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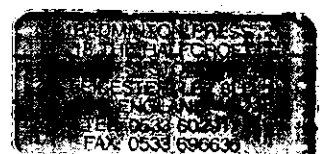


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A STUDY OF A SAMPLE OF 10-11 YEAR OLD CHILDREN - THEIR ATTITUDES
TOWARDS PHYSICAL EDUCATION AND PHYSICAL ACTIVITY
AND
THEIR ACTIVITY PATTERNS WITH SPECIFIC REFERENCE TO
PLAYTIME

BY

EDWARD RICHARDS

A Master's Thesis submitted in partial fulfilment of the requirements
for the award of Master of Philosophy
of the Loughborough University of Technology (1993)

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CONTENTS

<u>Chapter</u>	<u>Title</u>	<u>Page</u>
	Abstract	i
	List of Figures	ii
	List of Plates	iii
	List of Tables	iv
	List of Abbreviations	vi
	Acknowledgements	vii
1.00	Chapter 1	1
1.10	Introduction	1
1.20	Background to the Problem	1
1.30	The Problem	4
1.40	The Purpose	5
1.50	Associated Problems	5
1.60	Major Aims	8
2.00	Chapter 2 - Review of Literature	9
2.10	Introduction	9
2.20	Attitudes	11
2.21	Historical Background	11
2.22	Development of Systematic Analysis	11
2.23	Attitudes towards P.E.	13
2.24	Attitudes towards Physical Activity	25
2.30	Activity Patterns	28
2.31	Historical Background	28
2.32	Development of Systematic Analysis	30
2.33	Children's Activity Patterns in General	37
2.34	Activity in P.E. Lessons	49
2.35	Activity at Playtime	50
2.36	Children's Activity beyond School	52
2.40	Summary	58

3.00	Chapter 3 - Procedure	60
3.10	Description of the School	60
3.20	Overview of Procedure	61
3.30	Procedure for Entry into the Field	65
3.40	Methods of Collecting Data on Activity Patterns and Attitudes	70
3.41	Preamble	70
3.42	Initial Observations	70
3.43	The Preliminary Interviews	70
3.44	Administering the Preliminary Interviews	73
3.45	The In-Depth Interview	73
3.50	Rationale for the Choice of Procedures to Assess the Degree of Activity	75
3.51	Preamble	75
3.52	Initial Observation	75
3.53	Tabulated Logging - Second Stage	76
3.54	Photography - Third Stage	76
3.55	Heart Rate Monitoring - Fourth Stage	78
3.60	Design and Construction of Research Instruments	79
3.61	Design of Preliminary Interviews	79
3.62	Amendments to Preliminary Interviews	80
3.63	Design of In-depth Interviews	82
3.64	Amendments to In-Depth Interviews and Second Interviews	87
3.70	Design of Research Instrument to Assess Extent and Degree of Activity	89
3.71	Preamble	89
3.72	Observational Methods Attempted	89
3.73	Tabulated Logging Sheets	90
3.74	Playground Photography	91
3.75	Heart Rate Monitoring Tests	98
3.80	Summary Table of the Validity and Reliability of the Procedure	106
3.90	Summary Table of Sample Units and Procedure Used	109

4.00	Chapter 4 - Results	112
4.10	Introduction	112
4.20	Assessment of Children's Activity Levels by Teacher	113
4.21	Fitness and Unfitness as Related to Activity and Inactivity as Judged by Children	113
4.30	Initial Interviews	115
4.31	Playtime Activity	115
4.32	Boys' Activity Patterns	117
4.33	Girls' Activity Patterns	117
4.34	Evening and Weekend Activity	118
4.35	Participation in Clubs/Organisations	120
4.36	Involvement with Parents/Siblings	121
4.37	Hobbies and Interests	123
4.400	In-Depth Interviews	125
4.401	Attitudes to P.E./Games/Swimming	128
4.402	Anticipatory Reaction to P.E.	128
4.403	Anticipatory Reaction to Games	129
4.404	Anticipatory Reaction to Swimming	130
4.405	Improvements to P.E./Games/Swimming	131
4.406	Reaction to School	133
4.407	Girls' Reactions	134
4.408	Neutral Girls' Reactions	135
4.409	Favourite Lessons	135
4.410	Most Favourite Lessons	136
4.411	Sample Favourable Comments about P.E.	137
4.412	Sample Favourable Comments about Games	138
4.413	Reasons for Liking P.E.	138
4.414	Reasons for Liking Games	139
4.415	Least Enjoyable Lessons	139
4.416	Unfavourable Comments about P.E.	142
4.417	Avoidance Tactics	146
4.418	Holiday Activities	150
4.419	Children's Perceptions of Activity - Different Situations	152
4.50	Results of Playground Observation	154
4.51	General Observation	154

4.52	Location of Activity	155
4.53	Type of Activity and Frequency	157
4.54	Weather	159
4.55	Stationary/Active	160
4.56	Results of Logging Procedures	160
4.57	Summary	165
4.60	The Photographic Record	166
4.61	Procedure Check - Calibration of Photographs	166
4.62	Results of Photographic Analysis	170
4.63	Summary of Movement/Stationary Percentage	174
4.70	The Physiological Patterns of Selected Children at Play	175
4.71	Activities Associated with Particular Heart Rate Measures	182
 5.00	 Chapter 5 - Discussion of Results	 187
5.10	Introduction	187
5.20	Assessing Children	189
5.30	General Activity Patterns	190
5.31	Attitude to School and P.E. within the Framework of other Lessons	198
5.40	Some Final Thoughts on the Interview Procedures	201
5.50	Playground Activity	202
5.60	Children's Perceived Preferences	203
5.70	Initial Logging	203
5.71	Frequency of Activity	204
5.72	Freeze Frame Photography	204
5.73	Heart Rate Monitoring	205
5.80	Discussion of Playtime	211
5.90	Summary of Overall Results	213
5.100	Limitations of the Study - Possible Areas for Future Research	216
5.200	Conclusions	217
 6.00	 Bibliography	 223
7.00	Appendix	236

ABSTRACT

For some time there has been growing concern over the apparent increasingly sedentary lifestyle of children. Hence children's activity patterns have come under scrutiny in an effort to establish whether this concern was justified and to examine the extent to which they were engaging in sufficient habitual exercise as would promote beneficial cardiovascular effects.

This study sought to address these issues in children aged 10-11 years in a typical Junior School, and provides evidence of activity patterns and attitudes to physical education and physical activity of a representative sample of children.

A further contribution to the growing database of children's activity patterns is made through the examination of playground activity patterns. This involved the development of a means of quantifying playground activity through freeze frame photography. In addition, heart rate monitoring was employed with a small sample in order to gain evidence of the intensity of that activity.

Inactivity at an early age could have significant implications for children's future activity patterns and increased prevalence of coronary heart disease risk factors. Outside of school hours, children's activity patterns appear to be subject to a variety of influences which conspire to promote or negate habitual activity. Current evidence seems to suggest that the weekly physical education lesson does not necessarily provide sufficient levels of activity. However, children express a preference for 'short burst' rather than sustained activity and playtime, which occurs three times a school day, could provide a potential window of opportunity through which to encourage and promote enhanced levels of regular activity for a greater number of children who would otherwise be insufficiently active.

FIGURES

Number	Title	Page
1	Heart Rates of 6 - 7 years olds	46
2	Pilot Studies	93
3	Typical Pattern of Playground Activity by Location.	156
4	Activites and Territory as Normally Occupied by 3rd Years	156
5	Graph of an Individual Child's Activity	184

PLATES

Number	Title	Page
1	PE 3000 Sports Tester	99
2	Transmitter Location	99
3	PE 3000 Wristwatch Receiver	101
4	Calibration of Photographs	167
5 & 6	Examples of Initial Tandem Photography	168
7 & 8	Examples of Refined Technique of Tandem Photography	169
9 & 10	Example of Tandem Exposure to Facilitate Activity Analysis	171

TABLES

Number	Title	Page(s)
1	Overview of Procedure	64
2	Summary Table of the Validity and Reliability of the Procedures	106-108
3	Summary Table of Sample Units and Procedures Used	109-111
4	Children Perceived by their Peers as being Active/Inactive	114
5	Children Perceived by their Peers as being Unfit/Inactive	114
6	Professed Playground Activity by Descending Order of Popularity	116
7	Evening and Weekend Activity	119
8	Sport with Significant Others	121
9	Swimming Ability across the Group	124
10	Test/Retest Assessment of Degree of Agreement between Interviews	126
11	Possible Improvements as Perceived by the Children	131
12	Favourite Lessons	135
13	Reasons for Disliking P.E.	145
14	Reasons for Disliking Games	145
15	Incidence of Avoidance of P.E./Games	147
16	Reasons for Avoiding P.E.	147
17	Reasons for Avoiding Games	148
18	Excuses Offered to Avoid P.E./Games	148
19	Participation in P.E./Games if it were optional	149
20	Playground Activities Observed	154
21	Type of Activity and Frequency Observed during Playtime	158

22	Average Numbers of Children Observed to be Stationary Relative to Weather Conditions during Playtime	159
23	Average Numbers of Boys and Girls Standing Alone or in Groups During Playtime	161
24	Average Numbers of Boys and Girls Standing Alone or in Groups During Playtime	162
25	Number of Named Activities Occurring at any One Time During the Sample Period	163
26	Duration and Frequency of Specified Games During Playtime Observation	164
27	Number of Children in Playground Sample - Total and Stationary	172
28	Percentage of Children Active and Inactive in Six Selected Playtimes	173
29	Percentage Time Spent within Specified Ranges of Heart Rate of 11 year old Boys and Girls During Playtime	176
30	The Distribution of Heart Rate Scores During Two Separate Playtimes for Selected 11 year old Children	178
31	The Amount of Time Spent at Given Heart Rates During Playtime for Individual Children Assessed a Fit/Unfit, Active/Inactive.	181
32	Percentage Time Spent above Target Heart Rates by 11 year old Boys and Girls During Playtime	182

ABBREVIATIONS

ATPA	Attitude to Physical Activity
ATPE	Attitude to Physical Education
BE	Body Esteem
BI	Body Image
CATSS	Children's Attitudes to Specific Sports
CHD	Coronary Heart Disease
HRM	Heart Rate Monitor
PE	Physical Education
SE	Self Esteem

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1.00

CHAPTER 1

1.10

INTRODUCTION

1.20 Background to the Problem.

"Reliable assessments are hard to find, but there is a growing suspicion that even young children may be less physically active than they were twenty years ago."
(Fentem & Bassey, 1981. p.37)

Often this lack of exercise has been attributed to the changing nature of conflicting leisure activities, most notably television. A survey of 10 - 12 year olds in the Maurice region of Canada (Shephard, et al, 1975) revealed an enormous proportion of each week was spent watching all types of television. A similar picture of life in Australia is highlighted by Hawkins (1985) who documents increasing patterns of inactivity in children associated with increasing television viewing.

While much of the evidence for the lack of physical activity appears to centre on non-British subjects, there is nevertheless more than a suspicion that it might equally well apply here. In view of the time honoured phrase What North America does today, Britain will do tomorrow it is almost inevitable that British children will follow a similar pattern.

On the other hand Shephard (1982) makes us aware of the view held by some authors that ...

"children are naturally active, so that no special programs are needed to increase physical activity."
(p.157)

Gilliam, et al, (1981) in their study into children's activity patterns deduced that ...

"...children are not as active as they may appear; they do not voluntarily engage in high-intensity activity."

"even moderately active children seldom participate in physical activity of intensity high enough to promote cardiovascular health." (pp. 21-23)

What causes inactivity in children is both of interest and open to debate. By way of illustration, Shephard (1982) suggested that ...

"The essential cause of inactivity is a lack of motivation rather than a lack of facilities." (p.245)

Further, he suggests a possible reason for motivation shift developing, as being associated with the commitment to physical activity or otherwise of adults occupying positions as 'significant others' in the eyes of the child. Hence the child's own involvement and commitment could be influenced accordingly.

"Plainly, if children are to become more active, they must sense a commitment of adults to an active lifestyle." (p.236)

parents
influence

"In the case of physical activity, the involvement of both children and youth appears related to parental encouragement of participation." (Godin & Shephard, 1984. p.443)

Unfortunately, the scope of this study precludes any indepth study of parental involvement.

Clearly the problem of assessing activity in children has to recognise that different children will have different activity patterns. There is some evidence to suggest that certain types of children will have particular activity patterns. Perhaps the most obvious, and that on which the researchers and the lay public agree almost conclusively, is the activity patterns of boys and girls. Gilliam, et al, (1981) and Hawkins, (1985) perceived that boys are

gender
diff

more physically active than girls. Interestingly, in the light of observations made by Gilliam, et al, on the nature of physical activity, Durnin and Passmore (1967) found girls spent more time than boys on moderate exercise and less time on heavy or very heavy activity. Durnin also commented on a socio-economic difference, with boys in poorer circumstances being more active than their more wealthy counterparts.

Whatever the many and varied reasons expounded for perceived inactivity in children, the reasons for wanting both to discover activity patterns and then use the information to intervene and positively modify, are real enough. They largely centre on a shift in emphasis from traditional games to Health Related Fitness and an accent on Health Promotion. An active lifestyle, initiated during the formative years of childhood, being currently perceived as a major component in the prevention/reduction of cardiovascular disease, as well as the promotion of a sense of well being .

Concurrent with investigations into activity patterns have been attempts to analyse underlying attitudes, doubtless in the universal belief that developing positive attitudes is a desirable goal and that positive attitudes towards physical activity will encourage activity. However, in this context, it is perhaps pertinent to note that Figley (1984) indicates that this is as yet an under-researched area with little evidence to support such direct association between attitude and activity.

Attitude

X

"Developing favourable attitudes toward learning is a universal objective of instruction and certainly one that finds a place in the goals of most subject areas. The rationale quite often given for the desirability of this goal is that students with positive attitudes are more likely to achieve in that content area. Unfortunately, research evidence to support this claim is rather meagre both in numbers of studies and magnitude of the relationship." (Figley, 1984. p.229)

Williams, et al, (1983) raises the very valid question of whether what a child feels about physical activity (affective component) is in fact reflected in what they actually do (behavioural component). Martin, et al, (1985) give little support to the notion of attitude/behaviour relationship. Neither do Worsley, et al, (1984) who refer to the extensive literature on attitude-behaviour relations, well reviewed by Fishbein & Ajzen (1975).

" According to their theory of 'reasoned action', attitudes are a product of beliefs about social and non-social consequences of performing behaviour. That is, beliefs are directly predictive of attitudes. Similarly, attitudes predict behavioural intentions and these in turn predict behaviours. Thus, although substantial relationships exist between beliefs and attitudes, and behaviour, these are not direct, simple relationships." (pp.201-2)

Likewise, attitudes are believed to lack stability over time, being temporary, unenduring and subject to influence by current activities - indeed Coe (1984) takes the view that children's attitudes to physical activity is essentially equivalent to children's attitudes to specific sports.

Nevertheless. it is quite clear that many people concerned with sport would still perceive the attitudes of children towards PE and Sport as being significant information to have to hand.

1.30 THE PROBLEM

Hence the area of immediate concern and interest is to find out children's activity patterns and how children report those activity patterns. The basic questions to be answered are:

- Are children really active?
- Can this activity be subject to quantifiable measurement?
- What are the attitudes expressed in this connection?

Most of the work on attitudes thus far has centred on college students, young adults and children of Secondary School age, (who are all somewhat removed from the formative years of early childhood), with more work being done in relation to attitudes and attitudes to particular subjects and rather sparse information in respect of children's perceptions of P.E. Indeed, Coe (1984) points out that so far no studies have clarified what children mean by the term Physical Education, which appears to have restricted meaning for them.

1.40 THE PURPOSE

The purpose of this research project is to present a description of typical 10-11 year old children, their patterns of activity and their underlying attitudes, and thereby suggest possible ways of increasing the duration and intensity of that activity, where appropriate. Rather than use an approach which takes a broad perspective or indeed focus exclusively on a limited number of children, the purpose is to combine these techniques to investigate the detailed picture against the broad perspective, thus allowing perhaps a more meaningful picture to be obtained. Hence, there could be a need to re-examine the design of the conventional playground; to more accurately define sources of activity; and to look at the agencies to which children of this age are attracted for their leisure and recommend ways in which modifications might usefully be incorporated.

1.50 ASSOCIATED PROBLEMS

The problem for this specific study was to find out what combination of assessment techniques would best provide a description of activity which the author would feel confident to use.

Whilst the greatest interest previously has been shown in older children and young adults, it seems more appropriate to centre a study on younger children during their more formative years, when in theory one is closer to the source of the object of interest and therefore in a position to make early recommendations. To this end 10-11 year old children were selected since they were felt to be at the most appropriate age and would be sufficiently articulate in interview.

The task of describing the physical activity patterns of 10-11 year olds is vast and therefore there is a need to select very carefully the children who would form this cohort. Clearly, because the study is multi-faceted and at times in depth, the sample selected has, of necessity to be limited to manageable proportions, it is important to identify a school which is fairly typical i.e. which is not renowned for the quality of its P.E. programme and activity, but also not negative in any of these features. While it would have been possible to have taken a very good school and presented that as a pattern, the fact is that the majority of schools do not function in this way, and so a decision was taken to narrow the choice down to a fairly typical school. The brief description of the school should enable it to be put in context with other schools of similar type and population to permit comparison.

Choice of
sample
sch.

The procedures for determining attitudes also need to be looked at carefully. Coe (1984) and Martens (1978) comment that while the majority of work in this area has centred on children at secondary level and above, effective scales of measurement of attitudes at junior level are relatively thin on the ground and that researchers are still trying to develop effective instruments. The instruments used previously have been the questionnaire type involving open/closed questions; Likert type and Semantic Differential responses, and, in the main, have been developed for older, non-British respondents. However, there is a danger in placing too much reliance on questionnaires since there is concern

over applicability - the vocabulary used may, for instance, demand too high a reading competence or may well not be similar to that used by the children themselves. Likewise, previous procedures have required too fine a grading for the children to have been able to select accurately (Sharples, 1969). Irrespective of the accuracy of the child's response to a given questionnaire, the overt reality may well be totally different.

@naire

The problem of describing the activity patterns *per se* of 10-11 year olds is added to when one looks at the affective variables - given that current research into affective variables at Junior School is limited (Sharples, 1969). For example, Sharples (1969) points to the differences between schools as a result of an emphasis being placed on certain activities/subjects; this being associated with more favourable attitudes being shown towards the 'promoted' activity. Sex, age and weight are yet other variables - e.g. Boys are generally regarded as being more active than girls; younger children more spontaneously active than older; age determining appropriate leisure behaviour; and obese children less inclined to prolonged vigorous activity than this or normal children. Teaching methods are also regarded as influential of attitudes, as are the opportunities for activity available to youngsters within the school - frustration and the seeds of rejection being perceived as being sown where there is a disparity between numbers of children wanting to play for the school and the number of those with a realistic chance. Other variables worth mentioning in this connection are the influence of self esteem, body image, levels of fitness, peer group pressure, and levels of aspiration and parental encouragement.

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One further complication is the reliability of any study reliant on the extrapolation of data from such a restricted sample, but it is the intention of this study to fully describe a school and the 10-11 year old children within it, and so, at least, present a framework for anyone else interested in making later comparisons.

1.60 MAJOR AIMS

The major aims of this study are:

1. To describe the activity patterns of children in the upper primary band of what might be termed a typical school.
2. To discover the attitudes of upper primary children to physical activity.
3. To consider the relationships between attitudes and physical activity.
4. To identify the factors influencing the activities and attitudes of children.
5. Thereby to suggest means of possible development to improve activity and attitude in children of this age.

In the process of satisfying these five major aims it will be necessary to develop measuring techniques appropriate for use with this age.

2.10 Introduction

The interest in children's activity patterns has quite clearly been a 20th century phenomenon. Upon analysis it is perhaps not surprising, since it is within this century that all kinds of social changes have taken place, viz: greater availability of mechanised transport for all age groups; increased attraction offered by television, video and computers for more sedentary pursuits; an increasing crime rate which mitigated against safe play out of immediate adult supervision; a general disinclination towards vigorous exercise without the stimulus from parents or friends.

This review of literature is organised into two major sections, the first dealing with Attitudes and the second with Activity Patterns. Each major section is then subdivided into appropriately related sections. In both cases the review begins with a brief focus on the historical background to the work before tracing the development of systematic analysis for measuring attitudes to physical activity and physical education, and the methods for assessing physical activity, respectively.

The first section then considers attitudes to physical education and physical activity. Since much of the work regarding attitudes to physical activity is contained within sections 2.22 (the development of systematic analysis of attitudes) and 2.23 (attitudes to physical education), for the sake of clarity, it was not thought appropriate to duplicate this material in section 2.24 (attitudes to physical activity).

The second section goes on to consider activity patterns in general and in relation to the P.E. lesson, playtime, and beyond school.

There is no attempt in the Review of Literature to present the case for physical activity. Whilst at various points in the study reference may be made to levels of activity, heart rate and the implied beneficial effects which accrue, it is not the intention of this study to present or prove the case that physical activity is necessary for health and fitness.

The physical educator interested in children's activity patterns soon recognises that there is both the relatively objective assessment of the child's activity levels and also, perhaps more important in the long run, the attitude the child holds towards activity. This study attempts to measure both in top primary (10-11) children. It has been argued earlier that observation of the P.E. lesson alone can be quite misleading and therefore attitudes and activity patterns are assessed in sub sections - hence related literature is divided as follows:

2.20 ATTITUDES

- .21 Historical background
- .22 Development of systematic analysis
- .23 Attitudes towards physical education
- .24 Attitudes towards physical activity (play, leisure)

2.30 ACTIVITY PATTERNS

- .31 Historical background
- .32 Development of systematic analysis
- .33 Children s activity patterns in general
- .34 Activity in P.E. lesson
- .35 Activity at playtime
- .36 Activity beyond the school

2.20 ATTITUDES

2.21 Historical background

The term attitude has been in use for over a century but this review is restricted to that literature relating to attitudes to physical activity (ATPA) and physical education (ATPE) which had their origins in the early 1950's. It is intended to present the articles in chronological order starting with the attempts to develop reliable instruments with which to measure ATPA, before moving on to the later information gained as a result of using such instruments. Effectively, these later results were very much dependent upon the validity and reliability of the original test instruments and since they differ in form, it is worth examining the processes which contributed to their production. Where appropriate, comparisons will be drawn between the methodology, observations, results and conclusions of the various authors under review, so as to tease out the threads of the evolution in the assessment in attitudes.

2.22 The development of systematic analysis.

Wear (1951) attempted to develop a systematic means of assessing individual and group attitudes of College men towards physical activity (PA) using a Likert-type instrument. Later Kenyon (1968) felt this had drawbacks in not allowing for the multidimensionality of the domain and so developed six scales for assessing attitudes towards PA in college students (male and female). Kenyon (1968) probed a suitable definition of attitude and settled on:

"a latent or non-observable, complex, but relatively stable behavioural disposition reflecting both direction and intensity of feeling toward a particular object, whether it be concrete or abstract." (Kenyon, 1968. p.567)

Other later authors also used this definition.

Simon and Smoll (1974) appeared to be in agreement with much of Kenyon's work but saw a requirement to develop an instrument for use with children by the adaption of his original test through the introduction of substantial word changes.

Hence Attitudes to Physical Activity (ATPA) led on to the six domain test of Attitudes to Physical Activity (6 domain ATPA), which in turn was the precursor for Children's Attitude to Physical Activity (CATPA).

These procedures gave considerable impetus to attitude research in the late 1970's and early 1980's. However, once the desire to look at the primary/elementary age range arose, the problems associated with the use of questionnaires became apparent. At the same time the value of descriptive data gained from more informal approaches was recognised.

In the 1980's a significant change occurred in the assessment of attitudes with a broadening of the investigative procedure to take account of the various external and internal factors which could conceivably influence attitudes. Previously the focus of attention had tended to be attitudes *per se* without consideration of other variables.

Previously there had been a move towards daily programmes of PE/PA in France, Canada and the USA and the implication that it would promote a positive effect on pupils' attitudes was now scrutinised (Williams, et al, 1982).

In 1982 the second only study was undertaken into the relationship of attitudes to various variables such as Self Esteem, Body Esteem, Involvement, Age, Gender, School type, setting and form level. In this context, the possible influence of self esteem and body esteem were initially considered as separate items; some twelve months later the way they acted in consort was assessed (Williams, 1982, 1983). Interestingly, the question was raised at this juncture

as to whether what a person's attitude towards activity was in fact translated into performance.

Another area of consideration became the relationship between involvement and CATPA to test whether attitudes were strongly related to primary involvement (Williams, 1983).

The spotlight also fell on a consideration of the stability or variance of attitudes with reference to age.

Later consideration was given to such aspects as school environment, curriculum philosophy and the effects of it's interplay within and between teachers and pupils.

2.23 Attitudes towards P.E.

The next stage in the evolutionary process continued the theme of investigating children's attitudes but saw parallel rather than sequential threads developing. On the one hand research investigated attitudes of junior school pupils towards curriculum activities (including physical education) in relation to sex, age and school differences, as well as the possible positive effects of a regular daily P.E. programme both on children's attitudes to P.E. in particular and the school in general; while others sought to consider the possible influence of such variables as Body Esteem (BE), Self Esteem (SE), age, gender, form level, and social setting on the fostering and maintenance (or otherwise) of positive attitudes towards P.E. Investigation was also made of the influence a teacher may have on a child's attitude to P.E.

Sharples (1969), indicates that hitherto there had been little research done in the area of affective variables at junior school level - previous studies having been more concerned with cognitive performance. His examination of attitudes towards the five curriculum areas of art, P.E., writing, reading and maths, was

conducted amongst 438 children to discover if there was any relation between sex, age and the emphasis placed on particular subjects by individual schools. His work recognised the potential problem of measuring attitudes amongst young children highlighted by other researchers (Sharples, 1966; Wisenthal, 1965) and employed a Guttman scale. His research showed that P.E. was the second most popular activity behind art. Girls held more favourable attitudes towards school activities than boys, and younger children were more favourable than older. Where a school made a particular emphasis of an activity then it was generally more favourably perceived.

The work of Sharples (1969), was later extended by Alban Metcalfe (1981) who discovered that attitudes towards physical education were very positive but a decrease was noticeable amongst girls as they reached the top of the junior school (10-11 years of age).

The notion of daily P.E. programmes appears to have had its origins in France (Larajet, 1933). Three of the more recent papers on this area relate to experience with Canadian, French and New Zealand children. Bailey (1976) in his paper attempted to prove the case for growing children receiving a programme of vigorous PA, since many Canadian children were currently deprived of this experience. Amongst the reasons advanced to support his argument was that early motivation in PA would encourage participation in adulthood and that it would enhance academic skills. He touched on, but did not explore, the view that PA promoted a good self concept - a theme developed by the parallel thread of research. While he made eleven conclusions, space permits reference to only the two most salient - a) That there was a need for more emphasis on PA and not less; b) Positive early experience was important in influencing later attitudes.

Continuing this investigation of possible benefits from regular PA, Glassford (1978), found an overwhelming acceptance and support for compulsory P.E. on the part of parents and children, as well as a

similar response for daily P.E. (which received recommendation for incorporation into the curriculum). Interestingly, the main objective of the P.E. programme was seen as Health and Fitness as perceived by both parents and students, and while this could be linked with a national (Canadian) emphasis, has to be seen as one of the possible areas vis à vis Kenyon's typography. Parents expressed concern with an over emphasis on winning and this view received further support later from the work of Hendry (1978). Additionally, most students (three out of four) held positive attitudes towards P.E. in general and this view was reinforced in a variety of the succeeding literature.

In similar vein, Martens and Grant (1980), also working in Canada, found that the majority of parents, teachers, pupils and administrators were in support of daily P.E. programmes. One of the benefits cited was the improved attitude towards academic subjects and this was in keeping with the French experience.

In 1982, Pollatschek reviewed the movement towards daily P.E. in other countries in respect of its implications for the U.K. and noted that Fourestier in France, Bailey, Martens and Grant in Canada had all produced similar positive evidence. Likewise Dwyer, et al, (1983), reported the success of daily P.E., without loss of academic performance, had been demonstrated in Australia. Biddle and Biddle (1989), further reported that the United States Department of Health and Human Services (1980) 1990 health objectives for the nation contained eleven concerned with physical fitness and exercise, as well as a request for more children to receive daily physical education.

In Britain there has been a growing awareness of the role of exercise and this is clearly spelt out in the Heartbeat Wales programme, (Heartbeat Wales, 1987).

The 1990 National Curriculum Document on P.E. echoes the American recommendations and calls for more emphasis on activity and exercise.

"Pupils need to be made more aware of the short and long term benefits of both continuous activity and activities which develop strength, stamina and flexibility. They should experience activity for long periods of time."

"If these recommendations are acted upon, we believe that there will be considerable long term benefits to young people in terms of their continued participation in enjoyable physical activities, their adoption of healthy lifestyles, and the achievement of the highest standards in a wide range of physical activities." (N. C. Doc. 1990, p.49)

Williams, et al, (1982), reported interesting results in an attempt to determine whether daily P.E. in New Zealand primary schools would lead to positive attitudes towards P.E. The test for attitude was based on four dimensions of Kenyon's sub-domains (Health and Fitness, Social value, Aestheticism, Catharsis). Two experimental groups were used and a single control group. Somewhat surprisingly only one of the experimental groups showed any improvement in CATPA. A *post priore* examination revealed that this experimental group was of significantly lower socio-economic level than the control. The explanation for this result was given as the group having had pre-existent neutral attitudes capable of being changed. However, no further investigation into the class variable was suggested as being worthwhile. (Hendry was later to be viewed as seeing things differently.) The other experimental group whose attitudes remained constant were thought to have had already favourable attitudes - this evidence appeared to be in agreement with Martens (1979), who concluded from the Blanchard Project that daily P.E. did not lead to an increase if favourable attitudes were already in evidence. Williams (1983), also examined a second area - relationship between CATPA and involvement, using the Simon and Smoll test of CATPA - and found support for the view that attitudes were strongly related to primary involvement e.g. the provision of

opportunities led to the promotion of positive attitudes. This was later to be supported by the work of Hendry (1978).

The second sequential thread was that of ATPA and their relationship to various variables. Over a three year period Williams, et al., (1982), studied the relationship between ATPA/PE and Self Esteem (SE), Body Esteem (BE), Involvement, Age, Gender, School type, School setting (rural/urban) and form level. His motive was that the study of ATPE with New Zealand children was a neglected area (his 1982 study being the second only in this area). Additionally previous studies had merely concentrated on assessing attitudes without reference to the possible variables outlined above.

In 1982 they considered the influence of SE and BE as separate items but were two years later to consider their influence when they acted in consort.

Two reports were produced in 1983 - the first was critical of other research for not differentiating between children's attitudes to extra-curricular and instructional activities separately. Additionally it was felt that investigations had neglected to look at the behavioural involvement and so ignored what was considered to be a basic question of whether what a person felt about P.E. (affective component) was reflected in what they actually did (behavioural component). Here reference was made to the work of Albinson (1976) and the three components of attitude.

The second report caught breath as it were, and reviewed the findings of previous investigations and itemised what results would reasonably be anticipated on the basis of the current state of the art vis à vis research finding. While broad agreement was found on such items as pre-existing disposition, influence of school setting, curriculum, personal adjustment, no such agreement was found on the question of the stability or variance of attitude with reference to age. Hence a consideration of this unresolved area was now included in the study.

The fourth report of the series Williams (1984), sought to explain the relationship among body esteem, self esteem and attitudes of pupils towards PE.

The test instruments varied, with ATPA being measured using Kenyon's ATPA measure and Wear's standard and shortened - modified attitude inventory. SE was assessed using a four point Guttman scale developed by Rosenberg and BE using a shortened form of Kenyon's, 1969, instrument. It is worth observing that both Wear's and Kenyon's ATPA measures were used on various occasions, whereas Simon and Smoll (1974) had previously expressed a preference for Kenyon's test on the grounds of greater reliability.

The major findings of Williams, et al, (1984), are summarised below.

1. Attitude towards physical activity is influenced by gender with boys attaching differing importance to motivational factors than the girls and vice versa.
2. Younger pupils hold more positive attitudes than older pupils.
3. Rural pupils hold more favourable attitudes than urban pupils (especially females).
4. Self esteem (SE) and body esteem (BE) are a function of gender.
5. Disposition is dependent upon levels of SE/BE.
6. ATPA to some extent is a function of BE and SE.
7. Involvement at a younger age appears to lead to a more positive attitude in females.
8. Both sexes hold generally favourable attitudes to P.E.
9. Younger pupils (3rd Yr) hold more favourable attitudes towards PE than older pupils (5th Yr) in Co-Ed schools but no difference in Girls schools.

As a result of these findings various recommendations for future study emerged - there appeared to be a need to study what actually went on in schools and so gain an insight into the relationship

between pupil's attitudes to and perceptions of the teachers; as well as examine extra mural sport and leisure lifestyles. Many of these contributory factors were examined by Hendry 1978, in his study with children in the U.K.

His papers appeared to consider the inter-relation of seven areas -

1. The popularity of P.E. as a subject
2. Importance of Self Concept (SE/BE) in relation to ATPA
3. The influence of teachers on ATPA
4. Influence of the curriculum
5. The pressure/influences to which the teacher is subjected and how it finds an ultimate expression in CATPE
6. Positive and negative factors influencing children s participation
7. Possible influence of class on participation and CATPE.

His field research indicated support for the notion that P.E. was a popular subject with pupils and acknowledged the importance of SE and BE in relation to ATPE (this area formed a significant part of his findings, in keeping with other researchers).

The influence of the teacher and school environment on attitudes to PA and PE

Previous studies (Mason, 1965, Mosston, 1966, Mancini, et al, 1976), had indicated that the P.E. teacher may have been a significant influence on a pupil's attitude towards the subject. Hendry extended the work to look at the influences of the teacher on the pupil and indeed the factors affecting the teacher's tendency to present a particular curriculum. He particularly looked at the teacher in relation to the expectations of the school, his influence on the pupils and on their self perceptions and ATPE.

The situation is almost a dynamic continuum and a useful starting point from which to consider an overview would be the teacher. Hendry perceived the teacher as having low status by virtue of teaching a non-examination subject (plus the fact that he wears a different uniform ; often works in a physically separate area from the rest of the school; and keeps different hours which preclude regular staff-room contact).

"Because of status ambiguity and a sense of deviant identity they may seek to enhance their status and sense of self-esteem by sports success." (Hendry, 1978, p. 94)

Hence a possible ideal of Sport for All becomes modified to Sport for the Elite with a competitive accent. thus there is a gap between educational aims and reality which might influence the children's attitudes.

Further research into the area of a P.E. teacher's influence on CATPE was later undertaken by Ikulayo (1983); Morris (1985); and Figley (1985). Their work supported the view that the P.E. teacher was a critical factor in the formation of attitudes.

Ikulayo's (1983), research stressed the significance of the P.E. teacher's personality when considering the variables related to the formation of attitudes.

Morris (1985), made the following observations concerning the P.E. teacher's influence:

"..a teacher also has the responsibility to create an atmosphere in which students are likely to benefit from those activities." (Morris, 1985. p.34)

"Complex and difficult schoolwork is often made enjoyable and motivating simply because the teacher presents the material in a compelling fashion." (Morris, 1985. pp. 33-34)

Morris (1985), also emphasised that positive attitudes were more likely to arise when a teacher's enthusiasm and approach to a class resulted in a pleasant and benificent atmosphere.

Figley (1985), in examining positive and negative attitudes towards P.E., found that the teacher was a significant factor. The pupils reported that the teacher was the primary source in influencing positive and negative attitudes towards physical education. In particular, Figley concluded that it was the teacher's reinforcement or lack of reinforcement which ranked highly as a causal factor in influencing children's positive or negative attitudes to P.E.

The next stage might usefully be to consider the work related to the child's view (direct perspective) and then the teacher's perception of the child. SE and BE are considered significant within the total development of the child.

"Reactions to, and expectations of body type, become incorporated into the recipient's own body concept and thus provide a framework for his concept, which becomes a significant part of the total self concept."
(Staffieri, in Hendry 1978, p.7)

A significant work in this area of interpersonal perception is that of Laing, et al, (1966), who considered the way in which a person looked at himself and his perception of how significant others perceived him. Laing, et al, would define the way in which a person looks at himself and at another as a 'direct perspective'. A 'metaperspective' would refer to a person's opinion of what another thinks of him. There is also a third aspect, that of the meta-metaperspective which is a person's opinion of what another thinks of the first person's opinion of the other. Whilst in some respect this sort of definition would appear wordy, they are nevertheless useful labels to use because all three are inter-related in the real world. In other words, a child's perception of himself or an activity may

well be influenced by the way in which he views the teacher's perception of himself.

There was a suggestion that participation or non-participation may have been linked to physique and personality.

"Below a certain level of muscularity and extraversion motivation towards participation is reduced."
(Hendry, 1978. p.60)

Body type and level of attractiveness were seen as giving rise to positive or negative self/external perceptions.

Likewise, encouragement was perceived as being given to those pupils with the same physical qualities as the teacher. Hence as a result of different Body Image (BI) and Self Esteem (SE) the teacher was seen as making different evaluations of ability and either facilitating or imposing restrictions on participation accordingly. Differential treatment of pupils also emerged from a consideration of perceived physical abilities.

Participants received further reinforcement to their SE through the rituals of school, e.g. Assembly notices - with praise seen as reinforcing the separateness of participant from non-participant. Posts of responsibility were seen as traditionally being awarded to participants.

The reverse of this process was seen as contributing to the alienation of children to P.E. e.g. If BE and self perception were low, the child was unattractive, he was likely to receive lower teacher evaluation, to have had overt/covert restrictions placed on participation, and for the teacher to have had a lower perception of his ability (the halo effect), which gave rise to negative feedback and consequent further lowering of SE.

Boredom and alienation led to the school being perceived as less than worthwhile. Where leisure facilities were of the dual-use type, the link between leisure and school was a possible restriction on pupils willingness to be involved (Jephcott, 1967).

It was further observed that upper band pupils were more likely to perceive the school as being more worthwhile than the lower band and therefore more self motivated to participate and actively cement some relationship with the school.

Elsewhere in this paper mention was made of the need to consider whether what a child felt (affective component) was reflected in action (behavioural component). Hendry's ⁽¹⁹⁷⁹⁾ case studies, based on Kenyon's six dimensions, were revealed in this respect since different elements of his classification appeared to influence participation. One example given was of a child who was both good at P.E. and professed a keen liking for the subject and yet did not play for any school teams. The reason for participation and professed liking was seen as the result of seeking sociability and fitness from activity but not wishing to have competition/excitement/vertigo. Perhaps this serves to underline the usefulness of Kenyon's ATPA instrument and the need to differentiate between attitudes to P.E. and extra curricular activities as proposed by Williams (1983).

Socio/economic status

While Williams ⁽¹⁹⁸³⁾ touched on the possible effects of socio/economic status, Hendry ⁽¹⁹⁷⁹⁾ was the only one of the authors to raise the question of class to any extent.

Hendry took the view that youngsters who favoured participation in sport were more likely to have middle class than working class values because:

1. They had better access to information on available facilities,

2. They had greater parental support,
3. They had parents with a more active lifestyle which they adopted,
4. They were more at ease in the social setting and with the organisational setting of the leisure centre,
5. They had greater experience of extra curricular activities at school,
6. They were more able to afford the costs involved.

