syntocinon infusion affects the rate and frequency of contractions almost instantaneously, and is adjusted by the staff to "slow down" or "speed up" their patient's labour This can result in an uneven pattern of contractions It also puts the control of the source of noxious stimulation in the hands of the maternity unit staff Research has shown that the perception of pain is increased in situations where noxious stimulation is induced by others instead of being induced by 'nature' or by the subject him or herself (Bowers, 1968) Thus induction could make a mother feel less 'in control' and also be less able to control her response to pain, because of the difficulty in predicting the occurrence and intensity of the contractions

The effects of induction can therefore not be simply predicted It may affect the amount of noxious stimulation occurring through altering the pattern of contractions It may also modulate the transmission of this stimulation in a number of ways - through comparison, by making it less predictable and less controllable

2 1 5 2 RESULTS

2 1 5 2 1 ARM

75% of Primips and 83% of Multips had their membranes ruptured artificially ($\chi^2 = 0.35$ $df = 1$ $p = 0.55$) ARM was significantly associated

with higher levels of labour pain in the first stage of labour (see Table 2 1 6) Subjects who had their membranes ruptured artificially had shorter labours than those subjects whose membranes ruptured spontaneously (SRM) (Duration of first stage ARM = 7 2 hrs SRM = 9 2 hrs $F(1,97) = 3 53$ $p = 0 06$) Controlling for the duration of labour using an analysis of covariance did not significantly affect the relationship between ARM and high levels of labour pain ARM was therefore associated with higher levels of labour pain and this relationship was due to factors over and above the shorter duration of the first stage of labour ARM was not considered to be excessively distressing by a majority of subjects Only 18% of ARM subjects reported that they found the procedure "Fearful", "Frightening" or "Terrifying", "Upsetting", "Miserable" or "Unbearable"

2 1 5 2 2 SYNTOCINON ADMINISTRATION

50% of subjects received Syntocinon to induce or accelerate their labours Subjects who received Syntocinon had consistently higher average pain levels in both the first stage of labour and on recall The difference between their scores and those of subjects who had not received Syntocinon was marginally significant on the Sensory 1 measure ($F(1,92) = 2 03$ $p = 0 1$) and on Affective 2 ($F(1,92) = 2 04$ $p = 0 1$) so there was some indication that Syntocinon induction was associated with higher levels of labour pain All subjects who received Syntocinon, had previously had their membranes ruptured artificially An analysis of covariance, controlling for the effects of ARM, reduced the relationship to a non-significant level (all t values were less than 0 11 $p > 0 1$). Therefore induction by ARM was associated with higher levels of labour

Table 2 1 6 ARM and levels of labour pain

LABOUR PAIN MEASURE	N	ARM	sd	N	NO ARM	sd	F	p
Sensory 1	79	21 1	8 2	22	16 5	7 4	5.37	0 02*
Affective 1	79	4 5	4 0	22	3 1	3 0	2 32	0 1
Evaluative 2	79	2 4	1 7	22	2.4	1 6	0 00	0.99
Total PRI 1	79	28 2	12 4	22	22 1	9 3	4 53	0 03*
PPI 1	75	2 6	1 1	21	2 3	0 6	0 17	0 31
VA 1	60	5 3	2 5	19	6 3	1 7	1 01	0 12
Sensory 2	74	24 4	10 4	20	19 8	9 4	3 17	0 07
Affective 2	74	6 3	4 0	20	5 0	3 3	1 96	0 1
Evaluative 2	74	3 2	1 7	20	3 2	1 5	0 01	0 91
Total PRI 2	74	33 6	14 3	20	28 0	13 0	2 51	0 1
PPI 2	73	3 0	1 1	20	3 3	1 2	1 12	0 34
VA 2	66	7 8	1 8	16	8.3	1 6	0 89	0 35

For abbreviations see Table 1 3 2

pain, but the supplementation of ARM by Syntocinon infusion was not associated with any further elevation of pain levels

2 1 5 3 DISCUSSION

2 1 5 3 1 ARM

A very high proportion of subjects had their membranes ruptured artificially. This proportion was representative of the normal ARM rate at SRI (both during the day and at night) and reflects both induction and, to a greater extent, acceleration of labour (personal communication Senior Nursing Officer, Labour Suite, SRI). The prevalence of subjects with artificially ruptured membranes raises doubts about the validity of comparing these subjects with subjects who had spontaneously ruptured membranes. The SRM group may have been healthier, obstetrically speaking, than the ARM group, ie they were not being induced because of toxæmia or other complications of pregnancy. It might be that it was this 'health' which influenced their levels of labour pain, rather than their spontaneously ruptured membranes. However, subjects who had such complications of pregnancy had lower levels of labour pain, not higher ones (see Table 2 2 4). The duration of labour did not affect the relationship between ARM and high levels of labour pain and the occurrence of ARM was not associated with parity, nor with marked distress or fear. Therefore there is no evidence to suggest that ARM subjects had more pain than SRM subjects for reasons other than those related to the procedure and its consequences.

It is proposed that ARM increased labour pain scores by altering the pattern of contractions. Subjects commonly reported that their labour started "with a bang" as soon as their membranes had been ruptured.

Their contractions were immediately strong and frequent instead of starting off at half hour intervals, and/or being initially weak and gradually building up to full strength. This effect of artificially rupturing the membranes has been documented in many self reports of labour (eg Oakley, 1979).

If labour contractions build up gradually then the woman experiencing them will have some opportunity to adapt to them. She will be able to practice coping strategies (eg relaxation, distraction, the use of structured breathing exercises) and thus establish some control over her pain. The woman who has had an ARM is taken by surprise by the strength of the contractions and finds difficulty in "catching up" with the pain. Once swamped by an unexpectedly painful contraction, she will find difficulty in recovering the concentration, motivation and confidence to cope with the next one. Melzack, in a study on audio analgesia, has shown just this effect (Melzack et al, 1963). When the pain stimulus was increased gradually the effect of white noise (termed audio analgesia) was to modulate the pain. However, if the pain stimulus was increased rapidly the audioanalgesia was useless. An accelerated labour may produce this effect. Additionally the predictability of the intensity of pain accompanying each contraction will be lost because of the sudden change in the pattern of the contractions. As the predictability of noxious stimulation has been shown to be associated with lower levels of perceived stimulation (Johnstone et al, 1978) the experience of unpredictable pain associated with ARM may exaggerate the perception of labour pain.

This association found between artificial rupture of the membranes and higher levels of labour pain is of importance in demonstrating that an

increasingly common obstetric practice can exacerbate the pain that parturants will suffer

2 1 5 3.2 SYNTOCINON ADMINISTRATION

The use of Syntocinon was less common than the use of ARM (50% vs 79%). The effect of Syntocinon on the intensity of labour pain was not significant. The relationship between its use and higher levels of pain was mediated by the effect of ARM

2 1 6 COMPLICATIONS OF BIRTH

2 1 6 1 INTRODUCTION

Complications of birth are here defined as those which necessitate the use of forceps assisted delivery, or Caesarian section. These procedures are performed in order to facilitate or hasten the delivery of the baby. There are a number of reasons why such assistance will be given. An exhausted mother who can't supply sufficient pushing power to deliver the baby herself will be given a 'helping hand', as it is termed, though a 'helping forcep blade' would be more accurate. If the condition of the fetus is poor or deteriorating, rapid delivery is essential and will therefore often be expedited by forceps assistance, or by Caesarian section in very urgent cases. Severe haemorrhage and other serious maternal complications will also necessitate sectioning. It is not hypothesised that these conditions will affect the woman's experience of labour pain, except of course during the delivery itself when regional, epidural or general anaesthesia will be used and will obviously modulate the pain. Arguably the most common cause of complications in the second stage of labour is some mal-presentation of the baby where the presenting part is not optimally aligned with the maximum diameter of the birth

canal or/and the canal itself is restricted Cases where there was gross fetal/pelvic disproportion and cases of breech presentation (both diagnosable ante-natally) were excluded from the study but a number of forceps/sections did occur, some at least of which were clearly due to minor mal-presentations In other cases 'poor maternal effort' (a tired mother) or fetal distress were cited as the reason for assisted delivery but the midwife reported that these may have been compounded by some degree of mal-presentation There may be a relationship between the intensity of pain experienced in the first stage of labour and the subsequent occurrence of an assisted delivery The strength of uterine contractions and rate of dilation of the cervix may be affected by the position of the presenting part (see 1 1 3) This would therefore affect the amount of noxious stimulation occurring during the first stage of labour

2 1 6 2 RESULTS

15 subjects had assisted deliveries 10 subjects had forceps deliveries and 5 subjects had a Caesarian section The majority of these subjects were Primips - 9 forceps and 3 sections Complications of delivery were marginally associated with a prolonged second stage in Primips ($\chi^2 = 3.7$ $df = 1$ $p < 0.1 > 0.05$) but not in Multips ($\chi^2 = 0.64$ $df = 1$ $p > 0.1$). When the data from all the subjects with assisted deliveries was analysed, no clear relationship emerged between the intensity of pain and the occurrence of assisted deliveries Primiparous subjects who had assisted deliveries had lower levels of first stage pain than Primips with uncomplicated deliveries This effect was due to the extremely low levels of pain experienced by the 3 Primips who went on to require Caesarian sectioning (see Table 2 1 7)

Table 2 1 7 First stage pain levels in Primips, who subsequently had assisted deliveries

LABOUR PAIN MEASURE	NORMAL (N = 46)	FORCEPS (N = 9)	SECTION (n = 3)
Sensory 1	20 9	19 4	17 3
Affective 1	4 9	3 4	0 6
Evaluative 1	2 2	3 5	1 3
Total PRI 1	28 0	26 4	19 3

A prolonged second stage in Multips was not associated with the use of assisted delivery techniques. The Apgar scores of their babies were not significantly lower than those of multiparous mothers whose deliveries had been shorter ($F(1,48) = 0.63$ $p > 0.1$) so these babies showed no ill effects of their prolonged delivery.

2 1 6 3 DISCUSSION

Primips had lower levels of labour pain if they had assisted deliveries, especially if they had Caesarian sections. The small number of subjects precluded statistical analysis. However the possibility that the nature and intensity of first stage labour pain may be different for subjects who have unpredicted complications of delivery requiring operative assistance is intriguing, and may suggest that they encountered lower levels of noxious stimulation. The definition of abnormally prolonged delivery varies from Doctor to Doctor, most of whom will have specified a time limit (eg 40 mins) beyond which no patient should be undelivered. The implementation of these guide lines in practice however depends on the views of the attending midwife, the availability of the Doctor and the condition of the mother and baby. Thus a prolonged delivery may be rapidly and deliberately terminated in some cases, but continue natural

in others It was obvious that these limits were strictly adhered to in primiparous births, since all Primips whose deliveries were longer than 50 minutes received forceps or Caesarian assistance Despite the fact that Multips are usually in the second stage for a shorter time than Primips, prolonged multiparous delivery was not associated with the use of forceps There was probably less urgency in calling for medical assistance for patients who had given birth before This 'lack of action' seems to have been justified since the mothers did not suffer more pain nor the babies, lower Apgar scores

2 1 7 THE WEIGHT OF THE BABY

2 1.7 1 INTRODUCTION

The weight of the baby might be expected to affect the amount of pain involved in labour because the heavier the baby, the larger it will be and the larger the baby, the greater the effort involved in delivering it and the more substantial the trauma inflicted on the reproductive tract The size of the presenting part may also affect the intensity of noxious stimulation occurring in the first stage of labour in a manner analogous to that associated with malpresentation (see 1 3 3 and 2 1 6).

2 1 7 2 RESULTS

The babies' weights ranged from 2 4 kg to 5 6 kg The weight of the baby did not correlate significantly with any MPQ or VAS first stage scores (all correlations were less than 0.14) The weight of the baby correlated marginally significantly with the intensity of second stage pain measured on the VAS ($r = 0.17$ $N = 93$ $p < 0.1 > 0.05$).

2 1 7 3 DISCUSSION

All the babies born to mothers participating in this study, were within normal weight limits (Myles, 1981) This is probably why there was no strong correlation between the weight of the baby and the intensity of labour pain, a factor which has been found to be significant in a Canadian study (Melzack et al, 1984 weight range unspecified) The weight of very small (premature) or very large babies may affect the amount of noxious stimulation occurring in the first and second stages of labour more dramatically However, even very heavy babies may not have substantially larger skulls, so the effects of weight may be other than to increase the trauma of delivery

2 1 8 GENERAL DISCUSSION

The relationship between the variations in obstetric factors detailed in this chapter and the intensity of labour pain is summarised in Table

2 1 8 Scanning this table leads to the surprising conclusion that few of the obstetric factors examined were significantly related to the intensity of labour pain - a finding and a surprise echoed by two other researchers working in this area, Cogan et al (1976) and Melzack et al (1981) This result is not due to the lack of any relationship between obstetric factors and the amount of noxious stimulation occurring in childbirth, though this relationship may be a subtle one. The data on the effects of parity make it clear that it is the physical factors involved (which directly affect the amount of noxious stimulation occurring) which make multiparous birth less painful than primiparous birth If psychological factors were the sole cause of this effect then they would operate in both the first and second stages of labour It is also evident that psychological modulation is involved in obstetrically

Table 2 1 8 Summary table

Obstetric factors significantly related to levels of labour pain	Obstetric factors not significantly related to levels of labour pain
Duration of first stage of labour (Multips only)	Degree of cervical dilation
Parity (first stage measures)	Duration of second stage of labour
ARM	Parity (Recall measures)
Weight of the baby (Second stage measure marginally significant)	Syntocinon
	Complications of birth

related variations in labour pain, eg in the effect of ARM and that the intensity of labour pain is not simply a reflection of the intensity of noxious stimulation accompanying each contraction. It is likely that the scarcity of significant results reflects the grossness of the measures used to estimate the intensity of noxious stimulation, but given the number of obstetric factors examined, the lack of significant findings does suggest that variation in noxious stimulation was not extensive

This study aimed to reduce inter-subject variability in the intensity of noxious stimulation by using subjects who were expected to have a normal labour and by excluding subjects who were not in active labour or who were approaching transition. The success of this methodology owed much to the skilled assessments of the maternity unit staff. If breech births had been included then those subjects who had complications of delivery would most probably have had significantly more pain than other subjects. If premature births had been included then the correlation between the weight of the baby and the intensity of labour pain would likely have been significant. If the strength of the contractions had not been controlled for, then significant differences in pain might have been apparent between subjects receiving Syntocinon (strong contractions, high levels of noxious stimulation) and those who were in spontaneous, non-accelerated labour. In this study of 'normal' labour there was very considerable variability in the intensity of labour pain experienced. As it appears that variability in obstetric factors was not strongly related to the intensity of the pain experienced this supports Bonica's contention that "The amount of variability . . . in the intensity of labour pain is too extensive to depend solely

on the physiological factors involved" Bonica, 1975, p 152) and makes it more likely that psychological factors will be significantly related to the intensity of pain experienced in childbirth

PART 2

CHAPTER 2 - ANALGESIC USE AND OTHER NON-PSYCHOLOGICAL VARIABLES

2 2 1 GENERAL INTRODUCTION

The data discussed in this chapter primarily concerns the modulation of noxious transmission in labour by pharmacological analgesics. For convenience other non-psychological variables which are not directly related to the amount of noxious stimulation occurring during childbirth are also considered here

2 2 2 ANALGESIC USE

2 2 1 INTRODUCTION

The analgesic drugs given during labour in SRI were Pethidine and Entonox. Pethidine 150 mgs, usually accompanied by Sparine 25 mgs for its analgesic potentiation and anti-emetic effects, was offered to subjects during the first stage of labour when cervical dilation was not advanced beyond 7 cms (so as to avoid depressing fetal respiration at birth) It was administered by intermuscular injection and could be repeated at >3 hourly intervals if necessary The timing of its administration depended on the subjects' desires/needs and on the midwives' advice

Pethidine is a synthetic opiate with a potent analgesic action It has been shown to depress fetal respiration and its use in childbirth has been associated with low Apgar scores and longer lasting difficulties in the baby, eg 'sleepy' babies, feeding difficulties (Brazelton, 1961). Because of these effects its use in obstetrics has decreased sharply over the last few years (Bonica, 1975) Entonox (50% Oxygen, 50% Nitrous Oxide) has a long history of use in obstetrics. It is inhaled via a face mask, held in place by the woman herself. Thus as she becomes

drowsy due to the effects of the Nitrous Oxide, her grip relaxes and administration of the drug ceases. She therefore always remains conscious (Nitrous Oxide can induce anaesthesia). It has few reported side effects and the combination of the active drug (Nitrous Oxide) with Oxygen ensures a plentiful supply of oxygen to the mother and thus to the placental circulation (Bonica, 1967). Despite these advantages the use of Entonox has decreased partly because of its association with Pethidine (the traditional obstetric analgesic regime is Pethidine and Entonox, as used in the SRI) and partly because of the popularity and availability of epidural anaesthesia. In the SRI Entonox was usually offered towards the end of first stage, during transition and, especially in Primips, during early second stage, i.e. at times when the use of Pethidine is contra-indicated. In a few cases it was used earlier in labour as a substitute for, or supplement to, Pethidine.

2 2 2 2 RESULTS

2 2 2 2 1 PETHIDINE

86 subjects received Pethidine (150 mgs) at some stage during labour, 27 of them during the first quarter of the first stage or before 4 cms dilation (here defined as 'early' in labour). 68% of the subjects who received Pethidine later in labour reported that it gave them some relief from pain, compared with 54% of the subjects who received it earlier ($\chi^2 = 1.24$ df = 3 p = 0.74). Subjects who did not use Pethidine had significantly lower levels of pain. As can be seen from Table 2 2 1 the difference in pain levels between these groups was particularly marked on the Affective component of pain and also when those subjects who had received Pethidine early in labour (group 2) were compared with subjects who used no Pethidine at all (group 1).

Table 2 2 1 Pethidine use and levels of labour pain

LABOUR PAIN MEASURE	NO PETHIDINE	EARLY PETHIDINE	LATE PETHIDINE	F	df	p	PROBABILITY VALUES FOR t-TESTS		
							1/2	1/3	2/3
Sensory 1	17 0	22 3	19 7	1 9	² /96	0 14	0 06	0 29	0 1
Affective 1	1 7	6 3	3 8	7 7	² /96	0 0007	0 003***	0 06	0 01*
Evaluative 1	2 3	2 2	2 4	0 1	² /96	0 88	0 98	0 75	0 65
Total PRI 1	21 1	31 0	26 2	3 3	² /96	0 04	0 01*	0 1	0 8
PPI 1	2 1	3 1	2 5	4 3	² /91	0 01	0 008*	0 27	0 01*
VA1	5 1	6 3	5 3	1 3	² /74	0 27	0 1	0 1	0 74
Sensory 2	16 6	27 3	22 9	4 9	² /91	0 009	0 002*	0 04*	0 06
Affective 2	4 5	7 9	5 5	4 9	² /91	0 009	0 01*	0 39	0 008*
Evaluative 2	2 0	3 6	3 2	3 6	² /91	0 03	0 008*	0 02	0 33
Total PRI 2	23 2	38 8	31 3	6 1	² /91	0 003	0 001*	0 06*	0 01*
PPI 2	3 1	3 1	3 0	0 1	² /90	0 92	0 89	0 73	0 79
VA 2	8 1	8 1	7 7	0 6	² /79	0 56	0 99	0 46	0 35

For abbreviations see Table 1 3 2

Table 2 2.2 Pethidine use and Apgar scores

APGAR SCORES	NO PETHIDINE	EARLY PETHIDINE	LATE PETHIDINE	F	df	p	PROBABILITY VALUES FOR t-TESTS		
							1/2	1/3	2/3
At 1 minute	8 86	7 65	8 36	3 0	² /60	0 05	0 03 ⁺	0.33	0 05 ⁺
At 5 minutes	9 20	8 98	9 11	1 1	2/60	0 32	0 48	0 52	0 70

(+ Level of probability non-significant on Bonferroni test)

There was no significant relationship between Pethidine use and lower than average Apgar scores (see Table 2 2 2) but subjects who received Pethidine early in labour had the lowest average Apgar scores

2 2 2 2 2 ENTONOX

79 subjects received Entonox during labour, 12 of them during the earlier part of the first stage of labour 91% of the subjects who received Entonox early in labour reported that it had been beneficial in some way, whereas only 73% of subjects who received Entonox in late first or early second stage reported as positively ($\chi^2 = 1.84$ $df = 3$ $p = 0.60$) The majority of subjects who received Entonox also received Pethidine When the effect of Pethidine was controlled by an analysis of co-variance, the difference between these groups was as shown in Table 2 2 3 Subjects who received Entonox early in labour had more Evaluative pain during the first stage of labour than subjects who had Entonox later ($t = 1.7$ $df = 92$ $p = 0.08$), and had higher PPI ($t = 2.2$ $df = 87$ $p = 0.01$) and VA 1 scores ($t = 2.2$ $df = 71$ $p = 0.03$) than those subjects They also had higher PPI 1 scores ($t = 2.1$ $df = 87$ $p = 0.03$) than subjects who used no Entonox When the subjects who had received Entonox early in labour recalled their labour pain they reported marginally less pain in Total (Total PRI 2) than subjects who received Entonox at a later stage ($t = 1.6$ $df = 90$ $p = 0.1$)

2 2 2 3 DISCUSSION

The maternity unit in SRI still relies heavily on the traditional obstetric analgesic regime of Pethidine and Entonox The results of this study showed that the effect of these analgesics was regarded as fairly satisfactory by the majority of subjects Pethidine was not associated with

Table 2 2 3 Entonox use and Levels of Labour pain (Pethidine as co-variant)

LABOUR PAIN MEASURE	N	EARLY ENTONOX		LATER ENTONOX		NO ENTONOX			
		MEAN	SE	MEAN	SE	MEAN	SE		
Sensory 1	12	18.6	2.3	68	19.8	0.9	16	20.9	2.1
Affective 1	12	4.7	1.0	68	3.9	0.4	16	4.5	0.9
Evaluative 1	12	3.1	0.4	68	2.2	0.2	16	2.3	0.4
Total PRI 1	12	26.5	3.3	68	25.9	1.3	16	27.6	2.8
PPI 1	11	3.3	0.3	65	2.3	0.1	15	2.4	0.3
VA 1	8	7.1	0.8	55	5.2	0.3	12	5.5	0.6
Sensory 2	12	17.8	2.9	67	24.5	1.2	15	23.2	2.6
Affective 2	12	5.1	1.1	67	6.1	0.4	15	6.6	1.0
Evaluative 2	12	3.6	0.5	67	3.2	0.2	15	2.9	0.4
Total PRI 2	12	26.5	4.1	67	33.5	1.7	15	32.8	3.6
PPI 2	12	3.0	0.3	66	3.0	1.4	15	3.4	0.3
VA 2	11	7.9	0.5	59	8.0	0.2	11	7.5	0.5

For abbreviations see Table 1 3 2

lower levels of pain. It is suggested that this was because it was only used when labour pain became severe. However, Entonox was associated with non-significantly lower levels of pain. Its use early in labour did not seem to be effective at that time, just as Pethidine use too appeared ineffective. However when subjects recalled the pain they had experienced throughout labour and delivery, those who had received Entonox early in labour recorded the lowest levels of pain and the highest levels of satisfaction with its effectiveness. This suggests that it was a relatively effective analgesic when used repeatedly from early on in labour. The use of Entonox has been waning since the advent of epidural anaesthesia. The results of this study suggest that its usefulness might be re-evaluated, especially as Nitrous Oxide inhalation is regarded as comparatively free of side effects (Bonica, 1967), is under the woman's control and seems to be conducive to her use of psychological analgesia - breathing techniques, distraction, etc.

While the majority of subjects expressed some satisfaction with the pain relief obtained from Pethidine/Entonox, it should be noted that some subjects reported that they got no pain relief from these drugs. These subjects were over-represented in the 'early Pethidine' group, a group (27% of all subjects) characterised by youth, inexperience and anxiety (70% Primips, 25% teenagers, 44% "fearful/terrified", 62% no previous experience of severe pain). The midwives reported that the principal reason for administering Pethidine early in labour was to alleviate anxiety and excessive early labour pain. It appears that, as such, it was unsuccessful.

Even those subjects who were satisfied with the pain relief obtained from Pethidine and Entonox suffered considerable pain (compare their

pain levels with those of subjects suffering cancer or back pain

Fig 1 3 1) This reinforces the impression that total relief from labour pain is not sought by all parturants - an impression which is supported by the results of research carried out in London (Morgan et al, 1982a,b) which found a negative relationship between the effectiveness of obstetric analgesics and ratings of overall satisfaction with childbirth

2.2 3. THE HEALTH OF THE BABY

2 2 3 1 INTRODUCTION

The health of the baby may modify the mother's perception of the birth. For example she may feel more negative about the birth if the baby was ill or handicapped in some way and this may affect her recall of the pain involved. The condition of the baby was recorded by the midwife at one minute and at five minutes of age through the use of Apgar scoring. It is hypothesised that scores on these Apgar scales will correlate negatively with the recalled intensity of labour pain.

2 2 3 2 RESULTS

The health of the baby at one minute (Apgar 1 score) was negatively correlated with labour pain scores recorded in the first stage of labour, i.e. before there was any quantifiable data available on the state of the baby's health. This relationship was significant on the VA 1 measure ($r = -0.23$ $N = 101$ $p < 0.05$) and more strongly significant on the Affective 1 measure of the MPQ ($r = -0.27$ $N = 101$ $p < 0.01$). Other reports of the babies' health, Apgar scores at 5 minutes and midwives' reports of the babies' health 24-48 hrs after birth, were not significantly correlated with the intensity of pain recorded during labour or recalled after the

birth (all correlations were less than 0.08) All the babies were considered to be in a satisfactory condition by 5 minutes of age (Apgar scores >8)

2 2 3 3 DISCUSSION

The hypothesised relationship between the mother's recall of labour pain and the health of her baby was not supported. Instead it was the intensity of Affective pain which was recorded during the first stage of labour which was most strongly related to the baby's health at birth. This relationship could have been due to the intensity of pain influencing the subsequent health of the baby or to some prior knowledge of the baby's condition exacerbating first stage pain, particularly its Affective component. Was there any way these mothers could have known or suspected that their baby's condition was 'below par'? It is doubtful whether any overt measure of the baby's health could have given them cause for concern during the first stage of labour. The fetal heart rate was monitored electronically in some cases and by regular auscultation (abdominal sounding via a fetal stethoscope) in others. The results of this monitoring were available to the mothers. However, if the baby was considered to be 'at risk' as a result of this monitoring, or for any other reason, the subject was excluded from the study. It was therefore unlikely that any of the mothers studied would have obtained any reliable indication of their baby's present or future condition during the first stage of labour. There is of course always the possibility that some factor in the pattern of their labour suggested to them that "something's wrong" (Some subjects who subsequently required a Caesarian section reported "something's wrong" in the first stage of labour but so too did some subjects who had normal births.

However, we must also consider the possibility that high levels of "Distressing" or "Frightening" pain (ie Affective pain) occurring during labour may have some effect on the baby. The maternal reaction to such stress may affect the baby's condition during the birth process. The pattern of hormonal secretion from both mother and baby during birth is very complex. A high level of circulating stress hormones in the mother would increase the level of circulating stress hormones in the fetus since Adrenaline, Cortisol, etc can pass the placental barrier. These could dampen the baby's intrinsic response to the stress of birth by lowering the production of ACTH from the pituitary. The baby's normal stress reaction is important in activating physiological mechanisms essential for survival after birth (Begley et al, 1980). Therefore through the operation of a complex chain of hormonal events, high levels of Affective pain in the mother could lead to some deterioration in the baby's condition at birth.

This possibility should not be belaboured since the level of correlation was not high and the proposed explanation depends on complex interactive processes about which relatively little is known (Begley et al, 1980). Also fortunately, none of the babies was seriously ill. This is a parameter which should however be looked at in future research.

2 2 4 FACTORS RELATED TO OBSTETRIC OUTCOME

The following three factors - a history of pregnancy complications, age of the mother and social class of the mother, have all been related to poor obstetric outcome, ie to higher than average rates of maternal and fetal complications during childbirth and to higher than average perinatal mortality rates for infant and mother (Aladjem, 1972, Lubchenko, 1972). Since these factors may be related to the processes of childbirth

they could also be related to the amount of noxious stimulation occurring during childbirth. They may also be related to other variables examined in this study, eg ante-natal class attendance

2 2 4 1 COMPLICATIONS OF PREGNANCY

2 2 4 1 1 INTRODUCTION

Complications of pregnancy such as threatened abortion (miscarriage) or toxæmia of pregnancy may affect the health of the mother and the fetus and so influence the nature of the birth and perhaps the pain involved. Because of the potential risks involved the mother will be anxious about the birth which could exacerbate her perception of labour pain. Furthermore, medical intervention such as fetal monitoring, ARM or Syntocinon induction will be more likely and we already know that ARM which is necessarily involved in these procedures, is associated with high levels of labour pain (see Table 2 1 6). Therefore it is hypothesised that complications of pregnancy will be associated with high levels of labour pain.

2 2.4 1 2 RESULTS

33 subjects had complications of pregnancy, primarily involving mild toxæmia. These subjects were induced more frequently than subjects who did not have such complications ($\chi^2 = 0.52$ df = 1 p = 0.47). Their babies were however as healthy as those of other subjects who had not experienced complications during pregnancy.

Apgar 1 compl preg 8 3 no compl preg 8 1 $F(1,98) = 0.24$ p = 0.62.

Apgar 2 compl preg 9 4 no compl preg 9 6 $F(1,98) = 1.10$ p = 0.29

Their expectations of childbirth were not significantly worse than those

of other subjects ($F(1,93) = 0.01$, $p = 0.91$). Their labour did however contain marginally more events which were rated negatively (as distressing or frightening) ($F(1,98) = 1.8$, $p < 0.1 > 0.05$). Their Evaluative and PPI recall scores were significantly lower than those of subjects who had not experienced complications of pregnancy (see Table 2.2.4).