The role of parents

The work of some researchers has highlighted the influence of parents in determining attitudes. Boothby, et al, (1980), indicated that an early introduction to physical activity by parents had a fundamental influence on children's attitude to physical education. Where parents were interested in participating in sport, watching or reading about it, this interest was likely to be conveyed to their children. Conversely, their lack of interest was also likely to be relayed to their children. He concluded that:

"The most striking feature of sports participation appears to be the importance of continuity. If there is early participation, the chances of participation in later life are good." (Boothby, et al, 1980. p.65)

Given the nature of early family life and the likely contact, or otherwise, between parents and their children, this is hardly surprising. According to Mason (1965):

"Attitudes are never acquired in a social vacuum, they are acquired by a person being a member of a group and by accepting or rejecting the values of that group as a point of reference." (Mason, 1965. p. 5)

In a later study, Coe (1984), also acknowledged the importance of family life as well as local availability of opportunities in influencing children's attitudes to physical education. It is

perhaps worth noting that 75% of Coe's sample of 11-12 year old children participated in physical activity outside of school (with more boys than girls being involved) and that many of the activities undertaken did not relate to the children's own curriculum. Interestingly, considerable interest was expressed in wishing to play for the school team though relatively few children actually did. In this respect, boys gave reasons concerned with skill and performance, while girls wanted to do so for social reasons.

2.24 Attitudes towards Physical Activity

There have been various investigations into firstly attitudes to physical activity (ATPA) and later, children's attitudes to physical activity (CATPA). Kenyon (1968), as referred to earlier in this chapter, detailed six scales for assessing attitudes towards physical activity. Later Kenyon's inventory was modified and used by Simon and Smoll (1974); Smoll, Schutz, Wood and Cunningham (1975); Smoll, Schutz and Keeney, (1976), to investigate CATPA. Wood (1979), investigated the psychometric properties of the instrument and found that although it possessed an acceptable degree of internal consistency, three of the word pairs should be deleted.

Following Wood's psychometric analysis, the stability of CATPA was questioned (Smoll and Schutz, 1980); a revised CATPA inventory advanced by Schutz, Smoll and Wood, (1980) and later modified for use with children aged 8 years of age by Schutz, Smoll, Carre and Mosher, 1981; and the construct of physical activity was investigated by Schutz, Smoll and Wood (1980).

Martin and Williams (1985), conducted a psychometric analysis of an instrument for assessing CATPA and produced findings which lent support for the structural changes recommended by Schutz and Smoll (1980). They also found a lack of stability of CATPA (as did Schutz

and Smoll, 1980) and attributed this to the respondent's changing sports activity, as predicted by Schutz, Smoll and Wood (1980).

"The small differences between CATPA and CATSS (children's attitudes to a specific sport) mean scores, along with the results of canonical analysis and factor analysis, led to the conclusion that children's attitudes toward the construct physical activity are essentially equivalent to their attitude toward a specific sport."
(Schutz, Smoll and Wood, 1980. p.39)

Martin and Williams (1985), further suggest that:

"...rather than attitude being an enduring behavioural disposition as Kenyon defines it, CATPA may be more of a temporary phenomenon, or state that is influenced by current activities."
(Martin and Williams, 1985. p. 102.)

Activity appears to be a multidimensional word, possibly as a result, the distinction between CATPA and CATPE can appear somewhat blurred in the literature. Rather, it appears to depend upon an author's interpretation of the word's meaning, since the term 'activity' *per se*, can be used as a global word which describes all the activities which a child might experience at school, rather than as a term which describes all forms of physical movement, or can have a more specific connotation as in leisure activity or extra-curricular activity .

Coe (1984), found that:

"...studies have used the term 'Physical Education', none have clarified just what the children understood by it."
(Coe, 1984. pp.120-121.)

Further, he indicated that:

"From a content analysis of the responses, it is clear that 'physical education' has a restricted meaning for most children." (p. 121)

In this instance the children appeared to associate physical education with gymnastic type activity, possibly because physical education and games were often presented separately on their timetable, thereby indicating an institutional separation.

Coe, also pointed out that:

"The distinction between physical education and games or sports is by no means confined to children,.....
It is not uncommon to find advertisements asking for teachers of P.E. and games ." (p. 121)

2.30 ACTIVITY PATTERNS

2.31 Historical background

A central question of this study is the degree of activity of young children. Indeed the basic premise for many of the current investigations into this area is that children are basically inactive or only active for brief periods which are insufficient in intensity and duration as to enhance health. In this respect the finger of suspicion has pointed towards increased leisure time, more time spent passively watching television or the video, playing on the computer, or perhaps playing indoors because of the dangers inherent for the young child outdoors. Additionally with the wider ownership of cars rendering walking and cycling something of an obsolete pastime it would be perhaps natural to assume that this was merely a contemporary problem having its origins within the past 10 - 15 years, being coincident with many technological and cultural changes.

"...primary school children's activity levels are much lower than is desirable.Many factors contribute to this: the spread of car ownership; time spent watching TV; unwillingness to allow children to play away from home because of fears for their safety and so on."
(Anne Williams, 1989. p.4)

However, as early as the 1960's Huenemann, et al, (1967) in their study of the activity levels in a sample of American children suggested that teenagers had in fact been inactive for many years. Likewise Durnin (1967) in a study of the activity patterns in a community reported that levels of vigorous activity in teenage children were fairly modest.

Given this background it may well be that there are reasons why this phenomenon of apparent inactivity in children has not been

precisely evaluated as yet because of the difficulties experienced by researchers in obtaining reliable quantitative data.

"Measuring physical activity is difficult, particularly in children. Over 30 different techniques have been tried, none fully satisfactory (LaPorte, Montye, & Caspersen, 1985). Daily physical activities involve a multitude of actions that are difficult to quantitate without interfering with the subject's normal patterns of exercise."

(Rowland, 1990. p.33)

There are some major reasons for this outlined in this section, an outline of some of the more prominent ones being listed below:

- problem of deciding how to evaluate activity/inactivity and its frequency, duration and intensity,
- there is a lack of a commonly agreed measure of activity,
- difficult to measure without invalidating the result either because of intrusive monitoring equipment or the presence of the observer,
- queries have been raised over the reliability of questionnaires and their suitability to the respondent's reading age,
- the accuracy of the self report/diary has been questioned,
- there is concern over the reliability and validity of self-report measures,
- human memory is limited, particularly so in childhood,
- there is no commonly agreed time scale of assessment over which to determine habitual physical activity.

Inevitably the problems outlined above have spawned a variety of solutions but while they may be considered to contribute broadly to the overall picture, there remains the problem of comparing results gained by differing methods. Nevertheless a number of studies have looked at activity patterns in general, activity in relation to the P.E. lesson, at playtime and beyond school.

2.32 The development of systematic analysis

It would appear that there are three principle favoured methods of systematic analysis, viz:

1. Direct measurement of the body's response to exercise through heart rate monitoring and oxygen uptake. (Armstrong, et al, 1990)
2. Estimation of the likely intensity of activity through analysis of direct observation, film, video, "time and motion" study etc. (Baranowski, et al, 1987)
3. Indirect estimation as a result of self report measures of physical activity such as questionnaires, activity diaries, interviews. (Kannas, et al, 1986)

However, Edholm (1966), proposed that it was more accurate to classify these as two major categories, Direct measurement and Estimation. Direct measurement being the equivalent of 1. above, and Estimation consisting of the two subsections, (i) Estimation through direct observation and (ii) Indirect estimation from self reporting techniques, coupled together under the umbrella term Estimation.

Physical Activity can best be quantified by measuring the expenditure of energy during exercise but necessitates the use of obtrusive equipment. Durnin and Passmore (1967), described a method by which VO_2 could be established for various activities and then related to activities logged in an exercise diary. However it too had drawbacks.

"This method requires not only that laboratory-established VO_2 activities match those of daily living but also, impractically for children, that subjects reliably record their physical activities."
(Rowland, 1990. p.33)

Direct measurement of children's activity patterns as determined by equipment such as heart rate monitors has been used by researchers such as Gilliam, et al, (1981). A problem with direct measurement initially centred upon the cost, availability and intrusive bulk of the necessary monitoring equipment. While the equipment undoubtedly provides an accurate measurement of the physiological reactions of the body these may not necessarily always be in response to the activity *per se* but to transitory external stimuli which are difficult to differentiate thereby producing an overoptimistic assessment of an activity's intensity (Tuxworth 1988). With the advent of micro-electronics (e.g. P3000 Heart rate monitor) the problems associated with equipment size and cost have to some extent been obviated. Armstrong, et al, (1990), writing in respect of the P3000 Sport Tester indicate that:

"It has been found to be a reliable and valid means of recording heart rate with children (Tsanakas et al, 1986) and a recent survey of the most popular commercially available heart rate monitors concluded that the Sport Tester 3000 was first choice as, "in addition to having excellent validity and stability it permits almost total freedom of motion" (Léger and Thivierge, 1988)
(Armstrong, et al, 1990. p.153)

Estimation through direct observation has often been employed in association with some other method but is of itself very time consuming and therefore limits the period of observation. Likewise the act of observation can of itself lead to a modification in the subject's behaviour (Hawthorne effect) leading to the observation of atypical behaviour.

Estimation through indirect observation also presents difficulties. Questionnaires when used with adults are beset by inherent problems (Mundal et al, 1987). However, when used with children these problems appear to be magnified as a result of such factors as the prerequisite reading competence, and the child's limited ability to perceive or recall activity, its intensity/duration etc, beyond the immediate present (Telama, et al, 1985).

Diaries were suggested as a more reliable alternative for the collection of data but Baronowski (1984), questioned this assumption on the grounds that there were many influences on the accuracy of the form, such as:

"(a)the structure of the form, including the time period of recall and response format, (b)the appropriateness of the forms and instructions for the age and social group of the child, (c)the incentives for form completion, (d)the environment for form completion."
(Baronowski, 1984, cited in Dickenson, 1987. p.24)

Although questionnaires, or diaries such as are completed by the child, or his parent/teacher are easy to administer they are of variable reliability.

"Saris, (1986), notes that children below the age of 10 or 12 can provide only limited information about their patterns of activity. Parents do not often observe their children in play activities away from home, and teachers views are limited to the classroom setting."
(Saris, 1986 cited in Rowland, 1990. p.33)

It is not just reliability of self-report measures which has been questioned but also their validity (Baronowski, 1985; Bernard, Killworth, Kronenfield, & Sailer, 1984; McGowan, Bulik, Epstein, Kupfer, & Robertson, 1984; Powell, et al, 1987). To complicate the issue further an instrument which might be considered reliable would not necessarily also be valid. There is no established way

of assessing reliability and validity appropriately. Because of the differing populations to which the test instruments have been applied, there is further difficulty in comparing results and generalising about the data. Baronowski (1990), reviewed the conclusions of other researchers into this particular problem, and offered the following:

1. Reasonably high reliability coefficients are attainable when the same instrument is applied to the same group of subjects in relation to habitual activity.
2. Modest correlation is achieved when the same instrument is applied to the same group requiring recall of specific events which are not of an overlapping time period.
3. Two different instruments applied at the same time to the same group is likely to produce modest to non-existent correlations.

Given these caveats, the reliability and validity of self report measures is inevitably subject to some degree of error.

Measurement of activity patterns has to do with actual activity or movement as well as participation. However, just as activity has proved an apparently difficult component to measure, so would appear participation, since participation in a particular activity may be quite unrelated to physical activity.

"Participation stubbornly resists precise definition. Unlike movement which lends itself to observation, participation is open to various definitions and interpretations, and thus is not easily measured."
(Morris, 1985. p.103)

Clearly, the information gained about participation, is itself inexact, and may not be particularly relevant for studies in which the physiological assessment of suitable activity is being sought.

However, Huenemann, et al, (1967); Durnin (1967), have tried to classify discrete activity according to its known intensity, e.g. games of chase and tag being more intensive than, say, hopscotch, and thereby defining activity in terms of its perceived intensity, but clearly this has the inherent danger of linking participation to action noted earlier.

One of the reasons for studying children's activity patterns is to determine whether they are achieving sufficient levels of intensity for the activity to be beneficial. What constitutes an appropriate or sufficient level of activity has only recently been defined for children.

"...appropriate physical activity for children involves large muscle groups in dynamic movement for periods of 20 minutes or longer, three or more times per week, at an intensity eliciting heart rates equal to or in excess of $140 \text{ beats} \cdot \text{min}^{-1}$ (approximately 70% of maximum heart rate)"

(Simons-Morton, et al, (1988), cited in Armstrong, et al, (1990). p.152)

For adults it is commonly taken to be 70-85% of maximal heart rate (which is assumed to be 220 beats per minute - Age) for a duration of 20-45 minutes, three or four times a week. (Morris, et al, 1987)

The target heart rate can be measured directly using a heart rate monitor. However, given that they are a reasonably priced high technology item they are not normally available in quantities sufficient for use with a large sample. Accordingly some researchers (Telama, et al, 1985; Kannas, et al, 1986; Dickenson, 1987; Tuxworth, 1988), have endeavoured to obviate this by using such measures as reported breathlessness or sweating to indicate a

degree of activity which it is implied produces a sufficiently elevated heart rate.

Whilst most studies endeavour to categorize activity according to its intensity there is no consistency in the way this measure is applied and hence differentiation and comparison is problematic.

"We have fewer insights into children's responses to exercise than into the responses of adults, because technical and ethical constraints are involved in studying young subjects."
(Bar-Or, 1984., cited in Rowland, 1990. p.21)

Verschuur and Kemper (1985), have suggested that for an accurate picture of activity patterns to be apparent measurements should include:

- A 24 hour cycle of school and leisure time
- All 7 days of the week
- All seasons of the year.

Armstrong, et al, (1990), indicate some of the problems currently associated with methods of research into children's activity patterns.

"The habitual physical activity of adults is well documented but the literature concerned with children's physical activity patterns is relatively scarce and beset with problems of interpretation caused by the inherent difficulty of determining the quality and quantity of children's physical activity. Reliable data are limited and need to be interpreted in relation to the methodology employed. The self report, through retrospective questionnaire or daily diary, of the intensity and duration of periods of activity by children is problematic because children are less time conscious than adults and tend to engage in physical activity at sporadic times and intensities. Ideally the relative intensity and duration of activities should be immediately and simultaneously assessed. If a true picture of habitual physical activity is required at least three days of monitoring are necessary. The technique used must be socially acceptable, it should not

burden the child with cumbersome equipment and it should minimally influence the child's normal physical activity pattern. No study of British children's habitual physical activity, which satisfies these criteria, has been carried out."

(Armstrong, Balding, Bray, Gentle and Kirby, 1990. p.152)

Given the caveats expressed above, it readily becomes apparent that few if any studies will have had the benefit of a budget generous enough to make these criteria anything but a utopian dream. However neither should it result in research evidence being dismissed as invalid because it inevitably falls short of some ideal standard.

While a composite picture can be gained from the separate studies, because of a lack of integration of measurement and limitation of sample and duration it is difficult to generalise from any one study.

It would appear at this stage necessary to combine some of the techniques suggested. Perhaps get an overview of children's activity and participation patterns, attitudes towards sport, and then to focus down on to the key areas within the total picture, or in contrast, to focus on an element of children's activity time but place this against the general background. In this study, the key focus was the playtime but this was placed in the context of the children's attitudes and activity patterns.

2.33 Children's Activity Patterns in general

Studies of children's activity patterns in general appear to indicate a trend towards inactivity. For instance, Gilliam, (1977), pointed out that:

"...children are not all that active as they may appear.they do not voluntarily engage in high-intensity activity." (p.21)

Similarly, studies by Seliger, et al, (1974); Ilmarinen and Ruterfatz (1980); Gilliam, et al, (1981), all confirmed these findings.

In spite of the weight of research which has been undertaken in the last decade into this area, which in the main has confirmed this trend, Rowland (1990), introduced a note of caution.

"Although the amount of daily vigorous activity by children has been described as "shockingly low" (Sallis, 1987), this information is difficult to interpret because the threshold amounts of physical activity to achieve health effects are unknown, and no comparative data are available from the pretelevision era to establish that, in fact, children are becoming more sedentary." (Rowland, 1990. p.36)

However he did go on to point out that given the fact that much more can now be achieved with the aid of everyday labour saving devices it was fair to assume that the age-activity curve must be shifted downward.

Further he highlighted a study by Schramm, Lyle, and Parker, (1961), which indicated that with children watching 20 hours of television per week their available leisure time was inevitably reduced by 50%.

Rowland, (1990), also pointed to a study by Sullenger, Parke, and Wallin (1953), which presented evidence to suggest that even before television children preferred less active pursuits.

Obesity in children appears to be associated with inactivity. A recent study reported in The Fitness Report, Vol 11, No. 11, Dec 1990, indicated a connection between watching television and children's levels of fat, as well as between watching television and decreasing physical activity.

Work by Brandt and McGinnis, (1985); Ross, et al, (1987), reported that in American children of primary and secondary age, body fat levels had shown an increase over the past twenty years. Whether this was the result of decreased activity or increased consumption was not determined, but decreased activity levels was considered the most likely.

Previous research into children's activity patterns can be broadly divided into two categories according to whether they employed subjective measures like questionnaires, diaries etc., or objective measures such as heart rate monitors.

(i) Research using Subjective Measures

Huenemann, et al, (1967), used the diary method to record the activity levels of 16 and 17 year olds over four, seven day periods. An attempt was made to define the intensity of the reported activity by classifying it according to the likely energy expenditure, (e.g. Playing football, running were considered strenuous activity). The results indicated that the boys were engaged in only light activity for 90% of the week; girls for 95% of the time.

Interestingly, the study also considered the teenagers perceptions of their level of activity, which revealed that most

considered themselves as above average (which was not really the case).

Durnin (1967), similarly used diaries over one week with 13-15 year olds, together with random observations as a check on validity. Activity was classified according to the categories: moderate, heavy and very heavy. The boys were reported as spending 29 minutes per day in heavy physical activity and 12 minutes in very heavy activity, while the girls spent 10 and 3 minutes respectively.

Questionnaires and diaries were used by Shephard, et al, (1980). Children recorded a 24 hour period on two separate occasions in March and September. A daily activity questionnaire was completed during one week in March.

Results indicated that boys were engaged in vigorous activities for only 1.2 hours a day, and girls 0.9 hours. However it was not clear from the study what criteria were used to define vigorous activity or whether the duration of the exercise was comprised of short bursts or more sustained (i.e. 15-20 minutes). However, it did appear to confirm that boys were more active than girls.

Later in 1985, a study of Australian children (Australian Health and Fitness Survey, 1985) was reported. The levels of activity undertaken in and out of school during the previous week was assessed by means of a questionnaire. This revealed that some 30% of the under 12's had done no school sport the previous week. The corresponding figures for 12 year olds was 40%. Amongst the 15 year olds these figures increased to 49% for the boys and 51.5% for the girls. More than 20% of the boys and 25% of the girls had not been involved in activity outside of school time either. The children claimed normally to be more active than this so these results could indicate that an atypical week was chosen for the test.

Hebbelinck and Shephard (1986), conducted an extensive survey using a questionnaire with Canadian children. Children were classified as active, moderately active or sedentary according to the following criteria:

Active - performed an average of 3 or more hours of physical activity per week for 9 months or more,

Moderately active - an average of 3 hours per week for less than 9 months of the year,

Sedentary - less than 3 hours per week for less than 9 months of the year.

Activity status of Canadian Children

Age	Active(%)		Moderate(%)		Sedentary(%)	
	M	F	M	F	M	F
11-12	76	73	15	18	9	9
13-14	77	72	14	19	9	9
15-19	70	67	23	25	7	8

The results above would appear to contradict previous findings since they indicate a high percentage of active children. However, the intensity of the activity was not determined, rather its frequency and duration.

In response to this criticism, different criteria were applied based on Metabolic Equivalents (METS) and the results reworked. Even though the METS classifications were more modest than those used by Verschuur and Kemper, (1986), the revised figures showed inadequate levels of activity. By way of illustration a sample of the figures are set out overleaf.

Revised Activity Status of Canadian Children

Age	Active(%)		Moderate(%)		Sedentary(%)	
	M	F	M	F	M	F
11-12	3.5	3.5	9.3	12.2	90.7	87.8

This study also revealed that children in sparsely populated areas were less active than their contemporaries in more densely populated areas.

Another study carried out in North America the following year by McGinnis (1987), found similar levels of insufficient activity among children aged 10-17.

Dickenson (1987), used interviews in addition to questionnaires with 311 children aged 11-16 years of age. The results indicated that between 80 and 85 per cent of the children did less than five minutes vigorous activity a day, that inactivity increased with age, and that again boys were more active than girls. These are illustrated below.

Percentage by age group who were inactive or did less than 30 minutes activity

<u>Age</u>	<u>No Activity</u>		<u>Less than 30 mins Act^y</u>	
	Boys	Girls	Boys	Girls
11	38	45.5	81	64.5
12	51	50.5	66	82.5
13	31	68	47.5	87
14	28	66.5	60.5	90
15	28.5	62.5	53.5	83.5
16	52.5	80	74	98

Weymans and Reybrouck, (1989), used a standardised questionnaire to investigate the relationship between the habitual

activity level of physical activity and their cardiorespiratory endurance capacity in children, who came from schools in a region of Belgium. 140 boys in the age range 5.7 - 18.5 years, and 117 girls aged 6 to 16.5 years were involved. Children were asked about their participation in school PE lessons, and sport at the weekends and during holidays. In addition they were asked about their hobbies, membership of sports team or youth movement, their TV viewing habits and their journey to and from school.

The results revealed that levels of habitual activity were least in both boys and girls in the younger age bracket. 5-6 year olds were the least active, followed by the 7-8 year olds. Activity levels increased with age, with boys being more active than girls who peaked at the age of 12 before showing a decline in activity. *Younger > active*

A combination of methods has been applied by others to assess physical activity levels in children. Sunnegardh and Bratteby, (1987), studied a sample of 155 Swedish eight and thirteen year olds. An interview questionnaire was used to determine an activity score related to the type and duration of leisure time activities which the children pursued. Physical activity was also studied using an actometer with 116 of the children.

Boys were found to be more active than the girls with younger children being more active than the older.

Klesges & Klesges, (1987), chose to use a combination of observation and an accelerometer to assess 30 American pre-school children. The children were observed once during a nine hour period during spring or summer for approximately nine hours while wearing the accelerometer and engaged in non-structured activity. Observations of the children's activity was recorded using the Fargo Activity Timesampling Survey. Results revealed that children spent 66.79% of their time in activity of minimal intensity, 32.9%

in moderate intensity, and a mere 0.31% in extreme intensity activity.

While the majority of the studies into children's activity patterns have been conducted outside the U.K., Sleap and Warburton, (1990), studied primary school children from different regions of England. An evaluation of the children's activity patterns outside school was achieved by means of parents completing a detailed activity diary for their child. This was coupled with detailed observation of a small sample using a method based on an American procedure (O'Hara., Baranowski., Klobe., and Bee., 1988) during break times, lunchtimes, PE lessons and outside school hours. The findings indicated that primary aged children did very little vigorous activity, with half the children undertaking no vigorous activity (which had been defined as that which made them sweaty and/or breathless).

Baronowski, et al, (1987), studied American primary school children and recorded the number of aerobic events performed by them over two days. An aerobic event was defined as 20 minutes in which rapid trunk movement was sustained without stopping. In addition to a self report questionnaire, a group of 24 children were monitored by trained observers for a 12 hour period each day. Four less stringent criteria were established when after a total of 48 days observations no such aerobic event was noted.

Baronowski went on to conclude that children were active but in short bursts, which was of insufficient duration to increase aerobic capacity (Gilliam, Freedson, Geenan, & Shahraray, 1981; Verschuur & Kemper, 1985).

However, Stamford & Shimer, (1990), question the view that short bursts of activity are not beneficial.

"Even routine physical activity can help protect against heart disease whether it produces a target heart rate or not. Exercise in large, sweat-producing chunks counts, but so does exercise in bits and pieces. Body fat can be burned off by walking a dog as well as by running." (Stamford & Shimer, 1990)

(ii) Research using Objective Measurements

An early study by Bradfield, et al, 1971, monitored energy expenditure and physical activity patterns in a group of 54 English primary school boys using an telemetry device (the Socially Accepted Monitoring Instrument) to record heart rate over a period of three school days during the winter term. They found that participation had been higher than had been expected.

Seliger, et al, (1974), studied the habitual activity and fitness of 11-12 year old boys using heart rate monitors over a 24 hour period, together with information gleaned from personal interviews. As a result of finding that the children only spent some three per cent of their time in activity of moderate intensity (and none of heavy intensity) he concluded that they exhibited a sedentary lifestyle.

Another similar study was conducted by Saris, et al, (1980), again using heart rate monitoring over a 24 hour period with two groups of children aged 4-6 and 8-12. The threshold for activity of appropriate intensity was established at 176 beats per minute and above. Using this criterium the most active of the younger children spent 15 minutes per day at this level; the older children six minutes per day. The least active of the younger and older

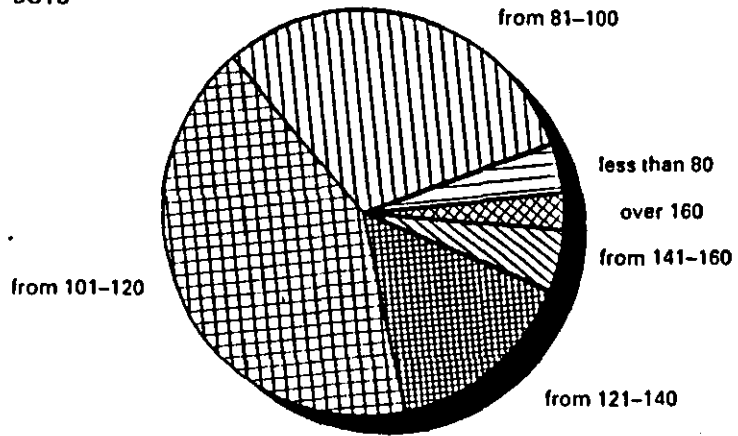
children only reached this threshold for four minutes per day. Accordingly, activity levels were judged to be insufficient.

However, there appears to be no commonly agreed standard regarding the baseline heart rate which denotes activity of appropriate intensity. A later study by Verschuur and Kemper, (1985), applied a different threshold of 150 beats per minute and widened the scope for detecting appropriate activity.

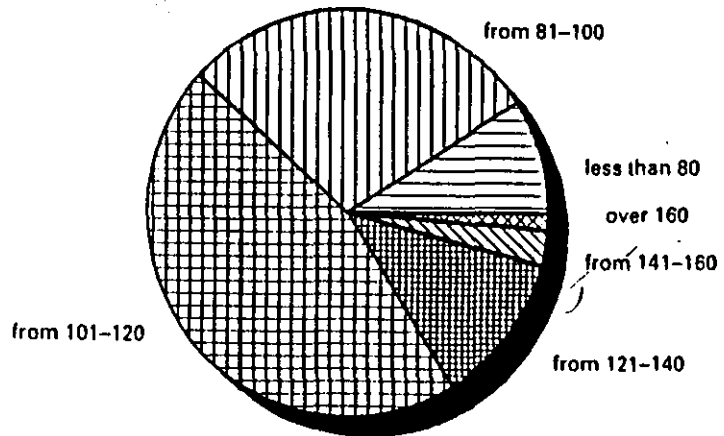
A threshold of 160 beats per minute was used in the research into the activity pattern of 6-7 year olds conducted by MacConnie, et al, (1982). Activity was monitored at minute intervals over two 12 hour period from 8 am - 8 pm. on separate days in summer and winter. Parents also completed an activity diary to complement the heart rate monitoring. The results tended to confirm previous studies with 61%, 37% and 2% of the children's time being spent on low, moderate and high intensity activity, respectively.

Gilliam, et al, (1981), also chose to continuously monitor 6-7 year olds for a period of 12 hours. The pie charts in Figure 1 illustrate clearly the relative inactivity of the children, especially the girls who spent only 9.4 minutes, as against the boys 20.9 minutes, at a heart rate above 161 beats per minute.

BOYS



GIRLS



Source: Gilliam, et al, 1981.

Figure 1: Heart Rates of 6-7 year olds (Gilliam, et al, 1981)

Likewise a study by Miyashita, et al, (1983), of 9-10 year old boys in Tokyo who were monitored over a 24 hour period produced a similar conclusion that they were insufficiently active.

A longitudinal study was conducted in Holland by Saris (1985), with children between the ages of 6 and 12 years of age. Continuous heart rate monitoring over a 24 hour period was employed, together with a questionnaire. The maximal oxygen uptake of the children was assessed in the laboratory to provide energy expenditure equivalents for various activities as the yardstick of intensity. The results of the heart rate monitoring and the physical activity scores derived from the questionnaires both showed similar downward trends, supporting the belief that boys are more active than girls, and that activity declines with age.

A second study involving 9-10 year old Japanese boys involved Atomi, et al, (1986), in monitoring heart rates for 12 hours on three separate days. They reported that boys spent an average of 4.7% of their time at heart rate equivalent to 60% of maximal aerobic power.

Armstrong, et al, (1990), considered previous studies of British school children and concluded that they were insufficiently rigorous and designed a study accordingly. This involved heart rate monitoring of a distinct group of primary and secondary school subjects over a 12 hour period during a normal school day, with the process being repeated over 3 days. Thirty nine children also had their heart rates monitored over a 12 hour period on a Saturday. The results indicated that:

"Of the 137 children monitored only 3 averaged a daily 20 min period with their heart rate above 139 beats.min⁻¹. 65% of the primary school children and 67.6% of the secondary schoolboys failed to average a daily 10 min period of physical activity of the appropriate intensity. The teenage girls were, however, the least active group with 85.7% failing to sustain a

single 20 min period and 49.2% failing to sustain a single 10 min period of monitoring. 47.6% of the secondary schoolgirls did not even demonstrate a daily 5 min period with their heart rates above 139 beats. min⁻¹." (Armstrong, et al, 1990. p.155)

When the results were further analysed to discover numbers of children who sustained 5 and 10 minute periods of activity in excess of thresholds of 139 and 159 beats per minute, it was found that periods of 5 minutes exercise of the required intensity were quite common. In this respect, while there was no difference between the sexes in terms of moderate amounts of activity, the boys were involved in more five minute periods of high intensity activity.

This finding led them to the conclusion that short bursts of activity, rather than the longer more sustained variety, were a feature of the physical activity patterns of primary school children, which would accord with the findings of Baranowski, et al, (1987).

These results were seen to be in general agreement with Seliger, et al, (1974); Verschuur and Kemper (1985), given that different methodology was used together with an emphasis on sustained periods of suitable activity. As had been previously demonstrated, this study confirmed that teenage boys exercised at higher levels of relative intensity than girls of similar age. Habitual activity amongst girls also showed a decline from 11/12 onwards.

Given that this study sought to improve on previous research there is perhaps one variable which was not considered: that of social grouping, since ^{& PASSMORE} Durnin (1967), concluded that boys from poorer socio-economic groups tended to be more active than those from wealthier backgrounds.

2.34 Activity in the P.E. lesson.

Not only is Physical Education an integral part of a child's experience of school but it appears to be an important one.

Williams (1989), writing in *Issues in Physical Education for the Primary Years*, states that:

"School physical education gives many children their only opportunity to develop physical potential. Children of primary school age have an interest in, and a thirst for, activity." (p.3)

Further:

"It satisfies a need for activity, provides an opportunity for laying the foundation of a life long interest in physical activity, and is a medium by which many aims of education can be achieved." (p.3)

Laudable though these aims may be, they may not necessarily be translated into practice.

"While activity levels achieved in curriculum time are unlikely to be sufficient to attain or maintain adequate fitness levels physical education must nevertheless be well placed to educate in and about health related fitness." (Williams, 1989. p.4)

This view was supported by Biddle and Biddle (1989):

"We are strongly influenced by our parents thus suggesting that education for health should start from the first day of life, not the fifth year in secondary school. Certainly it is too important not to be taught in primary schools.
(Biddle and Biddle, p.56 in Williams, 1989)

What constitutes 'Physical Education' inevitably varies from school to school being dependent upon the constraints of facilities, timetable, emphasis placed on this subject by a particular school, the balance between games, body management (e.g.

gymnastics, swimming, athletics) and creative activities, as well as the motivation, experience and competence of the teacher. This inevitably affects outcomes and leads to differences of provision and quality. Perhaps understandably, there does not appear to be any previous research into children's activity patterns during P.E. lessons.

However, there does appear to be an appreciation that:

"... activity levels achieved in curriculum time are unlikely to be sufficient to attain or maintain adequate fitness levels..."
(Williams, 1989. p.4).

2.35 Activity at Playtime

Studies of children's activity patterns during playtime are somewhat thin on the ground. One of the few studies was conducted by Hovell¹⁴(1978), in the U.S.A., into the extent of voluntary physical activity which elementary students indulged in during recess (the American equivalent of our playtime). Approximately 300 children, aged 8 - 11 years of age (Grades 3 - 6) were observed for a period of almost five minutes. At five second intervals their activity levels were rated according to the scale: no activity, moderate or vigorous activity.

Results indicated that the children were only engaged in physical activity for approximately 60% of the recess time. Further, when this activity was rated according to an aerobic standard, only slightly more than fifty percent of it could be classified as vigorous. As a result Hovell reached the conclusion that children do not of their own volition engage in aerobic activity during recess of sufficient intensity as to enhance their cardiorespiratory fitness.

Hovell concluded his discussion of his results with this statement:

"Thus although this analysis does not rule out the possibility that children obtain aerobic exercise outside of recess, it appears that children do not engage voluntarily in such activity when provided with the opportunity during the school routine. If as previous research has suggested, children are not as physically fit as they might be, recess periods may be an opportunity for health and physical educators to provide more extensive physical education and improve fitness. Doing so might contribute to the prevention of heart disease." (Hovell, 1978. p.472)

Significant though these findings may be, it is perhaps relevant to introduce the caveat that these elementary children were American and hence may not necessarily be directly comparable to the playtime experience of British children. However, although utilising different methodology, Sleaf and Warburton (1990), in their study of English primary schoolchildren employed an activity diary together with detailed observation of playtimes, as well as lunchtimes, PE lessons and periods outside school hours, found that these children also did very little vigorous physical activity.

Another study involving younger American children was conducted by Sallis, Patterson, McKenzie and Nader (1988), who assessed the activity levels of thirty three children aged 3-5 years using the Fargo Activity Timesampling Survey. Children were observed during thirty minute free play sessions in the playground over the course of two consecutive days and observers recorded what behaviour the children exhibited together with its intensity.

The results showed that the children were only vigorously active for 11% of the time, and engaged in sedentary activities for 60% of their free play time. Since the observations were made when the children were free of constraints and able to choose their own activity level it was felt that the results obtained were

particularly pertinent, and further suggested that either "young children are not naturally active, or that they have been socialised to choose low levels of activity."

Chris Rose, writing in 'Issues in Physical Education for the Primary Years' Ed. Anne Williams (1989) presents a slightly different view of youngsters and activity.

"Young children engage in physical activity which contributes to their physical development. Their sheer appetite for physical activity, the urge to master and exploit the body's capacity for movement extends their powers of endurance."
(C Rose, Chapter 3. p²⁴. 1989)

2.36 Children's activity beyond school

Whilst the main focus of this study is of the top junior child (aged 10-11), brief mention will be made of studies concerning the recreational activity patterns of older children, since they serve to enhance the pattern which emerges demonstrating a reduction in recreational activity from childhood, through adolescence to adulthood.

Studies as far back as Allott (1966), concluded that over 50% of the girls studied expressed no interest in pursuing physical activities learned at school, once they had left.

A study by Smallridge (1967) with 16-17 year old girls found similar results in respect of the major team games, but some evidence for a post school interest in more individual sports which had not been offered in school.

Moir (1977) found that, beyond school, girls had a preference for participating in swimming, walking, badminton, and keep fit.

The General Household Survey (1983) found similar preferences for leisure activities amongst 16 year old and above girls viz: Walking, swimming (indoor and outdoor), keep fit/jogging, and darts.

' A study into The Involvement of 9 to 13 Year Olds in Leisure Activities in Bradford ' (1983), concluded that while nine to thirteen year old children were actively involved in a wide range of leisure activities they would, if they were better informed, welcome the chance to try even more.

Percentages were given for those regularly participating in extra-curricular activities:

School	A	B	C	D	E
	23.7%	12.1%	16.5%	10.4%	14.3%

The percentage of those who attended non-school based leisure activities was:

School	A	B	C	D	E
	15.6%	8.7%	12.2%	34.0%	12.0%

While the implied level of participation appeared high, the report made no reference to the frequency, duration or intensity of the activities.

A Sports Council Report (1984) - From School to Community reported a current participation rate amongst 13 to 24 year old of:

	Outdoor		Indoor	
	M	F	M	F
Current Participation rate	53.1%	39.7%	56.1%	36.5%

However the report is open to criticism for not differentiating between age groups; the nature of activity classified as sport ; whether there was an overlap between the client group making up the indoor and outdoor percentage; or the frequency, duration and intensity of the participant activities. Hence the results appear to have little significance. Similar criticisms can also be levelled at the Sports Council Report for the Stirling District into the involvement of 15-19 year old in sport (McKusker 1985), which purported to show that 90% of young people of both sexes took part in recreational sport, with only 39% of the boys, and 31% of the girls participating in competitive sport.

A study by Hendry (1975) involving 3,000 adolescents (15-16 years old) discovered that more than half of the boys, and more than two thirds of the girls did not voluntarily participate in school sport outside of timetabled lessons.

Likewise a longitudinal study by Illmarinen and Rutenfranz (1980) using four annual retrospective interviews with a standard questionnaire, noted a significant decrease in sporting activity amongst boys after 15 and girls after 14 and concluded that leisure time physical activity tended to decrease, especially among girls, as adolescents left the school environment and entered working life.

Coe (1984) in his research with 11-12 year olds found that 75% of his sample were actively involved in physical activity out of school, with participation in nineteen different activities. Eleven of these related to organisations such as clubs. Football was the most popular but this was restricted to just boys. Badminton came

next in order of popularity with both sexes. In third place was gymnastics, with the girls showing the predominant preference for this. Coe also reported that 25% of the children were not actively involved in any activity out of school. The greater proportion of these non participants were girls.

Telama, et al, (1985), studied leisure time activity amongst Finnish children aged 3-6 and 9-18, using questionnaires (those for the younger children were designed to be completed by their parents.) Intensity of reported activity was assessed using subjective criteria according to whether children classified it:

1. Not out of breath, no sweating
2. Moderately out of breath and sweating
3. Strongly out of breath and sweating

This revealed the following:

Percentage distribution of intensity of leisure time physical activity among 12 and 18 year old Finnish girls and boys.

	Girls		Boys	
	12yrs	18yrs	12yrs	18yrs
Moderately out of breath & sweating	83.5	78	75.5	55.5
Strongly out of breath & sweating	6	10.5	15	35.5

Telama, et al, (1985), concluded that a large proportion of Finnish children and adolescents were physically active.

While it would appear that the majority of these Finnish children were involved in physical activity during their leisure time, given that the results were dependent upon the children's own individual interpretations of the exercise intensity, they may not necessarily be a true reflection. It could also be argued that the category of exercise intensity necessary to promote cardiovascular fitness is that of being strongly out of breath, in which case the levels of activity indulged in by the greater majority of the children would be insufficient.