2.2.4.1.3 DISCUSSION

Contrary to the hypothesis that subjects who had experienced complications of pregnancy would have high levels of labour pain, subjects who had pregnancy complications had significantly lower levels of labour pain than 'normal' subjects when labour was evaluated post-natally. By this time (24-48 hours after the birth) a potentially risky labour was over and the subjects had been safely delivered of their babies. It may be that the sense of relief they felt positively tinged their evaluation of labour pain. However, this relief did not prevent them reporting that incidents in their labours had been frightening or distressing, so their recall was not totally distorted by a 'rosy glow'. Furthermore, their first stage pain scores, recorded at a time when their anxiety should still have been high, were not higher than those of other subjects. Indeed, their Affective scores which might have reflected high levels of anxiety, were considerably lower ($p < 0.1 > 0.05$). It seems therefore that these subjects were not as anxious about their labours as had been supposed. The 'normality' of their expectations supports this contention. Many of these subjects would have been hospitalised during their pregnancy and so would have been familiar with the staff and their surroundings. For instance, patients with toxæmia go to the labour ward frequently (often once a day) for monitoring of the fetal heart (an abdominal monitor is used, not a fetal scalp electrode). Therefore the labour room staff,

Table 2 2 4. Complications of pregnancy and levels of labour pain

LABOUR PAIN MEASURE	NO COMPLICATIONS				COMPLICATIONS			
	N	NO COMPLICATIONS	SD	N	COMPLICATIONS	SD	F	p
Sensory 1	63	19 9	8 3	33	19 0	7 6	0 29	0 59
Affective 1	63	4 5	4 1	33	3 2	2 9	2 57	0 11
Evaluative 1	63	2 4	1 6	33	2 3	1 7	0 09	0 76
Total PRI 1	63	26 8	11 8	33	24 5	10 5	0 94	0 33
PPI 1	58	2 5	1 1	33	2 6	1 0	0 26	0 61
VA 1	47	5 5	2 4	28	5 4	2 4	0 7	0 78
Sensory 2	61	24 1	10 9	31	21 5	8 7	1 32	0 25
Affective 2	61	6 2	4 0	31	5 4	3 5	0 81	0 37
Evaluative 2	61	3 5	1 6	31	2 6	1 7	5 42	0 02*
Total PRI 2	61	33 8	14 6	31	29 0	11 5	2 41	0 12
PPI 2	61	3 3	1 1	30	2 6	1 0	7 88	0 006**
VA 2	54	8 1	1 7	26	7 8	1 3	0 55	0 46

For abbreviations see Table 1 3 2

the labour rooms and some of the equipment would become thoroughly familiar to them. Such factors may have allowed mothers who had complications of pregnancy to be more relaxed than other mothers strange to the unit, its staff and its routines, and so have counteracted any anxiety caused by their complications.

2 2 4 2 AGE

2 2 4 2 1 INTRODUCTION

Increasing maternal age has been associated with a number of complications of pregnancy and birth and with high perinatal mortality (Aladjam, 1972, Lubchenko, 1972). These complications are especially related to mothers giving birth for the first time - the unfortunately named "Elderly Primip" (The definition of elderly has varied considerably, some obstetricians so classifying women as young as 25'). While increasing maternal age may lead to a more difficult pregnancy and birth, the subjects' maturity may paradoxically be of benefit in that it increases the likelihood that she will have previously experienced and coped with pain and stress. Thus physiological factors may exacerbate the amount of noxious stimulation occurring in labour in older subjects but psychological factors may modulate this.

2 2 4 2 2 RESULTS

The average age of the subjects was 26 years (range 15 to 39). Age was marginally significantly correlated with the intensity of pain assessed on the PPI 1 measure ($r = 0.200$, $N = 92$, $p < 0.1 > 0.05$). This correlation was not more marked in Primips. All Primips' correlations were less than

2 2 4 2 3 DISCUSSION

The absence of any strong relationship between age and the intensity of labour pain indicates that the factors which make increased maternal age more obstetrically risky are not directly related to labour pain. This finding and the results of a study of labour pain recently carried out in Canada (Melzack et al, 1984) which showed a negative correlation between labour pain and age should be reassuring to the increasing numbers of women who are now giving birth at a later age (Sugerman, 1983) Melzack's finding in particular may indicate the beneficial effects of maturity

2 2 4 3 SOCIAL CLASS

2 2 4 3 1 INTRODUCTION

The relationship between low social class and poor obstetric outcome has been frequently documented (Aladjam, 1972, Lubchenko, 1972, Llwellyn-Jones, 1977, Myles, 1981) It is usually assumed that factors such as poor nutrition and high levels of environmental stress contribute to this relationship A positive relationship between low social class and high pain experience has also been found (Gerson and Skipper, 1975) Therefore it would be hypothesised that there would be a significant relationship between the intensity of labour pain and lower social class.

2 2 4 3 2 RESULTS

There was no significant relationship between social class and the intensity of first stage or recall labour pain assessment All correlation coefficients were less than 0.05 ($N=92$ $p>0.1$) There was no significant association between the occurrence of complications of pregnancy and the social class of the mother ($F(1,93) = 0.57$ $p>0.1$) Lower class subjects

were marginally more likely to have complications of birth ($F(1,93) = 2.61$, $p < 0.05$)

DISCUSSION

A significantly positive correlation between social class and the perceived intensity of labour pain has been reported by Melzack et al, 1981. It is therefore surprising that a similar relationship was not found in this study. However, the population served by SRI lacks the extremes of wealth (and poverty) found in the population of large cities such as Montreal where Melzack's study was carried out and where many of the studies which have shown a relationship between low social class and poor obstetric outcome have been set. As the results of this study showed only a marginal relationship between social class and the frequency of complications of birth, it may be that it is the extremes of wealth and poverty which are more strongly associated with differences in obstetric outcome and with consequent differences in the intensity of labour pain. A study of the relationship between low social class and reports of higher than average pain experiences carried out in a large British city (Larson and Mercer, 1984) found that the previously reported relationship between low class and high pain was not apparent, and attributed previous findings to small numbers, personality factors and the problems that patients have in communicating with clinicians of differing socioeconomic class (Larson and Mercer, 1984, p 885). It seems therefore more likely that Melzack's findings were attributable to factors such as obstetric health rather than to a direct relationship between social class and general pain perception.

2 2 5 GENERAL DISCUSSION

The results discussed in the previous chapter showed that there was little relationship evident between variation in obstetric factors and the amount of noxious stimulation occurring in childbirth. It was therefore not surprising that factors more loosely associated with the processes of labour - complications of pregnancy, age and social class - were not strongly related to levels of labour pain.

The use of analgesic drugs was not associated with a significant reduction in labour pain. This finding does not demonstrate the ineffectiveness of pharmacological analgesics, though their effectiveness may have been restricted by the low concentrations in which they could be used. It seemed that analgesic drugs were only used when labour pain became intense. Lower but not insignificant levels of pain were alleviated through the mechanisms of psychological analgesia (the use of coping strategies) or merely endured.

The lack of a clear and simple relationship between analgesic use and levels of labour pain, found in this study, make it unwise to consider analgesic use as a substitute variable for pain intensity in childbirth research.

The last two chapters have considered the relationship between a number of non-psychological variables and levels of labour pain. The remainder of this thesis will be concerned with psychological factors. Their relationship to labour pain will however be considered in the light of the information gained thus far on the influence of obstetric and pharmacological factors.

PART 2

CHAPTER 3 - PSYCHOLOGICAL FACTORS

2.3 1 GENERAL INTRODUCTION

In this chapter four of the psychological factors examined in this study and their relationship to labour pain will be discussed. Factors related to previous pain experience will be discussed in the following chapter. These factors are desirability of pregnancy, expectations of childbirth, ante-natal training and the presence of the husband at the birth. Their relationship to labour pain may be confounded by the effects of obstetric variables already delineated in Chapters 1 and 2 (ie by the effect of those variables which have been shown to be significantly related to levels of labour pain - referred to hereafter as 'predictive obstetric variables'). Consequently potential interactions between psychological and predictive obstetric variables will be examined.

2 3 2 THE DESIRABILITY OF PREGNANCY

2.3 2 1 INTRODUCTION

Research into the relationship between the desirability of pregnancy, assessed during pregnancy, and the intensity of labour pain, has generally found a negative relationship between the two (Eysenck, 1961, Chertok, 1969, Nettlebladt et al, 1976). The design of this study did not permit pre-natal contact with subjects but instead allowed subjects to give a retrospective overall evaluation of how desirable the pregnancy had been. As noted in 1 4 2, data on the desirability of pregnancy was collected in the second post-natal interview (see 3 1 2.) The number of subjects who responded to questions on the desirability of pregnancy was 29.

2 3 2 2 RESULTS

The mean desirability of pregnancy was 7.3 (on a 1-10 scale), range 3 to 9. Subject's reports of the desirability of their pregnancy were negatively correlated with the intensity of labour pain. The level of correlation achieved marginal significance on the Affective, recall measure of pain only ($r = -0.33$, $N = 29$, $p < 0.1 > 0.05$). Parity was not significantly related to the desirability of pregnancy ($r = -0.16$) nor were any of the predictive obstetric variables (all probability levels associated with the tests of these relationships were greater than 0.24).

2 3 2 3 DISCUSSION

There was a considerable range of desirability reported. This suggested that post-partum subjects could still contemplate (and report) a less than enthusiastic attitude to pregnancy while appearing to be wholeheartedly enthusiastic about the product of that pregnancy. The small number of subjects who responded to questions regarding the desirability of pregnancy does not reflect a general unwillingness to answer the relevant questions, but rather the operation of time constraints. These questions were the last in the second post-natal questionnaire. The relationship between high (Affective) pain scores and a relatively undesirable pregnancy replicates other findings (Eysenck, 1961, Nettlebladt et al, 1976) which were based on pre-natal assessment. This relationship was only marginally significant and an undesirable pregnancy was not related to overall pain intensity, so its effect was not as extensive as the results of these studies might predict.

2 3 3 EXPECTATIONS OF CHILDBIRTH

2 3 3 1 INTRODUCTION

Empirical pain research has demonstrated an association between negative expectations and high levels of pain (Hall and Stride, 1954, Johnson, 1973, Leventhal et al, 1979) Such research has utilised a variety of noxious stimuli both experimentally induced, eg electric shock (Hall and Stride, 1954) and occurring in "real life", eg Johnson (1973) who used the passing of an Endoscope If these situations can be considered analagous to childbirth then a similar relationship between expectations and pain would be predicted

However, a woman's expectations of childbirth may be affected by a number of factors, eg her own previous experience of childbirth, if any, the experiences of those close to her, particularly her own mother (Deutsch, 1947) and the influence of her culture - the Old Wives' tales, the Hollywood heroines clutching the bedpost in agony, the Biblical tradition - "In pain thou shalt bring forth children" These factors are unlikely to have influenced the expectations of those concerned with the experience of experimentally induced pain or of endoscopy Therefore the relationship between expectations of labour and labour pain may not replicate previous findings Furthermore animal experiments on the relationship between expectancy and magnitude of response to noxious stimuli have found that this relationship was complex, depending, even in strictly controlled laboratory conditions, on a number of factors including the accuracy of the expectations (Epstein, 1973).

2.3 3 2 RESULTS

No subjects reported that they had felt completely "confident", "eager" or "excited" by the prospect of giving birth 33 subjects reported that they had felt "fairly confident", 19 subjects had "mixed feelings" (1e

reported both positive and negative expectations), 28 subjects had been "fearful" and 15 subjects had felt "terrified". There was a positive correlation demonstrated overall between the degree of fearfulness felt and the intensity of labour pain (see Table 2.3 1.). There was no significant relationship between expectations of birth and parity ($F(1,95) = 0.04$ $p = 0.84$) nor with the amount of pain suffered in previous births (all correlations were less than 0.08) or with previous miscarriage ($r = -0.10$). The desirability of pregnancy was not significantly related to expectations of childbirth ($r = 0.28$ $N = 29$ $p < 0.1 > 0.05$). Predictive obstetric factors were not significantly related to expectations of childbirth (all probability levels were greater than 0.32).

Subjects' expectations of birth were not generally accurate, 86% of subjects reporting that their labour had differed from their expectations of it (54% of Primips, 32% of Multips, $\chi^2 = 1.9$ $df = 1$ $p = 0.16$). Subjects who had accurate expectations had lower levels of labour pain on average than subjects who found labour to be either "better than expected", or "worse than expected" or "different from expected" (see Fig 2.3.1). Subjects who had accurate expectations had significantly lower levels of labour pain than subjects with inaccurate expectations (better, worse and different combined) on the Evaluative recall measure of pain only.

Accurate = 1.4 SD 1.3 Inaccurate = 2.5 SD 1.6 $F(1,90) = 2.81$ $p(1 \text{ tail}) < 0.05$

2.3.3.3 DISCUSSION

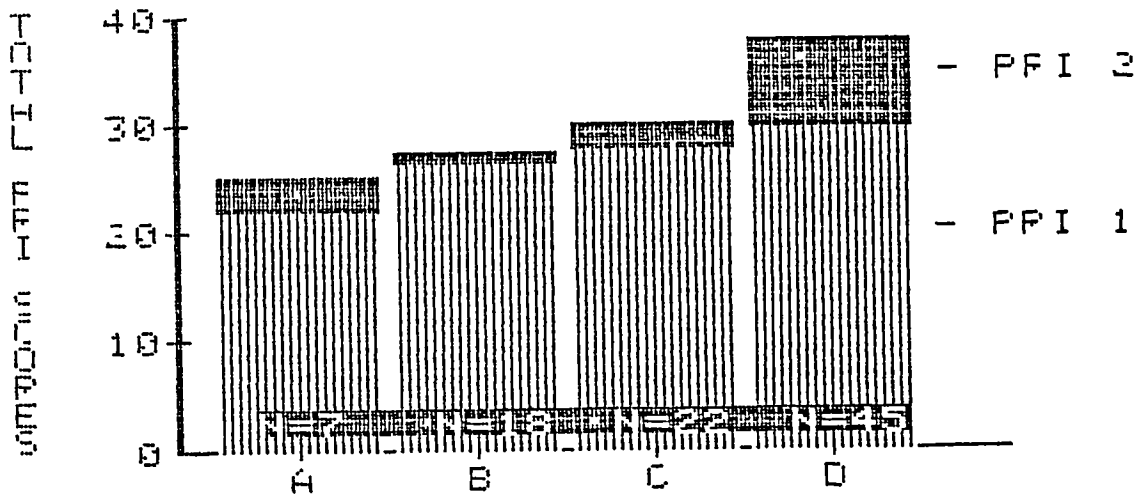
In general positive expectations of childbirth were associated with less pain in childbirth. This finding supports the results of experimental pain research which has shown similarly beneficial consequences of good

Table 2 3 1 Correlations between expectations of childbirth and levels of labour pain

LABOUR PAIN MEASURE	N	r	p	
Sensory 1	95	0 14	NS	+Expectations were scored
Affective 1	95	0 18	<0 1	as - fairly confident = 1
Evaluative 1	95	0 11	NS	mixed feelings = 2
Total PRI 1	95	0 18	<0 1	fearful = 3
PPI 1	92	0 22	<0 05*	terrified = 4
VA 1	71	0 14	NS	
Sensory 2	90	0 24	<0 05*	
Affective 2	90	0 14	NS	
Evaluative 2	90	0 13	NS	
Total PRI 2	90	0 24	<0 05*	
PPI 2	89	0 15	NS	
VA 2	82	0 11	NS	

Abbreviations as in Table 1 3 2

Fig 2 3 1 Levels of labour pain and experience of subjects compared with expectations of birth



A = as expected

B = differed from expectations

C = better than expected

D = worse than expected

expectations (Hall and Stride, 1954, Johnson, 1973, Leventhal et al, 1979) However, the accuracy of the subjects' expectations was also of importance, an accurate expectation being related to lower levels of labour pain than an inaccurate one even when the inaccurate expectation had been a positive one (generally associated with less labour pain) or when the positiveness of the experience had confounded negative expectations This finding is supported by the results of a study carried out by Astbury (1980b) which showed that accurate expectations of the procedures involved in childbirth (induction, mode of delivery, etc.) were related to lower levels of labour pain, and to studies involving pain unrelated to childbirth which have concluded that congruence between expected and experienced sensations is responsible for lowering pain distress levels (Johnson, 1975) and the magnitude of reaction to noxious stimulation (Epstein, 1973)

Negative expectations appeared to be unrelated to previous negative experiences - intense pain in previous births, previous miscarriage

Accurate expectations were related to parity, Primips not surprisingly being less accurate in the expectations than Multips. The very small number of subjects reporting that labour was "as expected" is notable, reflecting no doubt the fact that childbirth is a remarkably unpredictable event The inaccuracy of subjects' expectations may also indicate some deficiency in the preparation for childbirth provided by antenatal classes, a lack of preparation which seemed to be particularly distressing for some subjects "Why didn't anyone tell me" (. what it would be like) was a heartfelt cry frequently encountered in the postnatal wards' Unrealistically high expectations of childbirth led it seemed to unrealistic expectations of coping ability. These were sometime

dramatically contradicted with unfortunate consequences - feelings of anger, embarrassment and failure were very apparent in a number of subjects. The formation of realistic expectations may be difficult to encourage in some subjects as research on preparation for surgery has shown (Andrew, 1970). Furthermore the nature of childbirth may proscribe it. However it is a factor which should be actively considered by those involved in preparing women for childbirth, particularly those women who have had no personal experiences to base their expectations on.

2 3 4 ANTE-NATAL TRAINING

2 3 4 1 INTRODUCTION

Subjects who participated in this study had, like all British parturants, the opportunity to attend ante-natal classes run by the NHS, which are designed to educate the participants about pregnancy, birth and childcare and to train them in psychoprophalactic methods of coping with labour pain. These methods primarily emphasise relaxation and the use of structured breathing techniques though individual trainers may teach other methods of coping with pain, eg through distraction. The techniques taught in these classes differ somewhat from those taught in North America as does the rationale for, and the implementation of, this teaching (see 1 1 4). In North America such training is known as prepared childbirth training, a term which is used extensively in the literature, while in Britain it is often called ante-natal or psychoprophalactic training. PCT classes based on the North American model are run in Britain by the National Childbirth Trust (NCT) and are widely available to parturants though less commonly used than their NHS equivalent.

As discussed in 1 1 4., the evidence on the effectiveness of PCT is .

Table 2 3 2. The relationship between ante-natal class attendance and levels of labour pain

LABOUR PAIN MEASURE	ANTE-NATAL CLASS ATTEND			NO ANTE-NATAL CLASS ATTEND			F	p
	N	SD	N	SD	F			
Sensory 1	77	19 7	20	20 1	9 6	0 04	0.85	
Affective 1	77	3 5	20	6 3	5 4	9 11	0.003**	
Evaluative 1	77	2 3	20	2 4	1 9	0.03	0.86	
Total PRI 1	77	25 6	20	28 9	14 9	1.28	0 26	
PPI 1	74	2 6	18	2 5	1 1	0 03	0.85	
VA 1	62	5 4	14	5 9	2 4	0 39	0.53	
Sensory 2	75	23 2	19	24 0	13 1	0 07	0.78	
Affective 2	75	5 6	19	7 6	4 5	4 08	0.04*	
Evaluative 2	75	3 1	19	3 6	1 6	1 44	0 23	
Total PRI 2	75	31 7	19	35 3	18 1	0 96	0 32	
PPI 2	74	3 1	19	2 8	1 2	0 91	0 34	
VA 2	66	7 9	15	8 1	1 7	0 19	0 66	

Abbreviations as in Table 1 3 2

*

conflicting, especially when labour pain is employed as the dependent variable rather than some more general evaluation of the positiveness of the birth experience. The results of this study should indicate whether or not ante-natal training, as carried out in Britain, is associated with lower levels of labour pain assessed in detail during labour and post-natally.

2 3 4 2 RESULTS

77 subjects attended ante-natal classes, 18 during previous confinements, not during the current pregnancy. The majority of these subjects attended the classes run by the Infirmary. 74 subjects attended NHS classes. 4 subjects attended NCT classes (ie 1 subject attended both). Ante-natal class attendance was associated with significantly lower levels of Affective pain. The overall intensity of labour pain was not significantly reduced (see Table 2 3 2). Ante-natal training completed in the current pregnancy was similarly associated with lower levels of Affective pain (see Table 2 3 3).

Table 2 3 3 Levels of labour pain and current, or previous, ante-natal class attendance

MPQ SCORE	CURRENT CLASS ATTEN	PREVIOUS CLASS ATTEN	NO CLASS ATTEND	df	F	p
Affective 1	3 31	4 22	6 30	2,94	5 0	0 008* ¹
Affective 2	5 31	6 82	7 6	2,94	3 1	0 04*

Subjects who attended ante-natal classes in the current pregnancy had significantly lower levels of Affective pain assessed in the first stage of labour than subjects who had attended no classes ($t = 3.16$ $df = 94$ $p = 0.002$).

Attendance at ante-natal classes was marginally associated with Entonox use ($\chi^2 = 3.5$ $df = 2$ $p < 0.1 > 0.05$). It was significantly associated with parity when current versus previous attendance was considered ($\chi^2 = 10.7$ $df = 2$ $p < 0.001$) but not when overall attendance was considered ($\chi^2 = 0.4$ $df = 1$ $p = 0.51$). Overall attendance was not significantly associated with any other predictive obstetric variables (all probability levels were greater than 0.30).

Attendance was strongly related to social class and to age (see Table 2.3.4.).

Table 2.3.4. The relationship between attendance at ante-natal classes and social class and age

	ANTE-NATAL CLASSES	SD	NO ANTE- NATAL CLASSES	SD	df	F	p
\bar{X} of social class category	3.3	0.9	4.3	0.7	1,96	20.6	<0.0001***
Age	26.8	5.1	23.3	5.3	1,96	7.0	0.009**

Positive expectations of birth were marginally related to attendance ($F(1,95) = 2.24$ $p < 0.1 > 0.05$) but accurate expectations were not ($\chi^2 = 0.12$ $df = 1$ $p = 0.72$). An analysis of co-variance controlling for the effects of class, age and expectations showed that some significant relationship between ante-natal class attendance and lower levels of Affective pain, recorded in the first stage of labour still remained, unaffected by these confounding variables (see Table 2.3.5.).

Table 2 3 5 Levels of labour pain and ante-natal class attendance
(Age, social class and expectations of birth as co-variables)

LABOUR PAIN MEASURE	+ANTE-NATAL CLASS ATTEND	NO ANTE-NATAL CLASS ATTEND	df	t	p
Sensory 1	19 8	20 0	89	0 09	0 92
Affective 1	3 6	5 7	89	2 02	0 04*
Evaluative 1	2 3	2 5	89	0 30	0 76
Total PRI 1	25 7	28 2	89	0 76	0 44
PPI 1	2 6	2 4	84	-0 61	0 53
VA 1	5 4	6 0	69	0 70	0 48
Sensory 2	23 7	21 9	86	-0 60	0 54
Affective 2	5 9	6 7	86	0 79	0 43
Evaluative 2	3 1	3 5	86	0 60	0 48
Total PRI 2	32 4	32 1	86	-0 05	0 95
PPI 2	3 1	2 8	85	-0 88	0 37
VA 2	7 9	8 0	73	0 21	0 83

+Adjusted group means

Abbreviations as in Table 1 3 2

2 3 4 3 DISCUSSION

The results of this study showed that attendance at ante-natal classes was associated with a reduction in the Affective dimension of labour pain, not in its overall intensity, ie on average subjects who had attended ante-natal classes and had therefore received instruction in the use of psychoprophalactic techniques, experienced pain which was less dreadful, nasty or frightening - had less negative affective properties - than subjects who had not attended the classes. They also had less negative expectations

The number of subjects who attended ante-natal classes was comparatively high. The figures for a Glasgow hospital of comparative size are approximately 30% (personal communication Principal Physiotherapist, Glasgow Royal Maternity Hospital). They still however demonstrated the strong social class and age bias which has been reported elsewhere (Beck and Seigel, 1980). This might lead us to question the nature of the group who did not attend the classes. It has been hypothesised that PCT is effective in modulating labour pain not because of the nature of the training, but because of the nature of the participants which would lead them to have less pain in labour anyway (Beck and Seigel, 1980). The subjects who attended classes were younger and of a higher social class than subjects who did not attend classes. They also had more positive expectations of birth, an attitude which may have resulted from class attendance, but may also have predisposed them towards it. Statistical control of the effects of these factors indicated that some relationship between ante-natal training and lower levels of Affective pain exists irrespective of the constitution of the classes in terms of age, class and expectations

The results of this study disagreed with those of a number of studies (Cogan, Henneborn and Klopfer, 1975a,b, 1976) which have shown an association between PCT and very low levels of pain in childbirth, the subjects using no supplementary pharmacological analgesia. These studies exclusively utilised subjects who had attended one particular form of ante-natal class (run by the Childbirth Without Pain League). Studies which used a less selective subject population (Melzack et al, 1981, 1984, Worthington, 1982) have found, as did this study, that the pain modulation achieved by subjects who had undergone ante-natal training was significant but not extensive, and that subjects supplemented the analgesia obtained through use of psychoprophalactic techniques with pharmacological analgesics. The results of this study would therefore suggest that ante-natal training, as carried out in Britain, is effective in reducing the Affective dimension of labour pain. It does not produce painless childbirth.

The means by which this partial modulation of pain was achieved have not been examined here. Details of the specific techniques used by subjects to cope with labour pain are given in Part 3. The relationship between the use of these strategies and attendance at ante-natal classes is discussed there.

2 3 5. THE PRESENCE OF THE HUSBAND

2 3 5 1 INTRODUCTION

Husbands or other chosen birth companions (referred to hereafter as 'husbands') are encouraged to be present at births which take place in SRI as discussed in 1 1 4. This practice is now widespread and is generally regarded as a positive feature of modern hospitalised birth.

(Kitzinger, 1979, Myles, 1981) The form that this companionship takes can vary widely according to obstetric practice, ante-natal or prepared childbirth training, and of course, according to the inclinations of the couple themselves. In SRI no specific role was assigned to the husband by the staff or ante-natal trainers, though some midwives encouraged their more active involvement than others.

2 3 5 2 RESULTS

79 subjects had their husbands with them throughout the major part of labour and delivery (ie they were only absent for a small proportion of the time, or during the earlier part of the first stage of labour). These subjects did not report significantly lower levels of labour pain (see Table 2 3 6.) The husband's presence was not significantly associated with any of the predictive obstetric variables (all probability levels were greater than 0.2). The desirability of pregnancy was marginally related to the presence of the husband ($F(1,27) = 2.52$ $p = 0.12$), his presence being more likely if the pregnancy was highly desired. Positive expectations of birth were also marginally related to his presence ($F(1,95) = 2.07$ $p < 0.1 > 0.05$) but accurate expectations were not ($\chi^2 = 0.28$ $df = 1$ $p = 0.59$). Ante-natal class attendance was marginally related to the husband's presence ($\chi^2 = 3.4$ $df = 1$ $p = 0.06$).

60 of the subjects whose husbands had accompanied them in labour reported that his presence had been generally helpful (ie not that it had specifically helped them to cope with the pain, see Fig 1 2 2). These subjects recorded on average lower labour pain scores than either subjects who had no chosen companion with them, or whose husbands were with them but were not perceived as being of help (see Fig 2 3 2). When the pain levels

Table 2 3 6 Level of labour pain in subjects accompanied or not accompanied by their husbands

MPQ MEASURE	N	HP	SD	N	HA	SD	F	p
Sensory 1	80	19 5	7 8	21	22 4	9 8	2 1	0 15
Affective 1	80	3 9	3 8	21	5 2	4 1	1 7	0 20
Evaluative 1	80	2 4	1 6	21	2 2	2 0	0 2	0 62
Total PRI 1	80	25 9	11 1	21	30 4	14 6	2 3	0 23
PPI 1	75	2 5	1 0	21	2 9	1 2	2 2	0 14
VA 1	59	5 5	2 3	20	5 6	2 4	0 10	0 75
Sensory 2	77	23 1	10 3	17	24 4	10 8	0 2	0 65
Affective 2	77	5 8	3 8	17	7 0	4 3	1 3	0 26
Evaluative 2	77	3 2	1 6	17	3 0	2 0	0 3	0 57
Total PRI 2	77	32 0	13 9	17	34 5	15 1	0 4	0 51
PPI 2	76	3 1	1 2	17	2 9	1 0	0 3	0 61
VA 2	68	7 9	1 7	14	8 0	1 8	0 00	0 94

HP = Husband present

HA = Husband absent

Abbreviations as in Table 1 3 2

Fig. 2.3.2. Levels of labour pain and presence and helpfulness of the husband

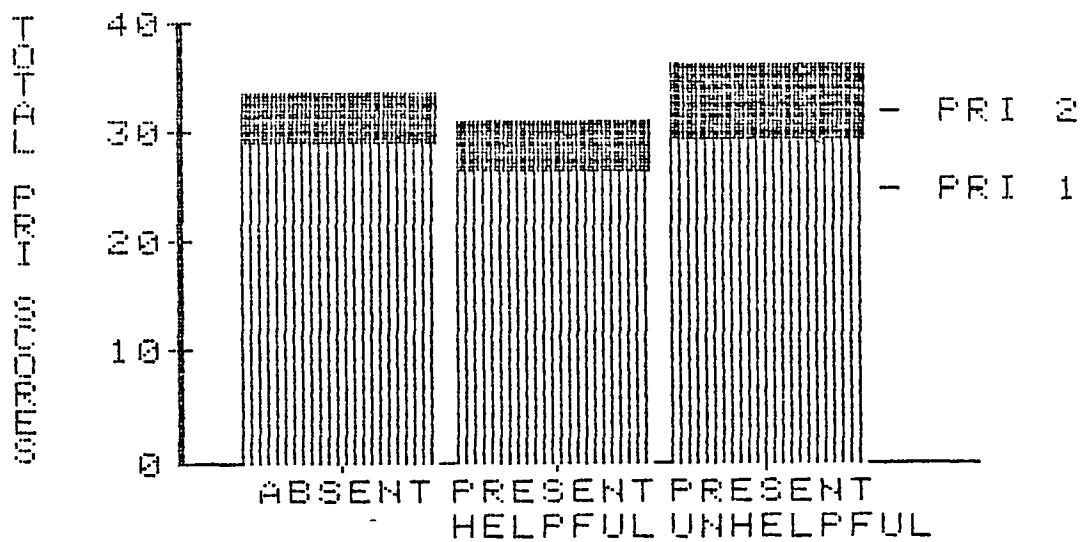


Table 2 3 7. Levels of labour pain in subjects accompanied by 'helpful' husbands (HHP) compared with those of all other subjects

MPQ MEASURE	HHP* (n=60)		OTHERS (n=38)		F	p
	Mean	SD	Mean	SD		
Sensory 1	19.3	7.0	20.9	9.8	0.90	0.34
Affective 1	3.7	3.5	5.0	4.3	2.62	0.10 ^{tr}
Evaluative 1	2.3	1.6	2.4	1.6	0.02	0.89
Total PRI 1	25.3	10.0	28.5	14.2	1.75	0.18
PPI 1	2.4	0.9	2.8	1.2	3.95	0.04*
VA 1	5.6	2.3	5.4	2.4	0.14	0.71
Sensory 2	22.7	10.3	24.4	10.4	0.58	0.44
Affective 2	5.5	3.6	6.9	4.2	2.53	0.10 ^{tr}
Evaluative 2	3.0	1.7	3.4	1.5	1.14	0.28
Total PRI 2	31.2	13.8	34.6	14.5	1.27	0.26
PPI 2	2.9	1.2	3.3	1.1	2.98	0.08 ^{tr}
VA 2	8.0	1.5	7.8	1.9	0.20	0.65

HHP* Helpful husband present
Abbreviations as in Table 1 3 2

of the subjects who had been accompanied by 'helpful husbands' were compared with those of the remaining subjects they were found to be significantly lower on the Affective and PPI measures of the MPQ recorded during the first stage of labour, and on the Affective and PPI recall measures (see Table 2 3 7)

2 3 5 3 DISCUSSION

The mere presence of the husband, or chosen birth companion, was not associated with lower levels of labour pain. This finding is in agreement with those of Nettlebladt et al (1976) but not with those of Henneborn and Cogan (1975) and Cogan and Henneborn (1976) who reported that accompanied subjects had significantly lower levels of labour pain than unaccompanied subjects. In contrast Melzack, in the 1984 John J Bonica Memorial Lecture, entitled "The Myth of Painless Childbirth" (Melzack, 1984) reported that significantly higher levels of pain, as assessed on the MPQ have been recorded when the husband was present at the time of pain assessment than when he was absent (Wallach, 1982, Melzack, 1984). He surmised that one possible explanation for this effect was that the subjects were exaggerating their pain in order to express anger at their husbands. This is a hypothesis which is quite commonly expressed by midwives - that women complain more about labour pain when their husbands are present in order to impress them, or to make them feel guilty, "After all it was his fault that she got into this mess in the first place". Such an effect, if generally found, would call into question not only the validity of labour pain assessment but also the helpfulness of the husband's presence at childbirth, and the quality of the average relationship between the husband and the woman giving birth to his child.

There was no evidence of such an effect in this study. Subjects reported generally lower levels of labour pain when their husbands were with them at the time of pain assessment (see Table 2.3.6). When asked about their response to their husband's presence the majority of subjects reported its helpfulness in very positive terms, comments such as, "It made the whole thing much more wonderful, having him there" "I fell in love with him all over again" being fairly typical. Of the 19 subjects who reported that their husband's presence had not been helpful, only one advanced an explanation which was suggestive of anger. The remaining subjects (all of whom spontaneously offered an explanation) said that his presence made them anxious (N=8), because he might feel ill, uncomfortable, or upset by her suffering, or should be at home "looking after the other kids", that his presence was immaterial, since "I was too dopey to notice" (N=6), or that they preferred to cope with childbirth, as with other things in life, by themselves (N=7). These statements may have been post-hoc rationalisations, but as they were made in the minority of cases do not suggest that the average effect of the husband's presence was to arouse hostility in the parturient and exaggerate her pain scores.

2.3.6 GENERAL DISCUSSION

The relationship between the occurrence of psychological factors detailed in this chapter and the intensity of labour pain is summarised in Table 2.3.8. The majority of factors examined showed some significant association with levels of labour pain, supporting the findings of others (cited in 1.1.4) that variation in psychological factors is associated with differences in the intensity of labour pain. The detailed assessment of sub-components of pain experience made possible by the MPQ

Table 2 3 8 Summary table

Psychological factors significantly related to levels of labour pain	Psychological factors not significantly related to levels of labour pain
Desirability of pregnancy (Affective only)	The presence of the husband
Expectations of birth	
Accurate expectations (Evaluative only)	
Ante-natal training (Affective only)	
The 'helpful' presence of the husband	

showed that a number of these factors were involved in modulating the non-sensory aspects of labour pain, rather than its overall intensity. The subtlety of this modulation may explain some of the conflicting findings which have characterised research into the relationship between psychological factors and labour pain, many previous studies having assessed only the overall intensity of labour pain.

The results of this study have clarified the relationship between antenatal training and levels of labour pain, and between the presence of the husband at the birth and levels of labour pain in a representative sample of British parturants. Since these variables are subject to strong cultural effects and as most previously published work has been carried out in other cultures, such clarification should be helpful to those concerned with childbirth in Britain.

There were few significant associations found between the psychological factors examined in this chapter and predictive obstetric variables.

The apparently all pervading nature of factors such as parity leads to an expectation of multiple psychological/obstetric interactions. Research on the effects of PCT has also claimed that the use of psychoprophalaxis can reduce the duration of labour (Shapiro and Schmitt, 1973) and the rate of birth complications (Flowers, 1962), i.e. that psychological factors can modulate the mechanisms of childbirth. There was no evidence of such effects in this study. Therefore the results of this study, like those of a number of other studies (Nettlebladt et al, 1976, Melzack et al, 1981, 1984, Worthington, 1982, Melzack, 1984) have failed to replicate the findings of these previous studies. The findings of these PCT studies may however have been compounded by the effects of variables such as the age or social class of the subjects or by differential patterns

of analgesic use (Beck and Seigel, 1980) Variability in obstetric factors was not related to differences in psychological factors The processes of childbirth could hardly alter the desirability of pregnancy, expectations of birth, the presence of the husband, or attendance at ante-natal classes since these events preceeded the birth Thus the lack of interaction between the specified obstetric and psychological variables should not be taken as evidence of a general lack of association between psychological and non-psychological variables in childbirth It does indicate that the relationships found between psychological factors and lower levels of labour pain were not due to underlying differences in levels of noxious stimulation but depended on the modulation of its transmission

PART 2

CHAPTER 4 - PREVIOUS EXPERIENCE OF PAIN

2 4 1 INTRODUCTION

This chapter will investigate the pain histories of the subjects and relate the intensity of previous pain experience to levels of pain in childbirth

Sensitivity to pain is widely assumed to vary from person to person and to be relatively stable from one occasion of noxious stimulation to another (Hardy et al, 1952), though studies of individual thresholds to experimentally induced pain have found stable thresholds difficult to demonstrate empirically (Beecher, 1959) Thus, though individuals must differ in the amount of noxious stimulation they have encountered in life, in general it might be held that subjects who had previously experienced severe pain would also experience severe pain in labour since their sensitivity to noxious stimulation would be the same on all occasions The tendency to complain of pain would also be expected to be consistent (Petrie, 1967, Sternbach, 1968) so that subjects who would report intense previous pain experiences would also report high levels of pain in labour The intensity of previously experienced pain related to childbirth, such as that occurring during previous births or miscarriages or during pregnancy, might be positively correlated with the intensity of pain experienced during a current birth If a woman had experienced a lot of pain on such occasions then she would expect and fear that the same thing would happen again, these expectations and anxieties tending to facilitate the transmission of noxious stimulation A similar relationship might be thought to exist between the previous experience of pain unrelated to childbirth (eg headache, backache, pain related to injury or surgery) and the experience of labour pain Thus there are a number of reasons to assume that

the relationship between the intensity of previous pain and the intensity of labour pain would be positive

However, it might alternatively be argued that a person who had never experienced severe pain would be more distressed, shocked and frightened by an experience of intense noxious stimulation, such as occurs during childbirth, than a person who had previously suffered such experience. This distress, etc would tend to exacerbate pain levels occurring during childbirth and thus render the relationship between previous pain experience and labour pain experience negative, not positive Collins (1965) found that subjects (soldiers) who had been very protected during childhood tended to complain more of experimentally induced pain in adulthood than subjects who had been more independent in childhood Their distress might have been due to their minimal previous pain experience (Sternbach, 1968) A study conducted by Scott and Gijbers (1981) on the pain perception of competitive swimmers showed that the more highly competitive swimmers tolerated experimentally induced pain better than those who were less competitive As the training of all the swimmers progressed (involving regular experience of intense pain going through the so-called 'pain barrier' in their daily swimming sessions) so their tolerance of experimentally induced ischaemic pain increased The authors concluded that both the superior tolerance of the more highly competitive swimmers and the improvement in tolerance which accompanied training could be related to the previous experience of intense pain, this experience modulating subsequent reports or experiences of pain The modulation of their pain it was held, may have been influenced by some sort of short term neurohormonal adaptation to pain as well as by psychological factors such as anxiety (Scott and Gijbers, 1981) These findings would thus support the contention that the relationship between previous pain

experience and levels of labour pain, would be negative, not positive

2 4 2 RESULTS

2 4 2 1 PREVIOUS PAIN RELATED TO CHILDBIRTH

The intensity of pain experienced in previous births (and in stillbirths) measured on the VAS ranged from 1 to 9, with a mean of 6. It was positively correlated with the intensity of pain experienced in the current birth. Subjects who had given birth once before (Para 2) reported labour pain levels in the current birth which correlated significantly with those of their previous births on the Affective, Total PRI and PPI measures of the MPQ recorded post-natally. The significance level of the correlation coefficients in Multips who had given birth more than twice (Para <2) was higher and extended to a number of MPQ 1 and 2 measures and to VA 2 (see Table 2 4 1). The intensity of previous labour pain was not significantly associated with negative expectations of birth (Para 2 $r = 0.12$ $N = 34$ $p > 0.1$ Para <2 $r = -0.08$ $N = 16$ $p > 0.1$) or an unenthusiastic attitude to pregnancy (Para 2 $r = -0.27$ $N = 11$ $p > 0.1$ Para <2 $r = 0.21$ $N = 5$ $p > 0.1$).

38 out of the total sample of subjects experienced some degree of pain (not discomfort) during pregnancy. Its average intensity was 4.5, ranging from 0.5 to 9.5. The intensity of this pain (at its most severe) was positively correlated with the intensity of pain they experienced during childbirth (see Table 2 4 2). Thus there was a positive relationship between the intensity of previous pain, related to childbirth, and the intensity of pain experienced in the current birth. The intensity of pregnancy pain correlated positively but not significantly with negative expectations of birth ($r = 0.23$ $N = 38$ $p > 0.1$). It was negatively and significantly correlated with the desirability of pregnancy, i.e., the more the pain the less desirable the pregnancy ($r = -0.64$ $N = 12$ $p < 0.02$). The intensity of pain suffered in pregnancy was not significantly related to

Table 2 4 1 Correlations between the intensity of pain experienced in previous births and the intensity of pain experienced in the current birth

LABOUR PAIN MEASURE	N	r	p
<u>Subjects who had only one previous birth</u>			
Sensory 1	34	0 140	NS
Affective 1	34	0 116	NS
Evaluative 1	34	0 007	NS
Total PRI 1	34	0 141	NS
PPI 1	34	0 126	NS
VA 1	25	-0 156	NS
Sensory 2	34	0 297	<0 1
Affective 2	34	0 334	<0 05*
Evaluative 2	34	0 496	<0 01**
Total PRI 2	34	0 376	<0 05*
PPI 2	34	0 420	<0 01**
VA 2	26	0 273	NS
<u>Subjects who had two or more previous births</u>			
Correlations reported are only those which were significant			
Sensory 1	17	0 498	<0 05*
Total PRI 1	17	0 450	<0 1
Sensory 2	15	0 605	<0 01*
PPI 2	15	0 566	<0 02*
VA 2	12	0 656	<0 02*

Abbreviations as in Table 1 3 2

Table 2 4 2 Correlations between the intensity of pain experienced during pregnancy and the intensity of pain experienced in the current birth

LABOUR PAIN MEASURE	N	r	p
Sensory 1	38	0 269	NS
Affective 1	38	0 207	NS
Evaluative 1	38	0 417	<0 01
Total PRI 1	38	0 314	<0 5
PPI 1	37	0 230	NS
VA 1	28	0 236	NS
Sensory 2	36	0 302	<0 1
Affective 2	36	0 314	<0 1
Evaluative 2	36	0 341	<0 05*
Total PRI 2	36	0 356	<0 05*
PPI 2	35	0 228	NS
VA 2	32	0 145	NS

Abbreviations as in Table 1 3 2

Table 2 4 3 Varieties of pain experienced previously

*Dysmenorrhoea
Headache
Backache
Migraine
Post-operative pain (eg tonsillectomy)
Post-traumatic pain (eg fracture of digit)
Arthritic pains

*Pain varieties are listed in descending order of frequency

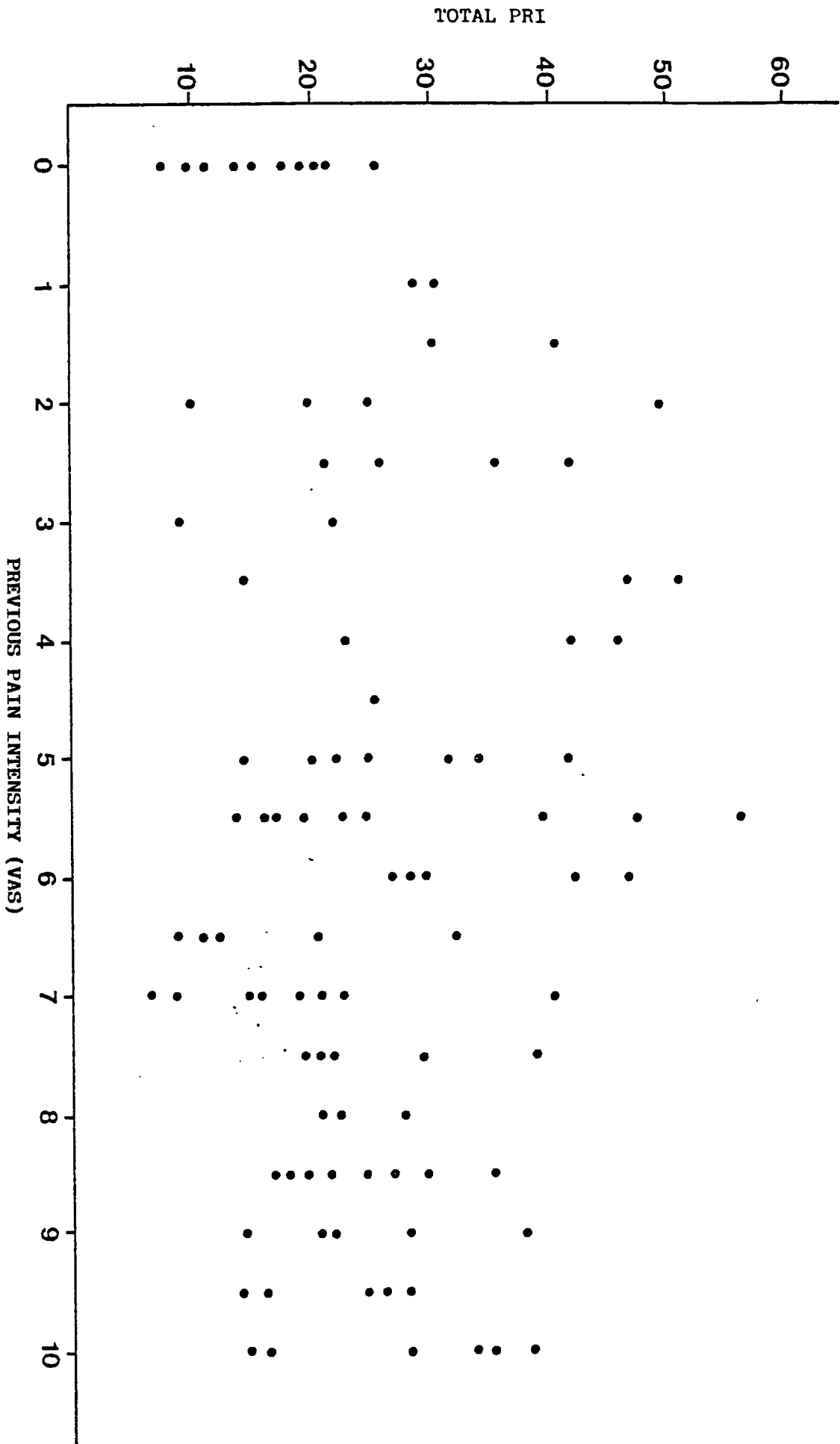


Fig. 2.4.1. Scatter plot of previous pain intensity versus Labour pain intensity

parity ($r = 0.01$) nor to any other predictive obstetric variable (all probability levels were greater than 0.53).

2.4.2.2. PREVIOUS PAIN UNRELATED TO CHILDBIRTH

The subjects of this study had encountered a wide variety of different pains (see Table 2.4.3.). The intensity of the most severe instance of previous pain unrelated to childbirth was not significantly correlated with the intensity of labour pain (see Table 2.4.4.). Fig. 2.4.1. shows that the relationship between these variables was more U shaped than linear. A small number of subjects reported no previous experience of pain unrelated to childbirth. These subjects had very low levels of labour pain. Subjects who had previously experienced moderate levels of pain had higher average levels of labour pain than subjects who had previously experienced severe pain.

The data for Primips and Multips were analysed separately; all Multips having previously experienced pain ... in labour. Previous pain experience was grouped into 3 categories - group 1, no previous pain experience (NPP), group 2, low previous pain (LPP) experience (0-6 on the VAS), group 3, high previous pain (HPP) experience (>6 on the VAS). The division between groups 2 and 3 was based on the mean of the VAS scores which corresponded approximately with the upper end of the moderate and the lower end of the severe levels as signified by the labelling on the VAS (see Fig. 2.4.2.).

Fig. 2.4.2. Numerical scaling of the VAS

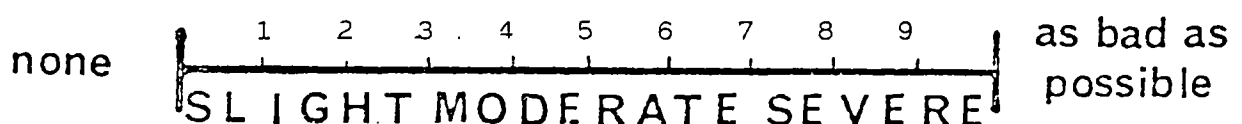


Table 2 4 4 Correlations between the intensity of previous pain unrelated to childbirth*and the intensity of pain in the current birth

LABOUR PAIN MEASURE	N	r
Sensory 1	97	-0 06
Affective 1	97	0 02
Evaluative 1	97	0 05
Total PRI 1	97	-0 02
PPI 1	92	-0 01
VA 1	76	-0 02
Sensory 2	94	0 05
Affective 2	94	0 02
Evaluative 2	94	0 07
Total PRI 2	94	0 04
PPI 2	93	0 04
VA 2	81	0 15

Critical value for r at 0 05 level of significance

with N = 70 = 0 232

N = 80 = 0 217

N = 90 = 0 205

N = 100 = 0 195

Abbreviations as in Table 1 3 2

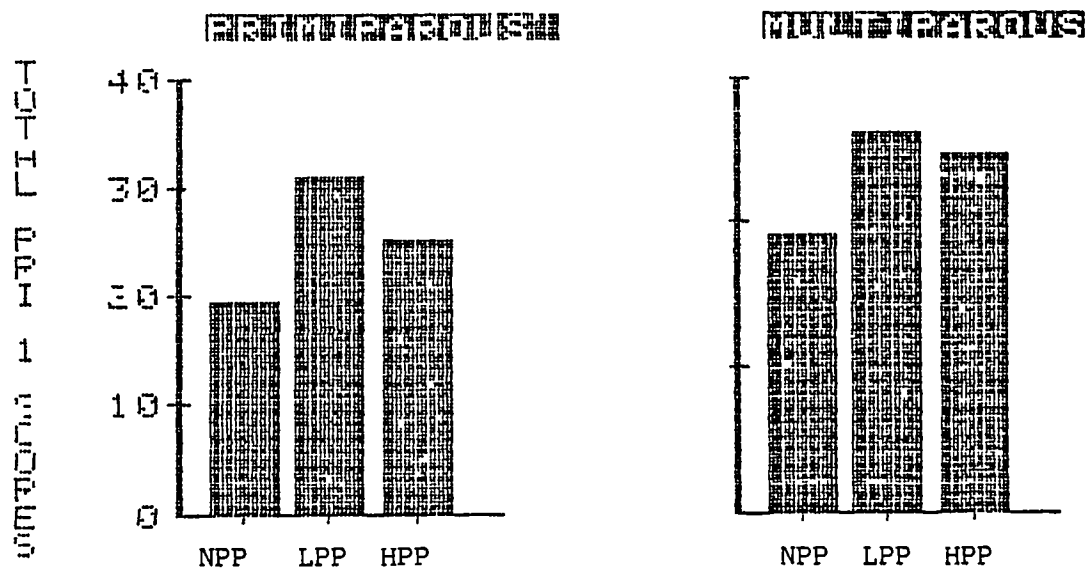
*NPP subjects were included in this analysis The intensity of their most severe instance of previous pain was scored as 0

Fig. 2.4.3. shows that the relationship between grouped previous pain intensity and labour pain intensity was strongest in Primips. Tables 2.4.5. and 2.4.6. detail the intensity of pain experienced by these subjects. Primips who had previously experienced high pain had significantly lower levels of labour pain (Sensory 1 and 2; Total PRI 2) than Primips who previously experienced low pain. Multips who had previously experienced no pain had significantly lower levels of labour pain (PPI 2) than Multips who previously experienced low pain. There were no significant differences between the multiparous low and high previous pain groups (see Table 2.4.7). Thus there was a positive relationship between no previous pain and low levels of labour pain in both Primips and Multips but a negative relationship between the intensity of previous pain (low or high) and the intensity of labour pain in Primips only.

There was a marginally significant relationship between analgesic use and previous experience of pain (see Fig. 2.4.4.). When the effects of analgesic use were controlled, using analysis of co-variance, the relationship between previous pain intensity and labour pain intensity was enhanced (see Table 2.4.7.). There was no significant association between previous pain experience and predictive obstetric variables (all probability levels were greater than 0.34). Parity was not associated with the intensity of previous pain, unrelated to childbirth ($F(1,87) = 0.16$ $p = 0.69$).

Factors which were an intrinsic part of previous pain experience were examined. The intensity of previous pain was significantly correlated with the number of types of pain previously experienced, the frequency and the stressfulness of previous pain experiences (see Table 2.4.8.). The intensity of stress associated with previous pain experience was

Fig 2 4 3 The intensity of previous pain unrelated to childbirth and levels of labour pain in Primips and Multips



NPP = No previous pain

LPP = Low previous pain

HPP = High previous pain

Table 2 4 5 Levels of labour pain and the intensity of previous pain Primips only

LABOUR PAIN MEASURE	N	NPP	SD	N	LPP	SD	N	HPP	SD	F	p
Sensory 1	6	15 6	4 8	26	23 6	8 0	26	18 8	6 2	4 76	0 01**
Affective 1	6	2 5	4 2	26	5 4	4 1	26	4 0	3 4	1 83	0 17
Evaluative 1	6	1 3	1 3	26	2 6	1 5	26	2 4	1 7	1 64	0 20
Total PRI 1	6	19 5	7 8	26	31 8	11 6	26	25 2	9 3	4 68	0 01**
PPI 1	6	2 1	0 4	25	2 8	1 1	22	2 5	1 0	1 10	0 34
VA 1	4	6 7	2 4	21	5 5	2 6	22	5 6	2 3	0 39	0 67
Sensory 2	5	16 0	9 8	24	28 5	11 2	26	21 4	7 7	5 41	0 007**
Affective 2	5	4 6	5 3	24	7 5	3 9	26	5 6	3 1	2 23	0 11
Evaluative 2	5	2 6	2 4	24	3 4	1 4	26	3 3	1 7	0 50	0 60
Total PRI 2	5	23 2	17 1	24	39 1	15 0	26	29 8	10 7	4 57	0 01**
PPI 2	5	2 0	0 7	24	3 1	1 0	25	3 0	1 1	2 27	0 11
VA 2	3	7 5	2 1	22	7 6	2 0	25	8 2	1 5	0 85	0 43

NPP = No previous pain

LPP = Low previous pain

HPP = High previous pain

For other abbreviations see Table 1 3 2

Table 2 4 6 Levels of labour pain and the intensity of previous pain Multips only

MEASURE	N	NPP	SD	N	LPP	SD	N	HPP	SD	F	p
Sensory 1	4	16 7	4 5	16	19 1	11 1	19	18 3	7 8	0 11	0 89
Affective 1	4	1 0	0 0	16	4 0	4 5	19	3 7	3 1	2 29	0 13
Evaluative 1	4	1 0	1 4	16	2 5	1 9	19	2 3	1 5	1 35	0 27
Total PRI 1	4	18 7	4 3	16	25 6	15 4	19	24 5	10 0	0 51	0 60
PPI 1	4	2 0	0 0	16	2 6	1 2	19	2 5	1 1	1 05	0 31
VA 1	4	4 5	1 1	16	6 2	1 8	19	4 9	2 6	1 43	0.25
Sensory 2	4	19 7	8 8	16	20 8	10 3	19	24 5	11 0	0 71	0 49
Affective 2	4	5 0	2 9	16	5 8	4 8	19	5 6	3 7	0 07	0 93
Evaluative 2	4	2 2	2 0	16	3 3	1 7	19	3 0	1 7	0 56	0 57
Total PRI 2	4	27 0	12 6	16	30 0	14 9	19	33 2	14 2	0 42	0 66
PPI 2	4	1 7	0 9	16	3 4	1 0	19	3 3	1 3	3 39	0 04*
VA 2	2	8 7	0 7	14	7 7	1 6	15	8 0	2 1	0 32	0 73

NPP = No previous pain

LPP = Low previous pain

HPP = High previous pain

For other abbreviations see Table 1 3 2

Table 2 4.7 Significant differences in labour pain levels for subjects with differing intensities of previous pain

LABOUR PAIN MEASURE	PRIMIPS ONLY			MULTIPS ONLY							
	PREVIOUS PAIN GROUPS	t	p	CO-VARIANT+ t	p	LABOUR PAIN MEASURE	PREVIOUS PAIN GROUPS	t	p	CO-VARIANT+ t	p
Sensory 1	NPP/LPP	2 51	0 01	2 80	0 007*	PPI 2	NPP/LPP	-2 54	0 01	-2 68	0 009*
Sensory 1	LPP/HPP	2 48	0 01	3 02	0 003*						
Total PRI 1	NPP/LPP	2 63	0 01	2 73	0 008*						
	LPP/HPP	2 29	0 02	3 05	0 003*						
Sensory 2	NPP/LPP	2 67	0 01	3 03	0 003*						
Sensory 2	LPP/HPP	2 63	0 01	2 98	0 004*						
Total PRI 2	NPP/LPP	2 43	0 01	2 68	0 009*						
	LPP/HPP	2 45	0 01	2 78	0 007*						