Kannas, et al, (1986) conducted an extensive study of leisure time activity in four countries (viz: Austria, England, Finland and Norway) using self-report techniques. The children in the target group were aged 11.5, 13.5 and 15.5. Data was initially collected in 1983/4 and a follow-up survey done in 1986.

The criteria chosen as an indicator of minimal therapeutic activity was that of between 20-30 minutes of exercise, three or four times a week.

Interestingly, there were no consistent differences between the four countries.

The percentages of 11 year olds undertaking 2-3 hours of physical activity per week were found to be:

Austria 47%; Norway 48.5%; Finland 53.5%; England 58%

For the 15 year olds these figures were:

Austria 63.5%; Norway 58%; Finland 55%; England 55%

However these figures give no indication of how the time spent on activity is computed, since frequency and intensity would have been a more relevant yardstick rather than total time. Further, a frequency of three or four times a week was suggested by the

criteria as being ideal. While the study revealed that 61% of the 11 year olds and 50% of the 15 year olds participated in activity between 1 and 6 times a week, no information as to the duration of activity sessions was given.

Although the researchers did make some attempt to determine the intensity of activity, along similar lines to those used by Telama, et al, (1985) in respect of making children sweaty or breathless, no clear references are made to the intensity of the activity in which the children indulged.

Kannas, et al, (1986), did however comment that the number of physically passive children (i.e. those performing no physical activity resulting in loss of breath or perspiring) during the week increased to some extent with age in every country except Austria.

Initially these results appear promising but without precise data concerning the intensity and frequency of the activity it is difficult to establish whether the children are engaged in sufficient therapeutic activity.

Throughout, studies appear to indicate that boys engage in physical activity to a greater extent than girls. The reasons for this state of affairs may, to some extent, be socially and culturally, rather than biologically, defined.

"Informal play activity is also unevenly distributed. White and Coakley (1986) note the tendency for parents of girls to deny the opportunities given to boys to play informal games away from home. This restriction is often because of fears for girls safety, although also linked to differential social conditioning which operates for boys and girls. It does mean that girls are denied access to an experience of physical activity which many boys are able to enjoy. Different cultures and communities also vary in their commitment to play activity and in their attitude towards giving children the freedom to join in informal play."

(Williams, 1989. p.4)

2.40 Summary

The research into children's attitudes towards PE and PA seems related to the multi dimensionality of the concept with significant influence being exerted by such variables as SE, BE, Involvement, Age, Gender, School type, Teacher, Parental involvement, and Socio-economic status.

Younger pupils generally held more positive attitudes than older, but there appears to be a gender difference with girls holding less positive attitudes as they grow older.

Daily PE had a positive influence on enhancing attitudes to PE, as could the teacher.

Attitudes were not necessarily enduring over time, but were a temporary phenomenon and hence capable of change.

However, Figley (1985), plays "devils advocate" in respect of the universal belief that developing attitudes is a desirable goal, by indicating that, as yet, this is an under-researched area with little evidence to support this claim.

"Developing desirable attitudes toward learning is a universal objective of instruction and certainly one that finds a place in the goals of most subject areas..... Unfortunately, research evidence to support this claim is rather meagre both in numbers of studies and magnitude of relationship." (Figley, 1985. p.229)

By definition Figley points out that a study of attitudes is a universal objective and there would appear to be some strength in juxtaposing measures of attitude with actual measures of activity.

In respect of children's activity patterns, there is no commonly accepted means of assessing these, or view as to whether information gained by subjective or objective means is the more

indicative. Rather, the methods used appear complementary. Neither is there necessarily agreement as to the baseline heart rate which would indicate activity of sufficient intensity. Likewise, there seems to be debate over what constitutes appropriate levels of activity, with no resolution as to the relative therapeutic value of short burst versus sustained activity.

While it is difficult to compare these studies directly because of the different methodologies, protocols and criteria used, nevertheless certain common trends seem to emerge.

Firstly, that activity levels amongst children are lower than could be considered desirable. Secondly, that children do not voluntarily indulge in activity of sufficient intensity. Thirdly, that there is a difference between the activity levels of boys and girls, with boys being more active than their female counterparts. However, this is a comparative statement and does not necessarily indicate that boys normally indulge in levels of activity which are of sufficient intensity. Finally, there is evidence of decreasing levels of activity with age.

3.10 DESCRIPTION OF THE SCHOOL

The school used for this study is an 8 - 12 year old mixed sex Middle School, with 285 pupils and 13 staff on roll. It was established in 1953 and serves a catchment area containing a large estate of council houses as well as private housing. Hence the children come from a cross section of what might broadly be termed working and middle class homes.

The building is of single storey, flat-roof construction and in addition to the normal classrooms possesses an integral canteen/dining room, gym/assembly hall, separate science and craft block, well stocked library, large playground and on site playing field. There is a separate First School and a 12 - 18 Comprehensive School on the same campus and dual use is made of some of the secondary school's adjoining playing field facilities. Additionally the school has the use of water time at the local swimming baths with coach transport being provided by the L.E.A.

The school day starts at 08.55 and finishes at 15.30 with a morning and afternoon break of 15 minutes, and a one hour seven minutes lunchbreak.

The curriculum offered appears conventional in most respects with the exception that French is taught from the first year and there is an emphasis placed very strongly on library work, information retrieval and reading skills.

The majority of the children live fairly close to the school and travel in on foot.

Parental support for the school appears good, with functions being well and enthusiastically attended, and it is noticeable that the community regard the school favourably - there being an absence

of graffiti and vandalism in spite of the site being open and therefore vulnerable to attack.

3.20 OVERVIEW OF PROCEDURE

The major aims of the study are to look at the activity patterns; attitudes to and influences on physical activity; and to consider the relationships between attitudes and physical activity in 10-11 year old children. As a result of this and by identifying the agencies operating or influencing the activities and attitudes of children it might be possible to suggest means of development to improve activity and attitudes in children of this age.

To that end, it would have been most restrictive to have focussed on P.E. lessons alone, in that they are only a very small part of children's total physical activity. Rather it became necessary to identify physical activity throughout typical days in a child's life. In this context, it could well involve after school matches, the Scouts, Girl Guides, youth club., which all go to make up the fabric of the child's active life.

It has already been mentioned that questionnaires appear to present grave limitations when dealing with young children and therefore a primary decision was made that the more sensitive, but time consuming, structured interview would form the basis of the major fact finding operation.

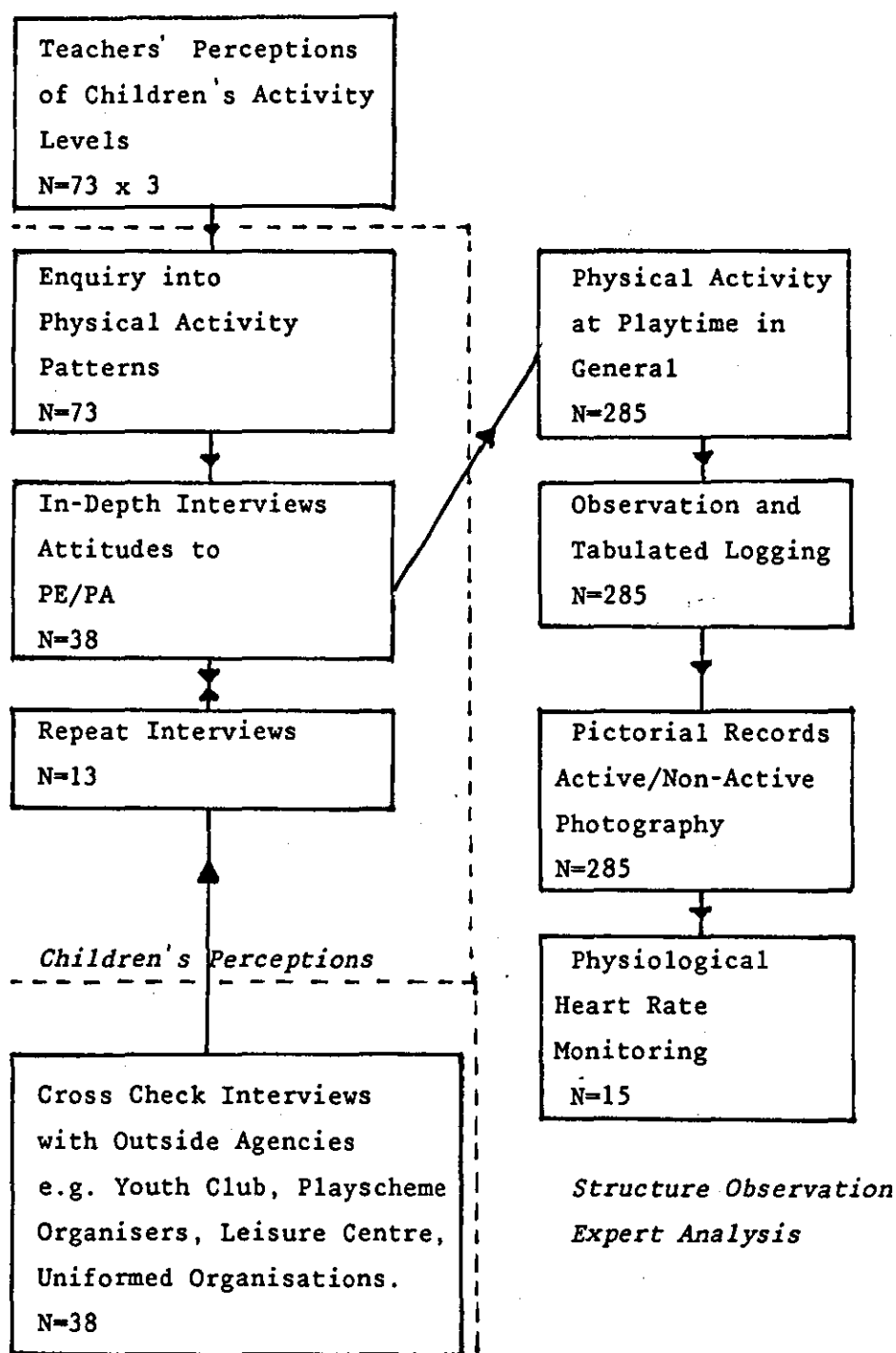
If actual activity was to be compared with reported activity it seemed necessary to focus in on a standard and common part of children's activity patterns. At first sight the P.E. lesson might appear to satisfy this aim. However, on reflection it seemed less desirable because there is considerable variation between types of lesson taught by different staff in different schools. In addition, this sort of lesson only occurs two or three times a week viz: Possibly some 4-5 sessions comprised of one or two separate P.E.

lessons, a double Games lesson, and possibly a Swimming lesson. where available. Nevertheless, P.E., Games and Swimming appear to contribute a significant amount to a child's attitude towards activity and are worthy of study for their overall contribution.

On the other hand, playtime occurs 15 times a week, viz: Typically, 15 minutes in the morning, an hour perhaps at lunchtime (less time expended in washing hands, being marshalled for lunch and actually consuming the same - say, approximately 20 minutes), and again a break of 10-15 minutes in the afternoon.

Playtime is relatively discrete, largely unstructured by adults and in fact provides a very significant part of children's activity programme. To identify activity in this context various procedures were adopted as a major portion of the project. These consisted of Tabulated Logging, Photographic Analysis and Heart Rate Monitoring.

The procedures thus adopted can best be seen by reference to the flow diagram overleaf.



An overview of the procedures used to provide a broad perspective and in-depth focus on children's perceptions of attitude and activity and actual activity patterns

It became quite apparent that a number of different procedures were to be used and indeed that several procedural problems, like making contact with a school and children, required considerable thought. For this reason, the procedure has been divided into a number of inter-related but relatively discrete sub sections.

TABLE 1.

3.30 PROCEDURE FOR ENTRY INTO THE FIELD

3.40 METHODS OF COLLECTING DATA ON ACTIVITY PATTERNS AND ATTITUDES AND IMPORTANT AGENTS

1. Preamble
2. Initial Observation
3. Preliminary Interviews
4. Administering the Preliminary Interviews
5. The In Depth Interview

3.50 RATIONALE FOR THE CHOICE OF PROCEDURES TO ASSESS THE DEGREE OF ACTIVITY

1. Preamble
2. Initial Observation
3. Tabulated Logging
4. Photography
5. Heart Rate Monitoring

3.60 DESIGN AND CONSTRUCTION OF EQUIPMENT

1. Design of Preliminary Interviews
2. Amendments to Preliminary Interviews
3. Design of In Depth Interviews; Second Interview Format
4. Amendments to In Depth Interviews and Second Interviews

3.70 DESIGN OF EQUIPMENT TO ASSESS EXTENT AND DEGREE OF ACTIVITY

1. Preamble
2. Observational Methods Attempted
3. Tabulated Logging
4. Playground Photography
5. Heart Rate Monitoring Tests

3.80 SUMMARY TABLE OF THE VALIDITY AND RELIABILITY OF THE PROCEDURE

3.90 SUMMARY TABLE OF SAMPLE UNITS AND PROCEDURE USED.

3.30 PROCEDURE FOR ENTRY INTO THE FIELD

As the success of the procedures relied heavily on inter personal relationships these formal elements of contact i.e. Interviews with Headmasters and children, were practised away from the setting and the school to be used.

Once the decision had been taken to study upper primary children in just one such school, the problem of gaining entry into the field arose. For a seconded Teacher this would normally be a relatively straightforward procedure, much as predicted by Lofland (1984).

"Writers conceive the major entry problems of the known investigator to be *strategic* rather than ethical."
(Lofland, 1984. p.23)

However, in this instance entry was no mere formality since a long standing industrial dispute between Teachers and Employers was at its height, and as a consequence, all extra curricular activities had ceased (except for those performed by members of the non-striking PAT organisation) and all Teachers were taking a very hard line against any extra duties and were concentrating their efforts on their contractual teaching commitments.

Notwithstanding this, it was possible to invoke some cooperation from the L.E.A. in gaining outline permission to approach a primary school, with a view to seeking their cooperation. Selection of school, at such as a critical phase would inevitably be problematic since there would be a pre-existent need to convince both the Headmaster and Staff that participation would involve no extra burden.

Lofland (1984) advises:

"..... you are more likely to be successful in your quest for access if you enter negotiations armed with *connections, accounts, knowledge and courtesy*." (p.25)

With this in mind, the following priorities were established:

1. Know some of the Staff - preferably have a key informant on the staff - so as both to obviate and perhaps smooth over any initial doubts/problems on the part of the unknown staff.
2. Know the Headmaster, so as to ensure a sympathetic evaluation of the entry request.
3. Know the P.E. Inspector responsible for that particular school at least reasonably well, so as more readily to obtain the L.E.A.'s outline approval and so facilitate the protocol of acceptance.
4. Be within reasonable travelling distance to maximise time in the field as distinct from in transit.

In the event, the selected school met all these priorities based on Lofland's (1984) 'connections'. The other three of Lofland's priorities were to be invoked in various measure when dealing with the Headmaster, Staff and Pupils.

In making the initial approach, prior advice had been sought of the key informant as to the likely response to a request for a three month attachment. Given an encouraging response, the initial appointment to speak with the Headmaster was made by phone. Lofland's (1984) advice concerning accounts, knowledge and courtesy was now to come to the fore. Hence the necessary precautions were taken to attend the interview a) immaculately presented, b) able to outline what would be involved for the School and Staff, together with proposals to minimise the workload on Staff, c) willing to be at the disposal of the School where possible, d) wanting to be fully involved in the life of the School, and e) in a position to guarantee total confidentiality and anonymity.

Discussions were subsequently held with the Head of Third Year to outline the projected study and seek his cooperation as a key 'gate keeper'. An informal meeting with the other third year staff and the remainder of the staff followed, providing an opportunity to outline personally what would be involved. A key feature of the interpersonal contact, at this point, was to provide reassurance that

nothing judgemental was involved in the study, as well as to allay fears and misapprehensions.

Other researchers would do well to heed the following comment by Lofland (1984).

"Most sensible people do not believe what a stranger tells them. In the long run, the (investigator's) hosts will judge and trust him, not because of what he (initially) says about himself or about his research, but by the style in which he lives, and acts, by the way he treats them." (Wax, (1971). p.365, cited Lofland, (1984). p.26)

Despite the fact that key informants and other staff who have connections with the researcher will do much in an attempt to allay initial apprehensions, the researcher is nonetheless judged on his ability to deliver on his promises.

Examples of the follow-up letters to the Headmaster and L.E.A are contained in the Appendix. (1,2,3)

Prior to actual entry into the field it was necessary to plan a strategy for being a) neutral, and b) readily accepted by Staff and pupils.

Policy a) Use formal form of address at all times i.e. Mr., Mrs.

b) Be totally professional in every respect including punctuality, appearance.

c) Avoid being critical, passing judgements, offering advice, or becoming aligned with any particular faction.

d) To be polite, courteous and pleasant towards the children - show an interest in them and make a point of extending courtesy to them e.g. opening doors for them, thanking them for assistance, asking their advice .

e) To socialise with Staff whenever possible.

f) To look for opportunities to be of assistance to the Staff and the School (as a way of recompensing them for their cooperation and assistance).

This also extended to the children and careful note was taken of anything they could be assisted with, and actioned within twenty four hours. In short, whatever was promised, was to be carried out as soon as, and as unobtrusively as, possible. Three examples of favours accomplished on behalf of the School, Staff and children, are included here by way of illustrating the means through which relationships were developed. Further examples are to be found in the Appendix.

- 1) Providing colour print photographs, taken from slides, for a class project on the topic of Volcanoes.
- 2) Organising the copying of a video tape.
- 3) Teaching demonstration P.E. lessons.

There are other gatekeepers within any social institutions with an influence which far outweighs their position, with whom the researcher must plan in advance to establish good working relationships e.g. The ancillary staff, caretaker, cleaners, secretary, kitchen staff, library assistant. Their subtle influence is not to be underestimated.

Similarly a key informant is in a position of privileged knowledge and can provide key information in advance so as to prevent simple gaffs/misunderstandings arising. Perhaps by providing advance information about the organisation and hierarchy of the School, where not to park one's car, where not to sit in the Staff Room, what factions already exist amongst staff and how best to avoid being caught up in them.

The actual point of entry requires prior preparation and thought, since children are a mixture of being wary of strangers, curious about strangers, and over eager to please adults by saying 'the right thing'. This latter point is hardly surprising in view of the emphasis laid by education in general on being right and thereby avoiding criticism. Hence a researcher needs to plan for a neutral and non-revealing introduction when introduced to the children by, say, the Headmaster during Assembly. One way round this might be to be described as a visitor to the School whom the children would be seeing a lot of and who would be observing and chatting to them.

Having the aforementioned procedures in mind, entry to the School seemed to cause few problems. Acceptance by the various agencies seems proven by the unsolicited feedback from them. For example, the Headmaster wrote a letter to the University complimenting the researcher on his tact and diplomacy in securing the willing cooperation of Staff and pupils; the Head of Third Year, who was a crucial gatekeeper, thanked the researcher for his participation in the life of the School and expressed the view that the School had been a better place for his presence; finally the children variously expressed disappointment to their class teachers when told that the researcher was leaving at the end of term. These sorts of comments were noted and are included in the Appendix, not as matters of conceit, but as statements which reflect the success of entry to the field with trust.

3.40 METHODS OF COLLECTING DATA ON ACTIVITY PATTERNS AND ATTITUDES AND IMPORTANT AGENTS

3.41 Preamble

Various procedures were decided upon from the outset, while others evolved or had to be developed as a result of experience in the field. Below is set out the rationale for the choice of the various means of collecting data together with an explanation of the evolutionary processes gone through during the development of certain aspects in order to circumvent initial limitations.

3.42 Initial Observation

The first two weeks of the study were devoted to being in the school setting, becoming familiar with the environment, the routine, observing staff and children at work and play in order to get to know and, more importantly perhaps, become known and familiar.

3.43 The Preliminary Interviews (Sample N=73 - The Whole Third Year)

To provide a basis for a study which was likely to involve in-depth interviews, it was decided to conduct a relatively short preliminary interview with each of the children on the subject of their activity patterns. By using all the children of this population, a very full picture of activity patterns would be gained, but clearly such a large number, seventy three, could not be catered for in the more in depth interviews to follow.

The reasoning for this procedure of conducting preliminary interviews was as follows:

1. It would provide a means of making personal contact with all the children and establish some rapport.
2. Would enable the children to become more at ease with the

researcher and help dissolve the tension felt by having an unknown adult in their midst.

3. Hopefully provide data on a side spectrum of their activity patterns including what they did within and without school, on a regular club basis; with parents and significant others.

4. Provide an overview of the children's lives and hopefully reveal aspects which could be worthy of further investigation and so provide some point of focus.

5. Provide some basis on which to judge the reliability of the children's verbal responses. e.g. If a child professed active membership of a particular club it would be possible in verifying this to have a check on the reliability of response.

6. In view of the very wide range of ability and reading competence within the group some means of gathering information other than questionnaire was preferred. Indeed in this respect, questionnaires suitable for use with children of this age are largely still in the process of being developed, having heretofore been produced for use with older non-British children; often not couched in the language the children themselves use; and are dependent on reading ability and comprehension.

These objections could have been overcome in a variety of ways, viz:

a) By developing one's own questionnaire, taking account of the words children themselves typically use.

- While this would have been both a possible and a logical solution, it was considered impractical in view of the time scale for the entire project (10 weeks). This aspect of the project was only foreseen as being a contributory unit, which would provide a window, as it were, on the activity of children and so enable the study to be enlarged and deepened.

b) An existing questionnaire could have been used.

- However, this was ruled out because of the caveats expressed previously concerning their being at an early stage of development.

c) Simon and Smoll's⁽¹⁹⁷⁴⁾ questionnaire, considered suitable for

use with this age group of British children, could possibly have been used.

- However, one is still constrained by the problem of the range of reading competence and the fact that it is 'word bound'.

d) It would have been feasible to have read out the questionnaire to the group as a whole and invited the children to tick off their responses on a sheet.

- While it would have been likely to have worked fairly effectively, if somewhat clinically, the teachers action was at a critical phase and it was considered wholly inappropriate to disturb the teachers or children s timetable, especially when at the stage of feeling one's way in. The children had lost time from school as a result of the dispute and presumably had work to catch up. Hence it was considered unwise to invite parental or school disapproval by causing disruption to normal working.

In any event, direct contact with children was desirable, in order to allow some chit chat which would both serve to establish empathy and perhaps provide some nuggets of information worthy of later exploration.

e) An alternative consideration could have been the use of a combination of the above techniques (leaving aside the question of disruption, for the moment) employing verbal response sheets incorporating 'faces' to depict agreement, neutrality or disagreement - (cf. Cheffers and Mancini Human Movement Attitude Scale reported by Martens, 1978, p. 240-6)

- Once again a possible solution which was discounted because the factors of disruption and inappropriate timing were considered to be of greater consequence.

f) The poor readers of the group could be eliminated and a selective questionnaire used.

- In the event this was regarded as a possible but impracticable solution because one would have had to consider eliminating some of the more able and middle range readers too, in order to avoid the poor readers being aware that they had been singled out, since children of this age are both perceptive and sensitive.

- Additionally, information on everyone's activity patterns was required and, as was later to prove the case, the poor reader who was inarticulate, and perhaps initially unattractive as an interview prospect, in fact produced some of the most fruitful and worthwhile interview material.

In fact certain authors support the use of interviews quite strongly.

"Much can be discovered about students regard for activity simply by observation. But another useful approach is to ask questions of students. Sometimes it may be helpful to ask what a student likes and dislikes about an activity. In some cases, the students may feel free enough and capable enough to provide accurate and candid information about their feelings toward participation." (Morris, 1985. p.105)

3.44 Administering the Preliminary Interviews

Interviews were initially conceived as providing the minimum disruption if they coincided with work in the Practical Unit (P.U.) where the entire Third Year was divided into four units and received team teaching on a cyclical basis during the course of one afternoon and the following morning session. During this time, children were largely working individually, without direct supervision and so were available on an *ad hoc* basis with minimal disruption.

3.45 The In-Depth Interview (Sample N=38)

The review of literature, together with discussions with and observation of children revealed a need to explore in greater depth children's attitudes to various aspects of physical activity, the School etc. Questionnaires were again ruled out for the reasons previously stated and preference shown for in-depth interviews. To enable this to be kept within manageable proportions and reasonable time scale, a decision was taken to reduce the group size to thirty eight (20 boys and 18 girls). Details of the basis on which selection was made are contained below.

The three class teachers were invited to assign children to the categories 'Inactive', 'Moderately Active', 'Very Active', on the basis of their present knowledge and as a result of this a random selection from each of the three categories was selected for in-depth structured interviews.

Support for the notion of using teachers to make such assessments is cited by Shephard, (1982).

"The problem of exaggeration encountered in many adults becomes even worse when the activity of a child is perceived through the eyes of a parent. However, schoolteachers may be capable of rating the activity of young children relatively effectively." (Savis et al., 1980. p.157)

Where possible, interviews would be tape recorded (i.e. subject to the necessary approval of the child) and last approximately ten minutes, so as:

- a) not to exceed a reasonable concentration span, and
- b) to reduce possible disruption, in terms of time spent out of a lesson to the minimum.

Whenever possible interviews would be timed to coincide, as in the preliminary interviews, with Practical Unit, Art, Project Work, etc., when children would be traditionally doing their own thing and not subject to whole class instruction. Agreement as to the most convenient extraction time was to be negotiated in advance in accordance with the strategy of getting along in the Field.

Two separate interviews with each of the selected children were to be conducted so as to:

- a) enable there to be an opportunity to pick up or extend any interesting comments made during the first interview;
- b) keep interviews to a manageable length (i.e. 2 x 10 minutes was perceived as preferable to 1 x 20 minutes);
- c) enable various avenues of enquiry to be explored.

A means was also required whereby the validity of children's responses could be cross checked to determine some degree of reliability or faith which could be attributed to the response.

To this end, a standard test - retest procedure was adopted with twelve subjects (6 boys, 6 girls) involving repeat interviews, after a delay of at least a week, to permit comparison of responses.

3.50 RATIONALE FOR THE CHOICE OF PROCEDURES TO ASSESS THE DEGREE OF ACTIVITY

3.51 Preamble

In an attempt to measure the degree and extent of activity, and to see how a more objective assessment related to the child's stated activity level, it was clearly necessary to reduce the observations to a recognised aspect of activity. The focus of the study became playground activity for reasons already outlined in the overview of procedure.

3.52 Initial Observation

Initially observation of children and the variety of their activity was employed over several days, for the following reasons:

1. A need to identify restrictions imposed by the School and the environment on children's activities.

2. Need to discover the range of activity in which children engaged.

3. Need to identify the way in which activity could vary relative to such variables as time of day, day to day (i.e. whether there were certain "in" games which temporarily superceded others), and weather.

4. Whether different activities went on, by tradition, in specific areas of the playground.

5. Need to identify whether children were indeed participating in some of the playground activity which they claimed.

No attempt was made to hide the observer and thereby prevent any possibility of the observer's presence leading to modification of the activity.

"..... unless the observer is screened from the child, watching may modify natural activity patterns."
(Shephard, 1982. p.158)

Observation was at a fairly gross level and no great distortion was therefore feared by the presence of a 'known' observer.

3.53 Tabulated Logging - Second Stage

In order to quantify children's playground activity various aspects of the previously observed activity were codified to produce various categories and these built up into a logging sheet. The rationale being that at a gross level this would provide harder, more quantifiable data than mere observation.

3.54 Photography - Third Stage

"A problem with the tally sheet is that only a limited number of behaviors can realistically be observed and recorded before the entire process becomes cumbersome."
(Morris, 1985. p.105)

Because of the ever changing nature of the playground activity, as children "ebbed and flowed", and games were initiated, enacted and perhaps broke up to be reformulated elsewhere with different participants, Tabulated Logging became cumbersome and was only able to operate at a very gross level and provided a means of quantifying, say, numbers of children standing still on the playground periphery, or numbers of games of football happening at any one time.

A means was therefore sought of refining this to provide, if possible, a measure of the proportion of activity to non-activity. To this end, photography was to be experimented with in an attempt to evolve a system whereby the limitations of Tabulated Logging could be overcome.

Support for the notion of breaking the grip of print in curriculum research is provided in the Journal of Curriculum Studies.

"In research, the written word has become the dominant medium, doing research means collecting and processing data in ways that allow us to report in print, we assume that scholarship is essentially concerned with relating our work to the literature . This remains true despite the ready availability of high quality, still cameras and film which have a versatility undreamt of even a few years ago. given our frequent reference to science, we appear to have failed to notice that in many areas of science, visual techniques (photography, maps, films, diagrams), are of crucial importance." (R.WALKER J. Curr. Stud. 1986. Vol 18, No 1, p.95)

Another possible, but unexplored avenue was the use of a video camcorder instead of still photography - being more sophisticated and high tech . This was considered, but discounted for three reasons:

1. A camcorder was not available either on loan or, within the minimal budget, on hire.
2. It was sought to develop a system which was capable of being used by others without access to the more sophisticated and expensive equipment, but who nonetheless wished to have a means to quantify playground activity.
3. Still equipment and the necessary technical expertise were available to enable the feasibility of the theory to be explored in pilot runs and then to develop the idea through a modification programme.

3.55 Heart Rate Monitoring - Fourth Stage

As an extension of the aim of quantifying activity patterns, Heart Rate Monitoring (HRM), linked to tabulated logging, was employed with fifteen children.

Rationale:

1. The provision of hard data concerning heart rate monitored at five second intervals, linked with tabulated logging, would possibly reveal the percentage of time spent by typical children of this age in non-active, moderately intense and high intensity activity, during Playtime, which occurred three times in the school day.

"Questionnaires, pedometers, and heart rate counters are useful in quantifying information on physical activity relative to duration in children. However, intensity of the exercise is difficult to assess without an accurate measurement of heart rate."

(Gilliam, et al, 1981. p.65)

2. A new miniature, lightweight transmitter/receiver had just been developed and become available thereby rendering obsolete the previous extremely bulky and intrusive heart rate telemetry equipment.

3. Relatively little hard evidence is available concerning children's activity patterns from a physiological point of view.

"To our knowledge, no data are available which examines the voluntary activity patterns of 6 to 7 year old children using continuous heart rate monitoring system."

(Gilliam, et al, 1981. p.65)

4. Gilliam, et al (1981) had suggested a sex difference in activity intensity between boys and girls

"..... our data show that boys are more active than girls".

(Gilliam, et al, 1981. p.67)

..... and this suggestion could be examined, albeit on a small scale.

5. Retesting would be undertaken with six of the subjects to provide test/retest comparisons.

6. It would provide some possible indication of which playground activities were more likely to elevate the heart rate to the desired level.

3.60 DESIGN AND CONSTRUCTION OF RESEARCH INSTRUMENTS

3.61 Design of Preliminary Interviews

The aim was to provide a comprehensive overview of children's activity patterns and so the following areas were suggested for exploration through a structured interview on a one-to-one basis.

a) What children did - at Playtime.

b) " - in the evenings and at weekends.

(Evening was construed as the period between the end of school and being called for tea. The study being largely undertaken during the Spring Term, January - March, with restricted daylight hours, made this a convenient definition.)

c) What children did - on a regular basis as a member of a club, organisation.

d) " - in the company of parents, siblings, relatives, neighbours.

e) What hobbies and interests they had, if any.

f) Their Swimming ability and when they last went Swimming.

g) The ages of brothers/sisters (to seek any possible link between activity and having siblings older or younger than oneself.)

h) In addition, preliminary chit chat was planned in (to put the interviewee at ease) - subject matters to include a selection from the following topics:

- Pets. What they were called; how they were cared for; how long they had been owned
- The journey to School. Whether it was on foot or by car; how long it took; whether they lived for from school
- Exploration of any avenues presented by, say, whatever piece of craft work they were currently producing

3.62 Amendments to Preliminary Interviews

Trial interviews were conducted initially on a one-to-one basis and tape recorded to check children's reactions, level of vocabulary to use. Initially this latter point was somewhat of a problem in finding the right words - having had extensive experience of the secondary age group the phrasing of questions was not always appropriate to this age group, leading to difficulty in being comprehended or evoking one or two word responses or requests for clarification.

Problems with the location and design of the tape recorder became apparent. The condenser microphone built into the machine was insufficiently strong at discriminating sound unless the subject sat very close; the treble voice of the child tended to distort *vis à vis* the bass tones of the interviewer. This was subsequently improved by the provision of an external directional microphone.

Vocabulary was altered by being made more simple and by finding analogies.

The style of interview was amended - it went from the usual face-to-face interview with the interviewer emphasizing neutrality, to a more relaxed side-by-side chat, with the use of non-verbal communication to empathise with the interviewee. The belief was that children need and look for feedback - indeed all normal conversations rely on such feedback to progress successfully.

Group Interviews in twos, threes and fours were experimented with without a great deal of success. The problem lay in:

a) The microphone being insufficiently sensitive to make multiple speech sufficiently clear and so prevent comments being "drowned out" by the eagerness of more than one child to respond.

b) The children not feeling sufficiently free to say what they really felt in the presence of others. From the outset one child suffered some repercussions from the other children for comments he had made, even though everyone had agreed to confidentiality. At this age it is perhaps too much to ask that children do not disclose or make common knowledge the comments/views of others as a result of an interview.

c) Difficulty in determining who said what - impossible for the interviewer to fit a name to a voice without having had more initial contact with the children.

Interview Location.

Various locations were experimented with. The bookroom with its easy chairs and pleasant decor/ambiance would initially have been first choice but was regularly in use for showing T.V. programmes, video recordings or book work. Classrooms proved sterile, being too quiet and sepulchral. Indeed children appear to prefer background noise hence the craft room with the background hum drowning out the chance of being overheard. This idea is not too dissimilar from that of undercover agents talking in a room with the shower running to prevent eavesdropping. The actual location for the interview was the higher work surface facing the wall with corresponding stools. Hence by half turning and resting on the outside elbow it was possible for interviewer and interviewee to face each other and have non-verbal contact - often mirror images were presented. Fairly rapid processing of interviews was possible because subjects were more readily available without delay; the fact that they did not have to leave the working area was seen as beneficial.

The actual questions were not amended a great deal in outline content from the initially conceived format - apart, that is, from some initial diffidence in asking the ages of siblings. This drawing back was engendered by a feeling of encroaching on a child's private life, especially when it evoked the response as to whether it could be taken to include half brothers/sisters or in the case of questions about activity with parents, whether it related to my real Dad or Mum's current boyfriend. It was possible to feel a sense in which the study could have been jeopardised by asking such questions before gaining a more permanent acceptance from which to have the confidence to ask such questions.

All interviews were prefaced with the statement that interviews were a) optional; b) confidential and views expressed were not revealed to other children, Staff or Headmaster; c) not likely to include personal questions but in any event anyone could choose not to respond to any question without having to give a reason and without fear of punishment etc.

Where interviews were tape recorded, additional permission was sought and reassurances given in advance that the contents of the tape would not be related to a third party. Cassette tapes were never left accessible at any time and the policy was to remove and pocket them safely after each interview by way of providing overt assurance.

3.63 Design of In depth Interviews

The overall aim was to incorporate a variety of techniques and approaches and so make the format of the structured interview less stylised, e.g. incorporate flash cards, involve imagery, viz: - "If you had a magic wand, how would you make P.E. lessons better?"

The topics used were directed towards gaining information on the following:

- 1) Involvement in the holiday playscheme.
- 2) Reaction to P.E./Games/Swimming. (Elicited by verbal question with reaction being selected from a series of 'Faces' showing positive, neutral and negative response.)
- 3) Discussion arising out of (2) above, as to what was particularly liked/disliked about each activity.
- 4) Selection of favourite lessons from a total list. Initially children were requested to indicate their three favourite lessons. Later this was amended to an open choice of favourite lessons to prevent a forced or extended choice.
- 5) Most favourite lesson together with reasons.
- 6) Least favourite lesson together with reasons.
- 7) Discussion of activities at which children considered themselves good.
- 8) How P.E./Games/Swimming could be improved given the provision of a magic wand .
- 9) How Playtime had been spent that day and suggestions for making it better. (This question was not included in the original format but instituted later on when playground activity, as a focus of the study, became more prominent.)
- 10) Whether P.E./Games/Swimming had ever been avoided and, if so, by what method and for what reason. (Questions were in fact posed separately.)

Second Interview Format

1. Would you take part in P.E. if you did not have to? Can you say why you feel that way? (The questions were then repeated in slightly different form enquiring about optional participation in Games and Swimming.)

2. The next series of questions were based on a realisation that liking or disliking activity could well be a function of assessing factors which eventually outweigh each other to produce an overall preference - a sort of cost/benefit analysis. For instance, "I like Games because of the Teacher and it's a break from lessons, but the Cross Country makes it less enjoyable. In spite of all that, overall, I like it."

Question (1) concerning participation if P.E./Games/Swimming were optional tended to elicit a global response in terms of liking/disliking the activity. These questions aimed at probing what "turned children on and off" the activities.

The order of the questions was changed according to the views expressed concerning optional participation. i.e. If the response was positive - to participate given a free choice - then the positive question was posed next: I like P.E. because of? and vice versa.

This question "homed in" on P.E. and Games and deliberately ignored Swimming for the reason that as an activity there was considerable variance in its availability to children. (Viz: Entirely different groups of children went Swimming each week with the School. It was possible for a child never to go, participate just once in a term or take part every week, depending on whether they were asked. Preference was given to the extended training of the "gala" group with the result that different groups had different staff each week and the whole learning process was entirely random.)

Hence for the purpose of this question, unless the child was part of the elite group who had some structure to their Swimming programme, it was felt that responses would be unreliable.

<u>Questions</u>	I <u>like</u> P.E. because of	Accompanied
	I <u>dislike</u> P.E. because of	by
	I <u>like</u> Games because of	Flash Card
	I <u>dislike</u> Games because of	

<u>Flash Card</u>	The Teacher
	Being with my friends
	Being with my class
	The weather
	The things we do
	It's in the morning
	It's in the afternoon
	You're forced to do it
	It's a break from lessons
	We do Cross Country
	Some other reason.

All the reasons were lumped together on one flash card even though they were in some cases activity specific. e.g. The weather had little or no bearing on a indoor P.E. lesson. In this fashion there was some chance that if a child could not read well enough to interpret the flash card but stabbed a finger at a response and, say, said That one , then the question could be sensitively "re-set", and the possible responses read out for the child in order to avoid embarrassment, while still obtaining a reliable response.

4. How is activity different at Playtime from doing Games outdoors on the yard or on the field?

What would you do if you had half an hour free during school time? Would you prefer to organise yourselves or have the teacher do it for you? Why?

5. If someone is good/poor at P.E. or Games, do teachers/other children think any more/less of them, or does it not make any difference? (Questions were posed separately.)

6. Would you prefer to be selected by a captain or your teacher to join a team?

Whereabouts are you normally selected - towards the start, towards the middle, or towards the end? (The aim of this question was to find out children's perceptions of their ability, but it was not wholly successful because it was discovered that only the boys were selected by team captains and then just for certain activities.)

7. Can you name any children out of your Year who seem to be able to run about and never become tired?

Can you think of anyone from your Year who gets tired out very easily when they run?

(This question embodied the notion of building up a picture of whom the children perceived as fit/unfit to be able to relate this to their attitude towards activity.)