+ Pethidine and Entonox as co-variants
*Sig level on Bonferonni test

For other abbreviations see Table 1 3 2

Fig. 2.4.4. Previous pain and analgesic use

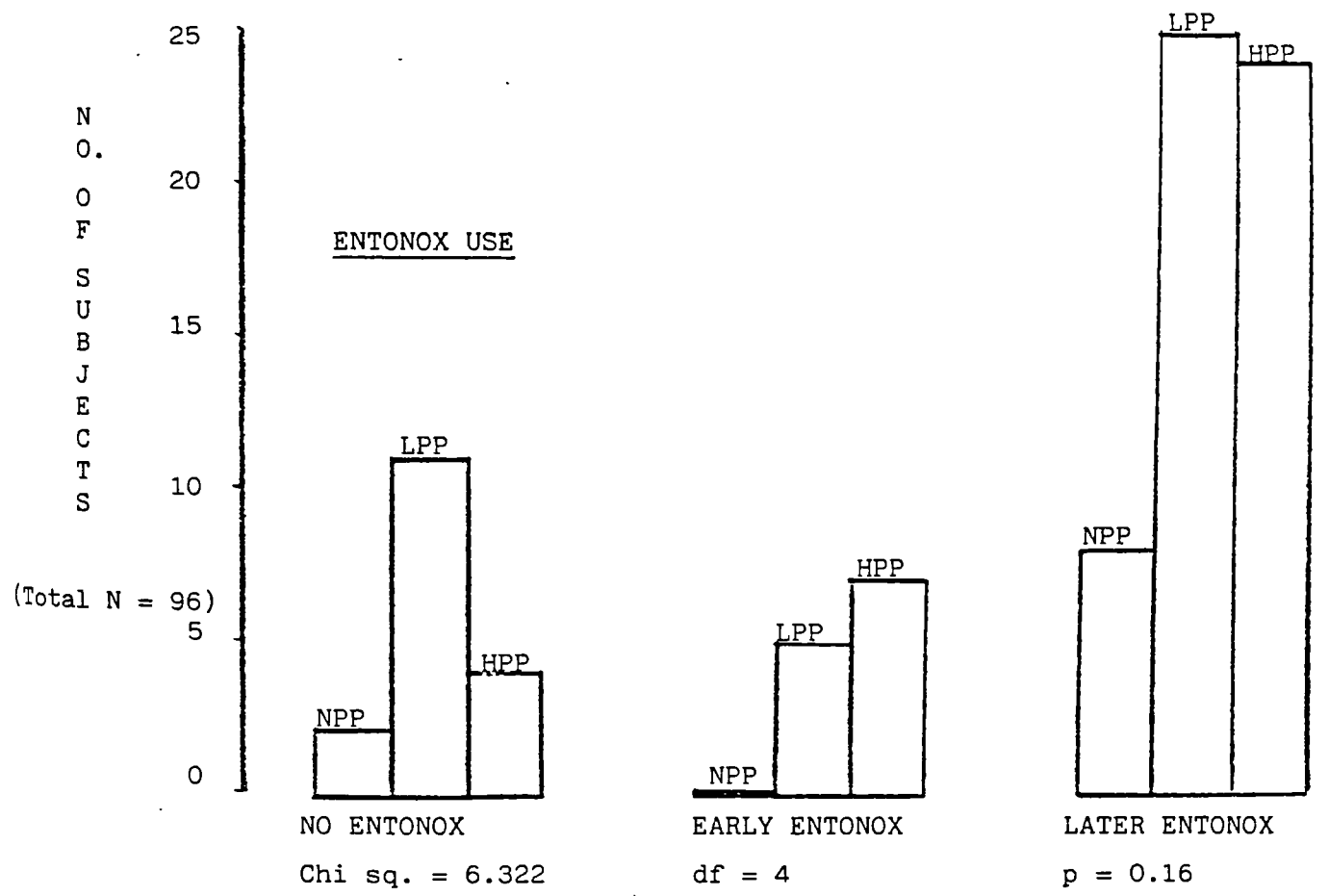
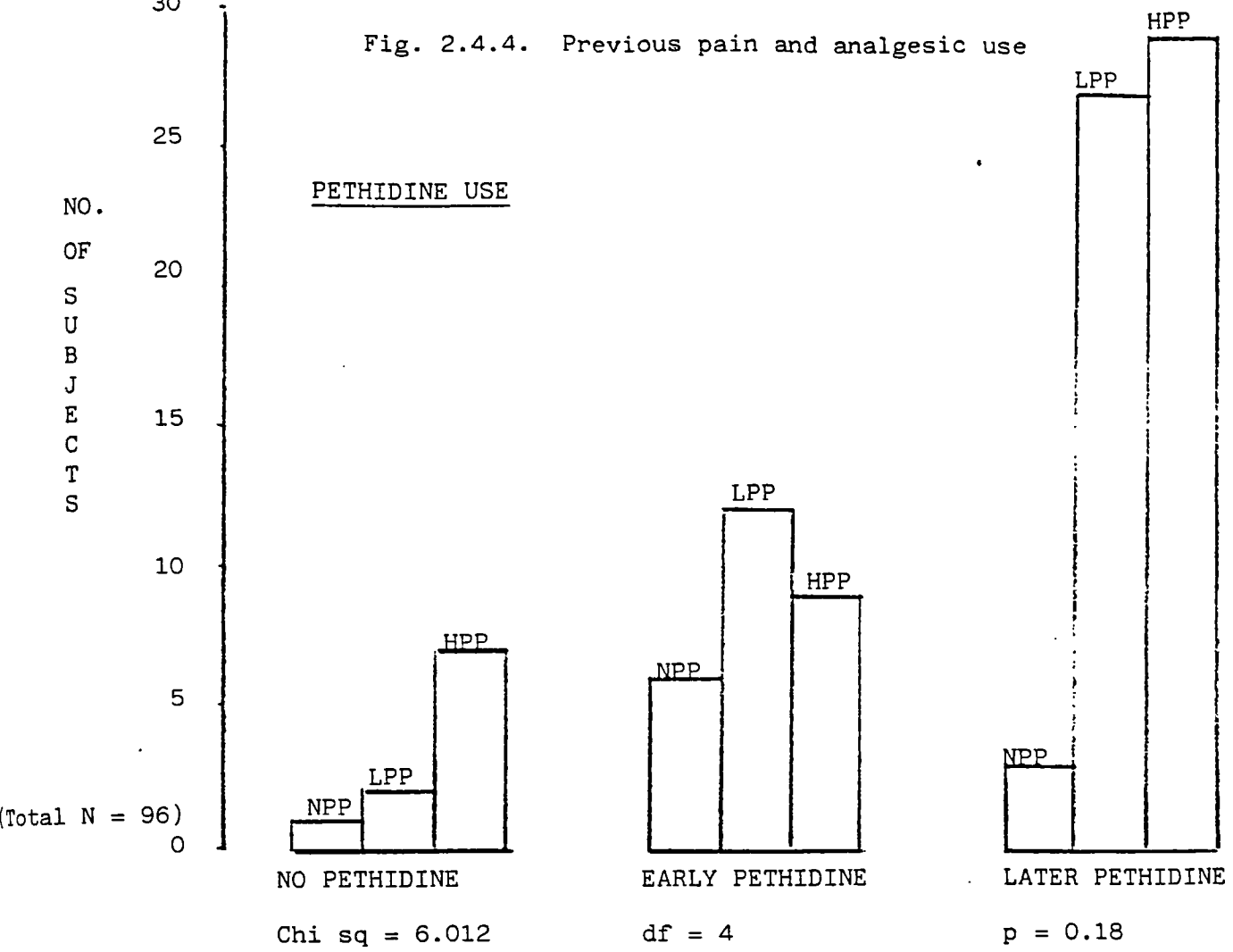


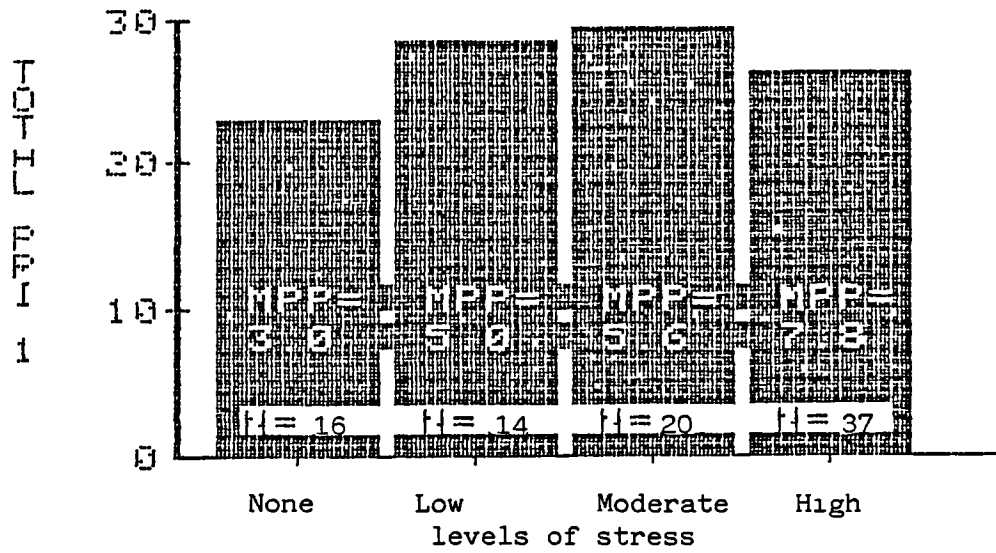
Table 2 4 8 Correlations between the intensity of previous pain and pain related variables

VARIABLE	N	r	p
No of types of pain	87	0 204	p<0 05*
Frequency of pain	87	0 214	p<0 05*
Stress of previous pain	87	0 529	p<0.01**

related to labour pain levels in a manner comparable to that of previous pain (see Fig 2 4 5) Subjects who experienced no stress associated with previous pain had the lowest levels of labour pain, those who experienced severe stress had moderate levels of labour pain, and subjects with intermediate levels of stress had the highest levels of labour pain An analysis of variance revealed no significant differences between these groups (all probability levels were greater than 0 20), and an analysis of co-variance, controlling for the effects of previous pain intensity was also non-significant (all probability levels greater than 0 16) There was therefore no evidence that the intensity of stress associated with previous pain was directly related to the intensity of labour pain

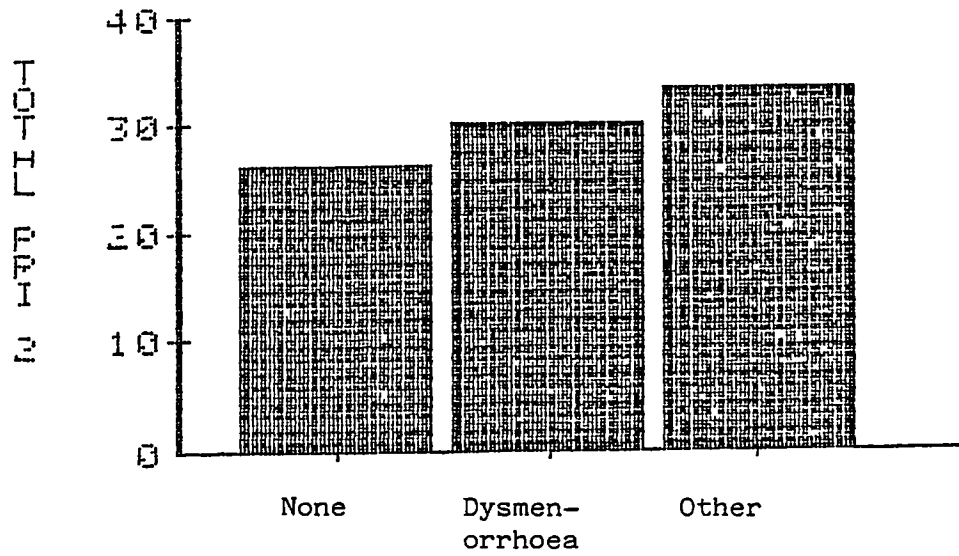
The most common type of previous pain experience was Dysmenorrhoea, one third of previous pain subjects having experienced painful periods. The intensity of pain associated with Dysmenorrhoea varied considerably, approximately equal number of subjects having experienced high or low levels of pain during menstruation (as previously defined as >6 and 0-6 on the VAS respectively) Subjects who had experienced Dysmenorrhoea did not have significantly different levels of labour pain from subjects who had previously experienced pain of other types (see Fig 2 4 6.).

Fig 2 4 5 Levels of labour pain and the stressfulness of previous pain



MPP = mean of intensity of previous pain

Fig 2 4 6 Levels of labour pain and the previous experience of no pain, of Dysmenorrhoea and of pain of other etiology



$F(2,94) = 2.03$ $p = 0.13$

Table 2 4 9 Levels of labour pain for subjects who experienced differing levels of dysmenorrhoea

LABOUR PAIN MEASURE	N	LOW DYS	SD	N	HIGH DYS	SD	F	p
Sensory 1	13	22 3	11 8	14	19 6	6 3	0 57	0 45
Affective 1	13	5 3	2 9	14	5 3	5 3	2 44	0 13
Evaluative 1	13	3 0	1 7	14	2 1	1 7	1 68	0 20
Total PRI 1	13	30 7	17 1	14	24 6	7 7	1 47	0 23
PPI 1	13	2 6	1 1	14	2 3	1 0	0 78	0 38
VA 1	13	25 3	12 3	13	20 5	6 9	1 51	0 23
Sensory 2	13	25 3	12 3	13	20 5	6 9	1 51	0 23
Affective 2	13	6 7	4 7	13	3 5	3 0	4 18	0 05*
Evaluative 2	13	3 3	1 7	13	2 4	1 8	1 43	0 24
Total PRI 2	13	34 6	17 2	13	25 4	8 1	3 04	0 09
PPI 2	13	3 1	0 8	13	2 4	0 9	4 19	0 05*
VA 2	12	7 8	1 2	12	7 9	1 5	0 00	0 95

DYS = dysmenorrhoea

For other abbreviations see Table 1 3 2

Subjects who had previously experienced high intensities of Dysmenorrhoea had significantly lower levels of labour pain than subjects who had previously experienced low intensities of Dysmenorrhoea when labour pain was assessed on the Affective and Total PRI measures 24-48 hours post-natally (see Table 2 4.9.)

2 4 3 DISCUSSION

The results of this study suggest that there is a complex relationship between the intensity of previous pain experience and the intensity of labour pain experience. While the intensity of previous pain related to childbirth was positively related to levels of labour pain, the intensity of previous pain unrelated to childbirth was negatively related to these. Additionally, a small number of subjects were found to have no previous pain experience unrelated to childbirth and to have very low levels of labour pain.

2 4 3 1 PREVIOUS PAIN RELATED TO CHILDBIRTH AND LEVELS OF LABOUR PAIN

Levels of pain experienced in previous births and during the current pregnancy were positively correlated with levels of labour pain. Whereas pain in pregnancy was associated with factors which have already been shown to be related to higher levels of labour pain (expectations and desirability of pregnancy) the positive correlations between the intensity of pain experienced in successive labours was not due to such associations. They probably reflect some stability in the amount of noxious stimulation which occurs during the successive childbirths of any one individual. This stability may be due to obstetric considerations such as the size and shape of the birth canal which do not vary from birth to birth.

2 4 3 2 PREVIOUS PAIN UNRELATED TO CHILDBIRTH AND LEVELS OF LABOUR PAIN

Subjects who had low levels of pain in pregnancy had low levels of labour pain and subjects who had low levels of pain in previous births had low levels of labour pain. The expectation would therefore be that subjects who had low levels of pain in the past would have low levels of labour pain and subjects who had severe pain in the past would have severe pain in labour. This hypothesised relationship would assume that there are individual differences in sensitivity to noxious stimulation and/or individual differences in the tendency to report stimuli as painful which are stable over time and in response to noxious stimuli of differing location, intensity and etiology. The relationship found between no previous pain and very low levels of labour pain would support such a hypothesis.

2 4 3 2 1 NO PREVIOUS PAIN

Subjects who had no previous experience of pain (NPP) had the lowest levels of labour pain. Perhaps these subjects differed from other subjects in their response to the noxious stimulation of labour because they were relatively insensitive to such stimulation. This insensitivity would render them unlikely to experience pain, except that resulting from extreme levels of noxious stimulation, as would happen in labour but not normally in everyday life. It is known that some human beings are almost totally insensitive to pain (McMurray, 1950) and that thresholds to noxious stimulation vary considerably in the general population (Hardy et al, 1952). The rare phenomenon of total insensitivity to pain is congenital and often associated with extreme mental subnormality. In individuals of normal intelligence it usually has serious physical consequences, joint damage, infection, burns, scalds, etc.

None of the subjects of this study displayed this extreme insensitivity to pain, they all for instance, suffered pain in labour whereas congenital pain insensitivity is associated with a complete lack of pain experience even in response to high levels of noxious stimulation (only one of the recorded case histories concerned a subject who had given birth. She apparently had no pain (Ervin and Sternbach, 1960)) They might however be considered to represent the lower end of the normal distribution of inherent sensitivity to pain in humans or to represent an atypical group of subjects who are relatively insensitive to pain Since they had never previously experienced pain unrelated to childbirth, no headaches, period pains or backache, and had labour pain levels much lower than those of other subjects of this and other studies (see Table 1 3 1) they might be better regarded as an atypical or unusual group The number of these subjects was small, fairly evenly represented in Primips and Multips and the standard deviation of their scores was comparatively narrow, thus they formed a distinct group

2 4 3 2 2. LOW AND HIGH PREVIOUS PAIN

Subjects who had previously experienced intense pain had lower levels of pain in labour than subjects who had more moderate previous pain experience Thus there was a negative relationship between intense previous pain and pain during childbirth This finding is supported by those of Scott and Gijbers (1981) who found that the occurrence of severe pain modulates subsequent pain perception and perhaps too by the observations of Riviere and Chastrusse, that bitches who had had a rough upbringing had less pain whelping than bitches who had been gently reared (Riviere and Chastrusse, 1954, quoted in Gibson, 1982, p 180)

In Primips the difference in labour pain levels between high previous pain (HPP) and low previous pain (LPP) subjects was substantial and occurred on pain measures recorded during the first stage of labour and by recall. These relationships were not due to the effects of other variables, the only potentially confounding variable being analgesic use, control of which strengthened the association between previous pain and labour pain. The labour pain levels of Multips were less clearly differentiated by previous pain experience, presumably because of the confounding effect of previous labour pain experience. Fig. 2 4 3 shows that LPP Multips did not have as high labour pain levels as LPP Primips. As 58% of Multips had experienced severe pain (>6 on the VAS) in their previous labours, this finding is not surprising, LPP Multips being to an extent comparable with HPP Primips.

It is therefore suggested that although some basic relationship exists between previous pain related to childbirth and levels of labour pain (acting through stable obstetric factors) the more dominant relationship is between the intensity of previous pain experience overall and the intensity of labour pain.

2 4 3 3 PREVIOUS DYSMENORRHOEA AND LEVELS OF LABOUR PAIN

A number of writers have postulated that there is a link between pain associated with menstruation and pain associated with childbirth. Deutsch (1947) has predicted that women who have Dysmenorrhoea will also have severe labour pain since both kinds of pain reflect a lack of adjustment to the physical manifestations of the female role - menstruating and giving birth. Melzack et al (1981) demonstrated a positive relationship between the occurrence of menstrual difficulties and high levels of labour



pain, explaining this relationship in terms of excess Prostaglandin secretion occurring both during menstruation and during labour (Prostaglandins are a group of biochemical substances which have a number of functions some of which are involved in reproduction in its broadest sense, ie with menstruation, initiation of labour, maintenance of uterine contractions and the 'let down' response during lactation. They are also involved in the inflammatory responses of the body and in some pain states (Zimmerman, 1981)

The results of this study showed that subjects who had experienced Dysmenorrhoea did not have significantly higher levels of labour pain than subjects who had not had Dysmenorrhoea and that subjects who had experienced severe Dysmenorrhoea had significantly lower levels of labour pain than subjects who had more moderate Dysmenorrhoea. These findings are not in agreement with the predictions of Deutsch and Melzack. Melzack et al (1981) did not define precisely what was meant by 'menstrual difficulties', whether these solely involved Dysmenorrhoea or whether other difficulties such as pre-menstrual tension, fluid retention or menorrhagia were included. It may be that such non-pain related menstrual difficulties are related to high levels of labour pain. The relationship between high levels of Dysmenorrhoea and low levels of labour pain demonstrates that the association found between the intensity of unspecified previous pain can be extended to pain of one specific etiology.

2 4 3 4 EXPLANATIONS OF THE RELATIONSHIP BETWEEN PREVIOUS PAIN EXPERIENCE AND LEVELS OF LABOUR PAIN

2 4 3 4 1 CONTRAST EFFECTS

The relationship between previous pain intensity and labour pain intensity might merely be due to comparison or contrast effects in the assessment of pain. In particular it might be suspected that subjects who

had just assessed their labour pain (MPQ 2, VA 2) would use these assessments as comparative 'markers' for their previous pain assessment. An assessment of severe labour pain would thus predispose them to subsequently assess their previous pain as moderate or mild. A negative relationship between the two assessments would result.

This explanation is unsatisfactory. As both previous pain intensity and labour pain intensity were assessed by the VAS (as well as labour pain intensity being assessed on the MPQ) contrast effects of assessment would be expected to be most apparent on the VAS data. There was no evidence of such effects, the relationship between VAS scores for previous pain and VAS scores for labour pain being non-significantly positive. Furthermore the effects of contrast could not explain why some subjects who had moderate levels of labour pain would subsequently report high levels of previous pain (HPP subjects) while others (NPP subjects) reported low levels. This is not to say that subjects never thought of one pain as being more or less intense than another. Comments about labour pain such as "Its the worst pain I've ever had" exemplify this. Nor is it to say that the experience of severe pain does not in some way reduce the severity of all other pains, but that contrast effects if operating at all, operated on the experience of pain, not simply on the reporting of it.

Subjects might have compared their experience (not the assessment) of previous pain with subsequent pain experience, increasing the perceived intensity of labour pain if it was considerably more intense than anything encountered before, or decreasing it if it was comparatively mild. The positive correlations between the pain of previous births and current births indicate that such comparison was not evident but the possibility

remains that subjects compare labour pain with previous pain unrelated to childbirth, but not with previous pain related to it

2 4 3 4 2 THE PSYCHOLOGICAL EFFECTS OF EXPERIENCING SEVERE PAIN

It was suggested in 2 4 1 that the anxiety associated with experiencing severe pain may be increased in subjects encountering intense noxious stimulation who have only experienced low levels of pain in the past. Thus bitches (Riviere and Chastrusse, 1954) and soldiers (Collins 1965) who had sheltered upbringings would be more sensitive to noxious stimulation in later life. So too might be women in labour whose previous experience in childhood and in adulthood had been restricted in terms of pain. Therefore a restricted previous pain experience might exacerbate anxiety associated with the experience of labour pain, and thus facilitate the transmission of noxious stimulation during childbirth.

Severe previous pain might reduce the anxiety associated with labour pain or affect the nature of the experience in some more fundamental way. An episode of intense pain can be terrifying, not just anxiety provoking. It can be so extreme that it gets beyond the person's ability to order the experience, cognitively or emotionally (Hebb, 1949).

"It abandons us to utter senselessness"

(Buytendijk, 1961, p 28)

"When it happened I was just thrown into another world "

"There was nothing but the pain " "A great black hole of pain " "I couldn't begin to describe it "

(Quotes from women regarding their labour pain, Oakley, 1979.)

It is often associated with the ultimate fear, of death

"Pain is death's shadow "

(Buytendijk, 1961, p 28)

"I never thought I would live through it " "I
thought I was going to die "

(Oakley, 1979)

Having "lived through" such an experience must affect the way that any
subsequent experience of intense pain is perceived

"Suffering passes but the fact of having suffered
never passes "

(Leon Bloy quoted in Buytendijk, 1961)

People who have survived intense pain must know at some level, not
necessarily consciously, that it can be survived, that they can come
"out the other end"

"In the clear light of the thoughtlessness which
characterises a life free of pain, consciousness
is filled with sensory impressions and with patterns
woven from them by the mind In the darkness of his
pain, man is alone, he is broken inwardly, isolated
from his suffering body and in this state he discovers
something new Existence He does not forget this
discovery "

(Leon Bloy quoted in Buytendijk, 1961)

It could be that an experience which provokes descriptions like those

quoted above would alter the essential nature of any future experiences of intense pain. That is to say that women having had such an experience in previous labours or in instances of intense previous pain, would know that it can be survived. This knowledge would somehow ameliorate their experience of labour pain. The effect could be perhaps analagous to the effects of 'flooding' where anxiety associated with a threatening stimulus is decreased subsequent to experiencing the most intense stimulation possible (Baum, 1970).

If a restricted previous pain experience exacerbates the anxiety associated with current noxious stimulation, or if previous experience of intense pain reduces that anxiety and alters the nature of subsequent pain, then it might be expected that such modulation would be maximally apparent in the Affective component of pain. Therefore the difference between LPP and HPP labour pain scores should have been greatest on the Affective measures of labour pain. There was no evidence of such an effect (see Tables 2.4.5. and 2.4.6.). Instead it was the Sensory and Total PRI measures of labour pain which showed the greatest difference between these groups of subjects. This was unusual since the Affective dimension of pain has seemed, in this study, to be the most labile (see 2.2.1., 2.2.2., 2.2.3.). Therefore it seems unlikely that the modulation of labour pain associated with previous pain experience was due solely to the effects discussed in this section.

2.4.3.4.3. PAIN COPING STRATEGIES

This modulation (2.4.3.4.2.) may have involved the use of pain coping strategies. Many of the subjects of this study attended classes where they were taught psychological strategies for coping with pain (relaxation, distraction,

etc) and such instruction appeared to be beneficial in that these subjects had lower levels of Affective pain (see Table 2 3 2) However, recent research on the use of pain coping strategies (Avia and Kanfer, 1980, Turk, 1985) has shown that many people learn to cope with pain (and stress) through their own experience, evolving their own coping strategies and using these strategies in preference to 'taught' strategies, in instances of severe pain (Tan, 1980, Taenzer, 1980)

The subjects of this study may have followed this pattern, subjects who had previously experienced severe pain having therefore had more opportunity to develop such strategies and use them in labour than subjects who had previously experienced more moderate pain Coping with a mild headache, or with mild Dysmenorrhoea through the use of psychological strategies is not the same as coping with a raging toothache, a fractured femur, or the pain resulting from prolonged chest surgery (all examples of LPP and HPP respectively) and it is arguable that labour pain is more akin to the latter examples than to the former Therefore HPP subjects had the opportunity to develop, practice and refine the use of psychological strategies under conditions of severe pain, such strategies being of more use than those developed (or learned at antenatal classes) by LPP subjects Furthermore HPP subjects had suffered more frequent pain, a wider variety of pain and more stressful pain than LPP subjects All these dimensions of pain experience might be expected to facilitate the development and practice of coping strategies in conditions akin to childbirth - a stressful as well as painful situation - and one in which the nature of the noxious stimulation varies (from early to active stage one labour, through transition to delivery)

It could thus be hypothesised that HPP subjects would have less pain in

labour than LPP subjects because they have a larger repertoire of effective coping strategies available for use during labour. Such a hypothesis would also incidentally predict that Multips would have less pain in labour than Primips since they have had the opportunity to practice coping strategies in conditions exactly akin to the current childbirth, namely in their previous childbirth(s), but that this effect would be augmented by the effects of their previous experience of intense pain. Such a hypothesis is, of course, supported by the results of this study (see Table 2.1.3 and Fig. 2.4.3) but the many other obstetric and psychological differences between Primips and Multips undoubtedly contributed to this effect as well.

2.4.3.4.4 PHYSIOLOGICAL FACTORS

An alternative explanation of the relationship between previous pain and labour pain concerns differences in the subjects' physiological response to noxious stimulation. The experience of certain kinds of repeated or continuous noxious stimulation has been shown to be associated with central and peripheral facilitation of the transmission of potentially noxious stimulation (Iggo, 1984, Wall, 1984). Thus previous experience of pain can affect subsequent pain perception through the operation of physiological mechanisms directly. Their effect though is to enhance pain perception, not to reduce it. Some of the endogenous analgesic systems appear to be stimulated by episodes of pain or stress (Lewis et al, 1984) but the response is closely related temporarily to the pain or stress occurrence, so it is unlikely that episodes of pain occurring many years previously could affect the operation of these mechanisms in labour. They may however facilitate their effects indirectly. Much remains to be discovered about the plasticity of the

nervous system in response to noxious stimulation (Wall, 1985), so it is entirely possible that the modulation of labour pain associated with intense previous pain experience may be mediated by physiological mechanisms as well as, or instead of, by psychological ones

2 4 3 5 SUMMARY

The relationship between the previous experience of pain and levels of pain in childbirth is complex. It is suggested that some basic relationship exists between the intensity of pain in subsequent births which is due to unchanging obstetric factors such as the dimensions of the birth canal which affect the level of noxious stimulation occurring during childbirth. The reaction or sensitivity to noxious stimulation both within and outwith labour was also apparently stable in a small and distinct group of subjects who had no pain experience outwith labour and had very low levels of labour pain. In the majority of subjects however, no such consistency could be demonstrated since they had low levels of previous pain but high levels of labour pain. This inverse relationship between the intensity of previous pain and the intensity of labour pain did not seem to be due to contrast effects. It may have been due to some alteration in the way that noxious stimulation is modulated following on an experience of intense pain. This alteration could be brought about by a number of psychological or physiological mechanisms. The possibility that one of these mechanisms involved the differential use of coping strategies is investigated in Part 3 of this study.

1/2- REVIEW

101 healthy British subjects were interviewed during the first stage of labour and again 24-48 hours later. The average intensity of their labour pain was found to be severe but not intensely negatively affective. However, there was considerable individual variation in the levels of pain experienced, approximately 8% of subjects having comparatively low levels of pain in childbirth, while 16% suffered extremely intense pain. Some of this variation was due to differences in obstetric factors. These were reflected in an association between higher levels of labour pain and Primiparity, a long first stage of labour in Multiples, artificial rupture of the membranes and the absence of pregnancy complications. It was assumed that some of these associations, namely those involving parity and the duration of the first stage of labour, were due to underlying variation in the level of noxious stimulation occurring during childbirth. Others, namely ARM and complications of pregnancy, were probably due to the modulation of that stimulation brought about through the effects of psychological factors. The intensity of labour pain was undoubtedly reduced by the modulatory effects of pharmacological analgesics. However, the use of these analgesics was not in general associated with significantly lower levels of labour pain since they were only administered when pain became severe. Thus variation in levels of labour pain was associated with surprisingly few differences in non-psychological factors. This was in part due to the criteria imposed on subject selection which reduced but did not remove entirely, individual differences in the amount of noxious stimulation occurring. The measures available to assess differences in the amount of stimulation occurring were imprecise and this also contributed to the paucity of significant findings. However the relationship between variation in obstetric factors, the amount of

noxious stimulation and levels of labour pain was obviously not a simple one

A number of psychological factors were found to be associated with differences in levels of labour pain, namely the desirability of pregnancy, expectations of birth and the accuracy of these expectations, ante-natal training and the welcomed presence of the husband. Many of these were solely related to lower levels of non-sensory (especially Affective) pain. It is therefore probable that the negative affect of labour pain can be reduced through the psychological modulation of noxious stimulation in childbirth. A number of psychological factors may be involved in such modulation, both factors whose variability depends primarily on the subject herself, eg the desirability of pregnancy, and those which can be manipulated by outside agencies, eg through the provision of ante-natal training. Such modulation of non-sensory pain is surely of benefit to the parturient, even if the overall intensity of labour pain cannot be reduced. The experience of intense pain is generally regarded as undesirable, but how much more undesirable must it be to experience "terrifying", "torturing", "unbearable" pain, especially on a profoundly significant and (meant to be) joyful occasion. Furthermore the association found between high levels of Affective pain and low Apgar scores may indicate that the baby as well as the mother will benefit from some reduction in this dimension of pain.

The previous experience of intense pain was associated with significantly lower levels of labour pain overall. The factors which underlie this relationship remain to be delineated, but may involve physiological effects as well as psychological ones. The investigation of the relationship between previous pain and labour pain revealed the unexpected presence of

an unusual group of subjects, those who had no previous experience of pain. Obstetric and midwifery staff seemed unaware of the existence of such a group, yet the results of this study would suggest the presence of such an atypical pain history is highly predictive of low levels of labour pain.