8. What activities do you do with your brother/sister/parents?

9. What did you do at Playtime today? When do you think you are most active - when in the Playground or in P.E./Games?

10. How did you last avoid doing P.E./Games/Swimming and why?

3.64 Amendments to In Depth Interviews and Second Interviews

Experience gained in the preliminary activity pattern interviews was incorporated into these interviews regarding such considerations as location and empathy.

A variety of styles was deliberately incorporated, as outlined elsewhere, so as to vary the approach and increase the "appeal" of the interview and perhaps indirectly to compare reactions to the differing approaches.

Following the pilot run, the Playscheme question was moved to become the opening question. The reason being that it was non threatening and fairly general. If children had participated one could ask about relevant activity and why they chose to be involved etc. If applicable, the question could be switched to what they did during their holidays.

The question about reaction to P.E./Games/Swimming using the Cheffers and Mancini 'Faces' invariably raised a smile and as such proved good "icebreakers".

Three favourite lessons were initially requested but children sometimes felt they had to force a choice or give three instead of perhaps one or two. Hence it was amended to just Favourite subjects and could be an unspecified number.

The question concerning the activity at which children felt they were good, was made more open ended and not taken to relate just to school. Some children felt no good at anything and therefore the ethics of leaving someone with a feeling of inadequacy was questioned. It was widened to encompass anything they though they did better than average.

Regarding the provision of a Magic Wand - again, like the Faces, this always raised a smile with children appearing to like

the analogy and hence was put in the middle of the interview to act as a "lightener".

In respect of the final question of avoidance of P.E./Games/Swimming - Swimming was left in as one of the lessons because children could have avoided this to the exclusion of P.E. and Games, but it must be born in mind that to a large extent this study's accent on Swimming was much modified. The Swimming programme of the School, as previously stated, was subject to all sorts of inherent problems as not to be a full part of the timetable and within the experience of all children. However, where it was deemed worthwhile to include, this was done.

The question of avoidance elicited answers which could possibly be suspect, and be more a reflection of the extent to which the interviewer was trusted than a deliberate attempt to deceive. Amendments were made to include this in the second in depth interview as a positive assumption of guilt. i.e. Much along the lines of the hoary psychologist's question, "How often do you beat your wife?" In the form, "How did you avoid P.E./Games?" it sometimes produced interesting and conflicting information and, as such, had more merit in its amended form.

Amendments to Second In Depth Interviews

1. Regarding the difference between playtime activity and outdoor games - In the pilot, P.E. was initially chosen as the contrast but was rapidly amended to outdoor games in order to compare "like with like", since Games involved greater numbers of children active at any one time and with a larger spatial dimension.

2. In respect of Fit/Unfit Children - This was included to check on the notion that activity is more enjoyable for the fit and correspondingly less enjoyable for the unfit, as well as to examine children's perceptions of fitness/unfitness and how they rated themselves.

INSTRUMENT

3.70 DESIGN OF RESEARCH TO ASSESS EXTENT AND DEGREE OF ACTIVITY.

3.71 Preamble

In order to determine the extent, nature and significance of playground activity, observation was undertaken to establish the variety of activity. This was not confined to the Third Year (10-11 year olds) only; since many of the games were unknown to the observer, supplementary "interviews" were held with Second and Fourth Year children to determine:

- a) The range of playground activity.
- b) The names ascribed to those activities.

Additionally Opie (1969) was consulted for supplementary information as to the form of these activities, because it was considered to be the definitive work on playground games.

3.72 Observational Methods Attempted.

a) Observing the playground in order to "make sense" of the activity and determine its range.

b) At a gross level, observing stationary children and checking on what observations were realistically possible within the one minute intervals.

c) Tabulated Logging looking specifically for numbers of stationary children (at one minute intervals).

d) Tabulated Logging of specific gross activities, e.g. Football games; Tag games.

e) Matrix Logging to determine which activities took place most often in which areas. i.e. Did certain activities take place

traditionally in certain areas and thereby influence activity patterns?

3.73 Tabulated Logging Sheets

Examples of the sheets used are contained in the Appendix.

Categories studied at a gross level were as follows:

- i) Stationary children.
- ii) Stationary groups.
- iii) Stationary groups which then burst into spontaneous activity.
- iv) "Injured".
- v) Static pastimes.

Gross Activity

- i) Football.
- ii) Wall to wall.
- iii) Chasing games.
- iv) Tag games.
- v) Standing still.

The above activities were chosen as being typical of the major forms of activity undertaken in the playground. The activities chosen were the personal choice of the observer and others could well have been selected, but at this stage the object of the exercise was to determine whether there was any potential in logging. i.e. Was it possible to record information accurately and in the time given at one minute intervals? While stationary children were recorded by numbers and sex: numbers of games were recorded, rather than participants.

3.74 Playground Photography

Playground observation needed to be refined down from its very gross level.

Photography of a section of playground was proposed, thereby to be able to distinguish between those children who were stationary and those who were moving.

Development of the theory followed these lines:

1. At one end of the spectrum is a combination of shutter speed, aperture and film speed at which all movement would be frozen.

2. At the other end of the spectrum is a combination of the above three factors which would combine to make movement blurred.

3. Between these two extremes there could be a combination of shutter speed, aperture and film speed at which stationary children would appear stationary and moving children have a peripheral blurr or perhaps blurring of the extremities, to denote movement, thereby permitting analysis of active and non-active children to be made.

N.B. The above explanation is not however strictly true in a photographic sense, but one is asked to assume for the present purpose that a stationary person will be photographed sharply. This is not exactly true, nor is the converse that a moving person will be blurred, but the explanation is made on this basis to preserve greater clarity.

Following extensive discussion with a professional photographer, it was concluded that the idea had merit and was worthy of the expense of a field trial.

Considerations taken into Account.

1. A 28mm wide angle lens would provide a fairly wide angle of vision to give fairly good coverage - anything wider would tend to produce distance distortion.

2. Photographs taken from a corner of the Playground would permit wide coverage of a discrete area.

3. A camera height of 7-8 foot would be most appropriate. It was also concluded that not much would be gained by photographing from the flat roof of the school building, since it would be too intrusive and be likely to modify activity too much.

4. The speed and direction at which the subject approaches the camera is critical. Head on movement is stilled by a shutter speed of 1/125 second, but fast lateral movement requires 1/500 second to freeze. However, in this respect the wide angle lens actually helps in that displacement of a subject moving across a lens is less than for the corresponding telephoto.

Experiments were proposed involving different combinations of shutter and film speeds, with subjects stationary or moving at a set pace in various predetermined directions at different distances from the camera.

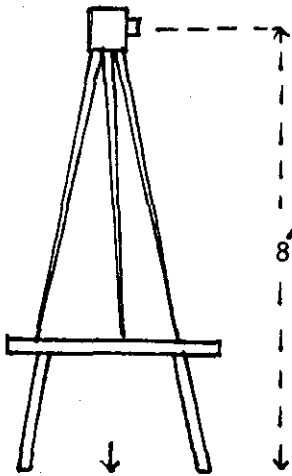
Black and white film (B/W) was selected for the following reasons:

a) Cheaper to use than colour film.

b) The developed negative can be left as an uncut strip (i.e. to include the leader and tail) and projected using a film strip projector to achieve substantial enlargements (e.g. 5 x 4) for the purposes of analysis.

With these points in mind a series of pilot studies were carried out to discover appropriate camera settings etc. see fig. 2.

Fig 2 PILOT STUDIES

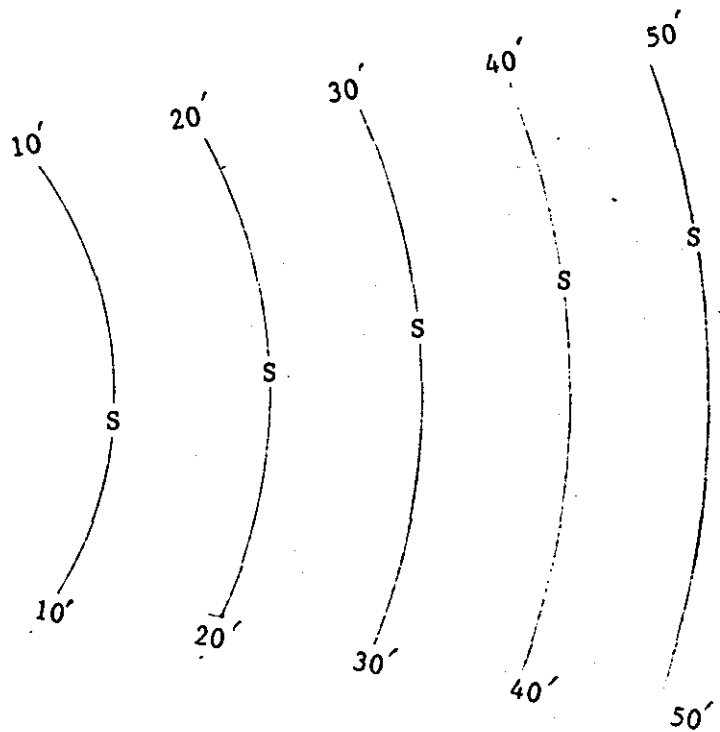
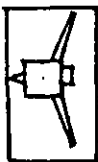


10' 20' 30' 40' 50'

CHALK LINE ARCS DRAWN 'N' FEET FROM DATUM POINT

PLAN VIEW

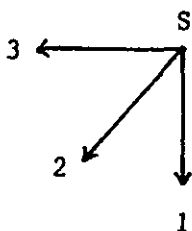
S = Subject



Positioning of Subjects - Given above.

Five test subjects were positioned, in staggered formation of 'line astern', on arc lines drawn 10, 20, 30, 40, and 50 feet from the camera. They were then required to be photographed, by stages, walking towards the camera; walking diagonally relative to the camera and finally walking at "right angles" to the camera along the line of an arc. This sequence was then repeated twice more, with the subjects jogging, and finally running.

A diagrammatic representation is given below.



Sequence

Position 1, 2, & 3 - Walking
Position 1, 2, & 3 - Jogging
Position 1, 2, & 3 - Running



S = Subject

1 = First position etc

Initial Test Details

Camera	-	Nikon FM with 28mm 1:2.8 lens.
Film	-	Ilford FP4 (B/W) 125 ASA.
Shutter Speed	-	1/125 1/60 1/30
Aperture	-	F8 F5.6 F11
Results	-	Assessed by projecting the negative film to a size of 4 6" x 5 6".

Analysis of Results

1. Problem with the focus of subjects as near as 10 foot with some combinations of camera setting.

2. Movement detectable often by virtue of the extremity which blurs. e.g. Feet when walking towards the camera; legs when moving diagonally.

3. Film speed of the Ilford FP4 (125 ASA) was judged satisfactory.

Details of Second Test Film

A second test film was shot using slower shutter speeds and different aperture settings (to secure sufficient depth of field to have those subjects nearest the camera, in focus).

The settings used were 1/15 at F16 and 1/30 at F11. (i.e. Half the shutter speed but double the aperture.) Depth of field was considered adequate at F16, without going to F22, because the wide angle lens has a bigger depth of field than standard anyway.

Details of Third Test Film

A third test film was shot in similar circumstances using 1/15 at F16, 1/30 at F11 and 1/8 at F22. The initial test protocol was used with the exception that one of the subjects remained stationary throughout thirty feet from the camera for comparative purposes, while the other subjects (at 10 ft, 20 ft, 40 ft, and 50 ft distance) moved in the predetermined directions and at the required pace.

Combined Results of the Second and Third Test Films

1. A setting of F11 at 1/30 produced reasonable results but the depth of field was insufficient and therefore apertures of F16 and F22 were considered better. In view of the fact that F22 is a very small aperture and F16 is double its size, the difference between the two is still not great, given that double a very small aperture is still comparatively small. Therefore F16 was considered adequate.

2. Active movement was found easier to detect than that of subjects just walking about. In this case posture tended to show up movement. In fact F22 at 1/8 made movement easier to determine.

3. With the slower camera speeds "ghosting" was noticed with fast moving subjects.

Overall Conclusion

If trying to determine the number of stationary children it would, in theory, be possible to use an even slower speed at which one would expect just the stationary children to show up, while the moving children would "disappear" or "ghost out".

Details of Fourth Test Film

A fourth test film was shot on a "full" playground using Ilford Pan F 50 ASA film (relacing the FP4) at F22 and a combination of 1/4; 1/2; 1/1, shutter speeds.

Result of Fourth Test Film

1. Black and white film is ideal because at this degree of over exposure the detail which is required remains and only extraneous items like cloud definition disappears.

2. At 1/1 second shutter speed, stationary children showed up well while moving children ghosted out . (Children were known to be present in the ghost areas because photographs, taken immediately before at 1/4 second shutter speed, showed their presence.

The Final Test Procedure

As a result of the experience gained from shooting and analysing the results of the four test films a final test procedure was determined.

Two cameras were to be mounted in tandem on a bar in order so as to take simultaneous photographs.

Camera A would be loaded with Ilford FP4 film (125 ASA) and exposures taken at F16 and 1/125.

Camera B would use Ilford Pan F film (50 ASA) at a setting of F16 at 1/1 shutter speed. (For the purpose of comparison portions of the test film would be exposed at 1/2 and 1/4 shutter speed.)

In this mode, Camera A would photograph everyone within a given sector, while Camera B would photograph a similar sector but just "detect" stationary children.

By comparison of the two simultaneous photographs one would therefore be able to determine the number of children in view, the number stationary, and thus the percentage of those who were moving.

It was not possible within the minimal budget to obtain two identical cameras and lenses. Working within the limitations as presented, a Nikon FM camera with 28mm wide angle lens was used to take whole playground photographs, and a Pentax Spotmatic camera with 35mm lens (offering slightly less wide angle) used to take 'stationary' photographs. Thus the Pentax negative would "underlap"

the Nikon one; by exclusion of extraneous details/subjects it was still possible to achieve the intended result.

Further test film was shot to establish the theory in practice. Film of playground activity was taken at 30 second intervals firing the twim cameras simultaneously to determine the percentage of playground activity. Ambient air temperature and wind strength were also recorded to determine whether these had any sufficient effect on percentage activity or indeed type of activity.

3.75 Heart Rate Monitoring Tests.

It was felt desirable that a physiological indication of the amount of physical activity undertaken by the children, during a typical playtime, be used.

To this end, Heart Rate Monitoring was carried out using a PE 3000 Sports Tester, consisting of a small transmitter attached to the chest by means of two surface electrodes, and a wristwatch receiver (see Plates 1 and 2). Such a unit is not usually perceived as being intrusive and it was felt that the children in the sample would neither feel inhibited nor embarrassed and indeed might well be interested to use this system.

To ensure that the readings were accurate the Sports Tester was calibrated against the alternative device most widely used, the telemeter, by Dr. A. Hardman at Loughborough University.

Resting Heart Rate was established within the confines of the classroom by means of a Pulsemeter. This was used to avoid the variable conditions e.g. wind, temperature, which could cause variation.

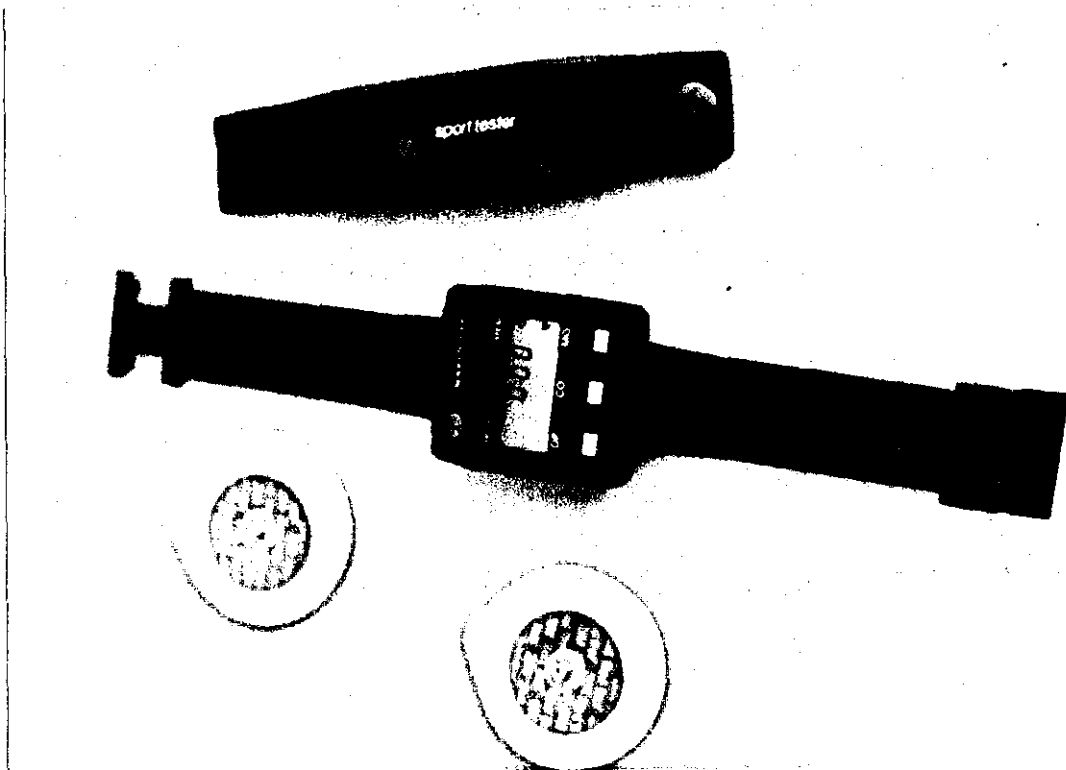


PLATE 1 PE 3000 Sports Tester



PLATE 2 Transmitter Located on Subject's Chest

Despite the fact that the system was non intrusive, a letter was sent in advance to every parent of those children selected to form the trial sample. (See Appendix 8) The letter included an offer inviting a phone call to explain any aspect of the procedure, should parents so request it. Of the fifteen initial letters requesting permission for participation there were no refusals and two requests for clarification. In both cases parents showed genuine interest in the project and were just keen to reinforce their support for the notion of a healthy lifestyle.

Various trials were conducted to ensure the author was fully conversant with the operation of the receiver. It was possible for the transmitter to have been attached using a chest band, but field trials demonstrated this to be unsuitable for use on young children with relatively small chest measurements. Additionally, since the wristwatch receiver was designed to accommodate an adult wrist, one or two elasticated wrist bands were used to pack out the youngster's wrist. A safety pin with clasp lock was also fitted to guard against inadvertant release of the strap (see Plate 3).

It is noted that one of the initial subjects tested became interested in the way in which the displayed heart rate increased with vigorous activity and deliberately sought to stimulate this response. As a result, this test was discontinued and the test repeated, including all subsequent tests, with the watch face (i.e. receiver display) blanked out by means of a small piece of adhesive paper.

One of the female staff had agreed to assist with the fitting of the transmitter to the chests of the girls and a full scale field trial was conducted to ensure she was conversant with the relevant procedure and to provide a dummy run as a means of evaluating any performance or operational problems.

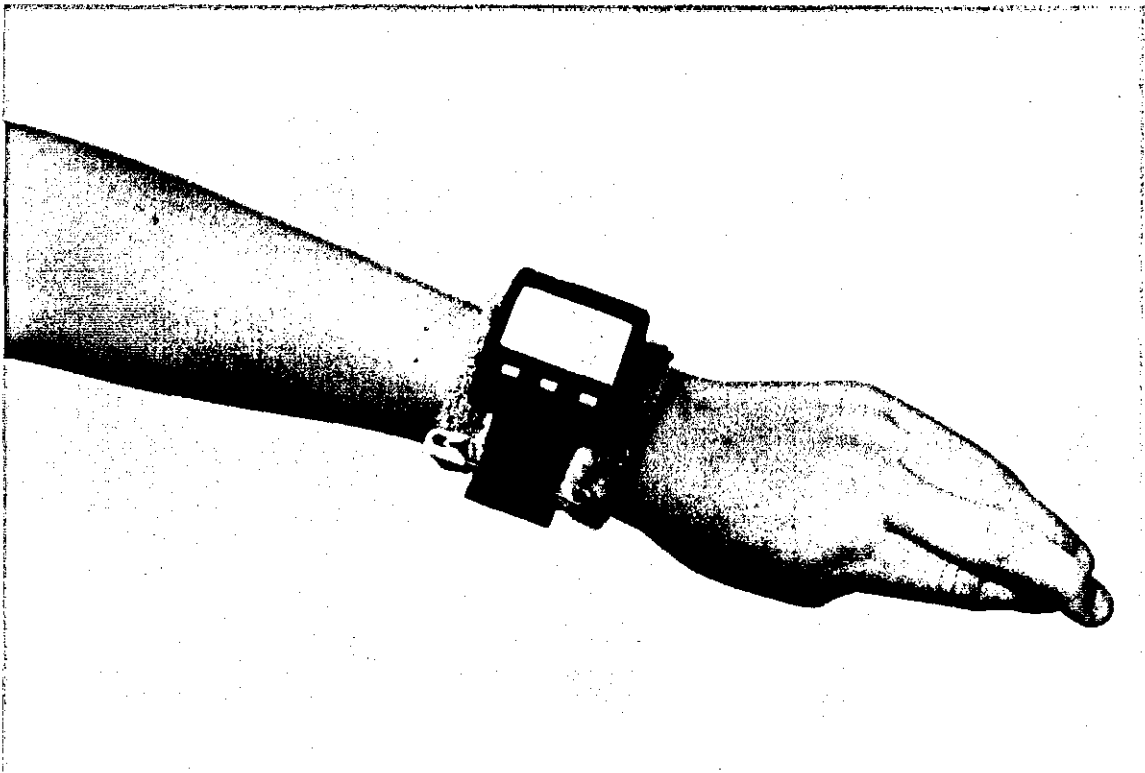


PLATE 3 PE 3000 Wristwatch Receiver

When fitted the device, subjects were asked not to press any buttons on the watch or to come too close to a television set which was working, since it could have produced a loss of data or artifacts.

Subjects wore the device for about 15 - 30 minutes prior to playtime, in order to become used to the device, and then for the duration of playtime.

Heart rate was monitored at 5 second intervals so as to gather maximum data (in this mode the memory had sufficient capacity for eighty minutes.)

Way points were able to be inserted into the receiver in order to describe the start and end of playtime etc. The use of way points diminishes the memory capacity slightly and is only mentioned here in passing for the benefit of anyone seeking to repeat the trial over an extended period.

A concurrent stop watch was also in operation to assist the author with the task of logging subject s activity at precise one minute intervals (or even less if circumstances permitted the gathering of additional supplementary data) during playtime.

A decision was taken not to extend logging to the fifteen minutes prior to playtime for operational reasons of:

- i) inconvenience;
- ii) enable the subjects to adjust to wearing the device.

Note was however taken of the nature of pre-trial activity.

Following the test the device was removed and 5-10 minutes spent in interviewing the child. Questions centred around the comfort and wearability, intrusiveness or otherwise of the device; whether it provoked any deviation from a normal playtime; whether that playtime had been "normal"; the extent of normal activity and a request to rate that activity level; plus questions about what

happens during normal a playtime and whether activity varies according to the time of day.

Questions concerning whether the subject was aware of becoming breathless and sweaty at any stage of the trial were subsequently added.

The rationale for this was as follows. Other studies (Dickenson 1987) into children's activity patterns appear to have centred on asking children how long they had engaged in activity sufficient to make them feel sweaty, as a means of determining involvement in vigorous activity. However, it was noted that during the early Heart Rate Monitoring tests that subjects who had to cease activity as a result of becoming breathless did not later claim to have felt sweaty. Even though the evidence was that heart rate was approaching 85% of maximum predicted heart rate, it was not accompanied by sweating and therefore there appeared a need to include questions about both sweating and breathlessness.

Accumulated data stored in the receiver's memory bank was accessed and logged manually for later analysis.

The sitting pulse rate was determined using a Tunturi Pulsemeter which provided a digital read out from a light source attached to the earlobe. The subject was allowed to relax in a comfortable chair in the quiet of the Book Room, with the device attached, for five minutes prior to the reading being taken.

In all fifteen subjects were chosen for the first test with the basic intention that a completed sample of ten or more children would provide a fair reflection of children's playground activity. Seven of these initial fifteen children were chosen for retest with the intention of attaining a completion rate of five or more. The object was not to attempt to correlate Test/Retest but merely to describe any variation as it existed.

Summary of the Debriefing Interviews Following Heart Rate Monitoring.

The debriefing interviews were not intended to be of the same magnitude as those conducted in the initial stage of the research. Rather the intention was to find out whether the unit had proved intrusive and how typical the test session had been of a normal playtime. Interestingly two main threads emerged.

Firstly in respect of the intrusiveness of the unit, a third of the sample mentioned that they had been conscious of an itchy sensation from the pre-gelled electrodes. Just two of the sample felt the transmitter would become detached from their chest because it was semi elasticated to allow for normal movement. Fortunately this "fear" was picked up early in the test period and a reassurance that the unit would not detach was issued at the time the unit was being fitted.

A large majority (12/15) considered that the "test" playtime had been normal and only one reported having been breathless or sweaty during playtime. It is significant that so many felt their trial had been indicative of their day to day activity patterns. In respect of feeling sweaty and breathless, perhaps this confirms the wisdom of having some concrete evidence of heart rate by which to judge children's activity, rather than to be totally reliant on children's own assessments of certain criteria which could be assumed to indicate activity.

By far the strongest and most corroborative evidence came to light in the apparently unsolicited comments which children made about the effects of weather on their level of activity. The comments all arose obliquely, as it were, in response to such questions as, "Did you do more or less running today?" and "How active did you think you were today?" and were in no case either prompted or anticipated. In fact seven of the sample commented directly that their level of activity was dependent on the weather -

being more vigorous when cold and more lethargic when hot. Below is just one comment from a boy which amply illustrates the observations.

" We usually play fighting, scraps, crash ups on the field and down by Mrs X's hut and also do the things I told you about previously. If the sun's really beating down and it's too hot to run about and play football, we sit in the shade by Mrs Y's room.

When it's cold we play running round games. We don't usually play football on wet days. When it's wet you can't get on the floor and roll over in the wet and dirt and so we change the game."

It seemed that the use of the Sports Tester in no way affected the sort of activity and given that the tests were carried out over twenty one playtimes, it is confidently expected that a good range of weather conditions was experienced.

3.80 TABLE 2 SUMMARY TABLE OF THE VALIDITY AND RELIABILITY OF THE PROCEDURES.

AGENCY	METHOD	No s CHILD'N INVOLVED	NATURE OF ACTIVITY SUMMARISED
Self	Cross referencing of information - e.g. A claims to swim each w/end with friends B & C. B & C in turn asked about w/end activity.	37	
Children claiming to have member- ship of organisa- tion e.g. Scouts, Guides.	Claimed membership of organisation - e.g. Scouts. Cross referenced with information from other members.	20	1 x 2 Hr session per week. Church parade once per month.
Holiday Play- scheme organisers	Interview about activities offered and children attending	23	4 days per week x 3 weeks during school summer holidays.
Youth Club leaders	Interview leader re: activities offered and children attending.	13	

AGENCY	METHOD	No' s CHILD' N INVOLVED	NATURE OF ACTIVITY SUMMARISED
Dr A. Hardman Loughborough University	Calibrations of Heart Rate Monitor (HRM) equipment by comparison with conventional heart rate telemetry techniques.		
Self and volunteer subject	Field trial of Heart Rate Monitor	1	Use HRM for 1 hour to familiarise with procedures
Self	Repeat HRM Test conducted with random selection of subjects.	6	Wear HRM for 15 min of normal class activity prior to 15 mins of Playtime
Self	Field trials of playground activity photo- graphy to refine techniques.		Shoot and analyse 5 test films incorporating such modifications as revealed by previous test film

SUMMARY TABLES OF THE VALIDITY AND RELIABILITY OF THE PROCEDURES

Whilst individual data is discussed in the text where appropriate the major aim of the exercise was to provide a validity and reliability check on the professed activity levels and involvement of children. Suffice it to say, at this stage, that the children s reported levels were firmly established.

3.90 TABLE 3 SUMMARY TABLE OF SAMPLE UNITS AND PROCEDURES USED.

INFORMATION GAINED	METHOD	SAMPLE UNIT	DATA FORM
Activity patterns and general influences	5-7 minute interview (Preliminary)	73 children	Transcripts from notes taken at time
Attitudes and in depth information on the above	10-12 minute interview (In Depth 1)	38 children Teacher selected for activity span	Taped/ Transcribed.
Continuation of above with validity and reliability questions.	10-12 minute interview (In Depth 1)	38 children	Taped/ Transcribed
Repeat interviews to check validity and reliability of In Depth 2.	10-12 minutes interviews	12 children randomly selected	Taped/ Transcribed
Interviews with outside agencies to confirm programme of activity and membership attending	1-1.25 Hour interviews with Holiday Playscheme Organisers, Youth Club Leaders, Local F ball Team Management		Transcripts from notes taken at the time.
Observation of F ball Training sessions and competition.			
Informal talks with Parents			

INFORMATION GAINED	METHOD	SAMPLE UNIT	DATA FORM
Range, types and nature of playtime activity	4x15 minute observation sessions	Whole School	Notes of activities observed
Tabulated logging of No's inactive children and No's of other activities (eg F'ball Chase games) in progress	Tabulated logging at 1 minute intervals	Whole School	Log sheet of gross data
Photography - No's of inactive/active children in a given area of the playground	Still photos taken of given area of playground using twim cameras operating every 30 secs.	Whole School	<p>Twin rolls of negative film recording identical playtime scenes</p> <p>A - Record of all children in playground area.</p> <p>B - Record of all inactive children, % of active to inactive children determined by analysis of film.</p>

INFORMATION GAINED	METHOD	SAMPLE UNIT	DATA FORM
Heart Rate Monitoring Subject's heart rate monitored at 5 sec intervals during playtime activity, supplemented by tabulated logging of observed activity during test period.	Heart rate monitor attached to subject during 15 mins of normal lessons prior to, and during 15 mins of playtime. Tabulated logging of activity indulged in during play- time. Follow up interviews after test - 7-10 minutes duration.	15 children	Data of Heart rate fluctuations at 5 sec intervals during play- time - graphed and highlighted with corresponding nature of activity being undertaken.
Repeat Heart Rate Monitoring - As above. Reliability and validity check.	As above	6 children	As above

4.10 Introduction

The major results tend to fall into three distinct categories. Firstly, those gained from in depth interviews and observation of behaviour which indicates attitude and/or interest. This has tended to lean heavily on what might be seen as subjective interpretation of both children's verbal and physical communication.

The second category comprises far more objective data gained about activity patterns using data logging and photography. The techniques of photography and logging did in actuality enable the moment to be crystalised, which then permitted the researcher to consider the moment in detail, over some time.

Both these categories have the advantage of gaining information from large numbers of children, but still necessitate interpretation and inference if we are to make statements of the childrens's total activity level and consequential physiological change.

The third category therefore took the investigation right to the "heart" of the matter by monitoring small numbers of children for their physiological activity as indicated by their heart rate.

Hopefully this combinaton of results, which uses such diverse measuring procedures to embrace the width of activity patterns and structures of children, when viewed together, will give a fuller picture of the child in action.

It is hoped that the reader will be led to the conclusion that with these varying techniques "The whole is greater than the sum of the parts".

4.20 ASSESSMENT OF CHILDREN'S ACTIVITY LEVELS BY TEACHERS

Before evaluating the amount of activity reported by the children it is worth noting that the three experienced form teachers were asked to place the children in one of the three activity categories and did so as follows:

ACTIVITY LEVEL	BOYS	GIRLS
Very Active	12	10
Moderately Active	18	16
Inactive	9	8

(Number of boys and girls of particular activity categories as selected by Form Teacher)

This assessment can be borne in mind as the responses of the children are recorded.

4.21 FITNESS AND UNFITNESS AS RELATED TO ACTIVITY/INACTIVITY AS JUDGED BY CHILDREN.

Whilst it was necessary for the study to have some broad expert opinion about the sample, in terms of fitness, it could be argued that children themselves, if they understand the concept of fitness, are probably capable of very accurate assessment, since they see their peers in all situations.

When the children were asked to say whom they felt had "the mileage ingredient and did not run out of steam" - they replied as in Table 4.

Similarly children were asked to nominate those whom they considered to be inactive and to "run out of steam quickly".

A list of their responses is tabulated in Table 5 below.

TABLE 4

Category	Boys			Girls		
	Subject No: Nominations			Subject No: Nominations		
Fit	33	-	15	45*	-	12
	3	-	9	39	-	8
	4	-	6	62	-	4
	45	-	5	33	-	3
	54	-	5	40	-	3
	57	-	3	72	-	3
	1	-	3			
	24	-	3			

Table of children perceived by their peers as being fit/active

TABLE 5

Category	Boys			Girls		
	Subject No: Nominations			Subject No: Nominations		
Unfit	48	-	6	47*	-	8
	47	-	4	48	-	7
	9	-	4	65*	-	7
	2	-	4	66*	-	5
	13	-	3	64	-	3
	11	-	3			
	66	-	3			
	10	-	3			

* = listed themselves as
fit/unfit

Table of children perceived by their peers as unfit/inactive

When compared with the author's and experienced teachers assessments of activity and inactivity, there was almost total agreement. Of the children receiving nominations of a perception of being fit - all would be classified as very active. Of the "unfit" children - all but two boys would be categorized inactive. The two exceptions - Subjects 2 & 13 - should, in the author's opinion, be reclassified as very active and moderately active respectively.

Perhaps it should be stated that children were making judgements about who they perceived as fit/unfit, without the benefit of a year list which might have served as an *aide memoire*. This was deliberately withheld so as to try and elicit the names of children in those particular categories which happened to be uppermost in the minds of the children.

Interestingly only three inactive girls and one very active girl selected themselves in the appropriate category.

4.30 THE INITIAL INTERVIEWS

All seventy three children in the age group selected were given an initial interview of five to ten minutes duration to provide some gross insights into their activity patterns. The results are presented below under convenient activity titles.

4.31 Playtime Activity

When asked to say what activities they did at playtime, the children reported that they took part in over twenty - see Table 6. The activities are presented as a boys' and girls' list because it has to be said that in certain activities at least, a strong gender bias can be observed.

TABLE 6**PROFESSED PLAYGROUND ACTIVITY BY DESCENDING ORDER OF POPULARITY OF PARTICIPATION**

Activity	No: Boys Responding (N=39)	Activity	No: Girls Responding (N=34)
Football	32	Wall to Wall	14
Tig	14	Stand About	11
Wall to Wall	12	Talk	8
Line Tig	9	Play Adventure}	7
Chase Games	8	Chase Games }	7
Tig & Torture}	4	Tig	6
"Scraps" }	4	Football }	4
Aki }	3	T.V. Games }	4
Stuck in Mud }	3	Running Games }	4
Gangs }	3	Visit T Shop	3
Throw & Catch}	2	Walk about }	2
Play Trains }	2	Creep inside }	2
Run Around }	2	Foxy }	2
Walk & Chat }	2	Aki }	2
Adventure Gms}	1	Races }	1
Sit & Think }	1	"Scarves" }	1
Jogging }	1	Rounders(Hands}	1
		Cat & Mouse }	1

(A compendium of the less obvious games is included in the Appendix(7))

4.32 Boys' Activity Patterns

Many children claimed to participate in football and playground observation of the Third Year as a discrete group certainly revealed this to be the most popular activity. Matches were often held on the same "pitch" as the Second Year game, without apparent undue interference. There was one occasion when no less than twenty nine out of the entire complement of thirty nine Third Year boys, were split into two teams, playing one large playground game of football. With just one ball between them, the intensity of the activity possible is questionable, but it goes some way to support the stated claim. Perhaps it is significant that nine of the boys are regular members of the local football team and their enthusiasm for the game could well be infectious. Indeed they could well be the catalyst for the involvement of others; there being kudos attached to being involved in a game with the "year's" better players, as well as a sense of some hero worship.

Chase and tag games were always very much in evidence with Wall to Wall as a mixed activity being observed to be the most popular, as predicted from interviews.

The few children who claimed to play 'Action Force', Trains, and Adventure Games were certainly observed involved in these activities.

4.33 Girls' Activity Patterns

Girls, by contrast showed a preference for more stationary pursuits like standing and talking. There was less evidence than claimed of Third Year girls playing football except on a very casual basis. However, the same did not apply to the Fourth Year which contained some very talented girls who played at least on equal terms with the boys.

Chase and tag games were again much in evidence and were witnessed both as single sex and mixed activities. Some of the tag games had a 'Catch as Catch Can' element to them to encourage the otherwise unwilling participation of the boys with the girls.

Cat and Mouse , T.V. and Adventure Games were most popular and this professed interest was supported by evidence of playground observation.

Overall, the weight of observational evidence supported the boys claim that they were more active than the girls.

4.34 Evening and Weekend Activity

The children, when asked what they did of an evening and weekend responded as detailed in Table 7.

30% of the boys played organised games (mainly football, plus rugby) either for the local estate team or other organised club. One boy even travelling as far as Coventry - a round trip of 38 miles - to get a regular game.

Other pastimes featured strongly with some interested in Swimming, especially on a Saturday afternoon when the local baths have a splash session with a large inflatable and the option of bringing along fins, rubber rings and water toys. In this respect Swimming appears to be enjoyed when done as an activity as distinct from a sport.

20% of the girls attend Dance classes/clubs of various types e.g. Acro, Tap, Ballet, National and Festival.

As far as the girls are concerned, play (i.e. use of free time in the evenings/weekends) tends to follow the trend of being with friends within the home.

TABLE 7

Evening Activity Boys (N=39) Girls (N=34)		Weekend Activity Boys (N=39) Girls (N=34)	
Team Games Football (28%)	Roller Booting 20%	Football (organised games) 28%	Dance (Irish/ Acro/National Festival) 20%
Other activities			
BMX Riding 15%	Play indoors 61%	Rugby (organ- ised game) 2%	Swimming 29%
Cycling 12%	Play at friend's house 21%	Swimming 12%	Playing with friends or at home 12%
	Watch T.V. 21%	Cycling 6%	Helping with shopping/ around house 11%
Other Activities		Other Activities	
Play indoors 28% Play at friend s house 25%		(eg Snooker/ darts/computer T.V.)	

Evening and Weekend Activity

Girls are also more involved with helping out at home and assisting with the shopping.

To a large extent, evening and weekend activity is a function of the time of year, weather, and the concern of parents for the safety of children either mixing with traffic on the roads or from being abducted when "playing out". Hence, playing indoors at home, or at the home of a friend or outside in the company of several others (e.g. a game of football on the grass area surrounded by homes) is regarded as relatively safe. This trend was particularly noticeable amongst the girls and is perhaps more a reflection of the concern felt by parents for their daughters, than necessarily inherent desire to be indolent or inactive.

4.35 Participation in Clubs/Organisations

When asked whether they were regular members of any clubs or organisation, the children responded as follows:

Boys		Girls	
Football	28%	Guides	34%
Youth Club	18%	Swimming	23%
Scouts	15%	Dancing	20%
Swimming Club	13%	Youth Club	17%

Organisations Attended in Descending Order of Importance

Clubs feature strongly and are a reflection of those available on the estate. viz. Football Club; well organised Youth Club; Scout/Guide companies, which given the national trend towards decreased participation, have separate troops/companies meeting on different nights to cater for the numbers wishing to be involved.

4.36 Involvement with Parents/Siblings

As it is often recognised that involvement in activity is a function of 'significant others' e.g. friends, parents, brothers/sisters; the children were asked to say what sports they carried out in the company of members of their family. Results are detailed in Table 8.

TABLE 8

TABLE OF SPORT WITH SIGNIFICANT OTHERS

BOYS			GIRLS	
With Parents	Swimming	20%	Swimming	29%
	Football	12%	Walking	5%
	Snooker	10%		
	Fishing	5%		
With Older B/S (14+)	Swimming	7%	Jogging	8%
	Snooker	2%	Swimming	3%
			Cycling	3%
With B/S Similar Age(9-13)	Swimming	5%	Scottish Dancing	9%
	Cycling	2%	Irish Dancing	2%
	Jogging	2%	Roller Booting	2%
With Younger B/S (<9)	Football	5%	Football	5%

Brothers and sisters featured in only relatively small numbers but parents were quite significant, primarily in Swimming where 20% of boys and 29% of girls reported taking part with their parents.

The involvement of parents and significant others is believed to be crucial to the endorsement of an active lifestyle.

- "I go for a run round the park on Sundays.... go with my brother and Dad. I would not be allowed to go on my own because there are too many old people." (Subj:44)
- "I go to the Baths every Sunday morning with my parents - I enjoy it." (Subj:52)
- "I like woodwork - I m kind of a tomboy and I like doing things like woodwork. At home I'm doing...making a draughts set with Dad - I just like doing it." (Subj:63)
(Although not directly related to an activity involving exercise, it is indicative of the way in which parental involvement encourages participation)

Claimed participation in activity with parents proved difficult to directly evaluate since interviews with parents was beyond the scope of this Study. However, of the professed activities regularly indulged in with parents, Swimming featured fairly strongly.

All but one of the entire cohort had at least one brother/sister, but the level of participation in sport as distinct from "kick about" activities, was not significantly high. At this age much obviously depends upon the comparative age of siblings. Older siblings (i.e. 14+) appeared to have their own friendships which excluded participation by the 10 - 11 year old. Where siblings were much younger (5-7 years of age) then the maturity gap was difficult to breach.

Activities like Swimming and Snooker, which transcended age barriers, were more likely to be mentioned in response to questions about sports participation with significant others, but still relatively infrequently.

4.37 Hobbies and Interests

BOYS		GIRLS	
Football	30%	Collecting(Various)	41%
Model Trains	28%	Girl Guides/Brownies	29%
Collecting (Various)	28%	Dancing	11%
Snooker	10%	Horse Riding/Draw-	
		ing/Swimming	5%

Hobbies and Interests in Descending Order of Popularity

In view of the well organised football team for boys and similar Girl Guide/Brownie Packs available locally, it is hardly surprising that interest should be so high in these two areas.

As Swimming featured as both a club activity and also the most popular activity in which parents and children participated together, it was decided to assess the ability level of the whole sample.

Table 9 (Overleaf) clearly shows that only seven children out of seventy three were unable to swim. The vast majority professed to swim up to a length but were not competitively orientated.

Clearly, it would appear that the Fun "Splash" sessions at the local pool are attracting most children.

TABLE 9

Table of Swimming Ability Across the Group

Ability Level	Boys (N=39)	Girls (N=34)
Non Swimmer	5	2
10 Metres	14	7
25 Metres	10	7
50 Metres	1	5
100 Metres	1	3
400 Metres		3
800 Metres plus	3	6
Prohibited from Swimming on Medical advice	3	1

4.400 THE IN DEPTH INTERVIEWS

Interviews have always been viewed as a valuable information gathering procedure if carried out sensitively and with forethought (see procedure). To check the validity of the information gained in these In Depth Interviews, all thirty eight children were interviewed twice, and in the case of thirteen children (thirteen were preselected to allow for "drop outs" which did not in fact occur) test/retest questions were included.

Table 10 shows the degree of agreement, which can be seen to be considerable. In this form of interview some change is to be expected and the author is confident that the differences can be explained by circumstances e.g. effects of positive and negative recency; the stability of attitudes over time, etc.

This procedure, not usually followed in interview based testing, does however appear to give validity to the statements offered.

In some ways this is similar to the test/retest situation. The expectation was that there would be broad agreement not absolute agreement between the less specific questions, whilst specific questions (e.g. attendance at a Playscheme) should produce a categoric response. Favourite subjects might well vary a little due to recent experience. It was felt that a complete list of agreement (//) in this respect would be unlikely.

Two independent teachers assessed the answers for degrees of agreement.

TABLE 10

Test/Retest Assessment of Degree of Agreement from Interview

	1	2	3	4	5	6	7	8	9	10	11	12	13
Playscheme	//	//	//	//	//	//	//	//	//	//	//	//	//
Attendance	//	//	//	//	//	//	//	//	//	//	//	//	//
Reaction	//	//	//	//	//	//	//	xx	//	//	//	//	xx
to P.E.	//	//	//	//	//	//	//	xx	//	//	//	//	xx
Reaction	//	//	//	//	//	//	//	//	//	//	//	/x	//
to Games	//	//	//	//	//	//	//	//	//	//	//	/x	//
Reaction	//	//	//	//	//	//	//	//	//	//	//	//	//
to Swimming	//	//	//	//	//	//	//	//	//	//	//	//	//
Favourite	//	//	//	/x	//	//	//	//	/x	//	//	//	//
Subjects	//	//	//	/x	//	//	//	//	/x	//	//	//	//
Most Favour-	//	//	//	//	//	//	xx	//	//	//	//	//	//
ite Subject	//	//	//	//	//	//	xx	//	//	//	//	//	//
Most Unpop-	//	xx	//	//	/x	//	//	//	//	//	//	/x	/x
ular Subject	//	xx	//	//	/x	//	//	//	//	//	//	/x	/x
Avoidance	xx	//	//	//	//	//	xx	//	//	//	xx	//	xx
of P.E.	xx	//	//	//	//	//	xx	//	//	//	xx	//	xx
Subject No:	13	24	27	8	28	7	16	18	19	20	36	38	48
Sex:	M	M	M	M	M	M	F	F	F	F	F	F	F

The majority of responses over the two interviews were consistent. Inevitably there were slight variations with most of these centering upon the responses to favourite subjects.

e.g.	1st Interview	2nd Interview
Subj: A	Maths Swimming Science English	Maths Swimming P.E. Games
Subj: B	Maths	Maths Art French
Subj: C	Games Maths French	Games Art

Whilst differences occur in that children add to or drop subjects from the list, or make slight changes, nevertheless the favourite subject remained the same - this was not unusual.

Similarly, the same situation occurred in respect of subjects which were disliked.

e.g.	1st Interview	2nd Interview
Subj: C	Reading	Memory and Spelling

This implies a change but really it is more of detail than a major category.

Occasionally the change was one of intensity, viz:

Subj: D	1st Interview	2nd Interview
	I don t like X/C	I quite like X/C

In one instance, an interviewee gave an entirely consistent interview to the extent of listing her favourite subjects as English, French and Reading, and then nominated P.E. and Practical Unit (P.U.) as her most favourite lessons inspite of these not appearing in her list of favourite subjects!




One girl as previously stated, underwent a complete transformation of attitude between the first and second interviews. However, in only one instance was an interviewee suspected of being unreliable in her responses. She initially claimed to like P.E., especially performing handstands and cartwheels. Subsequently, she claimed not to like P.E., especially when required to perform handstands and "things" since she could not do these manoeuvres! She said she would also prefer not to have to do P.E. at all, given a chance.

4.401 Attitudes to P.E./Games/Swimming

Whilst no attempt was made to document each P.E. lesson beyond that indicated in the degree of activity involved (see earlier), it was felt important and relatively easy to gain information about attitudes. To engender interest and provide a "break" in the formal interview procedure, the sort of 'faces' used by Cheffers and Mancini were employed. These seemed to be well received and clearly understood.

4.402 Anticipatory reaction to Physical Education

Whilst the majority of boys (75%) looked forward in anticipation to P.E., the girls were somewhat less enthusiastic. In this context it is significant that only one boy, but four girls, disliked the prospect of P.E. lessons.

ANTICIPATORY STATE	BOYS (N=20)	GIRLS (N=18)
	15	11
	4	3
	1	4

Children's Attitude to Physical Education Lessons

Amongst the main reasons given by boys for their taking a favourable view of P.E. were:

- i) a liking for the use of apparatus (13 comments)
- ii) a liking for doing physical things like running about (6 comments)




By contrast the main complaint about P.E. amongst boys was in having insufficient apparatus time (3 comments)

Amongst girls, unfavourable reaction centred upon a fear of working on apparatus at height, dislike of a particular teaching style and of being the butt of unfavourable comments from peers.

"I don't like P.E. - the climbing frame's too high and I can't do it. It's O.K. if I know we're not going to have the apparatus out."

"I don't like doing stretches and going up too high."

4.403 Anticipatory reaction to Games

ANTICIPATORY STATE	BOYS (N=20)	GIRLS (N=18)
	15	8
	5	5
	0	5




Children's Attitude to Games

In respect of Games, while the boys show an almost identical reaction as to P.E., in that 75% looked forward to Games, with the one boy who disliked P.E. previously taking a more neutral view; the girls appear more disenchanted, with a reduction in the overall positive reaction and corresponding increase in the neutral and "depressed" responses.

However, there were similarities in the main reasons expressed by both girls and boys alike for disliking Games, viz: Cross Country (Boys - 35%, Girls - 56%) and the cold weather (Boys - 35%, Girls - 44%). Even so, no one expressed a dislike of games in the literal sense of the word.

On the positive side, both boys and girls expressed a liking for Hockey (Boys - 11 comments, Girls - 8 comments). Football however evidently had a dominant appeal for boys receiving fourteen favourable comments.

4.404 Anticipatory Reaction to Swimming

ANTICIPATORY STATE	BOYS (N=20)	GIRLS (N=18)
	13	8
	4	6
	3	4

Children's Attitude Towards Swimming

Reaction might on the face of it appear reasonably favourable toward Swimming, however it should be borne in mind that many of those who opted for the face depicting an "excited" or "neutral" anticipatory state were not regular swimmers with the school. On the contrary, some of those who went more often with the school did not necessarily find the prospect particularly attractive.

"I don't like having to go in for the Gala. (Preparatory training appeared to begin very early and to take precedence over other swimming activities.) When you race against others and lose you get the blame. I could have been in the gala team but I don't want to be." (Boy)

"I don't like gala training - you only get to do one length and you don't have enough activity." (Girl)

"Just swimming backwards across the width is boring." (Girl)

4.405 Improvements to P.E./Games/Swimming

As a corollary to the aforementioned interview questions children were then asked to "wave a magic wand" and indicate what improvements they would like made to P.E./Games/Swimming.

TABLE 11

BOYS (N=20)	GIRLS (N=18)
Have apparatus out more (9)	Be able to use apparatus like
Have better equipment (2)	ropes and box all the time (3)
Do more advanced things (2)	Do more things on box instead of
P. Change the Teacher (2)	climbing frame - too high (1)
E. Have a bigger box (1)	Make the box smaller (1)
Have a higher climbing	Cut out apparatus work -
frame (1)	frightened of it (1)
Have P.E. more often (1)	
Scrap Cross Country (10)	Drop Cross Country (10)
Have match all the time (6)	Keep it as it is (2)
G Have F'ball all the time (4)	Have Basketball instead of
A Scrap Hockey (2)	Netball (1)
M Make it warmer outside (2)	Drop Hockey (1)
E Have Basketball as well as	Have Hockey more often than
S Hockey and Football (1)	Netball (1)
Have a larger sided game	Let girls play Football (1)
in Hockey (1)	Have longer - make it indoors (1)
Leave it as it is (1)	

Possible improvements as perceived by the children - numbers
responding in brackets

BOYS (N=20)

GIRLS (N=18)

S	Have more free time(1)	Have more free time (2)
W	Avoid swimming widths (1)	Stop swimming backwards and
I	Forget to ask me to join	forewards and try for badges (1)
M	in (1)	Abolish Swimming (1)
M	Be able to go more often (1)	Make the water warmer (1)
I	Leave it as it is (1)	Keep it the same (1)
N		
G		

Possible improvements as perceived by the children - numbers
responding given in brackets

While individual comments will inevitably provide nuggets of information and insight, perhaps what is most significant in this particular context are comments which have elicited a fair number of responses of a similar nature.

Comments about P.E. - Amongst boys there was support for the previously expressed notion that the use of apparatus increased their perception of an enjoyable lesson. Similarly, correspondingly fewer girls expressed a wish to use apparatus more frequently.

Comments about Games - Once again there was a united dislike amongst both boys and girls of Cross Country. Likewise, Football and the desire to play full sided, rather than small sided, games was dominant.

Comments about Swimming - Comments tended to have little universal agreement and were largely personal expressions of an individual's feelings rather than a "window" on the feelings of a portion of the group. While they are not necessarily to be ignored, they lend

little concrete support to the global picture of children's attitude to swimming.

4.406 Reaction to School

These direct questions would seem to imply that children would see "P.E." in a very favourable light. It may be that these particular children enjoy the school environment in total and hence P.E. as part of that whole rather than as the subject in isolation. Perhaps some relative measuring is necessary.

When asked whether they liked or disliked school or had no strong feelings either way, the children's response was as follows:

	BOYS (N=20)	GIRLS (N=18)
Like School	15	13
Neutral Feelings	4	5
Dislike School	1	0

Children's Reaction to School

The interviews revealed that the reasons for liking school were very varied; in some cases of quite a general nature.

- "I like the things we do."

Sometimes specific subjects were given:

- "I like Maths, Science, P.E., Games."

Others saw it as an alternative to boredom at home.

- "You get bored at home and anyway I enjoy the sports we do."

The one boy who commented that he disliked school, seemed to have both the general dislike of the work and perhaps the specific embarrassment of singing in assembly.

- "I don't like having to sing in Assembly and because of all the work we have to do." (It is interesting to note that this particular boy was the one who professed a dislike of P.E.)

4.407 Girls' reactions

Reaction varied, as with the boys. For some it centred around the company provided, particular aspects of the day and specific subjects.

- "...like being with my friends, playtime and doing P.E. and Games."
- "I love school. I like P.E., Games, Music. My best friends are here."
- "...like being here with my friends."

For others it was seen as an antidote to the inevitable boredom of being at home.

- "You're not bored and have lots to do all day and people to play with. It's not all work and not all play. It's FUN!"

Others referred to the contribution made by Teachers to establishing an harmonious atmosphere.

- "The Teachers help people very well and put any trouble right as soon as possible."

4.408 Neutral girls' reaction

Inevitably not every child wholeheartedly endorses every facet of school life, though the drawbacks were often modified by positive comments about certain subjects or Teachers.

- "I like Maths, English and Practical Unit....like the Teachers for Maths and English....the atmosphere in the class is good, but I don't like having to do the work."
- "I kind of half like it. I like Games but dislike some of the Teachers."

4.409 Favourite lessons

^{CHILDREN WERE}
When asked to select their favourite lessons from a list of those taken during the week, the Table 12, given below, resulted.

TABLE 12

Favourite Lessons

BOYS (N=20)		GIRLS (N=18)	
1. Games	11	1. Practical Unit	13
2= Maths	10	2. Games	9
2= P.E.	10	3= Maths	8
4. Practical Unit	9	3= P.E.	8
5= Art	8	5. Music	5
5= Science	8	6= Art	3
7. Swimming	5	6= French	3
8. English	3	8= English	2
9 Music	2	8= Science	2
10= Reading	1	8= Swimming	2
10= French	1	11. Reading	1

4.410 Most favourite lessons

BOYS (N=20)		GIRLS (N=18)	
1. Practical Unit	7	1. Practical Unit	7
2. Maths	5	2. Maths	6
3. Games	4	3. P.E.	2
4= P.E.	1	4= Art	1
4= Reading	1	4= Swimming	1
4= Science	1	4= Music	1
4= Swimming	1		

[Practical Unit (P.U.) refers to lessons taken in the purpose built practical block with facilities for Woodwork/Craft/Needlework]

It is interesting to note that Games, Maths, P.E. and P.U. occupied the top four placings for both boys and girls. In both cases, Games was perceived as being marginally preferable to P.E.

However, when it came down to just one selection, Practical Unit had a clear prominence for both boys and girls. Interestingly, Maths continued to feature strongly (even though the school is not overtly engaged in "promoting" Maths and as such increasing its appeal through recency).

The boys showed a preference for Games (20%) as a favourite subject, while the girls (11%) opted for P.E., with no selection being made for Games.

Particularly worthy of comment is the selection of most favourite subject made by a boy and girl who are outstanding athletes, very active, and heavily involved outside school hours with sports clubs. Interestingly, neither chose P.E. nor Games,

even though both are evidently exceptionally keen on any form of sporting activity associated with the school. Rather, both chose Maths as their most favourite subject. The rationale appeared to be, upon further investigation, that while both were indeed very keen on P.E. and Games, whether inside or outside school, Maths in its present form proved a welcome contrasting activity in which they found success and interest. Sport had almost assumed "a way of life" and as such had come to be accepted as everyday and "ordinary".

- "I like Maths, it's just that I'm good at it and find it easy." (Boy)
- "Maths is my all time favourite - I'm good at it and I just like it." (Girl)

It is interesting to note the high placement of Maths, but no attempt was made to establish the cause e.g. good teacher; interesting subject, etc., as it was beyond the scope of this study.

Where P.E. and Games had been favourably perceived, comments were sought as to what made it a pleasurable experience.

4.411 Sample favourable comments about P.E.

BOYS	GIRLS
"Like having the apparatus out (8)	"Like boxwork/climbing frame (6)
"Like doing physical things and running about (6)	"Like having apparatus out (3)
"Like boxwork (4)	"Like turning upside down and threading through benches (1)
"Like being with friends" (2)	"Like P.E. - doesn't involve work and writing" (1)

4.412 Sample favourable comments about Games

BOYS	GIRLS
Like Football (14)	Enjoy Hockey (8)
Like Hockey (11)	Like Netball (6)
Like Cross Country (5)	"I like Netball - I know how to play it!"
"Like moving about, feeling fit and active."	"It's a break from lessons and I like being with my friends."
"..like being with other classes and friends"	
"Games is more enjoyable because you're with your friends."	

Reaction to P.E./Games was further probed during a later interview by means of presenting the child with a list of reasons distilled from comments made during previous interviews, and the child asked to indicate which of the items positively influenced their enjoyment of the subject.

4.413 Reasons for liking P.E.

BOYS (N=20)		GIRLS (N=18)	
Being with friends	12	Things we do	8
Things we do	10	Being with friends	6
A break from lessons	7	Break from lessons	6
The Teacher	6	The Teacher	3
It's in the morning	2	It's in the morning	1
Being forced to do it	2	Doing it with Boys and Girls	1
Having to get changed	1		

Similar responses were sought in respect of Games.

4.414 Reasons for liking Games

BOYS (N=20)		GIRLS (N=18)	
Things we do	10	Things we do	8
Doing it with friends	8	Break from lessons	6
The Teacher	6	Doing it with friends	5
Break from lessons	5	The Teacher	4
Cross Country	3	It's in the afternoon	4
Weather (when sunny)	2	Weather (when sunny)	2
It's in the afternoon	2	Cross Country	2
Doing it mixed	1		

In every instance the additional category "Some other reason" had a nil response.

In respect of P.E. the reasons for liking the subject are remarkably similar for both boys and girls. This pattern is similarly repeated for Games.

In the light of the current emphasis on the proclaimed value of mixed P.E. and Games, it should perhaps be noted how few children cite it as a reason for enhancing their enjoyment of P.E. and Games.

4.415 Least Enjoyable Lessons

It was thought useful to examine the corollary to the above and investigate the least favourite lessons; the reasons offered for this; the unfavourable comments about P.E. and Games and the

reasons for disliking P.E. and Games, by way of providing both a contrast and a comparison.

Least enjoyable lessons

BOYS (N=20)		GIRLS (N=18)	
French	8	French	5
Maths	6	Maths	4
Reading	4	Art/English/Reading/	
Nothing	3	Science/Swimming	3
Music/English/Swimming	2	Nothing	2
		Music/P.E.	2

COMMENTS

BOYS	GIRLS
Fr "I don't know a lot of French "I'm not good at it..can t understand the hard words (2) "Mrs X. gets things different from Mrs Y. and I find it difficult to choose "It's boring going on about the same thing with Mrs Z. "I get mixed up learning French "	Fr "Mrs Z. is boring and always moans at you" (4) Maths "I hate doing sums " "I don't like the Teacher for Maths "I used to keep being told off in Maths "Maths is boring "
Maths "I'm not very good at Maths "The sums are too hard and I don't know how to do them "You have it every day but one and it seems to last for ages "I find it hard work in the top Maths group "	Reading "It's boring - there s too little activity "

COMMENTS CONTINUED

BOYS

GIRLS

Reading

"It's boring - there's not
enough action

"It's too quiet - I like to
have sound around me"

In the light of previously favourable comments about the popularity of Maths, it is significant to note the almost equally large response disliking it. Perhaps one child's meat really is another's poison.

Significantly P.E./Games do not figure prominently amongst the Top Ten least favourable subjects.

From the comments expressed about French it would appear to be a prime choice because of a dislike of a particular Teacher and her teaching style. It perhaps emphasizes the point that the person taking the lesson is often of greater significance than the subject in determining a child's response.

Comments as expressed above also serve to underline the need to examine the "other side of the coin", as it were, so as to seek to obtain a more balanced perspective of likes/dislikes.

While most children admitted to having a least favourable subject, nonetheless three boys and two girls enjoyed all their subjects.

During the course of interviews children were asked if there was anything they particularly disliked about P.E./Games. In addition unfavourable comments were also logged to see if any

particular trends emerged. When these comments and responses were aggregated, the following pattern emerged.

4.416 Unfavourable comments about P.E.

BOYS	GIRLS
Not enough apparatus time (3)	Fear of heights (3)
Dislike of Teacher shouting at you (3)	Dislike of Teacher (1)
Fear of heights (1)	Fear of looking a failure (1)
Dislike balancing activities (2)	Dislike balancing activities (2)
Getting changed in front of the girls (1)	

Unfavourable Comments About P.E. by Gender

It is perhaps inevitable that no programme of activity would be universally popular. Neither is it surprising that comments should encompass such aspects as a fear of heights, through a dislike for a particular Teacher or activity, to an apprehension over possible failure.

By way of amplifying the data above, sample illustrative quotations are given below:

- "I don't like P.E. The climbing frame's too high and I can't do it. It's only O.K. if I know we're not going to have the apparatus out." (Girl)

- "I don't like being split up into houses for hand-ball and losing 'cos we don't have enough good people. It really depends on if you've got to work with the grots." (Girl)

- "....they all try to get me out of it, so I don't have to do it because I'm slow and I hold up the group. I'm not very good at P.E. and all the others take the mickey." (Girl)

Comments about P.E. did not on the whole appear too negative. In spite of complaining about having insufficient apparatus time, the boys presumably enjoyed what they did have sufficiently to want more. A few girls expressed fears about using apparatus, but perhaps it is not unusual for some children to experience vertigo.

Overall then, no really strong feature of dislike emerged at this stage.

When a similar exercise was conducted on the subject of Games, the following picture emerged

BOYS		GIRLS	
Dislike Cross Country	12	Dislike Cross Country	11
Fear of being injured		Dislike of the cold	7
by a hockey stick	3	Fear of being injured	
"Doing skills is boring"	3	by a hockey stick	4
		"Doing Netball skills	
		is a waste of time"	2

Quotations illustrating some of the above dislikes are featured overleaf.

- " You don't get long enough for Netball doing skills for some of the time, whereas you spend the whole time doing Hockey." (Girl)
- " I don't want to be hit on the leg with a stick.....last time it happened I had to go to the Doctor's with a big bruise on my leg." (Boy)
- " I like it (Games) in summer when we have races and can sit on the grass and make daisy chains, but in the winter it's cold. I think it's a waste of time really." (Girl)

In this instance a very clear picture emerges.

a) An almost universal dislike of Cross Country, even though it is only a short figure of eight warm up lap round two pitches. Possibly because it is an inevitable and unimaginative start to every Games lesson it is unfavourably perceived. Even those athletic pupils who were keen participants in Fun Run Events professed a dislike of Cross Country in this form.

b) Girls complained fairly consistently about the cold but this could have a justification in the fact that the standard games kit consisted of T-shirt and gym knickers.

Reasons for disliking P.E./Games were further probed during later in depth interviews (by a technique similar to that outlined previously) and the following tables of results emerged.

TABLE 13

BOYS (N=20)		GIRLS (N=18)	
It's in the morning	4	Forced to do it	4
Forced to do it	3	The Teacher	3
Doing it with the girls	3	Doing it with the boys	2
Having to get changed	2	Having to get changed	2
The Teacher	1	Things we do	2
Things we do	1	It s in the morning	1
Some other reason?	0	Some other reason?	0

Reasons for Disliking P.E.

There is obviously no great weight of dissatisfaction with P.E. and this would seem to be in accordance with previous findings.

TABLE 14

BOYS (N=20)		GIRLS (N=18)	
Cross Country	8	Cross Country	10
The weather	7	The weather	8
Doing it with the girls	2	Doing it with the boys	1
Having to get changed	2	Having to get changed	1
Things we do	2	Forced to do it	1
Some other reason?	0	Things we do (Netball)	1
		Being ridiculed	1
		Some other reason?	0

Reasons for Disliking Games.

Again there is a clear picture of the negative effects of Cross Country and being outside in the cold - a response which is entirely consistent with previous interview findings.

By using "Likes" and "Dislike" and appropriate reasons, a double check is apparent on the answers of the children. The overall findings, discussed later can, it is felt, be accepted with some confidence.

4.417 Avoidance tactics

If the few negative attitudes towards P.E. and Games are to be translated into reality, a simple observation of avoidance behaviour might present insights.

A simple theoretical question was therefore posed as to whether there was any policy of avoidance tactics evident in operation amongst the children.

To this end, excuse notes for P.E./Games were logged and absences scrutinised to highlight any pattern coinciding with the days when P.E./Games appeared on the timetable. In the event neither avenue of investigation produced any positive evidence.

At the end of the first in depth interview children were asked whether they had ever "wagged it" from P.E./Games and if so how.

As a result of comparing what had been said by (anonymous) children and the experience of staff, some dubious responses were revealed with some children not admitting to avoiding P.E. without a valid reason. Hence the technique, in which the interviewer assumed guilt and merely asked for confirmation of the method used, was adopted, with very good results, at the end of the second indepth interview. As a result children who had previously claimed innocence revealed their avoidance tactics. It could be argued that this had as much to do with an increased level of confidence in the interviewer as confidant as with improved questioning technique, but the interviewer feels the latter reason to be more valid in this context.

TABLE 15

	BOYS (N=20)	GIRLS (N=18)
P.E.	8 (40%)	10 (55.55%)
GAMES	11 (55%)	7 (38.88%)
NEVER	9 (45%)	6 (33.33%)

Incidence of Avoidance of P.E./Games on some Occasions.

Surprisingly high percentages of children revealed involvement in avoiding P.E./Games at some stage. The reasons offered for avoidance are presented in Tables 16 and 17

BOYS	GIRLS
Did not want to do it (3)	Felt too tired (1)
Teacher always shouting at me (1)	Knew having apparatus out and was frightened of it(1)
Wanted to avoid certain activities e.g. Press ups; boring lesson; dodgeball (3)	Wanted to stay in class-room with friend (1)
Neck hurt (1)	Did not want to do it (2)
	Did not feel in mood for P.E. (1)
	Hate P.E. (2)
	Wanted to avoid stretching (1)
	Try it on once every three weeks - invent a new excuse each time (1)

TABLE 16 Reasons for Avoiding P.E.

BOYS		GIRLS	
Cold weather	(8)	Tried to avoid X/C	(3)
Avoiding X/C	(3)	Hate games	(2)
Did not want to do it	(1)	Did not like the cold	(2)
Raining	(1)	Had a "bad head"	(1)

(N.B. Some pupils avoided Games more than once by offering different excuses each time)

TABLE 17 Reasons for Avoiding Games.

Having elicited why they avoided P.E. and Games the children were then asked the method by which they avoided participating. These methods are presented in Table 18

EXCUSE OFFERED	BOYS	GIRLS
Said had forgotten kit	10	4
" " twisted ankle	1	1
" " stomach ache	1	
" " injured leg	2*	1
" " ear ache		1
" " hurt finger		1
" " dirty kit		1
Said felt sick		1
Persuaded mother to:		
- phone school with false excuse	1	
- write false excuse note	2	

[* Excuse offered by one of best footballers in the school]

TABLE 18 Table of Excuse Offered to Avoid P.E. and Games

Of the reasons for avoiding P.E. there is a certain variability - whim almost - whereas Cross Country and the cold weather emerge more strongly in the list of reasons for avoiding games.

In respect of methods, only three involved knowingly or unknowingly the support of parents - all others were unsupported excuses "tried on" by the children. To their credit, staff were quite adept at trapping malingerers and the usual pattern appeared to be for the children to try it on and then find themselves forced to participate. Overall what proved most surprising was the admission of outstanding, or at least better than average, performers that they had tried to avoid P.E./Games at some stage and on some pretext.

By way of follow up, all the cohort were asked whether they would participate in P.E./Games if it were optional.

TABLE 19

		BOYS (N=20)	GIRLS (N=18)	
P.E.	Yes	20	Yes	13
	No	0	No	5
GAMES	Yes	18	Yes	13
	No	2	No	5

Participation in P.E./Games if it were Optional

Certain reservations were expressed.

Viz: The two boys who voted not to do Games would agree to participate if a) Cross Country was abolished, and b) there was just Hockey instead of a combination with Football. One boy who had said 'Yes' to Games would only participate if the weather was warm.

The three girls who voted 'Yes' to Games would likewise only do so on condition that Cross Country was abolished. One girl in a similar position expressed reservations about her participation in cold weather. One girl who preferred not to participate in Games would do so if there was no Cross Country.

Interestingly, one hundred percent of the boys would choose to participate in P.E., while some of the "non participant" girls expressed reservations about apparatus sessions; the climbing frame being too high and their having a belief that they were poor performers.

4.418 Holiday activities

Whilst it was always the intention to study the children's activity patterns during term time, it was felt that a complete picture could only be gained if some simple guidelines could be presented for holiday periods.

The most obvious thing is that the Clubs continued, but many evening activities were brought into the day. In addition, a large number of children - 59% of girls and 49% of boys went on holiday playschemes that were based around physical activity.

A large number of children appeared to seek well organised activity. None claimed to have been pressurised by parents into attending - rather the impetus came from favourable comments of friends and the fact that in attending they would be in each other's company; from favourable impressions gained on previous playschemes and as a result of the variety of activities on offer.

Literature appears to indicate that boys are more active than girls but in this instance participation by girls is 10% higher - could it be that parents regard the playscheme as particularly 'safe' and well organised as to be worth patronising, or possibly that girls of this age affiliate more.

As this area is not to be studied further, it is perhaps worth noting a number of the responses.

1. (Very Active Girl) "I went to thePlayscheme... did Swimming, Hockey, Unihoc, Basketball, Football, Rounders, Cricket, Races, Tennis. I did it for two weeks.....I'd been encouraged to go by friends who d been previously."
2. (Active Boy) "I went after my younger sister had already joined in and found it good fun. At first I didn't think I'd like it but did and would go again. We did Trampoline, Swimming, a bit of Basketball, "Pirates" and generally joined in with all the other things."
3. (Active Girl) "I went to theScheme and stayed for a couple of weeks. I got the idea from leaflets given out in school - it appealed. Did Swimming, Table Tennis, Trampolining, Rounders, Football, Disco and "Pirates". The soccer was all boys except for two girls - me and H. (Refers to Subject 1 above) I'm reasonable at Football 'cos I've played in the back garden with my brother who's twelve now."
4. (Inactive Girl) "...Went to every morning for two weeks and did mainly badminton and tennis."

5. (Active Girl) "...Went to the Playscheme for three weeks. (Course lasted two weeks in reality) Went on the ponies, swam nearly every day and there was Gym or Hockey. It was good fun. I like the water now but I used to be scared of it. There were lots of friends to play with."
6. (Moderately Active Girl) "I attended the scheme. Played Tennis, went Swimming, to the barbecue, Disco, watched a film, played Badminton and Rounders.Say if you have a P.E. lesson, you have to have half an hour of it or an hour for Games. With Tennis you could stay there if you wanted to carry on over an hour. If you wanted to go you can (*sic*) go after about ten minutes. With Games you've got to carry on with it - sometimes it gets boring if you don't want to do it."

By way of validation, the names of children claiming participation in the Holiday Playscheme were checked with the Playscheme leaders, who confirmed their involvement without exception. Such confirmation lends support for the author's view of the basic honesty of children.

4.419 Children's perceptions of activity in different situations

It was considered useful to discover some information as to children's perception of activity. This has rather more to do with gaining a feel for children's perceptions of activity and is not a case of in any way attempting to set a common benchmark and compare like with like.

The majority of children had during interview expressed largely unfavourable comments about the brief warm up run which preceeded most Games lessons outdoors, but were observed to be as active, in terms of running, when in the playground.

As it is generally accepted that playtime activity is significant enough to have developmental effects on children, it was decided to ask children about their perceptions of running about in the playground at playtime as compared with a games lesson. They responded as follows.

PERCEPTION	BOYS (N=20)	GIRLS (N=18)
"Easier" to run in the playground	12	16
"Easier" to run in Games	3	2
Undecided	5	0

Comments which were made proved enlightening.

- "When running around in the playground you haven't got your mind on the fact that you're running - you just like play the game, concentrate on the game. When you stop you're not even short of breath - you do it, it's like walking, you do it automatically whenever you're in the playground." (Girl)
- "Cross Country's not a funny game - you can't run everywhere when you do Cross Country - it gives you stitch." (Boy)
- "You know when you can stop if you want to." (Boy)
- "It's easier running in short bursts." (Boy)
- "It's easier in the playground - you don't have to go where the Teacher says and you can stop when you want to." (Girl)
- "Cross Country's boring - a game like chase or wall to wall makes you run faster and not get breathless. It feels shorter." (Girl)

- "In the playground you don't think of being tired - you're with friends and having a lovely time." (Girl)

This brief insight leads inevitably to the conclusion that playground activity deserves more careful scrutiny.

4.50 RESULTS OF PLAYGROUND OBSERVATION

4.51 GENERAL OBSERVATION.

It was felt necessary to spend five playtimes merely becoming familiar with the playground environment and the problem of observation.

The initial observations were of the gross sort to identify the sort of activity played, allied to confirmatory talks with children.

The range of activities recorded throughout the total observation period was enormous. See Table 20 below.

Action Force	Rounders
"Aggro Box"	Scarves
Aki	"Scraps"
Cat and Mouse	Stuck in the Mud
"Chopper"	Throw and Catch
Dodge ball	Tig
Football	Tig and Torture
Foxy	Tig off Ground
Hare and Hounds	Tig on Lines
Hide and Seek	Trains
Hopscotch	T.V. Games
London	Wall to Wall

TABLE 20 Table of all Playground Activities Observed.

During these general observations, certain major factors were identified and confirmed as being valuable for the more detailed study.

1. Location of Activity.
2. Type of Activity and Frequency.
3. Weather categories.
4. Stationary to Active (A major interest).

4.52 Location of activity

The first thing that became apparent in any attempt to observe the type of activities involved was that patterns emerged. That is to say that if the Fourth Year played Football it always took precedence and occurred in the netball court immediately alongside the canteen and kitchen. Other games were restricted in that they required a wall or the provision of lines. Clearly, games that involved large numbers and special areas forced other games and stationary children into certain positions.

A typical playground pattern is shown in Figure 3.

Despite the fact that activity changes, Years tended to have their own territories, although these were loosely bound.

In contrast to Figure 3, Figure 4 shows a variety of Third Year Games.

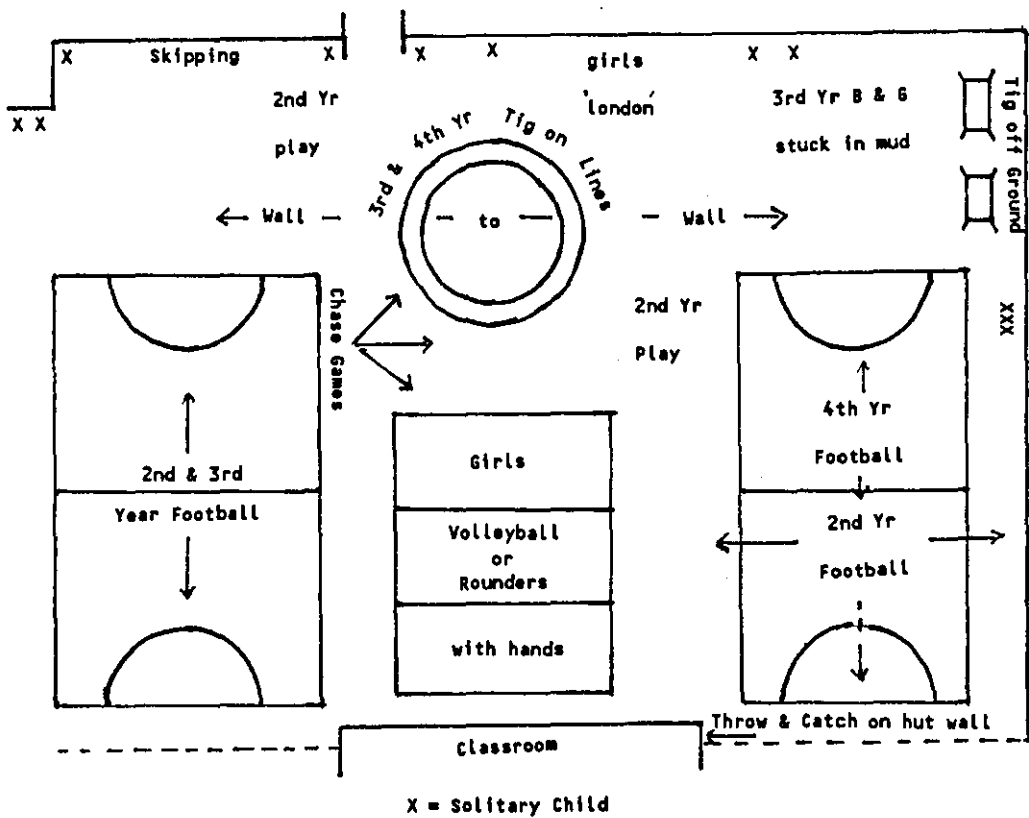


Fig 3 Typical Pattern of Playground Activity by Location.