The two methods of assessing labour pain used in this study were the MPQ and the VAS. The majority of significant results obtained, were apparent on the MPQ measures only. Subjects experienced considerable difficulty in responding to the VAS in the first stage of labour and these difficulties may have contributed to the lack of significant VAS findings. Kremer et al (1981) has observed that aged patients whose abstracting capacities are low find similar difficulties in using the VAS. Thus the VAS may be unsuitable for use with subjects who are unable (as in labour) to concentrate on the particular demands that this form of assessment involves. The repeated administration of the VAS as utilised by Scott Palmer and Skevington (1981) and Skelton (1984) may overcome these difficulties. The sensitivity of the VAS has however been called into question in studies which have not found any difficulty in administering it (Reading, 1981, Carlson, 1983) and when it was used in this study to recall labour pain. The VAS only assessed the intensity of labour pain and thus could not be responsive to the more subtle differences in the quality of labour pain which were reflected in the non-sensory scores of the MPQ. This factor may have reduced its sensitivity in assessing pain, like labour pain, which has an important non-sensory component. Furthermore, the very intensity of labour pain reduced the sensitivity of the VAS, since the range available for the assessment of severe pain was restricted.

The upper and lower ranges of the MPQ's PRI scales are, in contrast to those of the VAS, extensive. The permutation of the various categories of descriptors and their grouping into the Sensory, Affective and Evaluative subcomponents of pain (recently revalidated by Burckhardt, 1984), allows the MPQ to be responsive to the most subtle of differences in pain experience. These two aspects of the MPQ allowed subjects to record their experience of labour pain without any apparent restriction and in considerable detail. Because of the semantic nature and the complexity of the MPQ's PRI scales, subjects seemed unaware of how high or low their PRI scores were. Their task was to adequately describe the pain they were experiencing, not to evaluate its intensity. This meant that it was difficult for subjects to establish a criterion for pain assessment based on their experience of completing the PRI.

The PRI section of the MPQ was however found to be unsuitable for the assessment of the pain of one stage of labour in isolation from the more severe pain of another. This problem was not confined to the MPQ, the VA 1R measure being found to be inadequate for this task for differing reasons. Certain subjects may have difficulty in comprehending or differentiating the PRI descriptors or may select a descriptor, eg "Sickening" category 12, to describe a bodily sensation unrelated to pain. No evidence of the first of these effects was found in this study and the low use of category 12 (see Fig 1.3.4) suggests that the second effect was minimal if present at all. These considerations and the problems associated with the use of the PPI make the MPQ a less than perfect instrument for assessing labour pain. Its previously mentioned strengths however show that it provides a very effective method of assessing pain in childbirth.

PART 3

CHAPTER 1 - THE SECOND POST-NATAL INTERVIEW INTRODUCTION AND
METHODOLOGY

3 1 1 INTRODUCTION

The third part of this thesis concerns the strategies used by subjects to cope with labour pain and the relationship between these strategies and strategies used previously to cope with pain or stress. Details of strategy use were obtained in a second post-natal interview, the first post-natal interview having been found to be unsuitable for the collection of such data (see 1 2 4 2)

The second post-natal interview additionally provided an opportunity to gain more information about the subject's previous pain experience. This opportunity was used to re-assess the subject's previous experience of pain in terms of the overall amount of pain experienced, how much pain the subject had had in her life, including pain associated with childbirth, rather than in terms of its intensity (as assessed by the first post-natal interview). The assessment was based upon the subject's responses to a number of questionnaire items (see Fig 3 1 1.), but was made by the Investigator, not by the subject. Such an assessment should be free from any bias caused by individual subject's tendencies to over or under assess previous pain experience.

Details of the desirability of pregnancy (discussed in 2 3 2) were also obtained in the second post-natal interview.

3 1 1 1 PREVIOUS PAIN EXPERIENCE, STRATEGY USE AND LEVELS OF
LABOUR PAIN

It was hypothesised that subjects who had previously experienced intense pain unrelated to childbirth would use more strategies to cope with that

pain than subjects who had previously experienced moderate pain and that they would use the same strategies in labour. The use of these strategies would modulate their labour pain. This modulation would account for some or all of the reduction in average pain levels associated with intense previous pain experience. Subjects who had previously developed and practiced strategies to cope with stress might also use these strategies beneficially during labour. Pain coping strategies such as relaxation or distraction are, after all, frequently used to cope with stress. Thus the previous experience of coping with stress through the use of such strategies might extend the repertoire of well rehearsed strategies available to the subject in labour.

Subjects who had previously experienced large amounts of pain both unassociated and associated with childbirth might also have previously used more coping strategies and have 'transferred' these strategies and used them in labour. Thus their labour pain levels would be lower than those of subjects who had experienced less pain in life.

3 1 1 2 STRATEGY USE AND THE MODULATION OF PAIN

These predictions are dependent upon it being established that the use of coping strategies during childbirth will modulate labour pain. Experimental pain studies have demonstrated that relaxation training was effective in reducing pain tolerance (Stevens and Heide, 1977), that distraction was effective in reducing pain thresholds and tolerance (Barber and Cooper, 1972, Stone et al, 1977), that the use of pleasant imagery as a focus of distraction was more effective than the manipulation of expectations of pain reduction in reducing self reports of pain, and than the use of breathing techniques in reducing pain tolerance

(Stone et al, 1977), and that 'reversing the affect' of pain, ie thinking of the sensations associated with pain as positive rather than negative, was more effective than distraction in reducing the distress associated with prolonged experimental pain (McCaul and Haugtvedt, 1982)

Experimental pain is, of course, not the equivalent of clinical pain, far less the equivalent of labour pain. It is, of ethical necessity, mild in intensity, short in duration (McCaul's study on the relative effectiveness of reversal of affect versus distraction involving pain of 4 minutes maximum) and can be terminated at will. Studies of clinical pain have shown that relaxation was effective in relieving tension headache (Cox et al, 1975), that the use of pleasant imagery was effective in reducing self-reported discomfort in a dental situation (Horan et al, 1976), and that the reinterpretation of pain stimulation (a process akin to reversal of affect) was more effective in reducing ratings of the quality and quantity of chronic pain experience than distraction (Rybshtein-Blinchik, 1979)

None of these studies involved a type of clinical pain which was comparable to labour pain. Studies which have been carried out on labour pain itself have generally considered strategy use as an undifferentiated 'package' of strategies, which have been acquired through PCT or ante-natal class instruction. This type of paradigm is also evident in many clinical pain studies. Typically these studies involve the subjects being trained in a number of strategies and encouraged to use all of these strategies in coping with the painful condition or situation (Tan, 1980). Such an approach makes sense in clinical terms, since using a combination of strategies increases the efficacy of strategy use.

considerably (Scott and Barber, 1977)

In labour pain research the 'package' typically consists of relaxation, breathing exercises, the provision of information and reassurance about childbirth and training in the use of a variety of cognitive coping skills usually involving some form of distraction, ie the package equals PCT (see 2 3 4) These studies do not yield information about which particular strategies are used in labour since training in a strategy does not ensure its utilisation Nor can they reveal the use of strategies which were not 'learned' at PCT classes, but were otherwise acquired, for example, through the previous experience of pain

One series of studies has shown that the use of Lamaze type breathing exercises was more effective than other components of Lamaze PCT training in reducing experimental pain (Worthington and Martin, 1980) and that results on the experimental pain test (a cold pressor test) were positively related to the effectiveness of these techniques in labour (Worthington, 1982) These excellent studies unfortunately do not tell us about the utilisation and effectiveness of other coping strategies

3 1 1 3 THE CURRENT STUDY

This study aimed to examine the use and effectiveness of the strategies discussed above, ie relaxation, distraction, use of imagery and reversal of affect The use of structured breathing techniques as taught in British ante-natal classes was also examined Two further aspects of coping with pain were included

The first concerned the normalisation of the pain which occurs during childbirth Misattribution of pain to a harmful source has been shown to increase pain perception (Nisbett and Schacher, 1966) As the pain

of childbirth could be attributed by the parturient to harmless sources - the normal processes of childbirth, or to harmful sources - some abnormality in herself, or in the baby, the former might be expected to be related to lower levels of pain than the latter

The second aspect concerned control. Bowers (1968) showed that if a subject believed that she or he had control over noxious stimulation, then the pain and anxiety levels associated with such stimulation were lower than when no perception of control existed. Subjects experiencing noxious stimulation in childbirth may vary in their perception of being 'in control' and this perception might therefore affect their levels of labour pain. A feeling of being 'in control' in labour may also be related to the efficacy of coping strategies as Bandura (1977) has pointed out. Psychological coping strategies he theorised, are engaged upon in the belief that they will produce change (modulate pain or stress). Any modulation accomplished is attributed to this strategy use which reinforces belief in the efficacy of the strategy and in the person's ability to control pain or stress.

Numerous writers have disapproved of the helplessness imposed upon the parturient by modern hospital based obstetrics and have encouraged women to take a more active part in their births, believing that activity - being 'in control' - rather than passivity, will improve the woman's experience of childbirth and thus perhaps modulate the pain associated with it, eg (Kitzinger, 1962, Oakley, 1979). Hospitalisation and intervention during labour can, it is predicted, have the effect of removing the locus of control from the woman and placing it in the hands of the attendant medical staff (Wolkind and Zajicek, 1981). Thus the perception of personal control should be associated with less pain in labour than

the perception of being controlled by medical personnel

The use of strategies other than those listed above was of particular interest because the main hypothesis concerned the use of strategies during childbirth which had been spontaneously generated in response to previous pain (rather than taught through ante-natal training). While many spontaneously generated strategies may be classifiable as relaxation, distraction, etc, others may be idiosyncratic. If such idiosyncratic strategies were also found to be used in labour, this would provide strong evidence of the transfer of previously used strategies. The importance of spontaneously generated strategy use has been commented on by a number of researchers (Tan, 1980, Turk, 1985). However little has been written about their precise nature. Therefore details of the nature of idiosyncratic strategy use obtained from this study should be of general interest.

The aim of the third part of this study was to investigate the amount of previous pain subjects had experienced and relates this to levels of labour pain. The subject's use of coping strategies when in pain, under stress and in labour was detailed. Strategy use in labour was related to levels of labour pain and these data were analysed in the light of the subject's previous pain and coping experience.

3 1 2 METHOD

3 1 2 1 SUBJECTS

51 of the 101 women who participated in the main study. These subjects comprised all contactable subjects who were willing to participate further in the study from subject numbers 31-90. (Subjects 1-30 provided data, preliminary analysis of which led to the consolidation of the

hypothesis, which the third part of the study was designed to test
 Subjects 90-101 were not included because of time constraints)

3 subjects had moved out of the area 5 subjects refused to participate further because of lack of time (2) - they were back at work - lack of privacy (2) - they were living with relatives - and illness in the baby (1)

59% of the subjects were Primips 41% Multips The age range was 15-38 average 27.4 13%, 43%, 30% and 14% of subjects were in social classes 2, 3, 4 and 5 respectively Thus the subjects were representative of the subject population of the main study in these respects

3 1 2 2 SETTING

The subjects were interviewed in their own homes at a time when they expected to be alone and undisturbed by their baby

3 1 2 3 TIMING OF THE INTERVIEW

Subjects were interviewed approximately 3 months after the baby's birth This time was selected as the subjects had had some opportunity to adjust to motherhood, had established some sort of routine with the baby allowing them to predict relatively undisturbed periods suitable for interviewing, and had babies who were sleeping through the night, allowing their mothers to be clear thinking during the day

The interview was intended to last 40-60 minutes It sometimes had to be extended because of interruptions (mainly by the baby) or because the subject wished to talk at length about matters raised by the Interview.

3 1.2 4 PROCEDURE

Subjects were contacted about 2-3 months after the birth and asked if they still wished to participate in a further interview (preliminary permission had been granted at the end of the first post-natal interview) Before commencement of the interview the subject was informed about its nature and format, and permission was sought to tape record it Confidentiality was assured and it was made clear to the subject that she should omit any questions which concerned or distressed her.

3 1 2 5 THE QUESTIONNAIRE

It was considered essential that the interview should be conducted in a friendly, relaxed and non-judgemental manner Quantifiable data was required, but the method by which it was acquired had to facilitate free recall of strategy use and avoid any embarrassment to subjects (Idiosyncratic strategies might otherwise be forgotten, or seem too silly to mention) Accordingly a semi-structured interview was conducted and analysed (see Fig 3.1 1) based on methodologies developed by Markova (see Markova et al, 1980)

The interview was conducted as a dialogue and consisted of a number of open ended questions regarding previous pain experience, strategy use in response to previous pain, previous stress and labour pain, and the desirability of pregnancy These questions were followed by a number of probes designed to clarify, extend or help in the categorisation of the primary responses Examples of probe questions are given in Fig.

3 1 1 An attempt was made to ascertain whether subjects had acquired their coping strategies through direct teaching by others, eg parents, or through imitation (modelling) See questions on modelling Fig.3 1.1.

Fig 3 1 1 Second Post-Natal interview Questionnaire Items

<u>Detailed Questions and Probes</u>	
Amount of previous pain	Do you think you have had a lot of pain in your life? More or less than other people? Details of pains If nothing, probe "nothing at all, no illness, accidents, nothing when you were younger?" What's the worst pain you've ever had? If labour - outside of labour In labour - how bad? Is pain a regular part of your life? Probe "in a good way, e g sport In a bad way e g illness " "Through experience with others, e g spouse, parents."
Coping strategies pain	What do you do when you are in pain? Probe separately for "worst pain" and "everyday aches and pains "
Relaxation	Do you relax? How? Probe "Did it (the behaviour) make you feel more relaxed, or did it just take your mind off the pain?"
Distraction	Do you distract yourself in some way? How? Probe "Did it take your mind off the pain?" "What did you think of?"
Idiosyncratic strategies and strategies which may be classifiable	Do you find it helpful to do something/in general/in particular? Do you find it helpful to be with someone? Who? What do you think of when you are in pain?
Imagery Reversal of affect	Do you imagine something which makes the pain easier to bear? Something pleasant/or that the sensations themselves are pleasant?
Normalisation	Do you think its normal to have some pain in life? Do you think its normal to have the pain you have? When you are in pain, do you think it means that something terrible is wrong? Do you worry if you get a "new" pain? Would you rush off to the doctors immediately? How did you feel about any period pain you've had? Did it worry you? Have you ever had any pain which didn't worry you at all, e g in sport?
Control general	Do you normally feel in control of things?(+)
Control of pain	Do you feel "in control" when you are in pain? Or. Do you feel helpless? Do you know what to do to

Control of pain (Continued) to help yourself cope with the pain, or to help to ease the pain, or do you feel it won't make any difference what you do , so you just give up? (+)

Modelling How did your parents treat you when you got hurt when you were a child?

Did they make a fuss of you/take your mind off of it, etc ? Did they themselves have much pain? How did they cope with it? Do you think their ways of dealing with pain are good ways?

Would you want your child to deal with pain in the same way? If not, why not?

Did anyone else teach you how to cope with pain, e g spouse? Did your work or training teach you about pain, e g P T teacher, nurse? Probe How?

Introduction to coping with stress Do you lead a stressful life in general, or is it fairly quiet and calm? Do you tend to pack a lot in and get overstretched, or do you take things as they come?

Was your job demanding?

Was looking after the kids (before this one) stressful?

Have you had many "big" stresses in your life, e g big changes, bereavements, family problems, financial problems?

How do you cope with stress * How did you manage or attempt to cope with these 'big stressors? (Open ended sensitive probing if suitable)

*If you've had a bad day, or something is getting you down or worrying you, what do you do to make yourself feel better?

Relaxation Do you relax? How? e g book, bed

Distraction Do you take your mind off it? How? e g think about something - what?

Imagery Something pleasant?

Control Do you deal with the problem? e g talk it out, do something about it? Or do you think that nothing you do will change things anyway so you might as well not bother?

Idiosyncratic strategies Also *Sections above How do you prepare for something stressful? e g exam, operation, going to the dentist

What do you do?

What do you think about?

Modelling	Did you learn how to cope with things from anybody else? Probe who, and what strategies Did your work or training teach you how to cope with stress?
Control	Do you think you're good at taking care of yourself, or is it just luck that gets you through? (+) Do you see yourself as a 'strong woman'?
Coping with childbirth	Did you find this childbirth difficult to cope with? Why was that? Did any specific event, or medical procedure make it more difficult? Was it easier to cope with one part of labour, rather than another? (eg 1st stage, pushing) Did you go to ante-natal classes?
Idiosyncratic strategies	How did you cope with the easier part(s) of labour? What did you do? What did you think of?
Relaxation	Did you relax? Probe how. Did you use the relaxation techniques taught in ante-natal classes? Did they work?
Breathing techniques	Did you try to use breathing exercises? Probe if not ante-natal class attendee "Where did you learn them?" Did they work? Did you use them for long? Probe if not "Why not?" Did they relax you?
Distraction	Did anything take your mind off the pain? Probe if breathing techniques used "The breathing exercises?" Anything you did? Anything anyone else did? Anything you thought of? What?
Imagery	Did you think of anything nice, eg holidays? How did you feel about the pain of contractions (or of delivery if that was the easiest stage)?
Normalisation	Did you think the pain was normal, or did it worry you? Probe "Did it make you think something was wrong with you or the baby?"

- Reversal of affect Did you think the pain was a good thing? Probe, eg that it meant that everything was going OK That it meant that the baby would soon be delivered Did you welcome the pains?
- Control Did you feel in control in labour? Probe if not "Did you feel out of control?)
- Personal control/ staff control Did you feel the staff were in control? If so "were you happy about that? Did you trust them?"
- Did it get harder to cope? Probe later, at a different stage Did you have to change the way you coped? In what way? Probe for specific strategies again.
- Desirability of pregnancy How did you feel about being pregnant? Probe dismayed, overjoyed, OK, scared Did you plan/want the baby? Did this feeling stay the same throughout the pregnancy?

+Questions adapted from Rotter's Internal/External Locus of Control Scale (Rotter, 1966)

Fig. 3.1.2. Second Post-natal interview. Scoring Sheet.

Subject's Name:

Pain

How much pain.

No

pain = 0

Most

imaginable = 10

Coping strategies (Tick)Details.

Relaxation

Distraction

Idiosyncratic strategies (Tick if not otherwise covered)

1) What does she think?

2) What does she do?

Imagery

Reversal of Affect

Normalisation

Control

Modelling

Coping strategies Stress (Tick)Details.

Relaxation

Distraction

Imagery

Idiosyncratic strategies

1) What she does.

2) What she thinks.

Control

Modelling

Coping strategies labourDetailsStages

Relaxation

1st stage early

Distraction

1st stage advanced

Idiosyncratic strategies

Transition

Second Stage

1) What did she think?

Breathing - minimal use/Extensive use

Imagery

Reversal of affect

Normalisation

Control

Control by staff.

Did she do or think of anything during labour that was characteristic of her ways of coping with pain or stress? (Detail and Total 0----).

Desirability of pregnancy

0 = not wanted

at all

10 = consistently
delighted

3 1 2 6 ANALYSIS OF RESPONSES

The tape recorded responses were analysed by the Investigator and, in 50% of cases, by an independent rater. The information obtained from the subject's responses to the principal and subsidiary questions was used to score the responses to the question headings detailed in Fig.

3 1 2 The amount of previous pain was assessed on a 1-10 visual analogue scale, as was the desirability of pregnancy. The amount of previous pain included assessment of all previous pain related and unrelated to childbirth. The pain of the current birth was not discussed in any detail in the interview and was not included in this assessment.

The use of relaxation, distraction, imagery, reversal of affect, normalisation and control, was scored on a yes/no basis with regard to previous pain, previous stress and labour pain. Perceptions of personal control and staff control were similarly recorded with regard to childbirth, and the use of structured breathing techniques during childbirth was scored as none/minimal use/extensive use. The nature of the strategies used by subjects was noted in detail where they differed from the literature definitions of strategy uses (eg relaxation achieved through the use of techniques other than progressive relaxation (Jacobsson 1929; Benson et al 1977)) and precise details of idiosyncratic strategy use in labour were recorded in order to allow assessment of transfer of strategies. Transfer of strategies was scored on a yes/no basis for each strategy transferred. Evidence of modelling was noted and scored on a yes/no basis. The criteria for these assessments is laid out in Appendix 2.

The amount of previous pain was additionally assessed on the basis of the data obtained in the first post-natal interview concerning the intensity

frequency, variety and stressfulness of previous pain This assessment was carried out some time after the other assessments had been completed and the rater was blind to data and assessments obtained in the second post-natal interview

PART 3

CHAPTER 2 - THE AMOUNT OF PREVIOUS PAIN

3 2 1 INTRODUCTION

Data concerning the amount of previous pain and its relationship with levels of labour pain, will be dealt with in this chapter Strategy use and transfer will be dealt with in Part 3 Chapter 3

3 2 2 RESULTS

The average amount of pain previously experienced by the 51 subjects was 5.0009 (sd = 2.06). The range was 0.5 - 9.0 11 of the subjects were rated as having little previous experience of pain (scores $>0 < 3$, entitled Minimal Previous Pain Min PP) though only one of these was considered to have had very little pain (score = 0.5) 26 subjects had experienced a moderate amount of pain (scores $>3 < 6$, Moderate Previous Pain - Mod PP) and 14 subjects had experienced a lot of pain (>6 , Extensive Previous Pain - Ext PP) NB These assessments included pain associated with childbirth but excluded the pain of the current birth. The individual raters' assessments of the amount of pain correlated highly ($r = 0.97$) Their scores agreed exactly in 91% of cases

The amount of previous pain experience (grouped into minimal, moderate and extensive amounts as described above) was related to labour pain intensities (See Table 3 2 1) When analgesic use was controlled by analysis of co-variance, subjects with minimal previous experience of pain had significantly lower levels of labour pain on the Sensory ($t = 2.16$ df = 45 p = 0.03) and Total ($t = 2.33$ df = 45 p = 0.02) Pri 1 measures than subjects who had previously experienced moderate pain. Subjects who had extensive previous pain experience had significantly lower levels of Sensory ($t = -3.18$ df = 45 p = 0.002) and Total PRI 1 pain ($t = -2.78$

Table 3 2 1 Labour pain scores for subjects with varying amounts of previous pain

LABOUR PAIN MEASURE	N	MINIMAL AMOUNTS OF PREVIOUS PAIN		MODERATE AMOUNTS OF PREVIOUS PAIN		EXTENSIVE AMOUNTS OF PREVIOUS PAIN		F	p
		MEAN	SD	MEAN	SD	MEAN	SD		
Sensory 1	11	17.1	5.2	23.5	8.5	17.1	8.3	4.16	0.02*
Affective 1	11	2.1	2.9	4.7	3.7	3.7	3.3	2.06	0.13
Evaluative 1	11	1.9	1.7	2.9	1.3	2.2	1.8	2.09	0.13
Total PRI 1	11	21.2	7.1	31.2	12.1	23.0	10.7	4.38	0.01**
PPI 1	11	2.4	2.2	2.9	1.2	2.8	1.2	0.59	0.55
VA 1	11	5.0	2.0	6.2	2.2	5.5	3.0	0.87	0.42
Sensory 2	10	23.0	8.9	25.5	7.8	19.7	11.4	1.76	0.18
Affective 2	10	5.5	3.2	6.6	3.5	4.0	3.8	2.42	0.10
Evaluative 2	10	3.0	1.6	3.5	1.3	2.7	2.0	1.12	0.33
Total PRI 2	10	31.5	12.6	35.0	11.3	26.5	15.2	1.93	0.15
PPI 2	10	2.6	1.4	3.1	1.1	3.3	1.0	1.35	0.27
VA 2	8	8.6	1.4	7.2	2.0	8.6	1.2	3.41	0.04*

For abbreviations see Table 1 3 2

df = 45 p = 0 007), and Affective (t = -2 24 df = 45 p = 0 02)
and Total PRI 2 pain (t = -1 97 df = 45 p = 0 5)

The amount of previous pain was significantly and positively correlated with the intensity of previous pain unrelated to childbirth, the stressfulness of this previous pain experience, the number of types of previous pain experienced and the frequency with which they occurred. The intensity of previous pain related to childbirth was positively and significantly correlated with the amount of previous pain experience (see Table 3 2 2)

The amount of previous pain experience was assessed by the Investigator using the data available from the first post-natal Interview only. The correlation between these two assessments of the amount of previous pain was $r = 0.88$ which was highly significant ($N = 51$ p < 0 001)

3 2 3 DISCUSSION

The amount of previous pain was a much broader measure of pain experience than the intensity of previous pain. It took into account the intensity of all previous pain experiences plus the frequency, variety and stressfulness of these experiences (see Fig 3 1 1 and Appendix 2)

Since it also took into account subjects' previous experience of pain related to childbirth it may be considered to be a more valid measure of past pain experience than the measure used in Part 2 of this study. That measure relied solely on the intensity of the most painful previous pain unrelated to childbirth. It thus ignored other factors related to pain which may be of considerable importance to the sufferer and of relevance to any hypotheses concerning the relationship between previous pain experience and labour pain experience.

Table 3 2 2 Correlations between the amount of pain previously experienced and the intensity of previous pain and its specific characteristics

MEASURE 2nd PNI	MEASURE 1st PNI	N	r	p
	Intensity of previous pain	51	0 43	<0 01
	Stressfulness of previous pain	51	0 39	<0 01
The amount of previous pain	Frequency of previous pain	50	0 69	<0 001
	Number of types of previous pain	50	0 55	<0 001
	Intensity of previous labour pain (if only 1)	18	0 62	<0 01
	Intensity of previous labour pain (if more than 1)	10	0 79	<0 01
	Intensity of pregnancy pain	18	0 38	<0 1

2nd PNI - Assessed by Investigator and Co-rator on 2nd post-natal interview data

1st PNI - Assessed by subject at 1st post-natal interview

The 51 subjects had experienced varied amounts of previous pain, ranging from one subject (Mrs N) who could only recall one instance of very mild pain, to Mrs McP who had experienced a number of severe acute pains in addition to her daily experience of chronic arthritic pain. Mrs N was one of only two NPP (no previous pain unrelated to childbirth) subjects who participated in the third interview. The other NPP subject was multiparous and had thus experienced some amount of previous pain. It was unfortunate that this interesting group of subjects was not better represented in this part of the study. The methodology used did not allow for a 'quota' selection of previous pain groups.

The remaining 10 subjects who were assessed as having had minimal previous pain experience seemed to represent a subject population at the lower end of the normal range of pain sensitivity rather than a group atypically insensitive to noxious stimulation (see 2.4.3.2.1.) Yet they demonstrated a relationship between restricted previous pain experience and low levels of labour pain similar to that shown by NPP subjects (Fig 2.4.3). It would therefore seem more correct to state that women who have had minimal previous pain experience (rather than no previous pain experience) will have low levels of labour pain.

Subjects who had experienced extensive amounts of pain in their lives had lower levels of labour pain than subjects who had experienced moderate amounts of pain previously. Thus a broad measure of previous pain experience, the assessment of which was not directly dependent on the subject herself, was related to labour pain experience in the manner hypothesised.

A subject's assessment of the intensity of previous pain may be affected by her experience of labour pain. If labour pain was very severe she may recall her previous pain as being much reduced by comparison (see 2 4 3 4 1 for fuller discussion of this point). The substantial correlations found between the rater's assessment of the amount of previous pain, based on the subject's structured assessments of its intensity, frequency, etc (first PNI data) and that based on the second PNI data, suggests that an independent rater's assessments and the subject's were similar.

It was therefore unlikely that the subject's assessments of pain had been seriously biased by their experience of labour pain. Furthermore, it was found in a separate study (Gijbers and Niven, unpublished findings) that subjects who had rated the intensity of previous pain experience ante-natally, did not significantly alter their ratings after giving birth.

3 2 4 PREVIOUS PAIN EXPERIENCE (INTENSITY AND AMOUNT) AND LEVELS OF LABOUR PAIN

The results of this study have shown that two different measures of previous pain experience were related to significant differences in levels of labour pain. The intensity of previous pain unrelated to childbirth was assessed by the subjects themselves, and evidence suggests that their assessment of previous pain was not strongly affected by their more recent experience of labour pain. The amount of pain previously experienced was a broader measure of previous pain. It included a measure of pain related to childbirth.

Minimal previous experience of pain was related to the lowest levels of labour pain. Moderate intensities and amounts of previous pain were related to the highest average labour pain levels. Severe intensities of previous pain and extensive amounts of pain experience were associated with more moderate levels of labour pain.

PART 3

CHAPTER 3 - COPING STRATEGIES

3.3.1. INTRODUCTION

In the last chapter it was confirmed that the previous experience of pain was related to levels of labour pain. The differential use of coping strategies may explain this relationship.

In this chapter the nature of coping strategies used in response to pain and stress and during labour will be described (3.3.2.). The acquisition of these strategies will be related to modelling and ante-natal class attendance and the use of coping strategies during labour will be related to their previous use in coping with pain and stress (3.3.3.).

The levels of labour pain associated with the use of single strategies will be reported (3.3.4.) and multiple strategy use will be discussed (3.3.5.).

3.3.2. THE NATURE AND USE OF COPING STRATEGIES

3.3.2.1. RESULTS

Table 3.3.1. describes the nature of coping strategies used in experimental and clinical pain studies; in instances of previous pain and stress; and during labour. The strategies used in response to experimental and clinical pain were described in the studies cited in 3.1.1.2. The nature of the strategies used to cope with pain, stress and labour pain by the subjects of this study was described by those subjects.

Table 3.3.1. shows that many of the strategies used by the subjects of this study could be classified under headings derived from the clinical and experimental literature. However the nature of spontaneously generated strategies differed from the nature of strategies which had been formally taught (as in clinical and experimental pain studies and in ante-natal training).