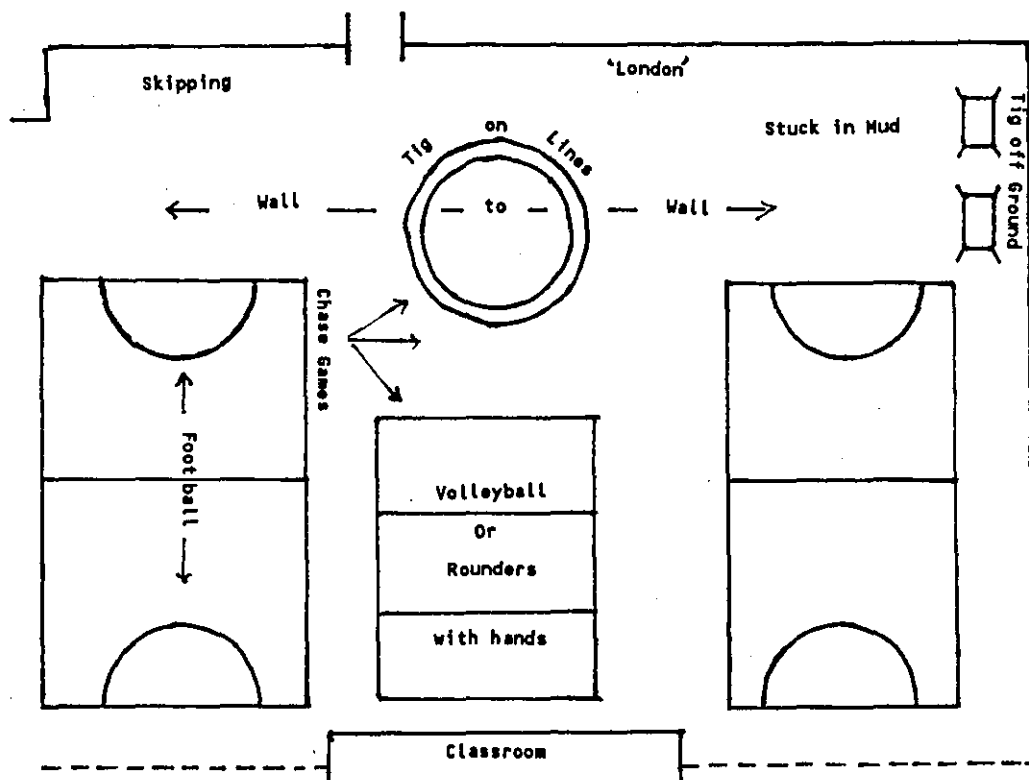


Fig 4 Activities and Territory as Normally Occupied by Third Years

This territorial and activity pattern made observation of Years and individuals relatively easy after some practice because the observer "knew" where to find a person.

Of course the implication is that the playground itself is influencing the sort of activity occurring and as will be shown later, a considerable amount of activity can occur. Thus very careful thought as to playground design might contribute much to the recent desire to produce healthy active children.

4.53 Type of activity and frequency

In the informal practice observations one of the simplest things was to record quite generally what activities were occurring. See Table 21 overleaf.

It is significant that in seven observations the children were recorded as playing football, indicating this to be the most popular "mass" activity.

TABLE 21

ACTIVITY	PLAYTIME - A.M./P.M. & DATE.						
	A.M.	P.M.	A.M.	P.M.	A.M.	A.M.	P.M.
	4-2	4-2	5-2	5-2	19-2	18-3	18-3
Football	/	/	/	/	/	/	/
Slam						/	
Tig	/			/		/	/
Tig & Torture	/				/	/	
Tig off Ground				/	/		/
Tig on Lines					/	/	/
Mock Fights		/	/	/			/
Wrestling	/	/	/	/		/	
Wall to Wall			/		/		/
Chase Games	/	/	/	/		/	
Horse & Jockeys			/				
Breakdancing			/				
Skipping						/	/
Throw & Catch						/	
Volleyball						/	
American F'ball						/	
Cricket with hands						/	
Foxy						/	
Stuck in Mud						/	/

Type of Activity and Frequency Observed during Playtime

4.54 Weather

There is a rule in the school, unquestioned by the children, that they go out at playtimes and lunch breaks. Observation of a number of playtimes with different weather conditions seemed to indicate that if it was windy or extremely cold, children played active games. Conversely they appeared to become more stationary in warm weather, as might be expected. It was not the intention of this study to examine this in any detail, but may be of interest to the reader to note the averages presented in Table 22, albeit that they were based on limited observations.

TABLE 22

	COLD & WINDY	COLD	DRIZZLE	WARM
Average Number of Stationary Children	3.4	3	2.71	5.54
Average Number of Children Stationary in Groups	7	20.23	24.5	28.15

Average Numbers of Children Observed to be Stationary Relative to
Weather Conditions during Playtime

Of perhaps more validity is the fact that when asked independently, the staff who had all undertaken playground duties over a considerable number of years, had all noticed the phenomenon.

This was taken into consideration when sampling playtime activity and might form the basis of further study.

4.55 Stationary/Active

The major aim of this study is to identify the actual activity patterns of young children with the intention of gaining some insight into contributory factors for fitness. Therefore the major concentration was on the contrast between the stationary and active child.

It became apparent that waves of activity occurred across the observation. At other times a fairly stationary playground suddenly burst into activity. It was decided that mere observation would be far too general to be of use and so a more structured logging procedure was designed.

4.56 Results of Logging Procedures

With the insights gained into the major forms of activity occurring five categories were identified.

1. Standing alone.
2. Standing in groups.
3. Football (and team games).
4. Tag games.
5. Chase games.

At first only the first two categories were assessed. In total four fifteen-minute playtimes were carefully monitored. Whilst it was impossible to count every child, by checking approximate attendance and children remaining within the school building, it is with confidence that between 235 - 285 children were in the playground. Each minute, the observer scanned the children and counted those who were standing still alone or in groups. (A child who stopped as part of a tag game was not included, for example. i.e. The behaviour classification was "standing still" rather than the actual movement pattern.) This was not as difficult as might be supposed in that the children

stood around the periphery because the central part of the playground was swept by action. With this in mind it was felt that boys and girls could be recorded separately.

PLAYTIME 1 (A.M.)					PLAYTIME 2 (P.M.)				
MINUTE	ALONE		GROUPS		MINUTE	ALONE		GROUPS	
	BOYS	GIRLS	BOYS	GIRLS		BOYS	GIRLS	BOYS	GIRLS
1	0	2	6	26	1	1	3	3	8
2	1	0	17	21	2	0	7	3	19
3	0	0	5	26	3	1	3	4	28
4	0	2	11	14	4	1	4	5	20
5	0	2	15	14	5	2	4	17	14
6	2	3	11	13	6	2	5	19	20
7	2	5	7	13	7	1	4	7	14
8	2	3	9	17	8	1	4	12	19
9	2	2	8	20	9	1	5	13	16
10	3	2	13	18	10	2	4	9	18
11	1	2	8	20	11	1	4	16	21
12	2	3	8	16	12	3	3	11	18
13	1	3	12	17	13	2	4	10	22
14	-	-	-	-	14	-	-	-	-
15	-	-	-	-	15	-	-	-	-
Total	16	29	130	235	Total	18	54	129	237

Av'ge 1.23 2.23 10.00 18.07 Av ge 1.38 4.15 9.92 18.23

Average			Average	
Child(ren)	3.46	28.07	Child(ren)	5.53 28.15

Number of Children		Number of Children	
Stationary at any	31.53	Stationary at any	33.68
One Time		One Time	

TABLE 23 Average Numbers of Boys and Girls Standing Alone or in Groups during Playtime

PLAYTIME 3 (A.M.)					PLAYTIME 4 (P.M.)				
MINUTE	ALONE		GROUPS		MINUTE	ALONE		GROUPS	
	BOYS	GIRLS	BOYS	GIRLS		BOYS	GIRLS	BOYS	GIRLS
1	1	1	6	0	1	-	-	-	-
2	0	0	2	4	2	1	1	2	17
3	0	1	4	8	3	3	4	0	4
4	0	1	3	12	4	1	6	2	18
5	0	8	0	8	5	3	3	4	20
6	0	0	3	22	6	2	0	6	9
7	3	4	2	18	7	2	6	8	2
8	3	0	5	12	8	0	0	0	0
9	1	6	0	15	9	9	2	3	8
10	2	1	0	19	10	1	9	2	14
11	1	0	4	24	11	1	3	8	20
12	1	0	7	18	12	0	1	5	18
13	1	2	2	23	13	0	0	5	28
14	3	5	6	18	14	0	5	5	13
15	0	2	3	29	15	-	-	-	-

Total	16	31	47	230	Total	23	40	50	171
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Av'ge	1.06	2.06	3.13	15.33	Av'ge	1.76	3.07	3.84	13.15
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Average			Average	
Child(ren)	3.12	18.46	Child(ren)	4.83 16.99

Number of Children		Number of Children
Stationary at any	21.58	Stationary at any
One Time		One Time
		21.82

TABLE 24 Average Numbers of Boys and Girls Standing Alone
or in Groups during Playtime

Quite clearly the girls are more sedentary. However, the numbers stationary are very small when considered against a sum total of 235-285. i.e. 31.53/33.68/21.58/21.82. In other words only around one in ten children were not involved in some "activity" involving movement.

A further four playtimes were observed to record the number of and frequency with which popular games occurred.

TABLE 25

Playtime	F ball %		Chase Gms %		Tag Gms %		W to W %	
	No:Gms	Time	No:Gms	Time	No:Gms	Time	No:Gms	Time
1	2-3*	100%	1-5	93%	1-4	66%	1-2	100%
2	3-6	100%	1-2	100%	1-2	77%	Not obsvd	
3	2-3	100%	Nil		2	43%	Not obsvd	
4	4-5	100%	1-3	46%	1-2	92%	Not obsvd	

Footnote: * At any one time during playtime there were at least two games of Football occurring and sometimes three.

W to W denotes Wall to Wall .

The Number of Named Activities Occurring at Any One Time During the Sample Period and the Percentage of the Sample Time in which the Game could be Observed

TABLE 26

Game and Playtime		No: of Sample Periods (Minutes) in which Games Occur		Range of Games
		Boys	Girls	
Football	1.	15/15	0/15	2 - 3
	2.	13/13	5/13	3 - 6
	3.	15/15	0/15	2 - 3
	4.	12/13	11/13	4 - 5
Wall to Wall	1.	15/15	11/15	1 - 2
	2.	Not recorded		-
	3.	Not recorded		-
	4.	Not recorded		-
Chase Games	1.	14/15	7/15	1 - 5
	2.	8/13	12/13	1 - 2
	3.			Nil
	4.	5/13	6/13	1 - 3
Tag Games	1.	10/15	4/15	1 - 4
	2.	3/13	10/13	1 - 2
	3.	5/14	5/14	1 - 2
	4.	8/13	12/13	1 - 2

Duration and Frequency of Specified Games during
Playtime Observation

Quite clearly, not only does Football occur at most times during playtimes but often three games are taking place at one time. It is worth noting that these games often overlap and indeed may be at right angles to one another without undue interference. This was indeed true of the Fourth Year who clearly had established

their own pitch, but who happily accommodated the Second Year playing at right angles across its base.

Throughout the total observation, and within these particular samples, it became apparent that many activities were equally played by boys and girls, e.g. tag and chase games. But Football always involved many boys, and occasionally had a surprising number of girls. It should be said, however, that these girls were principally Fourth Years who joined in whenever a Fourth Year game was in progress.

4.57 Summary.

Using the broad category of standing still or being in an active game gives gross insights into the child's activity patterns but does not really help the absolute measure of how active the child is physiologically.

A game of Football, for example, is classed as active, but we know that children are still, if only for a second or two. The question was asked - "Is there any way in which we can categorize activity and stillness more accurately?" This seemed to require crystalization of a moment in time.

A more sophisticated technique seemed necessary.

4.60 THE PHOTOGRAPHIC RECORD

4.61 Procedure Check - Calibration of Photographs

Four test films were shot initially in an attempt to refine the procedure into a workable model, and a detailed outline of this is contained in Chapter 3.

The first three films were concerned with test subjects moving in predetermined and strictly controlled directions at a variety of specified speeds, so that all combinations of these factors could be assessed for their ability to predict activity/movement through blurring of the subject in relation to a variety of aperture and shutter speeds.

Following extensive analysis of the exposed negative film and discussion with a professional photographer, a fourth test film was shot on a "full" playground using a different speed film at a narrow aperture setting of f2 and a combination of shutter speeds below one second.

This produced the required phenomenon whereby stationary children showed up well, but more active children "ghosted out".

Plate 4 illustrates this phenomenon.

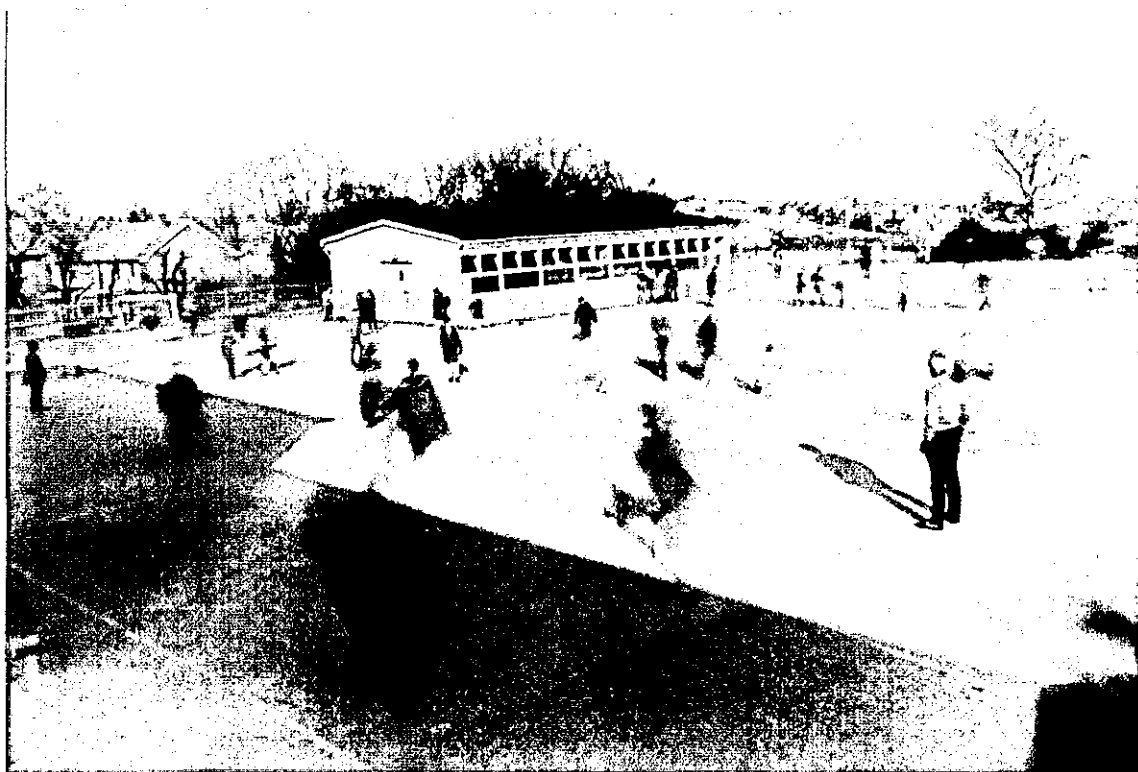


PLATE 4 "Ghosting Out"

N.B. It must be born in mind throughout this section that analysis of the exposed film was undertaken in its negative, rather than printed, state permitting enlargement, overlaid on a grid, to a size which as a print would have been a) commercially difficult, and, b) prohibitively expensive.

A second procedure in which two cameras were used in tandem to take two simultaneous photographs was adopted and refined over a further three playtimes.

By way of illustration, below are "before" and "after" photographs indicating an example of each of the initial and refined techniques



PLATES 5 & 6 Examples of Initial Tandem Photography



PLATES 7 & 8 Examples of the Refined Technique of Tandem

Photography

With the technique sufficiently refined it was now felt appropriate to progress to the real business of photographic analysis of playground activity.

4.62 RESULTS OF PHOTOGRAPHIC ANALYSIS

Approximately thirty exposures were taken at a rate of one per thirty seconds for the fifteen minutes of playtime. (Playtime normally varied between 13-16 minutes because bells were rung manually.)

This was done on six separate occasions and therefore approximately one hundred and eighty pairs of photographs were taken. Plates 9 & 10, which follow, show the sort of information gained.



No: of Children in Frame - 109 Stationary Children - 23

PLATES 9 & 10 Example of Tandem Exposure to Facilitate Activity

Analysis

The average number of children in each photograph during each playtime was calculated based on the thirty (approximately) sample units. The standard deviation was also calculated to give some idea of the range. This information is presented in Tables 27 & 28.

TABLE 27

Playtime	Total Children in Sample		Stationary Children Sample	
	Mean	Std:Dev ⁿ	Mean	Std:Dev ⁿ
1.(AM) 12-3-86	72.33	9.94	36.78	10.73
2.(AM) 14-3-86	81.79	14.72	34.68	5.87
3.(AM) 17-3-86	60.61	8.91	27.67	6.40
4.(AM) 19-3-86	85.71	9.69	30.60	6.61
5.(LCH)19-3-86	95.44	6.40	35.20	5.91
6.(PM) 19-3-86	96.52	6.89	41.48	6.31

Number of Children in the Playground Sample, Total and Stationary

TABLE 28

<u>Playtime</u>	<u>Mean Percentage</u>	<u>Mean Percentage</u>
	<u>Activity</u>	<u>Inactivity</u>
1.(AM) 12-3-86	49%	51%
2.(AM) 14-3-86	57%	43%
3.(AM) 17-3-86	54%	46%
4.(AM) 19-3-86	65%	35%
5.(LCH) 19-3-86	62%	38%
6.)PM) 19-3-86	57%	43%
X	57%	43%
S.D.	5.19	5.53

Percentage of Children Active and Inactive in Six Selected
Playtimes

Footnote: All these playtimes were in March - a period of the year which usually offers moderate and variable weather (as in this case). Readers must note that small changes might occur in extreme weather conditions.

Whilst there is some variation in the number of children appearing in each sample playtime, the low standard deviations indicate that this sample area had a fairly constant number of children throughout time.

More important is that the percentage of stationary children remains fairly constant around a mean of 43%, with again a very small standard deviation - 5.53.

This was surprising particularly as the weather conditions varied between the decidedly cool and the sunny and pleasant. It would appear that at this detailed level weather is making less impact.

4.63 SUMMARY OF MOVEMENT/STATIONARY PERCENTAGE

As expected, the percentage of stationary children in this situation, i.e. to include those momentarily stationary within a game, is much higher when compared to the behavioural categorization of stationary meaning a "still condition".

In fact the sample period for the logging was fractionally colder than the sample period for the photography, but if anything this would maximise the difference.

Even so, the converse that children are moving over half the time is significant, when one considers normal patterns of behaviour.

Clearly a more longitudinal study could focus on detailed changes such as the weather, time of year, etc., which were not within the scope of this work.

The observations to date have produced a picture which implies that children are involved in various physical activities at this age and seem to hold a healthy attitude towards that activity (as established by the interviews).

Further, the number of children in any one sample taking part in an active pastime at playtime is surprisingly high (established by logging).

When the moment is crystalised, the number of children who are active (meaning, in any form of movement) is still usually above fifty percent.

The picture so far is that at least some form of exercise is occurring with a large percentage of children - the Health Related Fitness lobby may be well pleased, but there is still the question as to whether this form of activity is having a significant effect on the physiological systems of the child. This can only be assessed by moving towards a physiological measure of some sort.

4.70 THE PHYSIOLOGICAL PATTERNS OF SELECTED CHILDREN AT PLAY.

The results of the Heart Rate Monitoring, recorded every five seconds, were entered into the Minitab Programme as beats per minute. The results were then processed in units of a ten beat interval. e.g. The percentage time between 90 and 99 beats per minute. The results of this overall analysis are presented in Table 29, which represents twenty one playtimes.

It can be seen from this Table that:

i) There appears to be a gender difference in the percentage time spent above the threshold target heart rates.

ii) This was the case irrespective of the threshold being established at 140, 150 or 160 beats per minute.

iii) Boys spent a greater percentage of time than girls at heart rates in excess of target thresholds at 140, 150 and 160 beats per min.

iv) The percentage difference varied between 35% and 47% and was greatest in the range above 160 beats per minute.

v) Conversely, the percentage time spent by both sexes below the minimum threshold of 140 beats per minute was comparatively high at 77.4% (boys) and 85.4% (girls) respectively.

These twenty one playtimes in which individuals were recorded, were in fact fourteen children monitored on one occasion and seven of those monitored on a second occasion. The reason for these samples has been explained in the Procedure.

TABLE 29

HEART RATE INTERVALS	% TIME	
	MALE (n=10)	FEMALE (n=10)
60-69	0.2	0.0
70-79	1.3	0.6
80-89	7.9	8.2
90-99	15.5	14.1
100-109	19.6	21.8
110-119	11.3	19.4
120-129	10.2	14.6
130-139	11.3	6.9
140-149	6.4	4.0
150-159	5.3	4.7
160-169	3.3	3.6
170-179	2.3	2.0
180-189	1.6	0.1
190-199	3.0	0.0
200-209	0.8	0.2
210-219	0.1	0.0

Percentage time spent within specified ranges
of heart rate of 11 year old boys and girls
during playtime

There was no attempt to use the retest as a calibration tool as it was expected that the children's playtime activity might vary. Nevertheless comparison between the two scores of the children is of interest and is given in Table 30.

It is quite interesting to note that:

i) While one girl produced a broadly similar profile of comparative inactivity between the two playtimes, the other children showed variations.

ii) Two of the boys were more active during the retest, (one considerably more so).

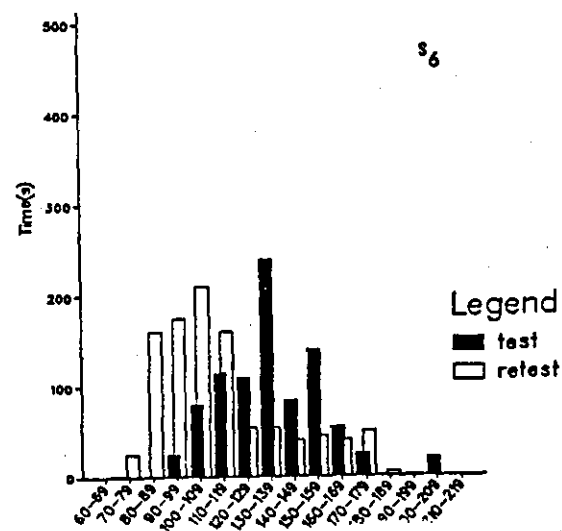
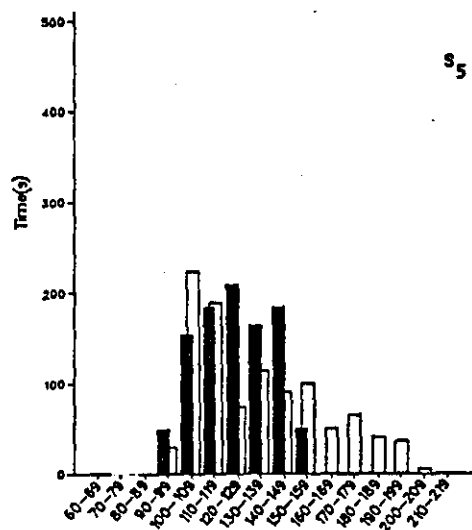
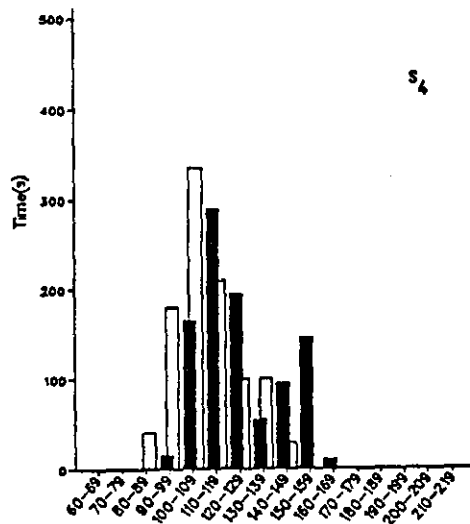
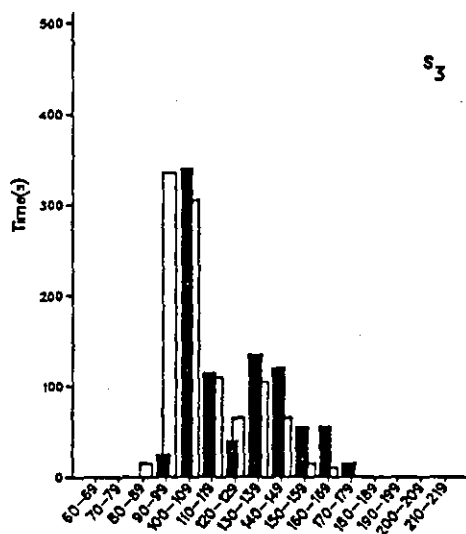
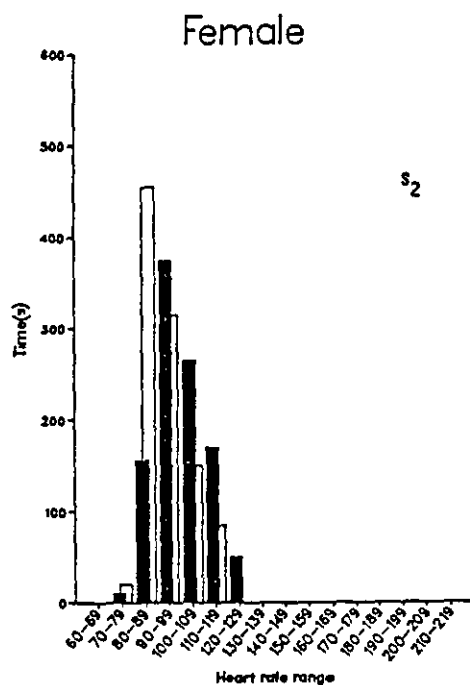
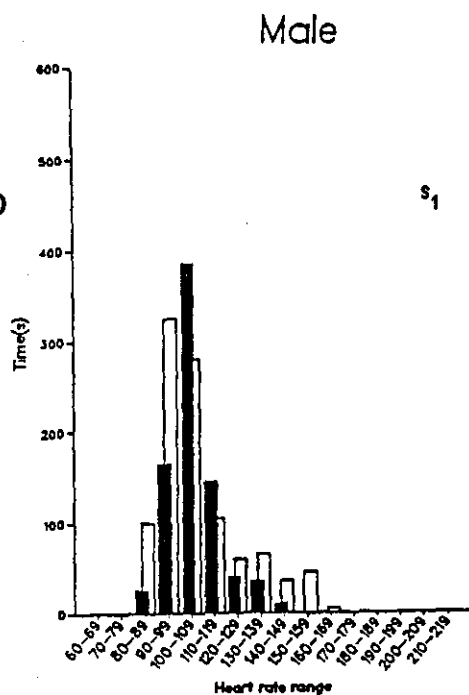
iii) Conversely, two of the girls were more active during the initial test playtime.

iv) By and large, the girls were less active during the retest.

v) All but one child recorded a heart rate in excess of the 140 beats per min. threshold, for both playtimes, albeit briefly, in some instances.

vi) From the evidence thus presented, it is not possible to draw any conclusion as to the comparative activity/inactivity of boys *vis à vis* girls.

TABLE 30



The Distribution of Heart Rate Scores during Two Separate Playtimes for Selected 11 year old Children (N=6)

Although the sample of fourteen children was randomly selected it did include four children who had been classed as being of low activity and five who had been classified as highly active.

The results of four of these children, who had been variously assessed as active, inactive, fit and unfit have been isolated to look for any major signs of difference. No attempt has been made to statistically test this difference as the study was not designed for this purpose. Nevertheless Table 31 does indicate that:

i) The fit child shows lower heart rates than the unfit child.

ii) This could be a function of their indulging in less strenuous activity than the unfit child, or indicate that because they are fit they benefit from a comparatively lower heart rate throughout the exercise range.

iii) By contrast, the unfit child is more likely to show a more elevated heart rate when indulging in exercise and hence could be erroneously perceived as being more active than the fit child. Rather, there is perhaps a need to consider this variable when making comparisons.

iv) The inactive child recorded heart rates well below the 140 beats per min. threshold, with the majority of time being spent in the 80-89 beats per min. band.

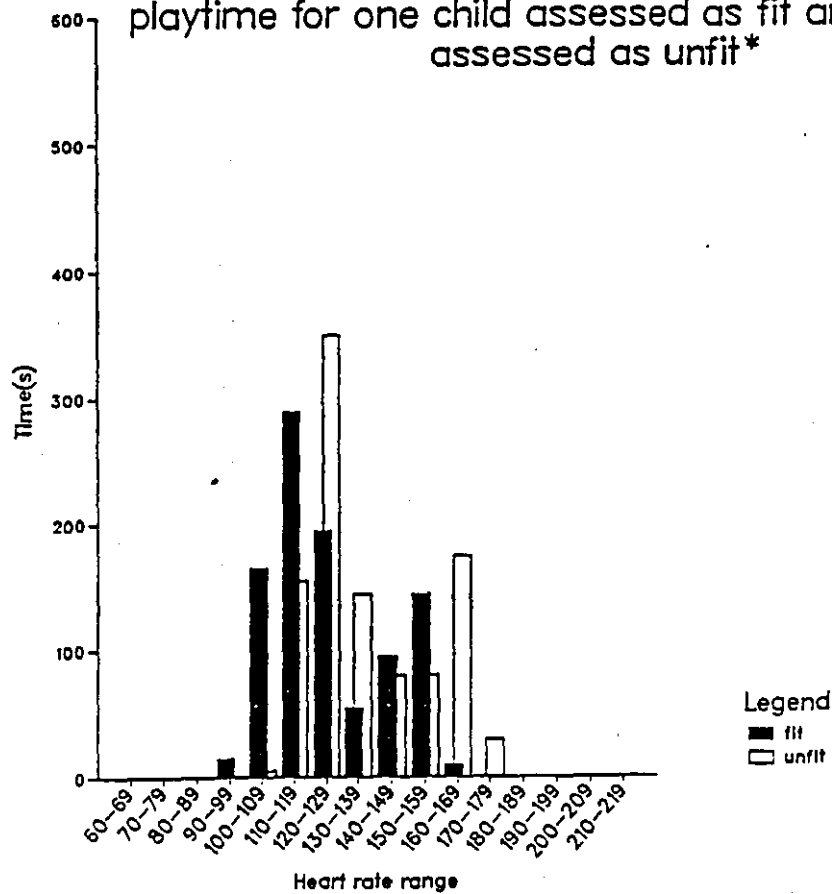
v) By contrast, for the active child some 80% of the recorded heart rates were above the 140 beats per min. threshold.

vi) The active child would appear to have been very active during the playtime and to have been indulging in high intensity exercise.

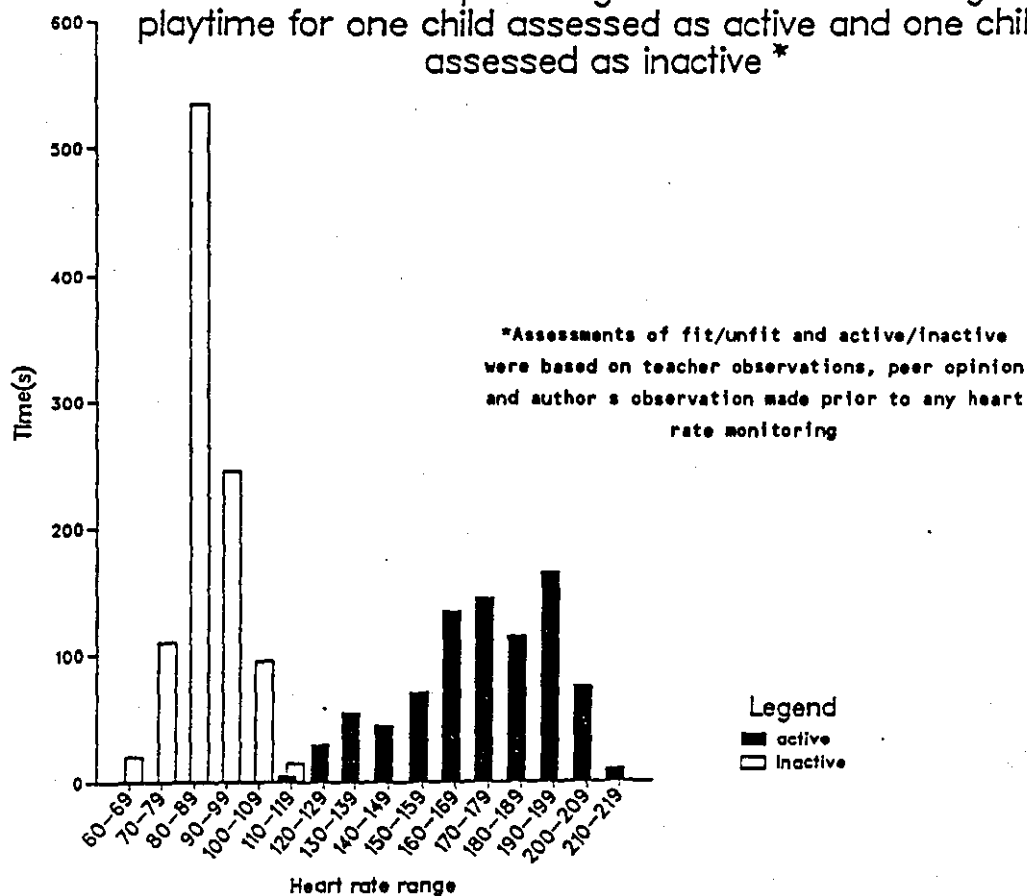
vi) It is a moot point as to whether children are active because they are fit, or fit as a result of being active.

Perhaps this latter point would be of interest for further study.

TABLE 31 Amount of time spent at given heart rates during a playtime for one child assessed as fit and one child assessed as unfit*



Amount of time spent at given heart rates during a playtime for one child assessed as active and one child assessed as inactive *



Because there was always an intention to imply that activity may well be having a fitness benefit, it was decided to look more carefully at the percentage time above 140 beats per min. which Simons-Morton, et al, (1988) concluded that a significant fitness effect could be expected. Given that other researchers have set differing threshold limits of 150 b.p.m. (Verschuur and Kemper, 1985) and 160 b.p.m. (MacConnie, et al, 1982), percentage time for these thresholds is also given for the purpose of permitting comparison.

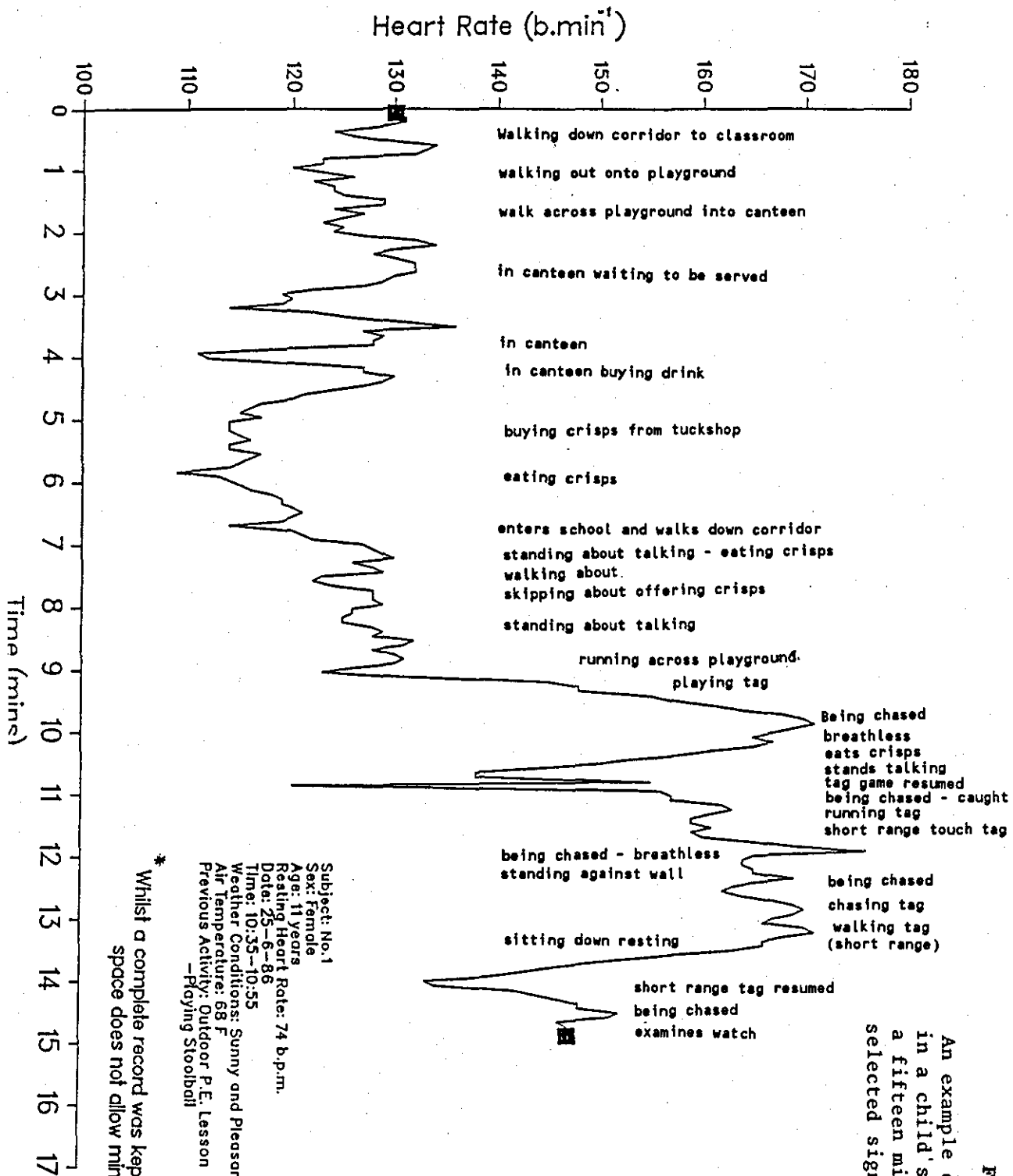
TABLE 32 Percentage time spent above target heart rates by 11 year old boys and girls during playtime

Heart rate Intervals	% Time	
	Boys (N=10)	Girls (N=10)
140 +	22.8	14.6
150 +	16.4	10.6
160 +	11.1	5.9

4.71 ACTIVITIES ASSOCIATED WITH PARTICULAR HEART RATE MEASURES.

If teachers and interested people accept that it is valuable to elevate children's heart rates above 140 beats per minute at least for some part of the day, it is inappropriate to say "Run", when there are activities already favoured by children which cause this to happen naturally. If we know what these are, we can by playground design; inclusion in Physical Education lessons, promote their incorporation into children's play.

To enable this to happen, a log of each individual child's activity was taken at twenty second intervals and superimposed onto the graph of their heart rate. An example of such a graph is illustrated in Figure 5.



* Whilst a complete record was kept of all behaviour, space does not allow minute detail

An example of the fluctuations in a child's heart rate during a fifteen minute playtime with selected significant* activities

Figure 5

The activities which seemed to cause the heart rate to move into the area of 140 beats or more per minute are listed below.

i) Football (when actively involved rather than on the periphery of the game)

ii) Tag games like Wall to Wall, Touch Tag, Chain Tag, Line Tig, Tig and Torture, Stuck in the Mud, Tig off the Ground etc

iii) Chasing games. In the main these are essentially similar to Tag games since they both involve some element of chase and capture by either touching the other child or physically restraining them.

iv) Running

v) Sprinting

vi) Fighting (e.g. Horse and Jockeys).

The activities which seemed to cause heavy loading of the cardiovascular system i.e. 170 plus beats per minute, are listed below.

i) Most Tag and Chase games

ii) Sprinting (i.e. running flat out as distinct from merely running about).