Table 3 3 1 The nature of strategy use

STRATEGY	LITERATURE DEF.	PREVIOUS PAIN AND/OR STRESS	LABOUR PAIN
Relaxation	Structured relaxation techniques	Structured techniques rarely used (N=1) Relaxation achieved through "putting feet up and letting mind go blank" (N=15), having a drink (N=3) or a cigarette (N=10), watching "mind-numbing rubbish" on the TV (N=6), having a bath (N=2), going to bed (N=6), getting neck massaged (N=2)	Structured breathing techniques used as taught at ante-natal classes A number of S's said they used these techniques, but just couldn't relax (N=20) Breathing exercises were relaxing.
Distraction	'Mental distractors' eg doing mental arithmetic, counting backwards, focussing on details of external object, eg picture	'Mental distractors' rarely used was typically achieved through 'keeping busy' (N=41) Tasks chosen were usually moderately physically demanding, but not taxing mentally, eg housework Some subjects escalated the demands of the task as pain or stress increased (N=3) eg Mrs A cleaned cupboards if pain not too bad, but cleaned out deep-freeze if pain worse Reading or watching TV was a source of distraction for some (N=10) Many S's commented that distraction was only effective if pain or stress comparatively mild If severe it was useless, especially where stress was involved	Physical distractors used before admission to hospital (N=10) eg doing ironing, watching TV, reading, conversing, were effective distractors in early labour but useless later Mental distractors used by some (N=11) eg counting ceiling tiles Many complained of lack of suitable distractors (N=16) "There's nothing to watch but the clock " Breathing exercises were distracting (N=16)
Imagery	Imagining a pleasant situation, eg lying on a warm beach, hot sun, cry of gulls, etc and concentrating on this image	Same kind of imagery used Typically holiday scene. (N=6) In one subject, a romantic scene Usually used in dental situation to cope with short-lived relatively intense pain (N=6)	No report of imagery used deliberately to distract A number of subjects mentioned their tendency to 'day dream' in mildly stressful situations 'Holiday scene' rarely used (N=2) Images of the baby were typical pleasant distractors, eg picture of taking baby home, what it would look like Very unpleasant images of pain itself, reported by some subjects (N=4) eg "Black Hole", "Whirling purple clouds"

STRATEGY	LITERATURE DEF.	PREVIOUS PAIN	STRESS	LABOUR PAIN
Reversal of affect	Thinking of the sensations causing or accompanying the pain as positive not negative, eg arm in ice water, usually painful, thought of as pleasantly cooling. Pain thought of as being acquired through adventurous escapade.	Thinking of dysmenorrhoea as meaning that her body was functioning in a healthy female fashion.		Pain of contractions positively and enthusiastically welcomed as evidence of healthy and rapid progress in labour. Some subjects reported visualising their cervix dilating with each pain. (N=5)
Breathing techniques	A variety of breathing techniques as taught by Lamaze-type PCT including deep, slow chest breathing; 'pant/blow' breathing and panting.	Not probed for. One subject spontaneously reported using techniques during breast feeding made very painful by cracked nipple.		Majority (N=34) used deep, slow chest breathing to cope with contraction pains. Panting was used at crowning. These techniques are taught at ante-natal classes. 4 S's (who had attended NCT classes) used Lamaze-type breathing.
Normalisation	Manipulation of apparent harmfulness of experientially induced pain affects attribution. However, all exp. induced pain is in fact harmless and only minor manipulation of harmfulness is ethically permissible.	While all subjects would worry about some kinds of persistent, unusual or severe pain, a number of subjects looked on pain as part of normal life (N=21). Others ('non-normalisers') panicked at any new pain, automatically fearing "the worst" and worried about "what was really wrong" even if reassured by doctors that pain was normal.		There was a clear differentiation between subjects who regarded labour pain as part of normal processes of childbirth (N=32) and those who thought "There must be something wrong because the pain is so bad". 9 subjects thought they were going to die because the pain was so severe.

STRATEGY	LITERATURE DEF	PREVIOUS PAIN	STRESS	LABOUR PAIN
Control	Internal rather external locus of control Actual or apparent control over intensity or timing of exp induced pain Control over pain inducing procedures, eg patient carries out own debridgement of burn tissue	25 S's reported that they felt "in control" when in pain They knew what to do, how to cope with it and didn't let it "Get on top" of them A few of these subjects (N=3) said that very severe instances of acute pain produced a different response The other subjects (N=26) felt helpless when faced with pain Being in pain meant not being in control for them	While many S's (N=36) felt "in control" in general in their lives, able to cope with minor stressors and attributing success to themselves not to fate or luck, a substantial proportion of these S's (N=20) reported experiencing severe stress which couldn't be controlled "There was nothing I could do about it It just had to be got through" Such experiences happened to subjects who normally coped well with very demanding lives as well as to subjects who had been more sheltered	19 S's felt "in control" in labour The remainder said they didn't feel "in control", 12 of whom didn't feel "out of control" either The remaining 20 did feel "out of control" at some point in labour. Being "in control" meant different things to different S's For some (N=5) it meant having some control over the processes of childbirth, for others, participating in the decisions made about the birth, eg what drugs, ? meant not "giving themselves a showing up", ie not being "out of control" (N=10)
Staff control	-	-	-	About half the subjects felt that the staff were in control The majority of these S's were happy about this situation (N=21) There was no dichotomy between staff control and person control Both could be in control (N=16) or neither (N=6)

STRATEGY	LITERATURE DEF	PREVIOUS PAIN AND/OR STRESS	LABOUR PAIN
Idiosyncratic strategies	-	<p>5 S's reported that they focussed their minds on the pain and concentrated on it. They said this was helpful</p> <p>A number of S's used some kind of 'time-limit' strategy, eg exams - "It will be over in 2 hours" Dysmenorrhoea "It will be better by tomorrow" "It will be done with when I'm 50" Bereavement "I'll feel better in a month's time" (N=10)</p> <p>The presence of a particular person was very helpful to many (N=15). Often the husband, whose presence was associated with pain relief (N=4) and relief from stress (N=12) not just comfort. One subject always talked to one of her 4 children when she was in pain - came to associate this child's presence with pain relief. "She was at school, so it was really bad that day" (Mrs P)</p> <p>Mrs T had learned to put herself to sleep through a kind of self hypnosis when she had prolonged intense pain following a chest surgery as a child. Prayer helped Mrs MCP cope with her chronic pain and with the many severe stresses she had in life</p>	<p>10 S's reported that they focussed their minds on labour pain</p> <p>"It will be over by tomorrow" (N=3) A number of S's who normally used a 'time-limit' strategy said they couldn't use it in labour, because they didn't know how long it would last.</p> <p>The presence of the husband served as a means of pain and stress relief for a number of subjects who had experienced this before (N=9). Mrs P brought the child's picture with her and held an imaginary conversation with her.</p> <p>Mrs T reported that she was very upset that she had coped with labour pain so badly. She had coped with her chest pain so well, but couldn't go to sleep in labour. She prayed through labour, concentrating her mind on it whenever the pain came on.</p> <p>Ms Q leaned on a wall to get strength in early labour. Later she leaned on her partner.</p> <p>Ms R (a concert violinist) played symphonies in her head during labour.</p>

Table 3 3 2 demonstrates the substantial level of agreement which existed between the two independent raters on their classification of coping strategies used

Table 3 3 2 Agreement between the two independent raters on assessment of strategy use, transfer of strategies and desirability of pregnancy

QUESTIONNAIRE ITEM	AGREEMENT
Relaxation	96%
Distraction	98%
Imagery	96%
Reversal of Affect	96%
Breathing techniques	98% Agreement on level of use 96%
Normalisation	94%
Control	91%
Personal control/staff control	97%
Idiosyncratic strategies	94%
Transfer of strategies	96%
Modelling (imitation and direct learning of strategies)	92%
Desirability of pregnancy	90% - agreement on level of desirability

Table 3 3 3 shows the use of these classified strategies in response to previous pain, stress and labour pain

All of the strategies probed for in the second post-natal interview had been used by subjects. The number of subjects using each strategy varied considerably. Some strategies were used primarily in response to one type of situation, eg reversal of affect was used primarily in

Table 3 3 3 Coping strategies used in pain, stress and labour

STRATEGY	*NO OF SUBJECTS USING THE STRATEGY			TOTAL
	IN PAIN	IN STRESS	IN LABOUR	
Relaxation	19	17	17	37
Distraction	41	32	34	49
Imagery	7	0	17	18
Reversal of affect	1	NA	11	11
Breathing techniques	NA	NA	38	38
Normalisation	21	NA	32	32
Control (Subjects)	25	36	19	38
Staff control	NA	NA	26	26
Staff trusted ^(x)	NA	NA	21	21
Idiosyncratic strategies	25	32	31	41
Focussing	5	NA	10	13

*Total number of subjects = 51

NA = Not applicable

(x) Subjects who felt that the staff were in control and were happy about this

labour, while others were more generally used. For example distraction (both mental and physical) was commonly used in response to pain of varying etiology, to stress and at various times during the parturient's experience of birth.

A number of subjects used idiosyncratic strategies, examples of which are given in Table 3.3.1. A proportion of these strategies involved 'focussing', i.e. the focussing of attention on the pain, the painful stimuli and the feelings generated by the pain (see examples in Table 3.3.1). Focussing was therefore categorised separately from other idiosyncratic strategies.

46 subjects altered or abandoned the use of a specific strategy as labour progressed from early to late first stage (N=32), from late first stage to transition (N=16) and from first to second stage (N=24).

44 subjects used Pethidine during the first stage of labour, 41 subjects used Entonox during the first or second stage.

3.3.2.2 DISCUSSION

The manner in which a particular coping strategy was used by subjects when they were suffering pain or encountering stress differed from the way these strategies were taught to subjects participating in experimental or clinical research or attending ante-natal classes. When subjects received formal instruction in the use of relaxation, they used structured relaxation techniques. In the absence of such training subjects achieved relaxation by "putting their feet up" or having a drink or a hot bath. Training is given in the use of mental distraction, yet the type of distractor most commonly used was physical rather than mental, i.e. "keeping busy". Presumably subjects found informal relaxation

and physical distraction effective, since they used these strategies repeatedly to cope with pain and stress. They might even be more effective than the variants evaluated by clinical and experimental research and consequently taught to large numbers of people suffering from acute and chronic pain. Evaluation of the relative efficacy of informally acquired strategies is clearly needed.

The nature of a coping strategy was therefore determined by the manner of its acquisition, whether formal or informal. It was also determined by the situation it was used in. For example, physical distraction could not be used in labour once the subject was hospitalised, since there were no suitable tasks available, so mental distractors were used instead. The range of potential mental distractors was further constrained when the subject was confined to bed in a bare, clinical labour room, so subjects resorted to counting the ceiling tiles. The type of strategy remained the same, but its nature changed in response to the situation the subject was in.

The nature of the noxious stimuli affected the kind of coping strategies used in response. While some strategies could it seems be used to cope with any kind of stress or pain, notably distraction, others were more specific. Labour pain in particular required, or attracted, specialised coping strategies. Some of these had been taught in ante-natal classes for the precise purpose of coping with labour pain, eg the use of structured breathing techniques. Others were used outwith childbirth but seemed to be facilitated by the nature of childbirth and the pain which accompanies it. Normalisation of labour pain seemed not surprisingly to be easier to achieve than normalisation of pain associated with disease, trauma or surgery. Reversing the affect of labour pain was more

common than reversing the affect of other pains, presumably for similar reasons. The use of pleasant imagery as a source of distraction was rare outwith childbirth but was fairly common in labour, perhaps because a pleasant image was readily available (of the baby), whereas other distractors were not.

Many subjects reported that the intensity of pain or stress affected their strategy use. An increase in the intensity of pain could render an effective strategy useless, forcing a change in strategy or resort to pharmacological analgesics. (See for example Mrs A's use of differing distractors.) The change in the intensity of labour pain (from early to late first stage) as well as the change in its nature (from first to second stage) provoked the alteration or abandonment of coping strategies (see Table 3.3.1.)

Strategies which were effective in ameliorating 'everyday' stress and which gave subjects some control over the demands of normal life were useless in the face of severe and traumatic stress (see Table 3.3.1 Control). Subjects indicated that a concept of 'control' was meaningless in such circumstances. Nothing could be done to cope with or alleviate the stress - relaxation was impossible, distraction unattainable, yet somehow the experience was endured'. Folkman (1984) in a review of the utility of control, has concluded that control is not always helpful, especially when events of extreme intensity or riskyness are involved. The results of this study would suggest that control of severe stress and intense pain is not only unhelpful, but is in some circumstances unattainable.

Idiosyncratic strategies were widely used. The nature of these varied

considerably Only one group of strategies could be categorised separately - Focussing Focussing attention on the nature and experience of pain was a strategy which has not (as far as is known) been described in the literature on coping strategies Turk (1985) in his extensive review of cognitive coping skills has recorded two techniques which bear some superficial resemblance to focussing "Imaginative transformation of pain", involves acknowledging noxious sensations but interpreting them as something other than pain Focussing acknowledges noxious sensations and acknowledges them fully as pain "Somatisation" involves focussing on the part of the body receiving noxious stimulation but in a detached manner, eg as if writing a biology report Focussing did not seem to involve any detachment On the contrary, all the feelings associated with the pain were concentrated upon

Informal discussion of the use of focussing as a coping strategy has revealed that it is a technique used sometimes by swimmers and runners when "going through the pain barrier" and is recommended as an effective method of coping with this pain by some coaches Dr Wynn Parry in a personal communication has reported that a number of his patients suffering from the severe chronic pain of brachial plexus injury use this technique and report that its use is followed by a period of complete relief from pain Since these patients suffer from particularly intense intractable pain (Wynn-Parry, 1980) such relief is notable It is also unusual since the effect of psychological coping strategies is normally to reduce pain levels (Melzack and Wall, 1982) not to abolish them Perhaps experiencing the full force of pain, stimulates endogenous analgesic mechanisms

The pattern of strategy use depicted in Table 3 3 3 shows that there

was considerable overlap between the strategies used to cope with pain and stress and these used in labour (Transfer of strategy use will be considered in more detail in the following chapter.)

Many of the idiosyncratic strategies used previously were also used in labour but some, eg 'time limiting' were inappropriate. This seemed to particularly distress some subjects since it affected their belief in their ability to cope with pain, their 'self-efficacy' as Bandura would term it. Mrs T (see Table 3.3.1, Idiosyncratic Strategies) expressed this feeling well, "I thought I was good at coping with pain since I'd coped very well, I thought, with the pain of all these tubes going in and out (following her repeated chest surgery). But then I couldn't put myself to sleep in labour. I needed to stay awake. And the pain was terrible, and I couldn't do a thing about it, and that made it worse. I felt very bad about it - I was a real disappointment to myself."

It can therefore be concluded that the subjects of this study, who were fairly representative of British women of reproductive age, used a considerable number of strategies in coping with pain, stress and labour pain. The nature of many of these strategies resembled, but was not the exact equivalent of strategies which have been shown to modulate pain. The type of strategy used and the exact form which that strategy took was dependent upon the nature of the noxious stimuli involved and the context in which they occurred. Very intense pain or stress could not be coped with through the use of the coping strategies examined. It was coped with in other ways, for example, through the use of drugs, or was simply endured, "tholed" or survived.

3 3 3 1 RESULTS

Relaxation in labour was marginally associated with attendance at ante-natal classes. The use of other coping strategies was not associated with ante-natal class attendance. A positive attitude to staff control was significantly associated with class attendance. See Table 3 3 4.

Table 3 3 4 Coping strategies used in labour and previous attendance at ante-natal classes

STRATEGY	CHI SQUARE STATISTICS	df	p
Relaxation	3 00	1	0 08 ^{tr}
Distraction	0 20	1	0 66
Imagery	0 11	1	0 73
Reverse affect	0 03	1	0 84
Breathing	0 31	2	0 37
Normalisation	0 64	1	0 42
Control	1 22	1	0 26
Staff control	2 26	1	0 12
Trust staff	4 02	1	0 04*
Idiosyncratic strategies	0 00	1	0 98
Focussing	0 00	1	0 92

The use of relaxation, imagery and focussing strategies in labour was significantly related to their previous use in coping with pain. The perception of being 'in control' in labour was associated with the perception of being in control when stressed. The use of idiosyncratic strategies was strongly associated with their previous use. See Table 3 3 5.

Some coping strategies had been acquired through modelling, ie through

Table 3 3 5 Coping strategies used in labour and their previous use in response to pain and stress

STRATEGY	PREVIOUS PAIN/ LABOUR CHI SQ	df	p	PREVIOUS STRESS/ LABOUR CHI SQ	df	p	STRESS & PAIN/ LABOUR CHI SQ	df	p
Relaxation	4.3	1	0.05*	0.42	1	N.S.	3.6	2	0.1
Distraction	0.7	1	N.S.	1.6	1	N.S.	0.02	2	N.S.
Imagery	3.4	1	0.10 ^{tr}	N.A.			N.A.		
Reverse affect	1.7	1	N.S.	N.A.			N.A.		
Breathing	N.A.			N.A.			N.A.		
Normalisation	0.04	1	N.S.	N.A.			N.A.		
Control	1.5	1	N.S.	3.4	1	0.1*	1.9	2	N.S.
Trust staff	N.A.			N.A.			N.A.		
Idiosyncratic strategies	0.4	1	N.S.	1.9	1	N.S.	10.9	2	0.001*†
Focussing	8.4	1	0.001***	N.A.			N.A.		

imitation of another person's coping strategies and/or through the influence of another person on the subject's use of coping strategies. 25 subjects showed evidence of modelling stress coping strategies, 28 modelled pain coping strategies and 15, labour pain strategies. The model imitated could be a family member, a friend or the spouse. The most common models were the parents (60% of cases). The parents (91% of cases), particularly the mother, had the most direct influence on the subject's use of coping strategies, through their early and continued reinforcement of certain strategies, and their active discouragement of others.

3 3 3 2 DISCUSSION

The subjects of this study used a considerable variety and number of coping strategies in labour. However they appeared to have learned very few of these at ante-natal classes, since class attendance was not strongly associated with the use of strategies in labour, even those which ante-natal training is specifically designed to encourage, relaxation, normalisation, the use of structured breathing techniques (Chertok, 1959, Astbury, 1980a, b). Instead it seemed that subjects frequently used strategies which they had used before (see Table 3 3 5). Such a finding, while depressing for ante-natal trainers, is not unique. Scott and Barber (1977) found that subjects instructed in the use of specific cognitive coping strategies used their own coping strategies (ie those which were already in their repertoire) to cope with experimentally induced pain, not the strategies they had been taught. Taenzer (1980) found the same effect in a study of post-operative pain. Furthermore as Astbury (1980a) has commented, reactions to childbirth may reflect very basic attitudes, beliefs and fears which are not amenable

to childbirth education and instruction. So the achievement of relaxation in labour (rather than the mere practising of relaxation techniques) and the normalisation of labour pain, may have been easier for some subjects than others, regardless of their attendance at ante-natal classes.

The most surprising 'non relationship' found was between ante-natal class attendance and the use of structured breathing techniques. The use of these techniques is central to ante-natal training (Chertok, 1959) and it seems unlikely that their use would be facilitated or inhibited by complex psychological or emotional factors. The lack of association can be explained, not by the failure of ante-natal training but by its success in demonstrating the efficacy of structured breathing techniques to a wider audience. If subjects had not attended ante-natal classes, they had often read about the use of these techniques in the multitude of books now available on the subject of birth. If not, the attending midwife would teach her patient how to breathe during contractions, talking her through each contraction until she had acquired the techniques of slow regular inspiration and exhalation, and encouraging her continued use of these. Thus the vast majority of subjects used these techniques in labour, whether they had attended ante-natal classes or not.

It was evident that many of the subjects had an extensive repertoire of coping strategies which they used in response to pain and stress (see Table 3.3.1) and in labour (see Table 3.3.1 and 3.3.5). How had these strategies been acquired? Presumably many strategies had been acquired through trial and error, and through the association of pain relief with certain behaviours or events not in themselves analgesic, which became

capable of conditioned pain modulation. Other strategies had been copied. For example a number of subjects copied the stress coping strategies of their parents "I always keep a brave face up in front of other people, even if I'm crying inside. That's just what my Mum did." Some wished to be more like someone else and appeared to have altered their ways of coping accordingly. "My husband's always very calm and patient when things go wrong, whereas I fly off the handle. I've really tried to be more like him over the years, and I have calmed down." Evidence of imitation of pain coping strategies, and of more precise stress coping strategies, was rarer, though the use of many common strategies, eg distraction, seemed partly the result of imitation and partly the result of differential reinforcement.

A few coping strategies had been taught directly. These were all related to coping with Dysmenorrhoea. Mothers, sisters, friends and occasionally "the Doctor" (the only instance of advice on coping coming from a medical source) gave very specific advice. "Go to bed with a hot water bottle" was the commonest. "Scrub the floor", "Go for a long walk" were others. This advice, which was sometimes but by no means always based on what the advisor did herself (rather than "said"), was typically followed assiduously for years. So instruction can be effective under some circumstances. The precise nature of these circumstances merits further examination.

The commonest form of 'modelling' so called, involved the reinforcement of certain coping strategies by parents. Subjects clearly recalled the "do's and don't's" of coping with pain and, to a lesser extent, stress, which had been part of their upbringing, and they were aware that they would similarly shape their children's responses to the multitude of

minor traumas which they were bound to encounter. A very typical account of this involved the discouragement of "making a fuss" about pain or injury. Distractors were provided for the young sufferer - toys were squeaked, sweeties produced, attention was diverted. The older child was given something to do to "keep her mind off it" and the teenager was given the formula "keep busy" which was quoted so frequently by the then adult subjects when they were asked how they coped with pain or stress (see Table 3.3.1.)

This approach to coping comprised an attitude to life in general "Life's hard", to how to cope in general "So you'd just better get on with it and not make a fuss", and to the use of a specific strategy "You just have to keep busy". Such an approach may be peculiar to Scottish culture since it was very prevalent in the Scottish subjects interviewed, and since Bond (1979) has noted a similar approach in Scottish cancer patients. It may alternatively reflect a common and logical response to a hard life which might be more prevalent in Scotland, but will occur in all cultures. Its existence does account for the popularity of distraction as a coping strategy amongst the subjects of this study.

Current research on coping is becoming focussed on coping style (Tan, 1982) since the existence of different coping styles has been shown to affect the way that subjects choose to cope with stressful or painful situations (Turk and Genest, 1979). Differences in coping style have been shown to reflect personality factors including anxiety and locus of control (Tan, 1982). The results of this study suggest that attitudes to coping reflect another kind of coping style, one which is acquired through imitation and reinforcement, is influenced by the family and the culture or life style of that family, and one in which the

attitudes to coping prescribe the use of a certain kind of coping strategy

3 3 4 SINGLE COPING STRATEGIES AND LEVELS OF LABOUR PAIN

3.3 4 1 RESULTS

Fig 3 3 1 shows the average levels of labour pain associated with the use of each strategy during labour

Table 3 3 6 lists the strategies and notes whether or not there was a significant difference in labour pain levels between subjects who used a strategy in labour and those who did not. Relaxation, distraction, reversal of affect, the use of breathing techniques and trusting the staff were all associated with significantly lower levels of labour pain. Table 3 3 7 describes these differences in detail. Reversal of affect and trusting the staff were associated with highly significant differences in levels of labour pain assessed on a number of first stage and recall MPQ measures. Relaxation, the use of breathing techniques and in particular, distraction, had a more restricted relationship with lower levels of labour pain.

There was a significant interaction between trusting the staff and analgesic use. The pattern of interaction was complex as is shown in Table 3 3 8. An analysis of co-variance controlling for the effects of Pethidine and Entonox use showed that trusting the staff was significantly related to lower levels of labour pain, even when the effects of analgesic use had been controlled. See Table 3 3 9.

There was no significant interactions between analgesic use and the use of relaxation, distraction, reversal of affect or structured breathing techniques. (All F values were less than 1.64 $p > 0.1$)

Fig 3 3 1 Levels of labour pain and coping strategies

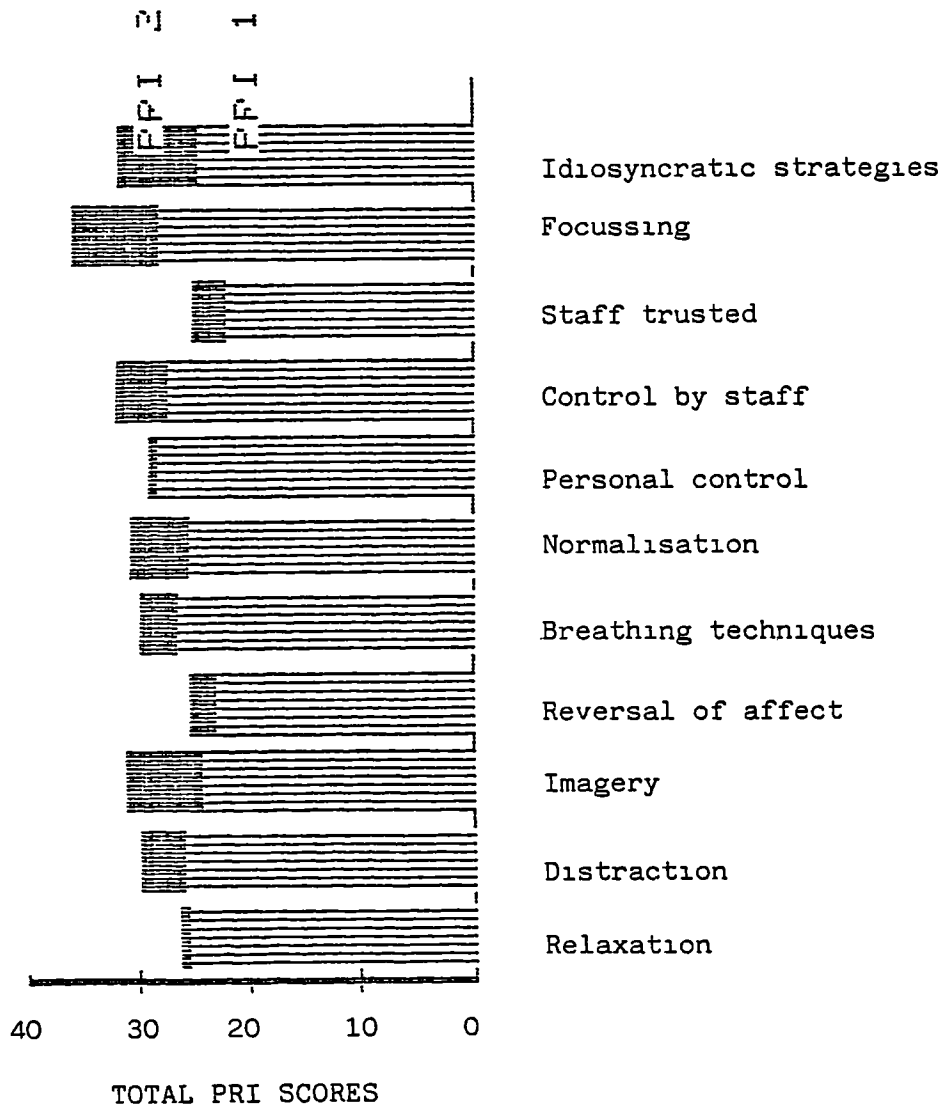


Table 3 3 6 Strategy use and differences in labour pain

STRATEGY	ANY SIGNIFICANT DIFFERENCE BETWEEN USE AND NON-USE	LEVEL OF SIGNIFICANCE (x)	PAIN MEASURES INVOLVED			
Relaxation	yes	<0 01	Sensory 2	Affective 2.	Evaluative 2	
			Total PRI 2			
Distraction	yes	<0 05	Sensory 2			
Imagery	no					
Reversal of affect	yes	<0 001	Affective 1	Affective 2	Evaluative 2	
			Total PRI 2			
Breathing techniques	yes	<0 01	VA 2 (trend on Affective 2)			
Normalisation	no					
Control	no					
Staff control	no					
Staff trusted	yes	<0 001	Sensory 1	Affective 1	Total PRI 1	
			Sensory 2	Affective 2	Evaluative 2	
			Total PRI 2			
Idiosyncratic strategies	no					
Focussing	no					

(x) The level quoted is the highest level of significance See Table 3 3 7 for other levels

Table 3 3 7 Strategy use and levels of labour pain - significant differences between use-non use of coping strategies

LABOUR PAIN MEASURE	N	STRAT USED IN LABOUR		STRAT NOT USED IN LABOUR		SD	t	p
		Used	Not used	Used	Not used			
<u>Relaxation</u>								
<u>Sensory 2</u>	16	19 9	8 7	33	25 2	9 0	1 95	0 05*
Affective 2	16	3 8	3 6	33	6 6	3 3	2 60	0 01**
Evaluative 2	16	2 5	1 8	33	3 5	1 3	2 29	+0 02*
Total PRI 2	16	25 6	12 4	33	35 1	12 2	2 50	0 01**
<u>Distraction</u>								
<u>Sensory 2</u>	32	21 5	8 6	17	27 0	9 4	2 04	0 04*
<u>Reversal of Affect</u>								
<u>Affective 1</u>	11	1 5	1 9	39	4 5	3 7	3 60	+0 001***
Affective 2	10	3 2	2 9	39	6 3	3 6	2 56	0 01**
Evaluative 2	10	1 6	1 7	39	3 6	1 3	4 06	0 0002***
Total PRI 2	10	24 4	10 1	39	34 1	13 1	2 16	0 03*
<u>Breathing Techniques</u>								
<u>Affective 2</u>	36	5 1	3 8	13	7 3	2 8	1 87	0 06
VA 2	18	7 29	2 0	12	9 11	0 8	2 84	0 007**

LABOUR PAIN MEASURE	N	STRAT USED IN LABOUR		SD	N	STRAT NOT USED IN LABOUR		SD	t	p
		Trusted	Not trusted			Used in Labour	Not Used in Labour			
Staff trusted										
Sensory 1	21	17 3	22 2	6 6	29	8 9	4 40	8 9	4 40	0 04*
Affective 1	21	2 1	4 9	1 9	29	3 8	11 8	3 8	11 8	+0 001***
Total PRI 1	21	22 0	29 6	8 2	29	12 3	6 9	12 3	6 9	+0 01**
Sensory 2	21	19 0	26 2	6 7	27	9 1	9 04	9 1	9 04	0 004**
Affective 2	21	3 9	6 8	3 3	27	3 2	9 63	3 2	9 63	0 003**
Evaluative 2	21	2 6	3 6	1 7	27	1 3	5 37	1 3	5 37	0 02*
Total PRI 2	21	25 1	36 4	9 5	27	12 3	11 83	12 3	11 83	0 001***

+ represents separate variance t-test used because of unequal variance

Abbreviations as in Table 1 3 2

Table 3 3 8. Significant differences in labour pain levels associated with the interaction between trusting the staff and analgesic use

LABOUR PAIN MEASURE	GENERAL INTERACTION	SPECIFIC INTERACTION	PAIN LEVEL	SD	SPECIFIC INTERACTION	PAIN LEVEL	SD	df	t	p
Sensory 1	Trust/ Pethidine	Trust/ Later Peth.	16 4	5 0	Not trust/ Early Peth	26 0	9 7	44	3 13	0 003*
Affective 1	-									
Evaluative 1	-									
Total PRI 1	Trust/ Pethidine	Trust/ Late Peth	20 7	6 2	Not trust/ Early	35 7	13 2	44	3 71	0 006**
PPI 1	-									
VA 1	-									
Sensory 2	Trust/ Entonox	Trust/ Entonox later	17 6	6 1	No trust/ Entonox later	29 0	8 5	42	4 47	0 0001***
Affective 2	Trust Staff/Entonox use	Interaction	F = 5 27	p 0 009	No sig	t tests				
Evaluative 2	Trust/ Pethidine	Trust/late Peth Trust/late Peth	2 3	1 5	No trust/early Trust/early	4 1	0 9	22 2	+ 3 58	0 001*
Total PRI 2	Trust/ Entonox	Trust/ Entonox later	22 6	8 7	No trust/ Entonox later	40 2	11 2	42	4 92	0 0000***
PPI 2	-									
VA 2	-									

+ separate variance t-test used because of unequal within group variance
For abbreviations see Table 1 3 2

Table 3 3 9 Trusting the staff and levels of labour pain (Pethidine and Entonox as co-variants)

LABOUR PAIN MEASURE	N		SE	N		SE	t	p
		+NO TRUST			+TRUSTED			
Sensory 1	29	21 8	1 6	21	17 2	1 7	1 89	0 06*
Affective 1	29	4 9	0 6	21	2 3	0 7	2 76	0 008**
Evaluative 1	29	2 5	0 3	21	2 4	0 4	0 10	0 91
Total PRI 1	29	29 3	2 1	21	22 0	2 4	2 21	0 03*
PPI 1	28	3 0	0 4	20	2 4	0 3	1 79	0 07
VA 1	22	6 0	0 9	16	5 2	0 8	1 02	0 28
Sensory 2	29	25 8	1 5	21	19 5	1 8	2 58	0 01**
Affective 2	29	6 8	0 6	21	4 0	0 7	2 86	0 006**
Evaluative 2	29	3 6	0 3	21	2 7	0 3	2 03	0 04*
Total PRI 2	29	35 9	2 1	21	25 8	2 4	3 03	0 004**
PPI 2	27	3 2	0 4	20	2 9	0 4	1 14	0 25
VA 2	27	8 4	0 8	20	7 7	0 7	1 54	0 16

Trusted = Trusting the Staff 1 e All S's who perceived the staff as being in control and who were happy about this
 No Trust = Not trusting the Staff, 1 e Subjects who perceived the staff as being in control but were not happy
 about this, and subjects who did not perceive the staff as being in control
 + Adjusted means

For abbreviations see Table 1 3 2

3 3 4 2 DISCUSSION

Subjects who used relaxation, distraction, reversal of affect and breathing techniques had lower levels of labour pain than subjects who did not use these strategies in labour. The use of these strategies could have modulated noxious stimulation in labour and thus resulted in lower levels of pain. Alternatively their use could have been facilitated by low levels of noxious stimulation so that subjects with low levels of pain could use these strategies while subjects with intense labour pain could not. The restricted use of coping strategies in conditions of intense pain has already been noted in this study (see Table 3 3 1 and 3 3 2 1), subjects reporting that strategy use had to be abandoned and replaced with the use of pharmacological analgesics when pain unconnected with childbirth became very severe. Increasing intensities of labour pain also prompted this response though many subjects reported that they changed their use of strategies rather than abandoned them (see Table 3 3 2 1). Perhaps then the use of coping strategies in labour is merely a correlate of low levels of pain, not the cause of them.