Overall, the picture seems to be that not only does a considerable amount of activity occur in the playground, of this school at least, but a good percentage of this activity causes the elevation of heart rate into an area which can be beneficial.

There is of course a real need to ensure that playtime remains "play" but those interested in children's fitness might well

consider how they can ensure that some of the play, at least, has this beneficial effect.

5.10 Introduction

There is almost general agreement that children should be more active. Concern has been expressed about both the nature of Physical Education in schools and opportunities to play outside of curriculum time. An oft declared aim of P.E. is the encouragement of youngsters to have positive attitudes towards physical activity as well as be active (Almond, 1984; Fox, 1984; Taylor, 1985), and yet children are perceived to be inactive. The overwhelming weight of evidence concerning children's activity patterns appears to point towards children being progressively less active with age, for girls to be less active than boys, and for activity to be generally below the threshold for any significant improvement in aerobic capacity. Various reasons have been advanced, such as a lack of motivation (Shephard, 1982), for instance.

This study had five major aims which were to:

1. To describe the activity patterns of children aged 10-11 in a typical school.
2. To discover the attitudes of upper primary children to physical activity.
3. To consider the relationships between attitudes and physical activity.
4. To identify the factors influencing the activities and attitudes of children.
5. To suggest means of improving activity and attitude in children of this age.

The literature clearly indicates that P.E. has been looked at fairly carefully. General activity patterns have been reviewed by certain authors and whilst recognising these, this Paper elicited the general activity patterns and attitudes of a sample of upper primary children by interview. It then focussed on activity patterns at Playtime; a period of time which is common to all school children and which is less affected by social class. Whilst it is recognised in the literature that such factors as social class and self esteem can affect attitudes and activity patterns, this was not regarded as a problem since the children involved came from a cross section of backgrounds.

The school used in this study was selected because it was a mixed sex state school with 285 pupils aged 8-12 on roll divided into roughly equal numbers of boys and girls. The catchment area from which the school drew its pupils contained a large council estate as well as private housing and therefore ensured a mixture of children from working class and middle class homes.

In order to focus accurately on playtime activity, it was thought crucial to gain background information on the children's activity patterns in general, their attitudes to P.E. and physical activity, as well as discover the relationships between attitudes and activity, and the agencies operating or influencing the activities and attitudes of children. On the basis of the information gathered suggestions will be made concerning possible ways of enhancing children's activity patterns and attitudes to physical activity.

To this end, a variety of techniques were employed such as interviews, observation, tabulated logging, photographic analysis, and heart rate monitoring. In the case of photographic analysis, a quite new procedure was devised.

Many previous authors had used questionnaires to elicit information about activity patterns and attitudes in general (Dickenson, 1987;

Telama, et al, 1985). The use of questionnaires with children of this age has been questioned (Saris, 1986, cited in Rowland, 1990), as to whether young children can provide sufficiently accurate information about their activity, as well as in respect of the vocabulary used and the respondent's reading ability. In order to obviate this, as well as provide a means of building a trusting relationship with the children, interviews were selected in preference.

With some confidence about the accuracy of the interview, a further problem remained ascertaining whether teachers and children could assess activity levels with any degree of accuracy and agreement.

5.20 Assessing Children

Firstly, experienced teachers who were asked to rate children according to their perceived levels of activity/inactivity, were reasonably confident about categorising children.

Prior to discussing activity with children, an attempt was made to see if children were aware of activity levels prevalent in their peers, with the same sort of accuracy as experienced adults. This was thought necessary because of the author's concern that children talk about fitness and activity without fully understanding the concepts.

The fact that the author, experienced teachers and children allocated their peers to the categories of Very Active, Moderately Active, and Inactive, with almost total agreement, would seem to suggest that at least the terms were fully understood. This gave the author some confidence when moving into interviews.

However, it should be pointed out that when the children had to categorise themselves rather than their peers, then

interestingly, only four children (three inactive and one very active girl) nominated themselves to an appropriate category. This observation would appear to bear out the work of Roberts, (1990), in relation to his work on attribution. Even though the children understand the concept of activity in relation to others, it may be that they do not understand the concept relative to themselves, in much the same way that children of less than 9 or 10 years of age find it difficult to attribute personal ability accurately.

Clearly both teachers' and children's perceptions are coloured by the activity patterns they witness on an almost daily basis, i.e. those which occur in P.E./Games lessons and in the playground.

However, it would appear that a fairly gross level the term 'activity' and 'inactivity' could be recognised. The next phase of the dissertation was done with some confidence. By means of interviews the general activity patterns and attitudes of the children towards activity were assessed. The initial interview related to general activity patterns and involved the whole cohort of seventy three children. The subsequent interview which delved into attitudes, involved some 38 children from the cohort being interviewed twice. During the second in-depth interview test/re-test questions were introduced to cross check the accuracy of recorded information.

5.30 General Activity Patterns

Activity patterns in P.E. lessons were not considered in this study as these are largely controlled by the teacher. The playground activity patterns form such a focus of the study that results relating to playground activity will be discussed together in a later section.

Children were asked to report on evening, weekend and holiday activity. Opportunities for children to be involved in and have

access to clubs and leisure facilities are regarded as important (Martens, 1978), since attitudes have been found to be related to primary involvement. These activities quite clearly reflected sexual stereotypes as represented by Coe, (1984), in that some 30% of the boys played organised games of football (plus some rugby), as well as going swimming. Certainly the accent was on boisterous activity.

Of the girls, 20% attended dance classes of various types. Overall the girls tended to follow the trend of being with friends within the home during the evening. They were also called upon to take a role helping out at home and assisting with the shopping. No boys reported being required to perform such tasks.

These findings are very much in accord with those of Coe, (1984), who indicated that football was the most popular activity but was restricted to just boys, while girls comprised the greater proportion of the non-participants outside school.

It may be of concern, at a time of gender equity that it was the girls who were concerned with being with friends, within the home, or helping with the shopping, while the boys were involved in more vigorous pursuits during their free time. On the face of it this evidence appears to accord with that of White and Coakley, (1986), who noted a tendency for girls to be denied the opportunities otherwise afforded boys, and linked this to fears for their safety and differential social conditioning.

The responses of the children to participation in organised clubs indicated that there were common factors like the Youth Club (18% and 17% attendance by boys and girls respectively), Scouts and Guides (15% and 34% respectively) and Swimming (13% and 23% respectively) all featuring amongst the top four affiliated organisations for both boys and girls. Football again featured prominently for the boys (28%).

To test the validity of these reported attendances the author visited the organisations listed not only to check the nature of attendance and activity but also to assess the form of opportunity available. In all cases the reported information tallied with the findings from the visits. It would perhaps be natural to have reservations about the honesty of children's reported activity patterns, but in this particular case the author can report with confidence that the children were honest in claiming participation in organised clubs and organisation.

Parental involvement in the introduction of youngsters to physical activity is perceived by several authors, (Mason, 1965; Boothby, et al, 1980; and Coe, 1984), to be fundamental in influencing positive attitudes towards physical education. In similar vein, Bailey, (1976), also considered that early motivation in physical activity would encourage participation in adulthood. The question of parental influence was considered by identifying numbers of children who took part in sport with significant others. 20% of the boys and 29% of the girls went swimming with their parents. This is a particularly pleasing aspect since swimming is often reported as being an ideal exercise for people of all ages, and is one which is thought most likely to appeal to lifelong participation. It is interesting to note that swimming with parents extends beyond any formal club situation and can clearly be perceived as casual recreation. In this context, swimming has an appeal for parents and children since it lends itself to joint participation by those of even modest ability and competence, at minimal cost.

Somewhat surprisingly brothers and sisters, whether younger, of similar age, or older appeared to have relatively little influence on involvement.

Whilst 28% of boys reported being regular members of football clubs only 12% reported significant direct involvement of their parents. This possibly stems from the fact that parents are happy

for their child to be in the care of a well organised and structured team under adequate adult supervision. By taking no active involvement themselves they are released from any responsibility, do not have to be concerned with problems of transport to and from away games, and can enjoy some free time to themselves. On the other hand, the participating parents have an affinity for football and wish to be involved as, perhaps, a team manager, coach, or merely as an interested spectator encouraging their child.

Common observation is that children have many other things to do and so a question was posed to discover popular hobbies and interests. Once again the results probably fit the commonly held stereotypes that active participation in football was the most popular hobby amongst the boys (Coe, 1984) and in this study accounted for 30% of the group, (Coe, 1984). In contrast, dancing classed as a hobby, was third in the popularity stakes amongst girls and accounted for just 11% of them. Whilst it may be realistic to expect that most of the boys involved in the football club would meet up and have a "kick about" game of football together, it is not surprising that less of the girls reported dancing as a casual hobby or interest, because it is unusual to meet for a "danceabout". It is interesting to consider if girls are disadvantaged in that activities associated with girls do not lend themselves to casual play.

These initial interviews which were purely concerned with children's activity patterns at a fairly gross level certainly seem to indicate certain gender issues and substantiate much of the literature. It is worrying that the cyclic pattern of introducing girls to games which are not suitable for casual play may in turn make them less skilful as practice is always confined to organised activity.

Having established a suitable background of activity patterns, further in-depth interviews with 38 of the cohort was administered

to test underlying attitudes and reactions to physical activity, but as attitudes may well be affected by P.E. experiences - attitudes to P.E. were considered to be important.

When asked about the P.E. lesson, in keeping with the general findings of children of this age, (Glassford, 1978; Hendry, 1978), the vast majority of the children were very positive towards P.E. (75% of the boys, 61% of the girls) and only a total of 5 children (1 boy and 4 girls) out of 38 expressed a negative attitude. Indeed these findings related to the boys, accord exactly with those of Glassford, (1978).

Coe, (1984), was critical of studies using the term P.E. without clarifying just what the children understood by it. In this study, and in this school, the term P.E. is used to mean movement type activity and Games is seen as a different entity. Indeed, it is identified on the children's timetable in such a form, with P.E. being allocated to a single lesson and Games a double. Of particular interest is the result that 75% of the boys anticipate P.E. and also Games positively. The girls (61%) were slightly less favourable than the boys in their anticipatory reaction to P.E. and this dropped to 44% in response to Games. Some slight gender differences, in keeping with Alban Metcalfe, (1981), would appear to be operating here.

Importantly, follow up questions found that the children who had negative responses did so for reasons of fear, lack of ability, and disliking of cold weather which are all reasons which have been expressed by another author, (Williams, 1984). Perhaps the time has come for recognising the negative effects of being cold has on children. At no other time are children forced to be outside, at the mercy of the elements, while dressed only in T-shirt and shorts. Doubtless children are encouraged to bring along additional clothing in the form of tracksuits and sweaters but few seem to remember to do so. An ultimate solution might be for the

school to provide all the appropriate clothing including tracksuit and wind-cheater and to launder this centrally ready for each lesson along the lines of American schools; thus also avoiding the social consequences of not having the right style .

Children's anticipatory reaction to swimming (as a school activity) was also noted. While the reaction to swimming (as a recreative activity) was apparently favourable, there was nevertheless a greater number expressing neutral or unfavourable responses than was the case for either P.E. or Games. There are reasons when an apparently attractive activity may be unattractive. In this particular study children recording neutral or negative responses were involved in competitive swimming for the school with an over-emphasis on winning, and, in the opinion of the author, had built up a negative perception of the sport as a result of their particular experiences. This result bears a strong accord with Glassford, (1978), who noted parental concern when there was an over emphasis placed on winning.

The responses as to how the children would improve P.E., Games and swimming, given *carte blanche*, proved very revealing since they were not just concerned with negative things but demonstrated a wish to extend their *repertoire*. Once again there were significant gender differences.

Overall the boys were very positive about P.E. and were keen to enhance the adventurous/risk challenge element by, for example, having the apparatus higher. This is in direct agreement with the findings of Kenyon, 1968, who found that boys responded to P.E. as a pursuit of vertigo. By contrast, while some girls expressed a wish to use the apparatus more often, others demonstrated the reverse of the boys in that the pursuit of vertigo was evidently serving to discourage them, once again supporting the gender differences reported by Kenyon.

Indeed, the findings of the study seem to support the overall view expressed by Williams, (1984), that attitudes towards physical activity were influenced by gender with a greater importance being attached to Kenyon's discrete sub domains by each sex. For instance, females were perceived as having a more positive attitude towards physical activity which emphasised the aesthetic. In contrast, this was not a significant motivator of males who regarded physical activity as a pursuit of vertigo more favourably. This finding has a significance for the teaching of P.E. since at this age boys and girls are not particularly different in terms of physical capabilities.

In respect of Games there was a strong dislike for cross country, together with a desire to play large sided Games of football. The brief cross country run prior to the Games lesson starting in earnest evoked a negative response from a large proportion of the children and was a major factor in reducing their perceived enjoyment of the activity - even amongst competent athletes. Paradoxically, some of the children who expressed this view, were apparently active in the playground where they were observed running around playing games of tig and chase. Perhaps the negative perception of cross country arises because although it really comprises a warm-up lap of the field, it appears purposeless to the participants and serves to delay the more enjoyable portion of the lesson, namely the game proper. In keeping with the findings of Roberts, (1986), children appear to enjoy a large sided game at this age even though they may have relatively little contact with the ball. It is not uncommon to find that they fantasize about being a famous player.

It might have been anticipated that siblings would have been significant others in positively influencing children's activity patterns. However, on the basis of the evidence gained in this study, the involvement of parents was more influential in encouraging, supporting and sustaining participation in sporting activity.

Activity is not confined to school, or the evenings and weekends. The extended summer break provides a real opportunity to be involved. Literature on the subject of free time activity, such as Coe, 1984, indicates a greater potential involvement of boys. However, this study found that a greater number of girls (59%) than boys (49%) were participants in the holiday playscheme which gave the children the opportunity to experience activities which were outside of their curriculum experience. While it was beyond the scope of this study to discover the reasons for this, it is possible to speculate as to the cause. The Playscheme was particularly well organised and the subject of favourable comments. It could be that children became interested as a result of positive endorsements and then their parents gave permission for them to attend since they perceived it as being safe and well organised.

5.31 Attitude to school and P.E. within the framework of other lessons

If a major aim of Physical Education is to develop positive attitudes towards an active lifestyle it may be that the process of being active may be of less importance than the underlying attitude towards activity. It was hypothesised that a favourable perception of the school might encourage a similar perception of physical education (and vice versa); this was examined.

On the whole perceptions of school were very positive with the vast majority of the child^{REN} expressing a liking for school. While a few expressed neutral feelings (20% of the boys, 27% of the girls) only one boy expressed a dislike. The reasons given for liking school were varied with both sexes similarly citing general reasons, an alternative to the boredom of home, and specific subjects as positive reasons.

When each child was asked to select his/her favourite lessons, and these were totalled, Games and P.E. were first and second equal for the boys and second and third equal for the girls, in accordance with the findings of Williams, (1984). It is interesting to note that Games, Maths, P.E. and Practical Unit (a lesson of woodwork, craft and textile skills) occupy the top four placings for both sexes. Further, Games is perceived by both sexes as being marginally preferable to P.E. which is at variance with the caveats expressed about being outside, at the mercy of the weather, and subjected to cross country.

When it came to making a selection of the children's most favourite lesson, and these single subject entries were totalled, Practical Unit achieved a clear prominence for both sexes, followed by Maths. Games and P.E. were placed third and fourth by the boys, and P.E. came third for the girls. Interestingly, whilst Games appeared as one of the popular activities for girls, it was never the most popular for any single girl. In the study by Sharples,

(1969), interestingly, P.E. was ranked second in popularity to Art, which seems to support the notion that practical subjects are popular at this age.

The school did not appear to place any overt emphasis on the promotion of either Practical Unit or Maths which might have produced a halo effect as mentioned by Williams, (1984). It is certainly the opinion of the author that Maths teaching was of a high standard but perhaps no higher than the teaching of other subjects.

When enquiries were made about children's least enjoyable lessons neither P.E. nor Games figured prominently. Predictably, Swimming was mentioned by two boys and three girls and P.E. just by two girls.

When the reasons for liking P.E. and Games were further probed the pattern which emerged was similar for both sexes and both activities. Using Kenyon's typography the social experience and aesthetic experience were dominant. The importance of social experience is in keeping with the general incentives literature in sports psychology reviewed by Carron (1980) and Whitehead, (1990).

When the reasons for disliking P.E. and Games were also probed some girls indicated an adverse reaction to P.E. as a pursuit of vertigo by proclaiming a fear of heights, whereas the boys complained of a lack of apparatus time, indicating that they were receiving insufficient stimulus in respect of the pursuit of vertigo. The dislike of cross country and being outside in the cold was universal for both sexes as the major negative features of Games. Overall a pattern has emerged which is broadly in agreement with the findings of Hendry, (1978); and Glassford, (1978), that P.E and Games are favourably perceived by children.

Despite this a surprising number of them had attempted to avoid P.E. or Games during their school career - only 45% of the

boys and 33% of the girls had never resorted to this. If one looks at non-avoidance again there is a gender bias evident which indicates that boys are least likely to avoid the subject. The relatively high percentage of children involved in avoidance tactics should be disquieting since a high proportion of otherwise willing participants is involved. Although merely highlighted by this study, it is perhaps worthy of more detailed future scrutiny.

Although children were found to hold predominantly positive attitudes towards P.E. and Games (the latter being less so at 44% for the girls) as well as for the school in general, there must nevertheless be concern expressed over the overall level of activity evident in the playground. Given the adage that "One man's meat is another man's poison", it would be unrealistic to assume that all children would find universal pleasure in P.E. and Games, or indeed like both equally. The extent to which this applies is particularly apparent in the context of P.E. where a motivating factor for the boys - that of having the apparatus out and being able to work at a height - was a positive de-motivator of the majority of the girls, who enjoyed the activity because of the opportunity to be in the company of their friends. Given that P.E. lessons at this age are mixed, there seems to be scope both to encourage the more adventurous and reduce the anxiety of the fearful by encouraging children to attempt manoeuvres with which they feel comfortable, as well as provide varying apparatus challenges appropriate to the varying abilities of the children. Lack of appropriate opportunity in this context is perhaps far more significant than ability.

An aim of physical education in general is to promote the subject positively so as to imbue participants with favourable experiences and memories of the subject which will colour their later reflections. Even though comparatively high percentages of children had had some involvement in avoiding P.E. and/or Games it was very interesting to note how many would choose to continue participation if they were made optional - potentially the acid

test. Boys were universally willing to participate in P.E. and 90% in favour of Games, whereas 72% of the girls indicated that they would continue participating.

5.40 SOME FINAL THOUGHTS ON THE INTERVIEW PROCEDURES

Interviews were initially selected, in preference to questionnaires, as a more useful and reliable means of obtaining accurate information. A check on the likely validity of this information was secured by means of a series of test/retest questions introduced during the second in-depth interview. Variations between responses over the course of the two interviews were remarkably few and tended to be of degree rather than magnitude. The variations which occurred in respect of professed favourite subject can be explained by the effects of positive or negative recency influencing selection. In only one instance was inconsistency of response regarded as being indicative of unreliability. The interviewee had initially claimed to have liked P.E. because of her ability to perform various manoeuvres. During her second interview she claimed the reverse. A subsequent check on her ability level confirmed she had not yet learned or mastered the manoeuvres previously claimed. Follow up discussion with teachers indicated that she was unreliable and had certain social problems. In spite of their being more time consuming to administer, the author was confident with the validity of the information gained by means of interviews.

Having established a good background of information on the general activity patterns and attitudes towards physical education and physical activity of this cohort of children, it was felt that they were reacting in similar fashion to other reported studies such as Alban Metcalfe, (1981); Hendry, (1978); Coe, (1984).

5.50 PLAYGROUND ACTIVITY

At a gross level children (aged 10-11 yrs) were asked about the activities they most preferred to play in the playground. For the boys there was a predominant preference for football, with tag and chase games coming a close second. More sedentary pursuits like walking and chatting and sitting and thinking were favoured by very few. By contrast, a majority of the girls expressed preferences for standing about, or talking. Of the more active pursuits mentioned, again tag and chase games figured prominently. However there was a definite gender bias towards professed activity amongst boys, with the girls apparently preferring inactivity.

When this was subjected to direct observation in the playground, whilst not all the categories of games mentioned were necessarily being played at any one time, there was evidence that all of the most popular games that the children professed playing, appeared during the period of observation. Football was played on every occasion, with tag and chase games also predominating. Activities as played by distinct year groups appeared to be confined to particular territories of the playground

The vast majority of the boys were indeed to be found playing football (with some 74% involvement on one observed occasion). By contrast, girls were observed in more sedentary pursuits as predicted. Chase and tag games involving both sexes were also in evidence. While the football was almost exclusively male dominated, chase and tag games were sometimes mixed and appeared to have a "Catch as Catch Can" element whereby otherwise reluctant involvement of the boys could be subverted.

However, it would be wrong to assume that involvement necessarily indicated participation in intense activity. With just one ball between some twenty nine boys playing football, sharing a crowded playing area with the second years, the degree of activity

is questionable. Rather, the significance lies in the fact that children of both sexes were observed in their predicted pursuits. The weight of the evidence also supported the proposition that boys are comparatively more active than girls.

The detailed effect of the weather on playground activity was beyond the scope of this study. However, discussion with experienced staff and careful rudimentary observation of the playground under different weather conditions indicated that at a gross level children were more active in windy and cold conditions. It would require further future study to confirm this.

5.60 Children s Perceived Preferences

During the in-depth interview, the children were asked whether they perceived it was easier to run in the playground (i.e. during playtime) or on the field during games. The overwhelming preference, particularly amongst the girls, was for being active in the playground. The reasons given for this came down to having an alternative focus whilst running (e.g. pursuit or avoidance of "capture"), the fact that they ran in short bursts and knew they could stop if necessary.

5.70 Initial Logging

A number of methods were used to try and arrive at the nature of gross activity in the playground, such as would be classed as "estimation" by Edholm, (1966). Initially logging of numbers of children standing alone and standing in groups was employed over four playtimes. The figures appeared to indicate that the girls were more sedentary, but also revealed that relatively few children were stationary at any one time. The conclusion, albeit at a gross level, was one of relative activity.

5.71 Frequency of Activity

Secondly, in order to add to this gross picture, the frequency of specified activities was observed during a further four playtimes. Football was indeed confirmed as a favourite activity with an almost 100% frequency, with chase and tag games also predominating, as had been predicted by the interviews. While the latter games were frequently mixed, football always involved large numbers of boys and, at times, some girls. The extent to which involvement in a game of football equates with a given level of cardio-vascular activity is questionable. However, the extent to which children participated in short burst, high intensity activity as characterised by tag and chase games may be indicative of their liking for such exercise, in preference to something more sustained. Baronowski, et al, (1987); Gilliam, Freedson, Geenan, and Shahraray, (1981); Verschuur and Kemper, (1985), all take a similar view that children are indeed active but in short bursts, just as described above, which they regard as being of insufficient duration to increase aerobic capacity. On the other hand, Stamford and Shimer, (1990), question the view that short bursts are not beneficial. Given that children have a potential for exercise in their twice daily playtime and lunchbreak, and naturally prefer to indulge in short burst activity in preference to the more sustained variety, it would seem worthy of future consideration to discover whether short burst activity was indeed beneficial or not.

5.72 Freeze Frame Photography

A more sophisticated technique was then employed in order to crystallise activity and inactivity. A technique involving tandem photography was devised which permitted a record of everyone in the playground, together with a comparable photograph of just the stationary children. Using this measuring technique the mean percentage of inactivity rose to 43% (with the mean of

corresponding activity 57%). Interestingly, the low standard deviations for the data indicated that the percentage of stationary children remained fairly constant at around the 43% level. Given the differing weather conditions which prevailed over the course of the photographic sessions it would appear to contradict the hypothesis that children's activity levels vary according to the weather.

5.73 Heart Rate Monitoring

Having determined that more than fifty percent of the children were active at any one time, what was not evident was the intensity of that activity. In order to address this, physiological measurement of heart rates were employed, similar to that used by Armstrong, et al, (1990), but with the addition of tabulated logging. In this context there was no intention to use HR Monitoring in isolation because of the recognition of the concern expressed by Armstrong about "snapshots". Heart rate monitoring was used to give an indication of a gross activity pattern rather than to provide precise information at any one point in time. This particular point is important in the light of the work of Tuxworth, 1988, who found that while the monitoring equipment provided an accurate measurement of physiological reactions of the body, these would not always be in response to the activity *per se*, but to transitory external stimuli which were difficult to differentiate, thereby providing an over/optimistic assessment of an activity's intensity. By using tabulated logging in tandem with heart rate monitoring in this study, the author was able to detect such an artefact. In such an instance, a child was noted asking the senior dinner lady, who deservedly enjoyed a fearsome reputation, if she could have permission to go inside to the toilet. Under this stress the child's heart was recorded elevating from 104 b.p.m to 130 beats per minute.

Other studies (e.g. Dickenson, 1987) have asked children to indicate periods of daily activity which made them sweaty and/or breathless by which to determine perceived vigorous activity. However, when subjects were asked about such feelings immediately after their heart rate monitoring trial, only one reported feeling breathless and two feeling sweaty (which they attributed to the prevailing weather). One subject had been observed stopping as a result of being breathless. Although her heart rate had peaked at 176 b.p.m. she did not report feeling sweaty. Given that only three of the group of 15 children reported these feelings, when many of them were, according to their recorded heart rate, undertaking aerobic activity perhaps raises a question mark over its effectiveness as an indication of vigorous activity.

Any interpretation of the results of the heart rate monitoring is dependent upon the location of the threshold for heart rate which equates to appropriate physical activity. Simons-Morton, et al, (1988), cited in Armstrong, et al, (1990), established this for children as an exercise eliciting a heart rate which was equal to or in excess of 140 beats, min^{-1} . On the other hand, Verschuur and Kemper, (1985), applied a threshold of 150 beats per minute, while MacConnie, et al, (1982), established theirs at 160 beats per minute.

Using a threshold of 140 beats per minute, boys spent 22.8%, girls 14.6%, of their time above this baseline.

When the threshold is revised upwards to 150 beats per minute, the corresponding figures for boys falls to 16.4%, and 10.6% for girls.

Further upward revision of the threshold to 160 beats per minute, produces a fall to 11.1% for boys and 5.9% for girls. This gender difference is in keeping with the findings of Armstrong, et al, 1990. Given that at the lower threshold of 140 beats per minute (as determined by Armstrong, et al, 1990), only a fifth of

the boys were 'active', and that this total dropped to a tenth at the higher threshold of 160 beats per minute, it appears that playtime, which might be considered a very active time, does not necessarily reflect healthy activity patterns.

The dangers inherent in gross pictures is illustrated by the following examples which should be considered alongside the figures for individuals (boys and girls) in the nominated categories: Inactive, Moderately active, and Active.

	Inactive Boy	Inactive Girl
% Time above Threshold of:		
140 b.p.m.	0.01	38.72
150 b.p.m.	0.00	27.94
160 b.p.m.	0.00	19.60

	Mod ^y active Boy	Mod ^y active Girl
% Time above Threshold of:		
140 b.p.m.	41.00	17.15
150 b.p.m.	24.50	8.82
160 b.p.m.	6.00	4.41

	Active Boy	Active Girl
% Time above Threshold of:		
140 b.p.m.	40.10	24.87
150 b.p.m.	25.52	14.72
160 b.p.m.	20.31	1.01

It readily becomes apparent that there are anomalies such as the 'Inactive Girl' having greater percentage time above the baseline thresholds than either the 'Moderately Active' or 'Active Girl'. A possible explanation for this phenomenon could be that because she is unfit, her heart rate elevates higher, more rapidly, and remains elevated for longer for a given amount of exercise than

her more fit peers. This explanation would accord with the bar chart comparing the amounts of time spent at given heart rates during playtime by one child assessed as fit and another assessed as unfit.

Granted that children are individual it is relevant to compare the results of the active girl above with a similarly rated peer to demonstrate how results vary widely at the individual level.

	Active Girl A	Active Girl B
% Time above Threshold of:		
140 b.p.m.	24.87	0.00
150 b.p.m.	14.72	0.00
160 b.p.m.	1.01	0.00

When certain of the children were retested, their results were often of similar basic pattern but differed in magnitude, an example of which is below.

Active Boy	Trial 1	Trial 2
% Time above Threshold of:		
140 b.p.m.	37.74	17.12
150 b.p.m.	19.60	12.03
160 b.p.m.	7.84	9.25

The playtime lasted a nominal 15 minutes. If these percentage times are then translated into minutes and seconds based on the notional duration of the playtime, the following average figures emerge:

Threshold of 140 beats per minute:

Boys - 3 mins 25 secs

Girls - 2 mins 11 secs

Threshold of 150 beats per minute:

Boys - 2 mins 27 secs

Girls - 1 min 35 secs

Threshold of 160 beats per minute:

Boys - 1 min 39 secs

Girls - 52 secs

The figures derived from heart rate monitoring, at best, indicated a trend in playtime activity patterns which seemed to indicate that boys are more active than girls whichever of the three baseline thresholds is used.

Playtime occurs on three occasions in the day - once in the morning and afternoon and for a longer period at lunchbreak. This would give scope for children's levels of activity during the day to sustain at least a threefold increase, if this pattern were to be repeated during the course of a typical day. However, such extrapolated figures would probably be deemed insufficient even working off the baseline figure of 140 beats per minute.

Playground activity is predominantly short burst activity, which children appear to find preferable. If the results found are in any way typical of playtime activity patterns, then on the basis of these figures alone it is difficult to envisage children attaining a daily 20 minute period with a heart rate above 139 beats, min^{-1} , (Armstrong, et al, 1990). While Armstrong, et al, (1990), reported 65% of their sample of Primary School children failed to average a daily 10 minute period of activity of appropriate intensity, on the basis of this study it would appear that such a figure could be achieved by more children; recommendations for which appear later.

The extent of what could be termed beneficial activity appears to be less than would have been expected as a result of tabulated logging, observation, perceived intensity of observed activity, and photographic analysis. However, these general results also mask anomalies in performance at a personal level which run counter to the overall trend, e.g. where a child, previously characterised as inactive, recorded greater levels of beneficial activity than an 'active' child. Likewise some children produced differing results when repeating the trial. Rather, these results offered a crystallising of a few moments in time through which to derive a broad impression of children's activity patterns at playtime. A more longitudinal trial, monitoring more children would now appear necessary in order to confirm this reported trend.

These findings are in broad agreement with the research of others who utilised heart rate monitoring, such as Saris, et al, (1980), who found that 8-12 year olds were only active for 6 minutes a day (using a baseline figure of 176 b.p.m.), and Seliger, et al, (1974), who found that 11-12 year olds only spent 3% of their time in moderate intensity activity and none in heavy intensity. However, it has to be appreciated that Seliger and Saris both monitored children for a 24 hour period.

One of the studies of playground activity *per se* was by Hovell, (1978), in the U.S.A., and utilised observation 8-11 year olds at 5 second intervals. Using such a method, children engaged in physical activity for approximately 60% of their playtime. When this activity was rated according to an aerobic standard, only slightly more than 50% was classified as vigorous. Some aspects of this study are comparable to Hovell's in that photographic analysis of the playground produced an assessment of 57% activity. Observation also showed that children were indulging in activities, like football, chase and tag games, such as had been used by other researchers (Huenemann, et al, 1967, Durnin^{+ PASSMORE}, 1967) when defining activity of perceived intensity. However, objective measurement

using a heart rate monitor appears to reveal the inherent danger of linking participation to action as noted by Morris, (1985).

5.80 DISCUSSION OF PLAYTIME

The analysis of Playtime Activity highlighted some interesting data. Boys demonstrated a strong preference for football, with tig and chase games a close second. Overall, there was a trend towards being involved in some active, as distinct from some sedentary pursuit. Girls, by contrast, were more content to stand and talk, but when active, tig and chase games were perceived as preferable to other pursuits.

At first sight it might appear that boys are potentially more active than girls, and this largely proved to be the case. However, participation did not necessarily equate to vigorous activity. While a large percentage of the boys were undoubtedly engaged in enthusiastically playing football together; because of the large numbers involved, there were too many players on each side for the exercise to be of an acceptable level of intensity for all but a few.

While teachers and fellow pupils were able to categorise children according to their perceived activity levels, and tabulated logging of the playground activity gave the appearance of supporting the notion that children were active at playtime, more detailed analysis using photographic evidence and later Heart Rate Monitoring (HRM) indicated that children were not necessarily as active in the playground as had first been thought.

Tabulated logging showed 10% of the children to be inactive. Photographic evidence indicated an activity level of 57%, but when the intensity of that activity was precisely monitored, the degree of beneficial activity was less than would be desirable for health reasons.

What was, however, very clear was the strong preference amongst children of this age for 'short burst' activity rather than the sustained variety, and for boys to be keener and more involved in boisterous activity than girls. Given this preference for short burst activity, it would appear both desirable and possible to encourage and stimulate this type of activity during a playtime. This could be achieved via such innovations as additional playground markings or a games selection box. While the majority of boys express a preference for and an interest in being involved in boisterous activity, a larger percentage of the girls were content with sedentary pursuits. It may be for these children that some degree of intervention through leadership would be desirable. The author observed one such inactive girl become involved in activity as a result of her parents being concerned by the child complaining of having "no friends" and of spending playtime standing about. The teacher recruited a small group of girls to incorporate her into their circle of friends. The girl concerned was also counselled on the need to be a friend in order to have friends. Five minutes of dedicated effort resulted in months of increased activity for this particular child.

That which was observable in the playground was a reflection of children's activity patterns outside of school. Apart from the fact that both sexes appeared equally interested in the Youth Club and the uniformed organisations, boys' play was associated with more structured sporting activity, such as football teams, and the continuance of that in the "knockabout" games between friends. By contrast, the free time activities preferred by the girls, such as dancing, did not lend themselves to meeting informally and having a "knockabout" in the company of others. Their opportunities to meet with others after school were further constrained by parental concerns for their safety and a requirement to assist in some small measure with the household chores, be it shopping or looking after a younger sibling. The traditional girls' activities such as Netball and Hockey do not lend themselves to *ad hoc* games in the way in which football seems to have a universal appeal for boys.

While girls are doubtless as capable of playing football as boys, they nevertheless lack the sort of minimal fundamental level of skill which makes it possible for the participant to exercise a nominal degree of control of the ball and its flight, which boys appear to acquire as a result of exposure to early play experience and school games lessons. There is certainly unexploited potential in helping girls acquire a basic minimal level of skill in football so as to increase its appeal.

The evidence collected in this study pointed to significant gender differences between the activity patterns of boys and girls, with boys being the more active. However it must be stressed that this is a comparative statement and not an absolute. While the boys activity levels in all but one case exceeded that of the girls, it does not necessarily follow that the boys were sustaining adequate levels of exercise.

5.90 SUMMARY OF OVERALL RESULTS

1. The methodology of using interviews rather than questionnaires, even though they were more time consuming, proved correct with this age group of children. In all but one documented instance the data gleaned proved reliable when subjected to test/retesting and cross checking with outside agencies. The data collected from the relatively large number of interviews enhanced the process of focussing down on playground activity.

2. Experienced teachers and 11 year old children proved capable of respectively categorising children and their peers according to perceived activity and fitness levels. However, children of this age were unlikely to rate themselves accurately in these respects.

3. While reasonable numbers of boys and girls were involved with clubs and outside agencies, these clearly reflected sexual stereotypes.

4. Evening and weekend activity for girls appeared limited by the constraints of being required to help out at home, with shopping, or because of parental concerns for their safety. Boys, in contrast, appeared to suffer less, if any, restrictions.

5. Involvement with parents played a more significant role in a child's involvement in weekend activity than that of siblings of whatever age.

6. Boys (75%) looked forward with equal anticipation to P.E. and Games. The majority of girls also pleasantly anticipated P.E. and Games, but the proportion was less than that of the boys, and there was greater positive anticipation of P.E. than Games. P.E. as a pursuit of vertigo was a strong motivator for boys but a demotivating factor for girls.

7. Football held a dominant appeal for boys but there was a universal dislike by both boys and girls of cross country and being outside in cold weather.

8. Children express a preference for short burst activity rather than sustained.

9. The vast majority of children enjoyed school and entertained positive attitudes towards it as an institution.

10. P.E. and Games were very favourably perceived by children of this age and featured amongst the four most favourite lessons for both sexes.

Games and P.E. were rated 3rd and 4th respectively by boys and P.E. rated third most favourite lesson by girls.

11. The principle reasons, expressed by both sexes, for liking P.E. were "being with friends" and the "things we do".

Responses were similar in respect of Games with girls also appreciating it as a break from lessons .

12. Just under half of the boys and two thirds of the girls had tried to avoid P.E and Games at some stage.

13. The vast majority of children would continue to participate in P.E. and Games if it were to be optional.

14. A larger percentage (59%) of girls attended the Holiday Playscheme than boys (49%).

15. Football, tag and chase games were the predominant playground activities. Football was predominantly male oriented.

16. Weather may influence playground activity.

17. On the basis of photographic evidence, 57% of children were active and indulging in some form of exercise at any one time during playtime.

18. Breathlessness and sweating as indicators of aerobic activity appear unreliable.

19. Using the threshold of 140 beats per minute for a heart rate which equates to appropriate physical exercise in children (Simons-Morton, et al, 1988, cited in Armstrong, et al, 1990), on average, boys spent almost 23% of their playtime and girls almost 15% of their time in aerobic activity.

20. Girls were consistently less active than boys at any threshold level from 140 -160 beats per minute although there were wide variations between individual children and between the same child on different occasions. Overall, in respect of playground activity, boys would appear more active than girls.

5.100 LIMITATIONS OF THE STUDY AND POSSIBLE AREA FOR FUTURE RESEARCH

For operational reasons this study was unable to address various issues which the author became aware of during his review of literature and research and which would appear to require possible future consideration by others. They are itemised here so as to provide food for thought as to future lines of enquiry.

1. No attempt was made to measure affective variable like class, socio-economic differences, self esteem, weather, in respect of their possible influence on activity levels in the playground.
2. The television viewing patterns of children in respect of its potential to reduce the amount of time available for physical activity.
3. Obesity and its possible potential to make children less inclined to spontaneous vigorous activity.
4. Children's diet and its implications for C.H.D. factors and activity patterns (particularly since 1981 and the abandonment of the national requirements for the provision of a school meal which met nutritional standards).
5. Possible causes of inactivity.
6. The significance of tactics for avoiding P.E. and Games at school and its relationship to children's attitudes and activity patterns.
7. There was no consideration of the question as to whether fit children exercise more or whether physical activity increases fitness.

8. Whether positive attitudes encouraged activity.
9. Whether different countries (e.g. Scandanavia) have an exercise ethos which influences children's activity patterns.
10. A longitudinal study of playtime to discover whether there is any increase or decrease in activity over time.

5.200 CONCLUSIONS

The findings of this research have various implications for the teaching of Physical Education, children's activity patterns and the promotion of an active lifestyle and the enhancement of the playtime and playground environment.

Children generally look forward to Physical Education lessons and rate P.E. and Games amongst their most favourite lessons. However there are certain criticisms which should be addressed, particularly, since a child's experience of school are crucial for both developing good habits and enhancing recollections in later life.

- At a functional level there is no reason why we should put children off activity by simple things like feeling the cold or being frightened. Teaching methods and approaches have moved to a point where this need not happen. Clothing for outdoor activities needs a radical rethink to ensure it is warm as well as functional. While children are doubtless encouraged to wear tracksuits and windproof suits perhaps the school needs to consider providing these on loan where appropriate. Even gloves and some form of woollen hat may also be necessary to complete the ensemble.