However, experimental pain studies have shown that the use of these strategies can modulate noxious stimulation where the intensity of noxious stimulation involved is held constant between experimental and control subjects (Barber and Cooper, 1972, Stevens and Heide, 1977, Worthington and Martin, 1980, McCaul and Haugtvedt, 1982). McCaul and Haugtvedt showed that reversal of affect was superior to distraction in modulating noxious stimulation of more than 100 secs duration. The results of this study which involved subjects experiencing a series of painful stimuli of between 80 and 110 secs duration (see Fig 2 1 3) demonstrated the same effect. Furthermore there was no interaction between

the use of these strategies and the use of analgesics so there was no evidence of a 'switch over' from strategy use to drug use. As analgesic drugs cannot be used in sufficient concentrations to abolish labour pain (because of the consequent risk to the baby) the combination of strategy use and analgesic use would seem to offer a logical approach to achieving maximal pain relief in labour. It was this approach which was taken by many of the subjects.

It is therefore probable that the use of relaxation, distraction, reversal of affect and structured breathing techniques in labour modulated levels of noxious stimulation occurring at that time.

Worthington (Worthington and Martin, 1980, Worthington, 1982) has shown that the use of 'Lamaze' structured breathing techniques was associated with the modulation of experimental pain and with lower levels of labour pain. The results of this study showed that the use of less complex structured breathing techniques, as taught in ante-natal classes, was also associated with lower levels of labour pain though the amount of pain reduction (if due to modulation) was not extensive.

Neither staff control nor personal control was related to lower levels of labour pain but "trusting the staff", a measure which reflected the subject's satisfaction with staff control, was. These findings are supported by the results of a study by Scott-Palmer and Skevington (1981) which showed that Internal Locus of Control was associated with higher levels of labour pain than External LOC. Thus a belief in and perception of personal control in labour was not associated with lower levels of pain. Brewin and Bradley (1982) found that subjects' expectations (assessed ante-natally) that the staff would be in control of discomfort

were related to lower levels of labour pain. Thus the expectation that staff could control labour pain and the experience of their efficiency in controlling it (see Table 3.3.8) were related to lower levels of pain. However the results of this study have shown that the relationship between trusting the staff and low levels of pain was not entirely due to the effects of analgesics administered by the staff (see Table 3.3.9). Thus the development of a good relationship between staff and patients, a relationship which is dependent upon both the staff's competence and the patient's trust, is of great importance in childbirth.

The use of certain strategies in labour was therefore associated with lower levels of labour pain when the levels of pain associated with the use of each strategy were compared with those associated with non-use of the strategy. However many subjects used more than one strategy during labour, so the analysis of single strategy use is not sufficient. Some analysis of multiple strategy use is required.

3.3.5 MULTIPLE STRATEGY USE

3.3.5.1 RESULTS

An analysis of combined strategy use was intended. However as the majority of subjects used 3 or more strategies in labour and as the combinations of strategies were heterogeneous, such analysis was impossible. It would have amounted to the consideration of single cases. Instead a very simple measure of multiple strategy use was constructed - the total number of strategies used in labour. This measure took no account of the kind of strategies used. Every strategy used in labour was included, both those used consecutively and those used concurrently. Hence 'successful' strategies, i.e. those associated with significantly lower levels

of labour pain in the previous section, and 'unsuccessful' ones were sometimes lumped together

3 3 5 1 1 THE TOTAL NUMBER OF STRATEGIES USED IN LABOUR

Fig 3 3 2 shows the percentage of subjects using different numbers of strategies in labour. The total number of strategies used was correlated with levels of labour pain. Table 3 3 10 shows that the larger the

Table 3 3 10 Correlations between the number of strategies used in labour and levels of labour pain

LABOUR PAIN MEASURE	N	r	p
Sensory 1	51	-0.20	NS
Affective 1	51	-0.35	<0.01**
Evaluative 1	51	-0.02	NS
Total PRI 1	51	-0.25	<0.1
PPI 1	49	-0.29	<0.05**
VA 1	39	-0.10	NS
Sensory 2	49	-0.30	<0.05*
Affective 2	49	-0.44	<0.01**
Evaluative 2	49	-0.42	<0.01**
Total PRI 2	49	-0.38	<0.01**
PPI 2	48	-0.18	NS
VA 2	44	-0.28	<0.1

number of strategies used, the lower the levels of labour pain. Fig 3 3 3 depicts the average levels of labour pain associated with the use of few or many coping strategies and compared with the average levels of a number of clinical pains. It can be seen that even the use of large numbers of strategies was not associated with minimal pain.

Fig. 3.3.2. Percentage of subjects using varying numbers of strategies in labour

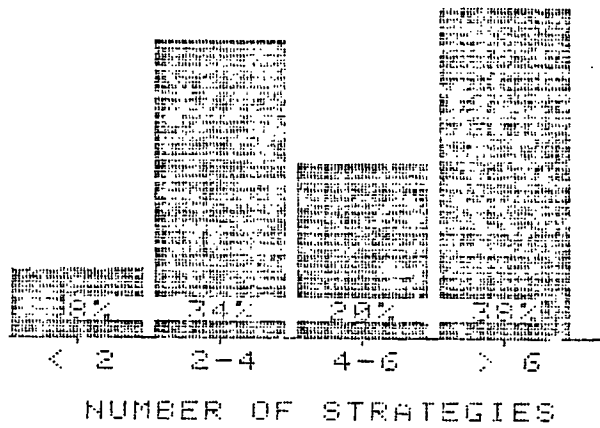
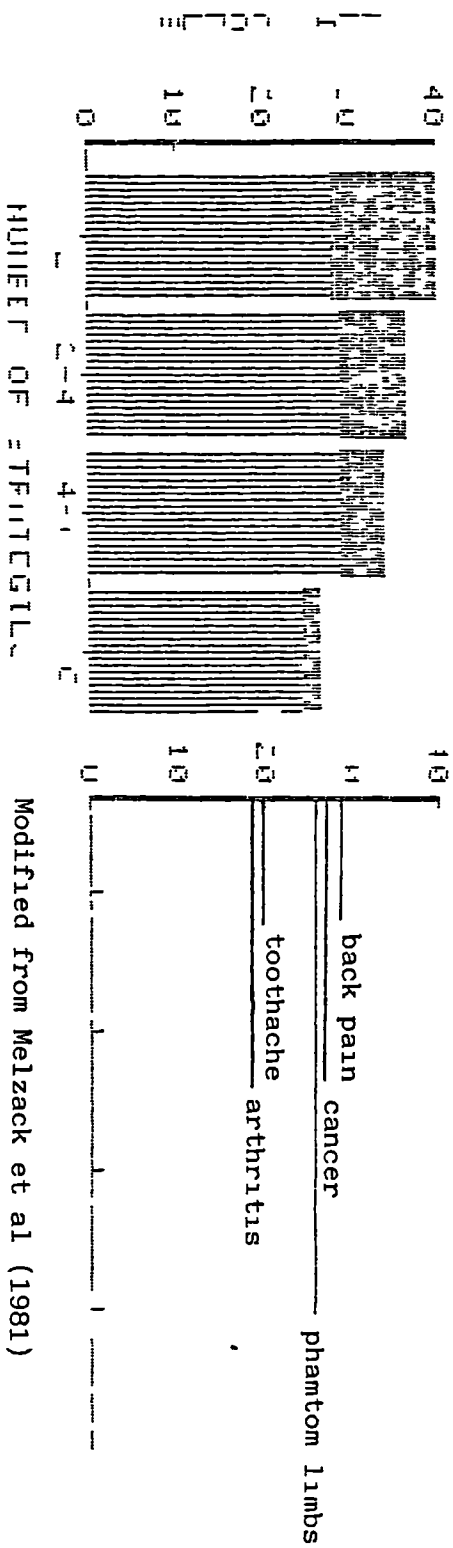


Fig 3 3 3 Levels of labour pain associated with the use of differing numbers of strategies in labour, compared with levels of clinical pain



Modified from Melzack et al (1981)
 Canadian Medical Association Journal
 125 357-363

Table 3.3.11 shows the correlations between the use of the different types of strategies in labour and the total number of strategies used. The use of 'successful' strategies was associated with the use of large numbers of other strategies.

Table 3.3.11 Correlations between the use of specific strategies in labour and the total number of strategies used in labour

SPECIFIC STRATEGY	N	r	p
Relaxation	51	0.34	<0.02*
Distraction	51	0.25	<0.1
Imagery	51	0.40	<0.01**
Reversal of Affect	51	0.44	<0.01**
Breathing Techniques	51	0.35	<0.02*
Normalisation	51	0.24	<0.1
Personal Control	51	0.49	<0.01**
Staff Control	51	0.19	NS
Staff Trusted	51	0.56	<0.001***
Idiosyncratic Strategies	51	0.25	<0.1

Strategy use was coded as 0 = not used in labour, 1 = used in labour

3.3.5.2 DISCUSSION

The subjects of this study used large numbers of strategies in labour. In part this reflects the broadness of the definition of strategy use, the use of idiosyncratic strategies being included as well as measures of attribution and control. Since the use of these strategies and the existence of attitudes to attribution and control have been associated with pain modulation in other studies (Nisbett and Schacter, 1966, Scott and Barber, 1977, Scott-Palmer and Skevington, 1981, Brewin and

Bradley, 1982) their inclusion seems justified. The large number of strategies used may also reflect the changing nature and intensity of labour pain and the nature of childbirth itself (see 3 3 2 2)

The increased effectiveness of multiple, as opposed to singular strategy use has been established in a number of experimental and clinical pain studies (Mitchell and White, 1936, Scott and Barber, 1977, Chappell and Stevenson, 1977) so the findings of this study that "the more the merrier" or at least "the less sore" are not surprising.

The beneficial effects of multiple strategy use may be due to the additive effects of combining different strategies. Melzack and Wall, (1982) have suggested that the combined use of different types of strategy will lower pain by simultaneously activating different modulatory systems. Such an effect may operate during labour. However multiple strategy use in labour also involved the changing use of strategies and as such may be a measure of the flexibility of a subject's response to labour pain, a type of pain which changes dramatically in its nature and intensity.

The association between the number of strategies used and levels of labour pain suggests that the strategies used do modulate the noxious stimulation occurring in labour. The argument that low levels of labour pain facilitate individual strategy use (see 3 3 4 2) is difficult to pursue when multiple strategy use is considered. Its extrapolation would make it necessary to argue that subjects with the lowest levels of pain would use a large number of different strategies, while those with higher levels of pain would use only a few. for what reason?

The amount of pain modulation achieved by strategy use and in many cases through the use of analgesic drugs as well, was not extensive. Subjects

still suffered considerable amounts of pain. Strategy use was presumably beneficial, since why else would it have been undertaken, but it did not ensure painless childbirth (see Fig 3 3 3)

PART 3

CHAPTER 4 - STRATEGY USE AND PREVIOUS EXPERIENCE

3 4 1 INTRODUCTION

This chapter will consider the transfer of strategies and the relationship between strategy use and the intensity and amount of previous pain. These data will be related to the hypothesis that subjects who have experienced considerable amounts and intensities of pain previously will develop and transfer a larger number of strategies than subjects who have had more moderate previous pain experience. This transfer of strategies will modulate levels of labour pain.

3 4 2 TRANSFER OF STRATEGIES USE AND TRANSFER OF STRATEGIES AND PREVIOUS EXPERIENCE OF PAIN

3 4 2 1 RESULTS

80% of subjects used strategies in labour which they have used previously to cope with pain or stress. The larger the number of transferred strategies used in labour, the lower was the level of pain (see Table 3 4 1)

Subjects who used transferred strategies had significantly lower levels of labour pain than subjects who did not use transferred strategies on the Affective 2 measure of pain only ($F(,47) = 3.89$ $p = 0.054$). Subjects who used three or more transferred strategies (3 = modal response) had significantly lower levels of labour pain than those who used few or no transferred strategies on a number of PRI 1 and 2 measures (see Table 3 4 2)

The total number of strategies used in labour was related to levels of labour pain. Therefore the effect of using a large number of transferred strategies may have been due to the contribution transferred strategies

Table 3 4 1 Correlations between the number of transferred strategies used in labour and levels of labour pain

LABOUR PAIN MEASURE	N	r	p
Sensory 1	51	-0 15	N S
Affective 1	51	-0 21	N S
Evaluative 1	51	-0 01	N S
Total PRI 1	51	-0 17	N S
PPI 1	49	-0 19	N S
VA 1	39	-0 02	N S
Sensory 2	49	-0 13	N S
Affective 2	49	-0 38	<0 01**
Evaluative 2	49	-0 31	<0 05*
Total PRI 2	49	-0 23	<0 1
PPI 2	48	-0 02	N S
VA 2	44	-0 13	N S

For abbreviations see Table 1 3 2

Table 3 4 2 Levels of Labour pain and the use of a number of transferred strategies

LABOUR PAIN MEASURE	N	LESS THAN 3 TRANSFERRED STRATEGIES			3 OR MORE TRANSFERRED STRATEGIES			t	p	+ ADJUSTED t	p
		N	SD	t	N	SD	t				
Sensory 1	36	21 4	9 0	15	17.9	6 6	-1 61	0 1 ^{tr}	1 74	0 08 ^{tr}	
Affective 1	36	4 6	3 7	15	2 0	2 1	2 58	0 01**	2 27	0 02*	
Evaluative 1	36	2 5	1 6	15	2 6	1 7	-0 20	0 84	0 06	0 94	
Total PRI 1	36	28 6	12 4	15	22 5	8 0	1.75	0 08 ^{tr}	1 95	0 05*	
PPI 1	35	2 9	1 2	14	2 5	1 0	1 16	0 17	1 02	0 34	
VA 1	27	5 6	2 3	12	5 9	2 5	-0 30	0 76	0.22	0 84	
Sensory 2	35	25 0	9 4	14	19 7	7 6	1 86	0 06 ^{tr}	1 28	0 20	
Affective 2	35	6.4	3 5	14	3 8	3 5	2 34	0 02*	1 58	0 12	
Evaluative 2	35	3 5	1 3	14	2 3	1 9	2 51	0 01**	1 63	0 10 ^{tr}	
Total PRI 2	35	34 7	12 9	14	25 2	10 7	2 42	0 02*	1 74	0 08 ^{tr}	
PPI 2	35	3 0	1 2	13	3 2	1 0	-0 45	0 65	0 41	0 67	
VA 2	31	7 9	2 0	13	7 8	1 2	0 17	0 86	0 28	0 80	

+ Adjusted t = t statistic for analysis of co-variance controlling for the effects of the total number of strategies used in labour

For abbreviations see Table 1 3 2

made to the total sum of strategies used in labour. An analysis of covariance controlling for the effects of the total number of strategies used, showed that the effect of transferred strategies was still significant (see Table 3.4.2.)

The number of transferred strategies used in labour was related to the number of strategies used previously. The larger the number of transferred strategies used in labour, the larger the number of strategies used previously to cope with pain ($r = 0.32$, $N = 51$, $p < 0.02$) and stress ($r = 0.41$, $N = 51$, $p < 0.01$). The number of transferred strategies used in labour was also marginally related to the intensity of previous pain ($r = 0.24$, $N = 47$, $p < 0.1$) and significantly related to the amount of previous pain ($r = 0.34$, $N = 51$, $p < 0.02$) as was the number of strategies previously used to cope with pain (see Table 3.4.3.)

Table 3.4.3 The number of strategies used to cope with previous pain and the intensity and amount of pain experienced

CORRELATED MEASURES	N	r	p
Intensity of previous pain / No. of pain strategies	47	0.23	<0.1
Amount of previous pain / No. of pain strategies	51	0.41	<0.01**

Therefore subjects who had previously experienced intense pain and/or extensive pain, used more strategies to cope with that pain and transferred more of these strategies than did subjects with more moderate pain experience. The use of these transferred strategies modulated their levels of labour pain.

3 4 2 2 DISCUSSION

A large proportion of the subjects of this study transferred strategies. Some of these subjects (approximately 50%) transferred one or two strategies. These commonly transferred strategies were of the sort frequently used to cope with pain and stress, namely relaxation and distraction (see Table 3 3 3), and often used in labour. Thus the transfer of one or two strategies reflected the widespread knowledge and use of a limited range of coping strategies.

The transfer of a larger number of strategies depended on subjects possessing an extensive repertoire of strategies, some of which they used in labour. The size of this repertoire was in part determined by the intensity and amount of experience a subject had had with pain. As was hypothesised subjects who had extensive pain experience developed more strategies to cope with this experience and used these beneficially in labour as compared with subjects who had more moderate previous experience of pain.

The effects of using a number of transferred strategies were not just those of multiple strategy use (see Table 3 4 2). Presumably the use of familiar, practiced strategies, strategies which had been shown to work when used previously, modulated pain more effectively than the use of other strategies.

3 4 3 THE TOTAL NUMBER OF STRATEGIES USED IN LABOUR AND PREVIOUS EXPERIENCE OF PAIN

3 4 3 1 RESULTS

The total number of strategies used in labour (ie transferred and untransferred strategies) was positively related to the intensity and amount of previous pain (see Table 3 4 4) and to the number of strategies

previously used to cope with pain ($r = 0.35$ $N = 51$ $p < 0.02$)

Table 3.4.4 The total number of strategies used in labour and the intensity and amount of previous pain experienced

CORRELATED MEASURES	N	r	p
Intensity of previous pain/ No. of labour strategies	47	0.27	<0.1
Amount of previous pain / No. of labour strategies	51	0.41	<0.01**

3.4.3.2 DISCUSSION

The larger the total number of strategies used in labour, the greater the intensity and amount of previous pain. Obviously the number of transferred strategies used in labour contributed to this relationship. However, the strength of the correlations between total strategy use and previous pain experience (as compared with those between transferred strategy use and previous pain experience (see 3.4.2.1 and Table 3.4.4)) suggests that those with considerable pain experience used more non-transferred strategies as well as more transferred strategies in labour.

Thus subjects with intense and/or extensive previous pain experience coped better with labour pain, not just because they used well proven strategies, but because they were more willing or able to use other coping strategies as well. Presumably this willingness or ability was influenced by their general experience of the use of coping strategies and by their belief in the effectiveness of their use (Folkman, 1984).

3.4.4 CONCLUSION

The use of coping strategies was widespread. A few strategies were used

by nearly all subjects in response to pain, stress and in labour. Most notable of these was distraction, a strategy which in its 'everyday' form seemed to reflect a common sense approach to coping which was determined by the culture at large. The use of other strategies was in part related to the personal experience of pain which the subject had previously encountered. Intense or extensive pain experience led to the use of a larger number of coping strategies than more moderate experience. However, very intense levels of pain (and stress) could not be coped with through the use of specific strategies, though some more basic form of coping or endurance seemed to operate on many of these occasions.

Subjects who had acquired an extensive repertoire of coping strategies through their experience of coping with pain, drew from this repertoire during labour and used a number of 'transferred' strategies which modulated their levels of pain. They tended to use larger numbers of strategies overall in labour, a factor which was also associated with the modulation of labour pain.

The relationship between the intensity and amount of previous pain and levels of labour pain was therefore mediated by the use of coping strategies in labour.

This mediation was in part associated with the use of specific, effective, transferred strategies by subjects whose previous pain experience had been considerable. These subjects seemed to demonstrate a generally superior coping capacity overall, their extensive repertoire of well rehearsed coping strategies and readiness to use other strategies allowing them to be flexible in their response to labour pain. Lazarus (1966)

has defined 'coping' as a "flexibility of response" (Lazarus, 1966, p 43) Thus, those subjects who had extensive or intense previous experience of pain were better at 'coping' with labour pain than those with more moderate pain experience

Frankenhaeuser (1980, 1983) has shown that the controllability of a stressful situation is linked to differences in the biochemical response pattern of subjects exposed to that stress Folkman (1984) has suggested that this differential biochemical response pattern is more closely associated with the subject's coping efforts in that situation (ie their use of broadly defined coping strategies and belief in the potential efficacy of these strategies) than with any absolute and objective measure of controllability (Folkman, 1984, p 847) It might be tentatively suggested that subjects who coped well in labour would differ in their biochemical response to the stress of childbirth, and the pain associated with it, from subjects who coped less well The subjects who coped best with labour pain were those who had had the greatest previous experience of pain Since differing biochemical environments affect the transmission of noxious stimulation (Zimmerman, 1981) and endogenous analgesic mechanisms (Rivot et al, 1984) they may be involved in the modulation of labour pain associated with extensive and intense previous experience of pain

4 GENERAL CONCLUSIONS

The aim of this study was to assess the nature and intensity of labour pain in a representative group of British parturants. These data were related to variations in obstetric factors which may have reflected underlying differences in the amount of noxious stimulation occurring during labour, and to the modulation of that stimulation by analgesic drugs. The main aim of the study was to examine the relationship between levels of labour pain and a number of psychological variables including the previous experience of pain to determine whether these variables were associated with any modulation of pain in childbirth.

The subjects who participated in the study were all British. The majority were Scottish, but a substantial minority were from other parts of Britain. The range of age and social class was considerable. They therefore appeared to be broadly representative of British parturants. However, the multiply deprived, the titled, the extremely rich and the extremely poor were not represented. Neither were the very old or the very young (in reproductive terms), the unhealthy or the many British citizens who are of non-caucasian origin.

Part 1 of this thesis dealt with the nature and intensity of labour pain and the measures which had been used to assess these. The levels of pain recorded in the first stage of labour were found to be on average intense, but there was considerable variability in this intensity. Pain scores recorded 24-48 hours after the birth, when subjects were required to recall the intensity of labour pain at its worst when completing the VAS, and to select descriptors from the PRI and PPI scales of the MPQ which assessed the pain they had experienced throughout labour and delivery, were higher than those recorded during the first stage of

labour. Since the sources and levels of noxious stimulation increase during the course of childbirth, and since there was evidence of accurate recall, it was concluded that the increases in these scores reflected an increase in pain during the latter part of the first stage, transition and in the second stage of labour. The nature of labour pain assessed by the MPQ 1 and 2 measures was similar. Relatively few Affective descriptors were selected, when the nature of labour pain was compared with the nature of pain of similar severity (Melzack, 1975) and subjects demonstrated a reluctance to select PPI descriptors which would classify childbirth as being an intensely negative experience. The nature and intensity of labour pain found in this study is similar to that found in other studies carried out in hospitals in North America (Melzack et al, 1981), in Western Europe (Nettlebladt et al, 1976) and in Britain (Scott-Palmer and Skevington, 1981). The Maternity Unit in which the study was carried out was typical of the vast majority of British Maternity Units. The results of this study which concerned non-culturally determined factors should therefore be of relevance to women giving birth in hospital in western countries. They should be of particular relevance to the average British parturient as should findings which were strongly associated with British culture or British obstetric practice, eg the use of Entonox, ante-natal training.

The PRI scales of the MPQ were found to be the easiest of the pain assessment measures to administer and to be more sensitive to subtle differences in the nature and intensity of labour pain than either the PPI or the VAS. The various PRI measures; Sensory, Affective, Evaluative and Total; were therefore regarded as providing the most valid assessment of the pain experienced in labour by the subjects of this study. However the PRI could not be used to assess the recall of second stage pain in

isolation from recall of first stage pain, so it did not provide the 'perfect' method of assessing labour pain. All the measures used provided some useful information about the nature or intensity of labour pain.

An association between variation in some obstetric factors and levels of labour pain was established in Part 2 (Chapters 1 and 2). The relationships found between parity and levels of labour pain and between the duration of the first stage of labour and levels of labour pain were thought to reflect underlying differences in levels of noxious stimulation. Other obstetric factors which might have been related to variations in noxious stimulation during childbirth were not found to be associated with significant differences in levels of labour pain. The relationship between levels of labour pain and artificial rupture of the membranes (Part 2 Chapter 1) and complications of pregnancy (Part 2 Chapter 2) was held to be due to modulatory psychological effects, and not to differences in the amount of noxious stimulation. The effect of ARM it was suggested was to alter the pattern of contractions and consequently affect the subject's ability to cope with them. The unexpectedly beneficial effects of complications of pregnancy might have been due to the subjects' increased familiarity with the labour ward, its routines and its personnel.

The desirability of pregnancy, positive and accurate expectations of childbirth, ante-natal training and the welcomed presence of the husband at the birth were all associated with lower levels of pain in labour. Statistical control of confounding obstetric, pharmacological and psychological variables did not negate these associations. It was concluded that these factors were associated with significantly lower

levels of pain, particularly non-sensory pain. Since no strong associations were found between psychological and predictive obstetric variables (see 2 3 1) the relationships found between psychological factors and lower levels of labour pain were unlikely to merely reflect individual differences in levels of noxious stimulation. It was probable that these factors actually reduced pain through modulating the noxious stimulation of childbirth.

Subjects who had minimal previous pain experience (Part 2 Chapter 4, Part 3 Chapter 1), had the lowest levels of labour pain. This relationship may be due to their relatively low sensitivity to noxious stimulation. Subjects who had extensive previous experience of pain had lower levels of labour pain than subjects whose previous pain experience had been more limited (Part 2 Chapter 4, Part 3 Chapter 1). This relationship may have been due to their superior coping capacities as well as to the effects of a number of other physiological and psychological factors. The possibility that noxious stimulation during labour was modulated by the effects of coping strategies, such as relaxation or distraction, was investigated in Part 3 of this study.

A considerable range of coping strategies was used by subjects during childbirth. Many of these resembled strategies which subjects had used previously to cope with pain and stress. The total number of strategies used in labour was negatively correlated with levels of labour pain and the use of relaxation, distraction, reversal of affect and breathing techniques was associated with lower levels of labour pain. Since the use of these strategies has been shown in experimental pain research to modulate noxious stimulation it is likely that their use in labour was associated with such modulation, and therefore with a reduction of pain.

levels. Subjects who had extensive experience of pain used a larger number of strategies to cope with that pain than subjects whose previous pain experience had been more moderate (in amount and intensity). They used a larger number of strategies in labour, a higher proportion of which they had used previously. This differential use of coping strategies accounted for some of the association between previous pain experience and levels of labour pain. This association may be mediated by biochemical factors.

Childbirth is a common yet unique experience. It involves extremely high levels of noxious stimulation which may be affected by a large number of complex interacting maternal, fetal and medical factors. The usual response to high levels of noxious stimulation is the use of potent analgesic or anaesthetic drugs. A state of general anaesthesia during childbirth is undesirable because of the emotional significance of the occasion and analgesics can only be used in moderation since they can endanger the fetus. Therefore other factors which can contribute to the modulation of noxious stimulation in labour are of considerable importance.

The findings of this study have demonstrated that a number of psychological factors were associated with lower levels of labour pain and probably with the modulation of noxious stimulation occurring in childbirth. The use of coping strategies in response to pain, stress and labour pain appeared to be a natural response to noxious stimulation which can be shaped by example, reinforcement and to a certain extent by formal training. The use of different strategies in labour, either simultaneously or sequentially seemed to be particularly effective in modulating labour pain. The subject's ability to cope with labour pain and crucially, their belief in that

ability could be facilitated or inhibited. Artificial rupture of the membranes (Part 2 Chapter 1) seemed to make it more difficult for subjects to cope with the pain which accompanied the suddenly strong and frequent contractions. The use of potent analgesic drugs (Part 2 Chapter 2) might have been expected to affect the use of coping strategies but there was no evidence that subjects used either drugs or coping strategies. Instead most subjects used both pharmacological and psychological analgesia in what was probably an attempt to obtain the maximal amount of pain relief through the minimal use of potentially harmful drugs. These attempts were not entirely successful as the high average levels of pain found in this study show. However, the majority of subjects seemed to be satisfied with the pain relief that they obtained.

Attendance at ante-natal classes facilitated the use of coping strategies in labour to some extent. It also affected the nature of the relationship between the parturient and the staff who cared for her. This relationship, characterised by its label 'trusting the staff' was of considerable benefit to the parturient. It was strongly associated with lower levels of labour pain. In part this association was mediated by the effects of analgesic drugs (Part 3 Chapter 2) which both lowered levels of pain and demonstrated the competence of the staff. As the use of Pethidine and Entonox, 'per se', was not associated with lower levels of pain, the interaction between analgesic effects and trusting the staff probably reflects the skillful use of analgesics. The skill of the staff has often been noted in this study and was probably a most important factor in reducing levels of labour pain, one which merits further investigation.

The effects of early pain experience have been investigated to some

extent (Lichstein and Sakett, 1971, Savendra et al, 1982) and the adverse consequences of prolonged noxious stimulation established (Iggo, 1984, Wall, 1984) The results of this study indicated that there is a wide variation in previous pain experience, even among young, healthy female subjects, a small proportion of these suffering very little pain under normal circumstances and low levels of pain in childbirth The consequences of intense or extensive pain experiences seemed not to be adverse Instead subjects who had suffered considerably in the past, suffered less in childbirth than those with a history of more moderate pain experience These findings suggest that active consideration should be given to the pain histories of persons who, like women in labour will inevitably encounter intense noxious stimuli Differing pain experience gave rise to differing coping capacities, subjects who had suffered intense or extensive pain in the past being more able to cope with labour pain through their flexible and practiced use of coping strategies This ability may be linked to a particular pattern of biochemical responsiveness which, it has been tentatively suggested, could affect pain transmission and pain modulatory systems

"Suffering passes but the fact of having suffered never passes "

(Leon Bloy)

The results of this study suggest that the experience of having suffered ameliorates subsequent suffering under some conditions

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MIDWIFE: (Name)

No:

Patient's name:

Duration of 1st stage	hrs	mins
2nd stage	hrs	mins

Baby's weight and condition Apgar 1) 1 minute
2) 5 minutes.

Analgesia

Drug and dosage

Time given repeated with effect

Entonox 1st stage 2nd stage

Can you indicate frequency of use?

Complications

Did the patient have any complications of pregnancy?

- eg Pre eclampsia
- Post maturity
- Other - details

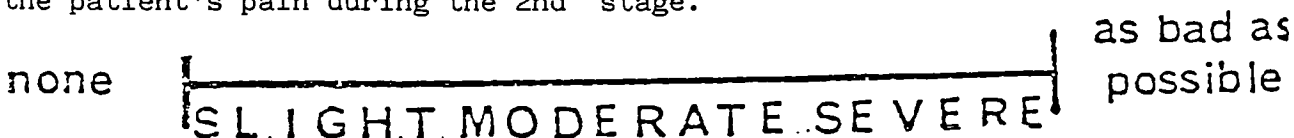
or of labour?

- eg Inco-ordinate contractions
- Fetal distress
- OP
- Others - details

Did these require treatment,

- eg ARM
- Induction
- Acceleration of labour
- Forceps delivery
- Caesarian section
- Other

Could you mark on the scale below your assessment of the intensity of the patient's pain during the 2nd stage.



Please add any comments you would like to make.

Thank you.

COPING STRATEGIES - CRITERIA FOR SCORING

Relaxation - strategies which lead to relaxation, muscularly, and to calmness of mind, eg during labour, deep breathing can relax abdominal muscles and calm subject. Relaxation strategies can be physical - breathing, lying down, hot bath or mental. Check that things like reading are relaxing not distracting, eg deep breathing in labour is often reported to occupy one's mind, ie distracts rather than relaxes.

Distraction - taking your mind off pain or stress by thinking of or doing something else. What is thought of, is not connected with the pain (it would be focussing or reversal of affect if it was) and it does not involve the full blown fantasising of imagery.

Focussing - instead of striving to take her mind off the pain, the subject concentrates on it, thinks of it deliberately and focusses upon it.

Idiosyncratic strategies - specific behaviour patterns, internal dialogues (Tan) or people associated with pain relief.

Imagery - imagining yourself in a situation inconducive to negative affect, eg on a beach in Honolulu, or imagining what is happening to you and/or your body as positive thing - cervix dilating is like the petals of a flower opening. It involves strongly metaphorical or simile like imaginings - you are on a beach or your cervix is like the flower, not merely focussing on an imaginary or real flower or picture, which is distraction, or having a positive attitude to labour involving renaming pain as intense stimulation.

Reversal of affect - thinking of pain as a positive rather than negative event. "It was exciting, ecstatic, orgasmic." It needs to be a positive and decisive change of affect.

Normalisation - pain is regarded as part of normal life - not necessarily an automatic cause of alarm. Such people accept that pain is a common phenomenon, even in health, and wouldn't rush to the doctor or be panicked by a new pain. However it is also normal to be concerned by lasting, severe pain. In labour such subjects are not frightened by the pain they have, in that they interpret it as a sign that something is wrong with them or the baby.

Control - Some women are in control of events, they normally feel in control of things. They "do something" about problems, they are independent, don't look for a lot of support from others, or feel helpless in the face of most problems. They attribute success and failure to themselves not to luck, fate or God. In pain and in stress they strive to cope by actively engaging in strategies which will help.

In labour "being in control" cannot mean having direct control over the pain. The phrase sometimes means that the woman's choices regarding drugs, delivery style, etc are followed. Using psychological strategies rather than accepting analgesics is sometimes expressed as "being in control". Being out of control can equal panic, not merely giving up. trying to control the pain.

Modelling - Pain responses can be modelled, ie learned from imitating others

Influence of other person Subject reports that the way she was brought up or trained (eg nurse) has influenced her pain behaviour extensively A significant other person has experienced and coped with pain and this example may have been followed

Breathing exercises- were breathing exercises attempted and were they helpful? Did they relax or distract? Please score and detail specifically under breathing exercises

Desirability of pregnancy

- 1) Not wanted but not aborted for some reason
- 5) Marked ambivalence - eg not planned but its OK now
- 10) Planned, delighted, no evidence of second thoughts, some reason for especially wanting this baby, eg previous stillbirth, infertility, etc

Appendix 3. Rationale for adopted methodology and analysis

3.1 Retrospective versus prospective methodology.

A retrospective rather than prospective methodology was used in this study. The principal reasons for this were practical ones. All potential female subjects of reproductive age could not be interviewed in the hope that they would become pregnant. Furthermore, in a previous small scale study of labour pain carried out by the Investigator (Gerrard, 1980), subjects were interviewed for the first time during pregnancy, completing at that time assessments of previous pain, desirability of pregnancy and expectations of birth. Only 10% of these subjects could be subsequently interviewed during the active stage of the first stage of labour. This was primarily due to problems in notification of labour by the husband or attendant midwife to the investigator, forgetfulness being often to blame. Such a loss of subjects was deemed unacceptable in this study. It was considered essential that subjects assessed their labour pain while in labour, since the sole use of recall pain measures is problematic (see 1.3.3.3). The subsequent use of a post-natal interview combined with the use of current state measures of pain, analgesic use etc (see 1.2.4.1) was an acceptable practical solution, though not an ideal one. The timing of this interview was set to avoid the immediate post-natal period, when the mother would be exhausted and/or elated, and the third or fourth post-natal day, when the acute mood swings associated with the 'fourth-day blues' are common (Cox, 1983). The use of more belated post-natal interviews was proscribed by the need for detailed recall of the nature, as well as the overall

intensity, of labour pain Such recall is obviously facilitated by recent rather than distant experience

While a prospective design has obvious methodological advantages, the use of pre-natal interviews in a study of this type may have some theoretical disadvantages The 'mother-to-be' interviewed 3 to 6 months before the birth is not in a 'normal' state of mind or body She may or may not be acutely anxious about the forthcoming birth just as someone approaching surgery, examination or participation in a psychological experiment may or may not be But in addition to any anxiety she has about giving birth, she will be pregnant - a stressful and anxiety provoking physical and psychological condition in its own right (Morris, 1978, Spielberger and Jacobs, 1978, Wolkind and Zajicek, 1981, Reading, 1985), one in which somatic disturbances and some degree of discomfort are normal (Myles, 1981, Wolkind and Zajicek, 1981) Thus a pregnant woman's response to questions about the desirability of pregnancy, her fears and anxieties about a future stressful event - childbirth- and her previous, non-pregnant, experience of pain may all be influenced by her current state (See appendix 4 2 for further discussion of this point)

The use of retrospective measures, however necessary, made the subject's task more difficult They were required to report experiences and feelings which they had encountered before the birth, post-natally The experience of the birth itself could have modulated these assessments, or at least have made them more demanding However the results of an unpublished prospective study of labour pain, which used recall labour pain measures only

(Gijbbers and Niven) suggest that previous pain assessment was not significantly altered by the experience of labour pain (see 3 2 3)

3.2 Modification of the VAS.

The form of the VAS used in this study is the form which is currently most widely used. It was developed on the basis of extensive research into the assessment of clinical and experimental pain (Scott and Huskisson, 1976). It may be argued that it has a restricted range available for the exclusive assessment of mild, moderate or severe pain. Since labour pain has been held by many (Astbury, 1980b, Melzack et al, 1981, Scott-Palmer and Skevington, 1981, Reading, 1985) to involve severe pain, some modification of the VAS might have been desirable in this study. For example the lower end point of the scale might have been raised or the upper end of the scale expanded in order to increase the proportion of the VAS available for the signification of intense pain.

Such modifications would have made comparison between the findings of this study and those of other pain studies using the VAS (Scott and Huskisson, 1976) and labour pain studies using the VAS (Scott-Palmer and Skevington, 1981, Skelton, 1984, Reading, 1985) more difficult as a 'calibration' study, with another group of subjects, would have been required to transform values where possible. Furthermore, Scott and Huskisson have shown that small modifications to the VAS such as changing the spacing of the words which underlie the line, or using a vertical rather than horizontal line, can alter the behavior of the scale and recommend that "minor changes should be avoided" (Scott and Huskisson, 1976, p.183). More major modifications may therefore be

proscribed Anticipatory modification of the VAS would have assumed that labour pain is severe, an assumption which would be challenged by those who believe in painless childbirth (Dick-Read, 1947, Kitzinger, 1962) On balance, it was decided to use the VAS unmodified, although this might (and indeed did) lead to some loss of discrimination between scores at the upper end of the scale

3.3 The analysis of interactions.

This study involved the analysis of large numbers of variables, a proportion of which interacted together The consideration of such variables jointly, through the analysis of their interaction, rather than separately may have been beneficial For example, analgesic use in labour was often associated with differences in other dependent variables An analysis of these interactions could have yielded useful information about their joint effects Instead, the effects of analgesic use were usually treated as confounding variables and statistically controlled This approach was taken because the particular analgesics used in SRI are not used universally in childbirth Therefore the sole consideration of their effects in interaction would restrict the generalisability of the results of this study The control of their confounding effects allowed the relationships between other independent variables which were not 'situation specific', eg previous pain experience, and levels of labour pain, to be separately examined Some additional analysis of analgesic interactions would have been of interest

Where variables inevitably interacted or co-varied, the control of the effects of one of the variables on the relationship between the other and levels of labour pain, was only of

theoretical importance For example, the duration of the second stage of labour is significantly shorter in Multips This obstetric relationship is a universal phenomenon Therefore controlling for the duration of the second stage, in the analysis of the relationship between parity and levels of labour pain, is meaningless in real terms It did however reveal that the shorter duration of the Multiparous second stage was the factor which was contributing to the exacerbation of recall pain scores in Multips.

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Appendix 4. The role of anxiety

4.1 Introduction

This study involved the investigation of a considerable number of independent variables which might affect the nature and intensity of pain in labour. Evident in the results of these investigations was a considerable amount of unexplained variance. While some of this unexplained variance was undoubtedly attributable to the imprecision of the measures used to assess the amount of noxious stimulation occurring (see 2.2.5), some would be due to the effects of individual differences which had not been accounted for, eg differences in relevant muscle grouping activity, differences in personality factors. One such factor, which was not directly studied but was frequently utilised as an explanatory concept, was that of anxiety.

4.2 Discussion

Common experience teaches us that if we are anxious, tense or frightened and we encounter some noxious stimulus, we are liable to experience more pain than if we are relaxed, calm and unworried. This link between high anxiety and high levels of pain has generally but not invariably been supported by the results of empirical research. Hill et al, in 1952 tested the response of two groups of subjects to electric shock. The 'formal' group, who received no reassurance and thus were held to be anxious about participation in the experiment, overestimated the painfulness of an electric shock, compared with the 'informal' group who had been reassured. A study of the role of information in modulating pain experience (Leventhal et al, 1979) found that pain levels were higher in all subjects who had been made more anxious by certain experimental manipulations and, in a clinical rather than experimental

study, Egbert et al (1964) showed that measures used to reassure patients pre-operatively (including the giving of information) resulted in the reduction of post-operative pain

A substantial number of empirical studies have been carried out into the relationship between anxiety and post-operative pain. While the similarity between surgery and childbirth should not be over-emphasised since it is unusual for surgical patients to be conscious during the operation and since surgical studies concentrate on *post-operative* measures whereas labour studies center on pain *during* childbirth (Beck and Siegel 1980), these studies may be of more relevance than experimental pain studies (see 3.1.1.2). Chapman and Cox (1977) found that a high level of anxiety was associated with higher levels of post-operative pain in patients undergoing elective surgery. Similar findings have been reported by Johnson et al (1970,1978), Martinez-Urrita (1975) and Ray and Fitzgibbon (1981). Two studies have reported negative findings, Bruegel (1971) and Wise et al (1978).

While certain threatening events such as surgery would seem likely to arouse some fear and anxiety ('state anxiety') in all who encounter them, it has been proposed that some individuals are more likely to suffer from high levels of anxiety in these circumstances than others. Subjects who generally, but not invariably, respond to threatening situations with intense perceived feelings of tension and apprehension and with high levels of autonomic arousal (ie with high levels of state anxiety), are said to have high levels of trait anxiety (Spielberger, 1966,1972). Such individuals are also more likely to perceive a wide range of stimulus situations as dangerous or threatening. Many of the studies on the effects of anxiety on post-operative pain levels concerned the relationship between anxiety levels

assessed immediately before surgery and as such were involved with a form of situational or state anxiety, rather than with generalised anxiety proneness - trait anxiety (Spielberger 1972)

Studies which have specifically examined the relationship between trait anxiety and pain have demonstrated more variable findings Taenzer (1983) found a significant relationship between trait anxiety, assessed two weeks and immediately pre-operatively, and post-operative measures of pain including the MPQ and VAS No relationship was however found in this study between pre-operative state anxiety and post-operative pain, even though pre-operative and post-operative state anxiety levels were strongly correlated Petrovich (1958) found no relationship between trait anxiety and surgical pain as did Wolff and Davis (1970) and Martinez-Urrutia (1975)

A related concept to that of trait anxiety is neuroticism Neuroticism scales such as the MPI which later became the EPI - the Eysenck Personality Inventory (Eysenck and Eysenck, 1964) are widely regarded as being anxiety related scales of the trait, rather than the state type (Eysenck, 1968, Sternbach, 1974, Debhees, 1977,), though neuroticism scores have been observed to rise in the presence of trauma (Kissen 1964) Subjects who score highly on such neuroticism scales are said to be more emotionally labile and over-responsive and more likely to exhibit neurotic type breakdown under traumatic circumstances 'Neurotic' subjects are postulated to display increased autonomic reactivity under such circumstances which will be reflected in high levels of arousal and usually in the subjective experience of anxiety and effort/stress These factors will exacerbate the perception of pain (Lynn and Eysenck 1961)

Lynn and Eysenck in 1961 showed that 'neurotic' subjects were less able to tolerate an experimentally induced pain stimulus than 'stable' subjects. Martin and Inglis (1965) also found poorer pain tolerance in 'neurotics' in a population of narcotic addicts (Note: The use of addicts and post-addicts, as in Hill et al (1952) would now be avoided because such subjects may have abnormal endorphin levels.) Levine et al (1966) failed to replicate these findings using two separate groups of experimental subjects, as did Davidson and McDougall (1969) who tested a sample of female subjects experiencing experimentally induced noxious heat and pressure stimulation.

Clinical studies have generally found a link between neuroticism and pain, eg Bond and Pearson (1969), Dalrymple et al (1972), Taenzer (1983). This link may however be influenced by an association between an absence of pain reports despite the presence of noxious stimulation and the denial of anxiety. This concurrent use of denial mechanisms results in very low neuroticism scores and in very low or absent pain scores (Bond 1971). Thus the association may not be due to the pain-increasing effects of autonomic over-reactivity. Many so called 'pain patients', ie patients with chronic intractable pain, score highly on neuroticism scales (Jamieson et al, 1976), as do patients labelled 'hypochondriacal' (Sternbach, 1974). Such patients may have become 'neurotic' through their experience of prolonged pain and unsuccessful treatment rather than become chronic pain sufferers as a result of neurotic personality dispositions (Gibson, 1982, Melzack and Wall, 1982).

The relationship between trait anxiety and pain, and between neuroticism and pain is therefore not as strong as a simplistic theoretical analysis might suggest - ie that high levels of trait anxiety and neuroticism would predict high levels of state anxiety and

arousal and consequently high levels of pain This is because the degree to which a threatening situation will give rise to fear and anxiety depends on the effects of a number of complex and interrelated factors as well as on personality traits

The type of threat involved may affect the type of reaction generally experienced Threats to the ego, rather than to life and limb, have been found to be more likely to produce high levels of state anxiety in subjects high in trait anxiety Physically dangerous situations evoke high levels of state anxiety in both high A-trait and low A-trait subjects (Spielberger et al, 1974) This may explain the relatively poor association found between measures of trait anxiety and post-operative pain, since the post-operative recovery situation may not be an ego-threatening one for most subjects

The degree of threat or trauma involved in a situation depends, not upon some objective criteria, but upon the subject's cognitive appraisal of the likelihood of loss, or threat of loss implicit in the situation, set against the opportunities for mastery provided by it and the coping resources to which she or he has access (Spielberger, 1966, Folkman, 1984) None of the components of this appraisal is firmly determined by reality The subject's assessment of risk will depend on her knowledge state and on the quantifiability of these risks Her assessment of the opportunities for mastery and of her personal coping resources are bound to depend on previous experience (Spielberger and Jacobs, 1978) as well as on the opinion of others, the degree of social and economic support available and perhaps on the coping style and Locus of Control of the subject Variation in any of these factors is likely to confound the relationship between any anxiety-related

personality trait and the level of anxiety or neurotic breakdown experienced in a stressful situation

Situations which are generally regarded as intrinsically anxiety-provoking do not always give rise to an exaggerated response to noxious stimulation. Soldiers who have been injured in battle have experienced a situation where the threat of loss of life or limb is very high and where opportunities for mastery or coping are severely limited. Similarly people admitted to hospital following an accident have experienced a highly threatening situation in which little can be done. When you are severely injured you are helpless, totally dependent upon the abilities of others. You may die. You may be crippled, handicapped or disfigured for the rest of your life. You will inevitably have to undergo distressing and painful examinations and procedures. This seems like a paradigmatic scenario for high anxiety and pain. Yet a significant proportion of soldiers injured on the battlefield (Beecher, 1959) and patients admitted to casualty departments following serious accident (Melzack et al, 1982) suffered little or no pain despite the severity of their injuries. The cause of this 'traumatic analgesia' is as yet poorly understood (Wall, 1979) but is not due to shock, brain damage (Melzack et al, 1982) or general insensitivity to pain (Beecher, 1959). Its importance in the context of this discussion is that it demonstrates that situations which appear to be highly stressful do not automatically give rise to exaggerated pain responses. Therefore high levels of state anxiety and arousal may not always increase the perception of pain.

Even when high levels of pain and stress co-exist, the direction of the relationship between them is unclear. Pain can cause anxiety as well as be exacerbated by it (Bond, 1971, Melzack and Wall, 1983, Reading, 1985). They frequently co-vary so that situations which give rise to

pain also give rise to anxiety because of the concurrent threat to function and survival involved

Childbirth is an inherently stressful experience (Bonica, 1975, Llwellyn-Jones, 1977, Myles, 1981, Reading, 1985) While undoubtedly ego threatening for some,

"I made a right fool of myself "

"I felt a real failure "

(Oakley, 1979)

the main causes of fear and anxiety are pain (Morris, 1978, Reading, 1985), the threat of harm to, or loss of, the baby and the threat of personal harm and death (Astbury, 1980b) Despite greatly improved medical care, maternal peri-natal mortality rates and fetal/newborn mortality and morbidity rates in Britain are still notable (Llwellyn-Jones, 1977) There is a very real risk in giving birth and consequently feelings of fear and anxiety are normal Measures are therefore routinely taken to reduce the anxiety a parturient suffers such as the giving of information and reassurance (Myles, 1981) and the provision of training in relaxation (Astbury, 1980b)

The amount of anxiety and autonomic reactivity experienced during childbirth undoubtedly varies. This variation may account for some of the variation in levels of pain experienced by subjects in labour Any variation which occurs in state anxiety or arousal during labour could be due to situational variants, ie factors exacerbating or moderating the anxiety and arousal at that time, and/or to the effects of constitutional tendencies such as trait anxiety or neuroticism In order to assess situational variants adequately it would be necessary to determine the objective risks and physical stresses involved which differ from birth to birth, and the cognitive appraisal of the subject -

how risky she perceived her labour and delivery to be, what threat of loss it carried for her, what personal and social resources she felt she could call on to help her cope with childbirth and what opportunities for mastery did it present her with. Finally one of the most potent sources of fear and anxiety during birth would require to be assessed, the nature and intensity of the pain experienced, since high levels of pain will exacerbate anxiety levels.

The assessment of all these factors during the course of childbirth would be impossible and ethically improper. An objective assessment of the subject's arousal level and reaction to stress could be obtained from estimations of her blood pressure, heart rate, level of circulating stress hormones etc. Such assessments would be confounded by the fetal stress response to birth (see 1 1 4 1)

Some assessment of the factors which had contributed to state anxiety during childbirth could be made post-natally. A number of measures related to these factors were obtained in the first and second post-natal interviews of this study, the difference between expectations and experience of birth (cognitive appraisal), the support gained from the presence of the husband and the relationship with staff (social resources), the use of and familiarity with coping strategies (personal resources), complications of birth, apgar scores of the baby, health of the baby (objective assessment of stressors encountered). The dependent variable used in this study was however pain in labour, not anxiety or arousal. Therefore the independent variables considered were directly related to the nature and intensity of pain experienced not to levels of arousal or anxiety which may have served as intervening variables. Given the focus of this study and the bi-directionality of pain and anxiety, this approach seemed justified.

The relationship found between variables which are commonly held to lower anxiety or arousal and lower levels of labour pain (eg antenatal class attendance, presence of the husband at the birth, use of relaxation techniques) suggests that lower levels of state anxiety in labour were related to lower levels of pain. Although the direction of this relationship remains unclear an assessment of state anxiety would not have clarified this. It would merely have allowed its direct and indirect effects to be properly considered.

Two measures were taken in this study which might be tentatively related to levels of trait anxiety or neuroticism, though the effects of intervening states of anxiety cannot be discounted. They were expectations of birth and the experience of previous pain.

The characteristically anxious or 'neurotic' woman would be likely to have negative expectations of birth. In the terms of this study she would report that she had felt "fearful" or "terrified" about her forthcoming birth, rather than "fairly confident". Such negative expectations were significantly but not strongly related to levels of labour pain (see table 2.3.1). However the confounding of expectations, whether negative or positive, was also related to higher levels of labour pain (see fig. 2.3.1) indicating perhaps the mediating effects of cognitive appraisal and state anxiety.

It was postulated that subjects who had previously experienced severe pain (HPP subjects) would also experience severe pain in labour since underlying relatively stable physiological and psychological factors would lead subjects to experience and report similar intensities of pain on different occasions of noxious stimulation (see 2.4.1, hypothesis 1). One such factor, one which was not specified, could involve anxiety related traits. Individual differences in trait anxiety

or neuroticism could influence both the previous experience of pain, exacerbating it in highly anxious or neurotic subjects, and the experience of labour pain, high A-trait subjects being more likely to be highly anxious about childbirth and neurotic subjects being more susceptible to neurotic-type breakdown in response to the trauma of labour. Both these factors would increase arousal levels and exacerbate pain

HPP subjects however had lower levels of labour pain than subjects who had reported more moderately painful previous experiences (LPP subjects), so the hypothesis that they would have higher levels of pain was not supported. As HPP subjects used more coping strategies in response to their previous pain, it seems unlikely that the intensity of pain they had experienced had been exacerbated by anxiety or high levels of arousal since high levels of arousal make the use of coping strategies less likely (Melzack and Wall, 1982). Similarly the use of larger numbers of coping strategies in labour by HPP subjects suggests that they were not highly anxious at that time. The lesser use of coping strategies in labour by LPP subjects may have been due to their high levels of state anxiety brought about by their relative lack of pain and pain coping experience (see 3.4.4). The findings of this study concerning the relationship between previous pain and labour pain therefore suggest that levels of state anxiety may have been of more importance in determining levels of labour pain than levels of trait anxiety or neuroticism.

A number of studies have demonstrated a significant though not dominant relationship between levels of anxiety in pregnancy and levels of labour pain. Some of these (Bonstein, 1964, Kondas and Scetnicka, 1972, Zax et al, 1975) involved measures of trait anxiety. Such measures

are invalid since pregnancy is in itself a stressful state giving rise to fear and anxiety (Wolkind and Zajicek, 1981) Thus the appropriate measure is that of state anxiety (Spielberger and Jacobs, 1978, Beck and Siegel, 1980) A relationship between levels of state anxiety in pregnancy and levels of pain in labour as found by Taylor (1953), Zuckerman (1963), Zichella et al (1977) or Reading (1985) cannot however be used as support for a causal relationship between high levels of state anxiety in labour and high levels of pain Levels of state anxiety associated with one event are not predictive of levels associated with another (Spielberger et al, 1974) Furthermore stress in pregnancy has been associated with complications of birth (Begeley et al, 1980, Beck and Siegel, 1980, Wolkind and Zajicek, 1981) so the relationship between anxiety in pregnancy and levels of labour pain may be confounded by this factor

A recent study of labour pain (Reading 1985) reported a significant correlation between scores on the neuroticism scale of the EPI measured post-natally and levels of recalled labour pain This finding may demonstrate that 'neurotic' subjects have higher levels of autonomic reactivity during labour and consequently experience higher levels of pain than more stable subjects However the pain measures were obtained at the same time as the EPI was administered and at the same time as a recall measure of state anxiety during childbirth was obtained The EPI requires a subject to rate their typical or normal habits, feelings etc Since these subjects had experienced nine months of pregnancy - an abnormal, atypical and stressful state, had recently experienced and were concurrently rating a highly stressful and painful state - birth, their assessment of 'normal' functioning may have been distorted Bendien (1963) and Kissen (1964) have observed that

neuroticism scores rise in the presence of trauma. A very painful labour is likely to be more traumatic than a less painful one. Therefore neuroticism score could have been increased by the effects of a painful labour especially as subjects completing the EPI had just recalled the pain and anxiety involved in their birth in order to assess them.

Some unconfounded assessment of trait anxiety or neuroticism is needed if the relationship between anxiety/arousal in labour and pain in labour is to be satisfactorily addressed. Ideally this should take place before the subjects are pregnant, at a time when they are free of state anxiety or stress. Such a requirement is obviously impracticable. An alternative approach would be to assess trait factors some weeks or months after birth at a time when the trauma of birth should have been moderated. Motherhood in itself is however a severe stressor (Brown and Harris, 1978) and adjustment to motherhood can take many months. Post-natal depression is now recognised as being a relatively common, but largely unrecognised problem in the first post-natal year (Cox, 1983). Therefore any post-natal assessment would have to be deferred if an accurate rating of trait anxiety or neuroticism was to be obtained.

4.3 Conclusions

4.3.1 An accurate assessment of trait and state anxiety measures and of neuroticism would be desirable in any study of labour pain. A considerable amount of subjective and objective data would have to be gathered in order to make this assessment. The practical and ethical difficulties involved in the collection of such data are considerable. The focus of this current study was on pain in labour rather than on anxiety. Accordingly, priority was given to the consideration of the direct relationship between the obstetric and non-obstetric independent

variables studied and levels of labour pain, even though many of these variables may have concurrently affected levels of state anxiety

4.3.2 Consideration of the relationship between some of the independent variables examined in this study and levels of labour pain suggests that individual differences in levels of trait anxiety or neuroticism were not related to levels of labour pain in a simple manner. Differences in levels of state anxiety may have been of more importance in determining variations in the nature and intensity of pain in childbirth. The direction and complexity of the inter-relationship between pain and anxiety in childbirth remains to be unravelled.

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