- Reasons need to be found as to why children, who are otherwise active participants, should seek to avoid school P.E. and

Games, and whether this might be a precursor of a later trend of avoidance of activity.

- Whether because of social conditioning or genetic factors there is some basis for believing that children's activity patterns are gender linked and that equity between the sexes has not been achieved.

- Girls seem to be less active than boys, which may imply that boys are sufficiently active. Rather it is a comparative rather than an absolute term. While girls do indeed appear less active, it is doubtful whether either sex indulges in adequate aerobic activity. There is possibly a case to be considered for putting the 'physical' back in Physical Education through compensatory activity of sufficient vigour. This could also be linked to increasing children's knowledge in respect of exercise, nutrition and a healthy lifestyle. Consideration could also be given to programmes of remedial activity targeted at girls or boys as appropriate, since there is evidence (Gilliam, et al, 1982) that activity patterns can be modified through intervention.

- The Japanese appear to appreciate the value of exercise and adopt an approach of compulsory group calasthenics in the workplace. Perhaps there is a place for such sessions to be included in our children's daily experience.

- If exercise and activity are regarded as therapeutic, beneficial and conducive to inducing vigour and well being, why is this panacea being rejected in favour of a sedentary lifestyle? It might be a case of a good product being inadequately and ineffectively marketed; a positive strategy to overcome such a deficiency could be required.

- Hypoactive children are at risk from being locked into a downward spiral of sustained inactivity. Inactivity lowers a child's level of physical fitness, which in turn possibly makes

them less inclined to exert themselves. Research is therefore needed into strategies for improving the exercise habits of such children.

- In similar vein, it seems well established that even moderately active children are not voluntarily participating in high intensity activity. While there is no clear research evidence of the relationship between physical activity and fitness, it needs to be determined whether fit children exercise more or whether increased activity leads to improved levels of fitness.

- Academic targets are assessed at various key stages in the National Curriculum. Perhaps fitness targets need to be similarly assessed in some simple form e.g. A 6 or 12 minute Run/Walk, or even a national fitness standard.

- Parental endorsement of activity is seen as being of significance. Because of parents' primary involvement, perhaps consideration be given to their potential role in encouraging, promoting and facilitating a child's active lifestyle, through an education programme which made them aware of the beneficial effects of regular activity/exercise.

- There appears to be some link between obesity in children and a more sedentary lifestyle, (Corbin, 1986). Given the abandonment of nationally established guidelines for nutrition, schools may need to re-evaluate the role of and the snacks on offer in the school tuck shop, and the nutritional value of the school meal.

- Children regard themselves as being immortal and do not appreciate the need to amend their lifestyle so as to avoid later health problems. It is as remote a concept as having a mortgage. Rather, exercise needs to be integrated into activity, with the accent on enjoyment.

- The duration and intensity of children's activity needs to be increased. Playtime occurs three times a day, five days a week during nine months of the years and cumulatively adds up to a significant amount of well distributed time. As such it has valuable potential. This study has shown that football, chase and tag games appeal to children and are those activities which encourage an elevated heart rate in excess of 140 beats per minute. Children perhaps need to be encouraged to play those games, or something similar during playtimes by means of a selection of cards, outlining variations of different games, which can be referred to at playtime and tried out. Any necessary small equipment could be made available on loan.

- Boys predominantly play football, while girls are not necessarily encouraged. The opportunity perhaps needs to be given to girls, through coaching, for them to experience the game, as well as gain greater expertise. A minimal level of skill in controlling a ball with their feet (rather than with their hands, which has hitherto been their predominant experience) could enhance both their level of enjoyment of the game and their willingness to play in their free time.

- Additionally, there is a need to more accurately define those activities which will potentially enhance children's heart rates to a beneficial level.

- Skipping is a beneficial aerobic activity. However, it was not observed being carried out at playtime. In this capacity it has enormous potential as a means by which exercise can be disguised as a fun activity and could receive more promotion as a playground activity. Perhaps if skipping ropes were made available for the children to use during playtimes, their availability and visible presence could encourage wider and spontaneous use and hence, increased levels of activity.

- Playground design has probably changed very little over the years and yet has the potential to encourage and facilitate activity in children. For new schools this needs to be considered at the drawing board stage, while for existing facilities low cost modifications may take the form of additional painted lines, targets, or goals on walls and playground surfaces. The notion of the provision of a school exercise trail which the children are encouraged to use and, perhaps, record their progress on a wallchart in their classroom, also needs consideration.

- The activity of children needs to be encouraged and increased. To some extent, for that to be possible, children need adequate space and freedom in which to move. At playtime, the girls did not dominate areas of the playground as did the boys with, say, football. Rather, they tended to occupy the playground margins or spaces which remained. It is a moot point as to whether this inhibited girls' activity patterns, or conversely, whether their activity levels would rise if more space was made available through designated areas.

- This study has shown that children have a preference for and are more likely to indulge in short burst activity. There appears to be disagreement between authors as to what constitutes appropriate and beneficial aerobic activity. On the one hand there are those who would argue that it must be of a sustained duration (Armstrong, et al, 1990), while others regard total time spent in high intensity exercise as the yardstick, (Rowland, 1990). There is a need to determine whether short burst high-intensity activity is indeed beneficial. Should that prove to be the case, then playtime activity could potentially make a significant contribution to a child's daily total. In addition, thought has to be given to promoting those activities which involve short burst activity and which children traditionally enjoy.

Some intervention to raise children's activity levels would appear both necessary and beneficial. Playtime provides the potentially ideal time. While the author is of the opinion that compulsion should be avoided so that children are free to "do their own thing", the role of playground supervisors perhaps needs to evolve so that some are specifically employed as playleaders. Hence, they could stimulate, encourage, suggest and direct (but not coerce) children in more purposeful activity. While it has to be recognised that children need to retain the spontaneous nature of activity at playtime, nevertheless, given the uptake for the local Playscheme (particularly amongst the girls) there is merit in exploring how children would respond to sensitive intervention by playtime playleaders. This option could perhaps be explored initially using a P.E. student on teaching practice.

Children's activity patterns have been the subject of much scrutiny and research, the majority of which confirmed that not only are they generally inactive, but neither do they voluntarily engage in high intensity activity. Perhaps the time has come for the theory to be put into practice, with positive initiatives being undertaken to intervene and reverse the trend.

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7.00

APPENDIX

(1)

LETTERS CONCERNED WITH ENTRY TO THE FIELD

Chief Education Officer

Education Office etc

Dear Mr _____

Currently I am on secondment from _____ School to Loughborough University, undertaking a M.Phil degree by research.

I propose to conduct a study into the activity patterns and attitudes towards physical activity of 10-11 year old children.

Accordingly, I wish to seek your permission to spend the Spring Term undertaking such research in a Junior School, conducting the investigation using interviews and observational analysis. Naturally, I would not seek to place any additional burden upon teaching staff.

You may be assured that total confidentiality would be observed and that any subsequent publication of the study would ensure complete anonymity of the people, school and authority. A draft copy of the findings and research report would be made available for your perusal before being committed to print.

I have discussed the matter provisionally with Mr _____, of the P.E. Inspectorate, who has responsibility for the school in which I would like to conduct my research, and he has indicated that his approval would be forthcoming.

Hence, I would be grateful if you would consider granting me outline permission to undertake such a study using an L.E.A. school.

Yours sincerely,

E Richards

(2)

Dear Mr Richards

Thank you for your recent letter concerning your proposed research into activity patterns and attitudes towards physical activity of 10-11 year old children.

Permission in principle has been granted for you to approach Junior Schools in the L.E.A. on the understanding that the final decision rests with Head Teachers of the individual schools concerned.

Any information that will be used which could identify particular pupils or staff should not, of course, be made available or published without the agreement of the staff concerned or the parents of the children in question.

Yours sincerely

Assistant Education Officer

(3)

Ref: ER/VJF

Headmaster

_____ School etc

Dear Mr _____

I have now received outline permission from the Chief Education Officer to pursue my research project. Additionally, I have discussed this project with Mr _____ of the P.E. Inspectorate, who has responsibility for your school, and has indicated his approval and cooperation.

When we had our initial discussion I indicated that my interest was in undertaking a study of the activity patterns and attitudes to physical activity of 10-11 year olds, in order to be able to relate this to our current knowledge of what happens at secondary level.

From the outset I wish to assure you and your staff that I have no hidden motive in assessing any aspect of your school, and that any future publication of my study will guarantee total anonymity and confidentiality of the people, school and authority involved.

With your permission I wish to spend several days of most weeks of the Spring Term observing, interviewing and generally immersing myself in the life of the school. This would involve making it possible for me to observe the daily routine of children, P.E., Games and Swimming, and have access to staff, harmless documents, and meetings/activities which might be considered relevant to my research. However, this would be undertaken with due regard to personal requirements for privacy.

My research would be conducted using questionnaires, interviews and observational analysis and I would do my utmost not to place any additional unnecessary burden upon teaching staff.

Should you feel it appropriate that I briefly outline my proposed research to a meeting of all staff in advance, then I would be more than willing to make myself available.

Likewise, at a later stage I would be prepared to report back to staff on findings relevant to their interests. In this way, I would hope both to provide necessary feedback and reciprocate your co-operation.

I look forward to our meeting on Wednesday, 8th January, when I will be happy to clarify any points arising.

Yours sincerely

E Richards

(4)

EXAMPLES OF FAVOURS ACCOMPLISHED ON BEHALF OF THE HOST SCHOOL

1. Assisting with the organisation of Sports Day.
2. Assisting with the Leavers' Party.
3. Digging out 'n' ton of sand from one high jump pit and tranferring it to another.
4. Accompanying the school party visiting France for 5 days.
5. Making tea for staff.
6. Accompanying a day trip to Statford upon Avon and Warwick castle.
7. Inflating all the balls in the P.E. store.
8. Supervising cricket practice.
9. Obtaining a white-line marker free for the P.E. Dept.

(5)

FORMAT OF PRELIMINARY INTERVIEWS

After a preliminary introduction to put the interviewee at ease and affirm that participation was optional and that all replies were confidential, the following questions were asked.

1. What do you do at playtime?
2. What do you do in the time after school and before you have tea?
3. What do you do at weekends?
4. Are you a member of any club or organisation, like the scouts/ guides, or youth club, sports club?
5. Do you do any activities with your parents, brothers or sisters, relatives or neighbours?
6. Do you have any hobbies or interests?
7. How far can you swim?
8. When was the last time you went swimming?

(6)

FORMAT OF THE IN DEPTH INTERVIEWS

First Interview

1. Did you take part in the Holiday Playscheme?
What activities did you do?
(Where children had not attended, they were asked a general question about what they did during the summer holiday.)
2. Which face on this card is most like yours before
PE/Games?Swimming?
(The child's reaction was selected from a series of Faces showing a positive, neutral and negative response.)
3. What do you particularly like/dislike about each activity?
4. Are any of these lessons your favourites? (Card with a comprehensive list provided.)
5. Which is your most favourite lesson and why?
6. Which are your least favourite lessons and why?

7. What activities do you think you are good at?
8. If you had a magic wand how would you improve PE/Games/
Swimming?
9. What did you do at Playtime today?
How would you make Playtime better?
10. Have you ever got out of doing PE/Games/Swimming?
How did you do that?
Why did you want to avoid Pe/Games/Swimming?
(Questions were posed separately.)

Second Interview

1. Would you take part in PE/Games/Swimming if you did not have
to? (Questions were posed separately.)
Can you say why you feel that way?
2. Depending upon whether the response to Qu.1 above was positive
or negative, the corresponding questions below were asked.

<u>Questions</u>	I <u>like</u> P.E. because of	Accompanied
	I <u>dislike</u> P.E. because of	by
	I <u>like</u> Games because of	Flash Card
	I <u>dislike</u> Games because of	

<u>Flash Card</u>	The Teacher
	Being with my friends
	Being with my class
	The weather
	The things we do
	It's in the morning
	It's in the afternoon
	You're forced to do it
	It's a break from lessons
	We do Cross Country
	Some other reason.

3. How is activity different at Playtime from doing games outdoors on the yard or the field?
4. If you had half an hour free during school time what would you do?
Would you prefer to organise yourselves or have a teacher do it for you? Why?
5. If someone is good/poor at PE or Games, do teachers/other children think any more/less of them, or does it not make any difference? (Questions were posed separately.)
6. Would you prefer to be selected by a captain or your teacher to join a team?
Whereabouts are you normally selected - towards the start, towards the middle, or towards the end?
7. Can you name any children out of your Year who seem to be able to run about and never become tired?
Can you think of anyone from your Year who gets tired out very easily when they run?
8. What activities do you do with your brother/sister/parents?
9. What did you do at Playtime today?
When do you think you are most active - when in the Playground or in P.E./Games?
10. How did you last avoid doing P.E./Games/Swimming and why?

(7)

COMPENDIUM OF THE LESS OBVIOUS PLAYGROUND GAMES

Cat & Mouse Played on slabs by two people (cat and mouse)
Mouse has 4 jumps, then Cat has 4 jumps and
tries to catch the Mouse.

Foxy Fox stands with back to the group who try to
creep up on him. If seen by the Fox when he
turns round unexpectedly, they are out and
stand along the wall.

Tig & Torture Game of tig in which those who are caught can
expect to be tortured by being tickled.

T.V. Games Mime a T.V. programme - clues given - when
anyone guesses they run to the person who is
'on' to be first with the answer.

(8) EXAMPLE OF THE PARENTAL LETTER IN RESPECT OF HEART RATE MONITORING

Dear Parents

ACTIVITY RESEARCH PROJECT

We are conducting a study into children's activity which involves recording heart rates during playtimes and lunchbreaks. Accordingly we are writing to a random selection of parents to ask their permission for their child to take part.

What is involved?

All that would be required would be for your child, on one occasion of about 30 minutes, to wear a simple heart rate recorder which is attached to the lower chest by means of two pads. A wrist watch receiver is worn on the arm. A lady member of staff, Mrs _____ will attach the recorder to the girls.

What do we hope to find out?

We aim to be able to make accurate recordings of the normal variations of heart rate during play.

General

This research is being undertaken with the support of the _____ L.E.A. at Loughborough University. It should be understood that participation of your child will be on an entirely voluntary basis and that on publication of the final research neither the children nor the school will be named.

Mr Richards, who will be supervising the project, will be pleased to answer any questions or provide additional information to any parent who requires it.

If you are happy for your child to participate, we would be grateful if you would sign and return the reply slip attached indicating the same.

Yours sincerely

E Richards

Enc.

PLEASE RETURN THIS FORM TO Mr _____, HEADMASTER, _____ SCHOOL

ACTIVITY RESEARCH PROJECT

* I give my permission for my son/daughter*.....
to participate in the above research project according to the
details made known to me.

* I would appreciate more information - please ask Mr Richards to
contact me at home/work*.

Telephone No:

Best Time/Day:

* Delete as necessary.

Signed..... Date.....

HEART RATE MONITORING DATA LISTED BY SUBJECT

TIME(S) SURJ 1 SURJ 2 SURJ 3 SURJ 4 SURJ 5 SURJ 6 SURJ 7

0	130	107	122	90	125	109	107
5	131	109	124	39	125	99	104
10	131	111	121	97	118	96	104
15	128	121	122	96	109	97	102
20	124	124	119	102	102	97	103
25	126	121	123	105	102	97	99
30	129	123	119	106	100	116	97
35	134	128	122	104	94	119	103
40	133	130	121	100	91	116	100
45	132	129	120	101	84	117	98
50	123	120	120	104	81	118	101
55	123	120	123	102	80	126	100
60	120	114	126	101	92	119	103
65	123	109	125	100	97	120	100
70	126	109	127	106	98	123	99
75	122	109	129	104	99	115	104
80	124	95	129	112	96	109	110
85	124	101	125	114	93	108	116
90	125	103	123	107	98	110	104
95	129	103	125	105	99	110	102
100	129	108	123	103	97	115	103
105	124	111	121	104	93	112	109
110	127	113	120	106	107	110	111
115	125	116	122	108	120	114	110
120	123	108	122	113	117	118	104
125	125	106	119	118	118	121	97
130	124	104	119	122	121	121	97
135	127	103	120	117	120	121	97
140	132	107	122	103	114	141	96
145	134	109	125	106	108	141	99
150	130	106	125	107	100	141	97
155	128	100	122	97	93	141	99
160	130	100	122	98	91	153	103
165	132	101	120	97	92	153	106
170	132	110	122	98	82	153	101
175	132	106	122	99	82	153	100
180	130	100	125	101	82	143	100
185	129	98	124	97	81	142	100
190	127	98	118	98	83	133	96
195	122	121	120	101	82	127	96
200	119	112	121	105	83	208	95
205	120	111	121	106	98	208	97
210	119	112	122	109	100	152	93
215	114	111	123	109	95	152	95
220	122	117	123	107	95	152	101
225	126	122	123	108	99	152	100
230	131	120	130	107	99	152	100
235	136	120	128	103	93	176	100
240	127	120	125	101	92	176	102
245	129	120	119	106	93	176	101
250	128	147	114	110	87	176	101
255	128	147	108	108	84	176	103
260	119	153	107	104	87	169	104
265	111	153	102	104	87	162	108
270	112	153	102	107	79	162	107
275	119	151	101	108	83	162	106

TIME(S)	SURJ 1	SURJ 2	SURJ 3	SURJ 4	SURJ 5	SURJ 6	SURJ 7
280	127	148	100	107	98	162	103
285	127	157	102	106	97	162	102
290	130	157	102	105	97	162	103
295	129	161	97	108	99	162	106
300	127	160	98	107	96	154	106
305	124	155	99	106	97	155	108
310	121	151	100	105	94	167	108
315	120	150	98	108	96	146	103
320	117	145	99	106	94	132	106
325	116	139	98	105	97	136	101
330	115	134	99	106	101	139	93
335	117	133	112	107	108	144	94
340	114	130	124	113	105	144	100
345	114	129	124	118	103	144	106
350	114	126	117	111	103	144	101
355	115	124	109	115	104	142	103
360	118	115	110	114	104	140	109
365	114	111	113	113	99	138	109
370	114	111	113	118	102	134	107
375	117	112	98	118	97	134	105
380	116	113	97	114	94	139	105
385	115	116	104	112	104	123	97
390	114	112	99	112	115	122	99
395	109	110	97	125	113	122	99
400	113	107	102	134	111	119	99
405	114	113	107	125	115	122	101
410	115	113	111	127	114	118	101
415	116	114	96	126	116	121	103
420	118	111	104	130	115	121	104
425	119	108	104	128	111	130	105
430	119	108	115	128	104	122	104
435	120	111	111	127	100	134	105
440	121	122	107	128	91	134	103
445	120	122	105	126	89	127	99
450	119	120	105	124	102	129	96
455	114	120	105	121	104	137	100
460	120	119	108	120	95	137	102
465	121	118	107	115	97	137	104
470	122	129	106	108	96	137	104
475	127	129	104	109	99	137	105
480	128	128	101	123	103	137	106
485	129	122	109	124	98	137	106
490	130	124	117	107	94	137	107
495	126	122	124	109	100	137	107
500	128	125	123	111	103	137	111
505	129	125	124	109	99	137	111
510	123	139	123	116	94	137	114
515	122	153	124	121	94	143	114
520	124	151	126	128	95	139	112
525	128	153	128	132	92	139	115
530	128	150	127	131	92	139	110
535	128	146	125	128	86	136	112
540	129	147	119	128	90	140	105
545	126	146	113	129	93	137	107
550	126	145	112	132	98	137	103
555	125	145	111	134	96	116	99
560	125	141	108	131	98	114	95
565	128	140	97	130	101	106	92
570	129	147	97	132	105	110	102

TIME(S)	SURJ 1	SURJ 2	SURJ 3	SURJ 4	SURJ 5	SURJ 6	SURJ 7
575	128	146	98	131	110	109	96
580	132	143	99	127	110	108	101
585	131	144	103	124	103	104	96
590	128	145	107	99	104	113	102
595	130	145	110	107	102	111	106
600	131	157	112	125	99	109	109
605	130	158	113	129	98	108	108
610	126	157	113	121	102	107	105
615	123	156	112	121	105	108	104
620	131	154	110	151	111	106	107
625	145	154	111	149	113	104	107
630	148	156	117	150	108	105	108
635	144	159	116	152	104	104	122
640	155	159	119	161	103	108	136
645	157	157	121	167	108	111	136
650	161	157	120	171	116	118	133
655	164	157	121	173	120	126	139
660	168	157	124	174	123	129	149
665	170	157	122	175	122	129	157
670	171	157	128	175	119	129	170
675	169	145	124	173	114	129	171
680	167	147	121	173	108	135	169
685	165	135	121	177	105	136	167
690	167	135	116	174	100	134	169
695	165	139	118	171	93	137	169
700	161	139	118	166	93	135	169
705	158	154	121	163	90	135	170
710	153	134	121	161	91	126	173
715	150	124	121	157	85	201	174
720	144	124	121	153	87	201	176
725	138	120	119	145	86	152	175
730	138	118	122	130	97	152	170
735	155	115	119	120	113	152	163
740	120	113	123	118	116	152	163
745	156	114	123	122	106	152	160
750	157	115	126	116	106	152	154
755	157	116	119	109	104	152	160
760	162	120	111	111	108	152	167
765	163	123	118	114	109	152	151
770	161	116	115	117	87	152	141
775	159	117	113	116	92	147	129
780	159	120	113	102	93	150	120
785	161	120	109	111	96	153	117
790	159	119	114	111	99	150	115
795	160	118	113	115	94	137	110
800	165	116	114	113	92	135	108
805	169	117	112	113	91	132	102
810	176	116	111	101	91	132	96
815	165	122	109	109	92	132	95
820	164	121	110	111	93	132	94
825	163	119	117	109	93	132	89
830	165	121	111	98	92	133	87
835	165	114	113	113	94	133	90
840	169	115	113	100	90	133	95
845	165	115	113	105	95	133	95
850	163	112	114	112	90	133	101
855	162	117	111	116	94	133	123
860	164	117	111	117	92	226	118
865	167	103	111	111	92	159	111

TIME(S)	SURJ 1	SURJ 2	SURJ 3	SURJ 4	SURJ 5	SURJ 6	SURJ 7
870	169	103	117	118	91	158	106
875	170	107	116	119	92	157	108
880	169	107	118	124	96	163	110
885	167	112	122	127	94	163	116
890	166	106	119	128	95	164	117
895	170	112	115	128	94	159	117
900	171	113	116	113	103	0	119
905	168	119	117	122	116	0	122
910	166	115	115	133	114	0	123
915	166	114	116	141	115	0	119
920	163	103	108	151	112	0	123
925	157	109	112	158	115	0	112
930	153	110	113	158	110	0	114
935	149	107	116	148	108	0	116
940	145	109	120	144	108	0	114
945	142	114	118	130	103	0	111
950	139	111	120	124	118	0	118
955	133	113	107	142	114	0	115
960	134	118	114	150	109	0	119
965	142	113	110	149	113	0	119
970	144	0	115	145	119	0	108
975	146	0	0	146	121	0	113
980	148	0	0	145	120	0	118
985	148	0	0	141	118	0	111
990	152	0	0	125	114	0	105
995	151	0	0	126	112	0	100
1000	146	0	0	126	106	0	101
1005	147	0	0	116	105	0	103
1010	147	0	0	116	105	0	101
1015	147	0	0	112	104	0	100
1020	0	0	0	0	101	0	0

TIME(s)	SURJ 8	SURJ 9	SURJ 10	SURJ 11	SURJ 12	SURJ 13	SURJ 14
0	115	102	110	125	104	144	65
5	104	102	102	126	112	146	65
10	107	101	102	131	122	140	66
15	100	106	101	124	117	127	77
20	93	100	95	116	115	123	80
25	90	99	93	113	112	121	86
30	97	99	90	120	110	114	82
35	105	100	102	125	107	113	82
40	107	103	103	118	106	119	87
45	109	106	104	124	108	119	82
50	116	106	105	138	107	118	86
55	117	97	106	135	114	120	85
60	118	102	100	131	117	124	84
65	100	101	95	135	113	116	88
70	101	100	105	137	125	114	81
75	99	107	113	138	133	113	83
80	102	107	110	142	134	115	86
85	99	103	103	144	128	124	79
90	97	100	108	147	130	110	78
95	99	105	106	147	130	124	76
100	97	107	107	140	132	108	76
105	97	107	114	136	124	119	79
110	97	138	113	130	131	120	81
115	93	138	110	133	128	123	80
120	110	137	109	137	123	119	81
125	104	132	111	144	131	127	85
130	112	131	102	150	122	122	69
135	107	129	105	155	121	126	72
140	113	122	105	158	117	129	87
145	107	119	103	162	116	133	92
150	111	110	102	165	116	135	97
155	103	112	108	168	123	140	99
160	103	115	127	169	116	138	103
165	106	109	147	170	118	133	102
170	101	109	161	172	123	137	104
175	103	106	165	177	121	132	104
180	103	111	169	177	123	135	104
185	106	112	159	173	130	130	93
190	122	118	162	178	120	135	95
195	109	120	163	181	123	133	93
200	107	118	159	182	122	134	90
205	111	115	150	186	127	139	94
210	114	113	143	137	132	128	94
215	115	119	136	189	134	134	97
220	108	119	142	190	131	132	93
225	107	115	151	191	114	130	92
230	107	106	158	191	119	133	95
235	107	100	159	191	122	127	100
240	112	103	151	191	118	130	100
245	112	103	142	190	112	128	97
250	106	104	149	191	121	121	94
255	105	104	150	190	112	125	90
260	105	112	149	188	114	115	85
265	106	104	152	184	112	124	86
270	108	104	152	179	111	123	88
275	102	103	147	177	108	126	83

TIME (S)	SURJ 8	SURJ 9	SURJ 10	SURJ 11	SURJ 12	SURJ 13	SURJ 14
280	100	108	142	174	113	121	85
285	96	111	126	174	109	123	87
290	97	114	122	178	109	128	90
295	103	105	127	181	129	127	91
300	102	105	125	173	135	127	83
305	100	107	126	176	101	132	88
310	103	109	126	174	106	133	94
315	113	108	128	174	114	138	100
320	104	100	125	170	116	133	105
325	107	99	114	167	119	144	110
330	107	102	116	157	124	146	113
335	107	105	114	157	120	140	107
340	114	102	108	157	123	128	99
345	135	106	107	161	113	123	98
350	144	107	104	161	116	109	95
355	141	103	106	155	113	118	90
360	139	98	103	163	136	109	91
365	139	102	100	168	149	117	99
370	133	104	101	163	149	122	87
375	132	107	100	163	146	122	86
380	117	106	110	161	147	123	85
385	102	108	107	161	150	124	86
390	99	110	115	160	154	127	85
395	90	105	91	158	141	128	83
400	92	107	97	153	136	125	80
405	92	108	116	156	133	132	82
410	93	110	124	150	119	130	82
415	93	108	114	149	128	135	83
420	89	105	110	147	124	133	82
425	83	105	120	147	122	139	86
430	90	106	137	155	116	113	85
435	90	106	131	162	126	134	82
440	90	103	123	172	129	128	75
445	90	104	128	182	122	129	78
450	94	102	130	188	138	130	83
455	105	104	110	192	152	123	87
460	106	108	125	193	153	122	85
465	109	112	128	195	147	126	89
470	110	108	121	195	153	127	89
475	110	109	124	193	154	122	83
480	112	101	125	198	153	125	83
485	110	101	125	198	147	120	83
490	109	101	109	200	144	121	90
495	101	101	114	200	137	117	80
500	98	144	114	199	134	121	86
505	96	144	115	201	131	121	83
510	90	144	109	201	142	121	82
515	92	144	112	201	159	126	84
520	88	144	112	200	162	130	87
525	91	144	112	198	156	126	88
530	93	166	108	197	159	128	82
535	92	166	103	196	157	132	85
540	100	166	112	196	152	135	86
545	92	173	95	195	153	126	83
550	100	171	99	196	163	127	83
555	99	169	97	194	154	137	87
560	101	169	98	193	147	126	89
565	99	160	107	192	146	126	86
570	101	160	104	189	139	133	89

TIME(S)	SUBJ 8	SUBJ 9	SUBJ 10	SUBJ 11	SUBJ 12	SUBJ 13	SUBJ 14
575	170	171	103	183	160	115	80
580	98	169	104	175	155	117	80
585	91	167	101	160	147	123	82
590	92	157	103	168	164	122	94
595	96	150	93	167	160	128	100
600	119	141	91	172	156	135	91
605	137	141	90	188	156	131	95
610	134	141	91	197	164	130	95
615	128	158	96	201	155	117	101
620	126	158	97	204	153	126	99
625	125	159	105	206	164	125	93
630	119	167	100	202	161	125	102
635	118	153	96	197	151	119	107
640	111	156	92	196	149	131	106
645	110	153	93	195	145	139	114
650	108	143	90	193	147	117	97
655	107	145	90	192	140	126	101
660	102	139	94	196	146	133	105
665	105	128	79	199	137	103	98
670	96	129	72	205	133	117	96
675	87	131	95	208	126	124	90
680	87	131	103	210	126	126	90
685	93	131	105	211	152	119	97
690	91	133	94	208	152	119	96
695	99	138	94	205	155	130	90
700	98	138	91	203	150	142	87
705	100	135	91	199	151	138	89
710	95	129	95	199	155	139	83
715	104	134	94	196	161	138	80
720	102	135	92	193	164	137	82
725	102	134	91	190	165	137	84
730	97	135	90	186	140	137	83
735	99	135	90	181	140	138	89
740	96	138	83	177	147	133	87
745	97	144	86	173	132	132	91
750	101	146	80	171	129	139	85
755	101	148	80	168	126	132	93
760	101	153	81	166	124	130	94
765	102	147	77	165	134	133	96
770	103	142	82	160	135	129	93
775	97	139	86	160	134	134	101
780	104	136	77	163	136	135	97
785	100	134	83	167	135	132	92
790	95	131	85	172	134	128	101
795	99	131	94	176	136	131	96
800	99	141	88	176	136	125	89
805	100	147	93	180	140	132	84
810	102	146	94	184	136	129	76
815	101	149	89	185	131	132	78
820	106	156	93	186	134	132	83
825	107	155	93	183	134	131	90
830	117	154	85	190	116	130	88
835	121	148	90	191	122	133	79
840	127	146	92	192	126	129	81
845	127	148	90	192	124	132	81
850	121	143	86	193	127	133	71
855	116	137	88	193	130	133	72
860	111	137	83	193	142	136	75
865	113	130	92	192	138	142	77

TIME(s)	SURJ 8	SURJ 9	SURJ 10	SURJ 11	SURJ 12	SURJ 13	SURJ 14
870	109	125	95	192	139	138	75
875	109	122	95	192	150	137	70
880	108	119	95	192	157	136	83
885	107	116	92	192	151	131	80
890	107	117	82	191	148	136	84
895	106	115	85	190	150	136	70
900	98	0	97	190	158	137	77
905	0	0	97	187	162	140	80
910	0	0	86	185	154	143	85
915	0	0	87	181	156	136	81
920	0	0	100	176	153	141	85
925	0	0	95	172	152	124	85
930	0	0	95	175	145	121	80
935	0	0	97	171	143	123	79
940	0	0	105	165	132	116	80
945	0	0	112	160	142	122	81
950	0	0	95	158	149	120	86
955	0	0	92	155	152	125	85
960	0	0	88	0	148	118	85
965	0	0	91	0	146	128	85
970	0	0	98	0	147	122	87
975	0	0	100	0	150	122	90
980	0	0	94	0	140	124	86
985	0	0	99	0	139	115	84
990	0	0	99	0	142	122	82
995	0	0	89	0	138	118	81
1000	0	0	91	0	0	119	83
1005	0	0	92	0	0	125	81
1010	0	0	92	0	0	124	81
1015	0	0	93	0	0	122	79
1020	0	0	86	0	0	125	0

TIME (s) SUBJ 15 SUBJ 16 SUBJ 17 SUBJ 18 SUBJ 19 SUBJ 20

0	100	87	136	81	113	104
5	107	85	132	80	111	104
10	101	79	130	88	114	92
15	94	80	121	94	109	92
20	89	80	119	94	110	92
25	92	80	106	92	108	92
30	89	89	100	92	106	92
35	93	89	96	81	118	104
40	95	90	95	105	113	104
45	89	86	102	106	112	101
50	85	84	103	96	109	101
55	88	85	106	100	108	107
60	82	85	103	103	113	107
65	83	88	100	103	115	103
70	84	89	95	98	111	102
75	87	82	102	95	102	105
80	84	85	99	95	104	101
85	87	85	102	88	105	91
90	94	87	94	88	114	94
95	101	114	101	87	109	94
100	103	118	105	87	106	94
105	75	116	104	93	101	94
110	81	111	99	97	107	137
115	91	108	100	92	111	137
120	43	113	96	95	96	145
125	102	118	91	91	108	146
130	104	114	94	95	111	146
135	110	109	90	100	101	146
140	115	102	96	109	104	146
145	113	100	95	105	106	146
150	115	104	94	104	113	145
155	115	104	89	101	112	143
160	115	100	92	97	116	143
165	117	95	101	96	112	143
170	118	93	102	94	105	138
175	124	93	99	99	102	140
180	129	90	87	99	103	137
185	134	96	88	99	98	137
190	136	99	95	95	101	137
195	135	101	100	89	102	126
200	142	97	107	94	105	123
205	144	94	105	97	100	124
210	144	97	105	102	99	119
215	141	97	105	113	100	118
220	133	82	105	110	106	118
225	131	80	107	99	103	112
230	118	82	109	100	102	112
235	117	83	109	101	103	112
240	121	83	109	107	110	98
245	122	80	138	107	102	98
250	123	81	138	100	93	98
255	132	92	133	98	95	105
260	145	96	137	94	102	104
265	144	97	140	88	102	100
270	133	94	142	90	107	102
275	128	95	144	91	99	95

TIME (s) SUBJ 15 SUBJ 16 SUBJ 17 SUBJ 18 SUBJ 19 SUBJ 20

280	125	87	143	98	108	96
285	128	86	140	98	110	94
290	143	83	143	102	107	94
295	152	84	137	108	101	96
300	155	82	133	109	104	94
305	156	86	126	104	110	92
310	159	84	119	110	124	93
315	160	83	119	106	123	94
320	163	78	115	105	112	94
325	175	79	114	109	114	94
330	178	81	115	104	117	106
335	178	85	107	101	120	109
340	178	85	109	98	123	109
345	178	84	104	111	128	109
350	175	88	106	127	144	128
355	171	88	101	141	139	130
360	166	87	103	147	132	133
365	158	88	105	154	136	134
370	151	88	104	157	133	134
375	140	91	107	160	138	134
380	138	88	103	159	131	130
385	131	84	106	153	129	123
390	125	85	105	157	128	114
395	116	86	103	156	132	110
400	115	89	104	149	123	106
405	119	90	104	134	120	100
410	119	90	104	130	118	98
415	114	95	112	124	117	109
420	111	96	105	115	112	113
425	104	103	105	105	115	113
430	102	108	102	101	143	89
435	101	110	102	109	143	86
440	103	110	102	131	152	87
445	103	103	100	129	157	92
450	98	101	92	120	156	96
455	98	99	96	110	156	95
460	102	99	93	106	149	90
465	105	103	88	100	141	93
470	111	96	90	104	138	93
475	99	94	86	100	139	94
480	98	92	90	100	140	94
485	98	99	91	92	153	97
490	99	93	92	90	153	99
495	99	94	89	100	177	102
500	109	77	96	116	170	100
505	110	84	93	122	160	99
510	108	85	94	116	156	98
515	105	84	92	114	152	94
520	103	83	89	114	159	101
525	101	90	91	115	163	102
530	111	90	92	121	153	102
535	103	90	93	111	148	108
540	107	84	110	104	139	108
545	100	87	110	99	136	106
550	104	85	110	98	133	106
555	102	85	114	94	131	90
560	102	85	114	98	131	90
565	104	87	116	83	100	90
570	103	88	120	83	100	92

TIME (s) SURJ 15 SURJ 16 SURJ 17 SURJ 18 SURJ 19 SURJ 20

575	108	89	119	83	105	105
580	100	95	115	83	111	91
585	99	95	103	82	113	90
590	98	97	96	82	109	93
595	97	109	92	84	114	93
600	97	119	92	89	121	97
605	131	114	90	112	123	97
610	129	103	89	136	129	95
615	125	107	102	137	124	95
620	114	109	104	132	118	91
625	112	106	106	132	114	91
630	106	101	104	127	122	97
635	109	92	110	118	123	97
640	105	95	117	112	110	98
645	110	86	124	103	104	103
650	107	82	122	96	108	103
655	104	80	123	93	105	115
660	105	83	130	94	111	117
665	109	85	131	94	102	117
670	110	90	130	93	111	118
675	89	90	133	98	115	118
680	90	85	134	97	109	105
685	94	103	132	93	113	110
690	90	114	134	82	113	109
695	94	114	133	92	133	103
700	95	115	124	95	132	107
705	93	110	114	96	150	105
710	95	109	114	126	152	105
715	92	110	112	137	161	102
720	92	110	111	131	167	102
725	95	107	113	135	174	91
730	103	97	112	125	174	97
735	103	95	109	122	176	99
740	83	90	108	117	175	103
745	85	88	108	114	175	104
750	111	86	108	133	170	93
755	112	82	99	154	161	95
760	97	85	98	158	151	95
765	89	89	107	154	147	95
770	87	92	107	149	158	97
775	91	92	106	149	144	97
780	93	93	107	141	146	97
785	95	93	117	142	140	104
790	78	90	118	132	151	104
795	82	91	119	130	153	97
800	91	91	118	129	152	104
805	108	87	112	121	147	98
810	110	86	114	116	146	102
815	103	87	101	113	148	103
820	100	89	105	110	148	109
825	93	88	109	106	148	108
830	87	83	112	102	195	105
835	87	80	112	100	194	102
840	92	82	112	104	194	102
845	85	84	112	105	190	104
850	89	84	115	103	192	120
855	89	87	116	102	183	120
860	77	87	123	99	187	130
865	81	87	125	102	186	126

TIME(s)	SUBJ 15	SUBJ 16	SUBJ 17	SUBJ 18	SUBJ 19	SUBJ 20
870	91	96	125	109	187	128
875	81	102	124	106	179	131
880	83	101	121	105	184	132
885	73	91	120	107	180	127
890	73	90	124	95	178	118
895	87	101	128	83	171	109
900	88	107	133	90	167	106
905	89	101	135	94	166	107
910	86	98	130	96	166	106
915	87	95	126	93	166	106
920	88	97	125	106	166	121
925	106	83	125	97	201	115
930	112	92	122	100	199	117
935	113	98	119	93	193	111
940	111	98	120	99	186	111
945	111	83	114	101	182	120
950	110	99	112	97	175	119
955	114	105	111	96	171	120
960	130	108	104	102	159	136
965	150	103	105	102	157	138
970	171	95	106	98	152	138
975	184	94	109	97	135	131
980	176	93	111	99	150	138
985	171	89	112	98	134	148
990	168	89	112	106	135	154
995	164	94	0	113	137	159
1000	167	92	0	101	141	161
1005	167	87	0	101	141	161
1010	162	89	0	99	138	154
1015	157	87	0	98	137	142
1020	150	80	0	0	0	136

