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Cheung, Maria Marisa, Ph.D.

City University of New York, 1989

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A

THE IMPACT OF THE PLAY ENVIRONMENT ON THE SOCIAL INTEGRATION OF MENTALLY RETARDED AND NON-DISABLED CHILDREN

BY

MARIA M. CHEUNG

A dissertation submitted to the Graduate Faculty
in the Psychology Program for partial fulfillment of
the requirements for the degree of Doctor of Philosophy
The City University of New York

1989

This manuscript has been read and accepted by the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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Abstract

THE IMPACT OF THE PLAY ENVIRONMENT ON THE SOCIAL INTEGRATION OF MENTALLY RETARDED AND NON-DISABLED CHILDREN

by

Maria M. Cheung

Advisor: Professor Roger Hart

This study is the first empirical attempt to explore the social integration potential of different types of play equipment in New York City's first outdoor public playground designed to integrate disabled and non-disabled children. This integrated outdoor play setting provides a valuable opportunity to study factors that can promote the mainstreaming of disabled children through play. Research has suggested that mentally retarded (MR) children are better accepted by their non-disabled (ND) peers in a gross-motor play setting than in the classroom. Four different play equipment areas were selected for behavioral observation : swings, sand box with wooden castle, climbing net with soft mat floor, and water play area with waterwheel. A total of 87 MR children and 72 ND children were observed. The results showed that limited social integration occurred between MR and ND children on the playground. Among the four equipment areas, the net area was associated with the highest percentages of peer group play and social integration. Rough and tumble type of play activities observed in the net area appeared to bring children into contact with

one another unintentionally and spontaneously, while the other three play areas required children to make more conscious efforts to initiate contact. The findings also suggest that play areas with few or no toys are more likely to be associated with more positive peer interactions and less negative behaviors than are areas with many toys. Children who were observed to have close adult supervision engaged in less peer interactions and less integrated play than children observed with less stringent supervision. Among other factors that were found to influence children's peer interactions and integrated play include: children's age, gender, severity of MR children's condition, social density in equipment area, children's familiarity with the playground and familiarity with their playmates within an equipment area.

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TABLE OF CONTENTS

CHAPTER 1

RATIONALE FOR RESEARCH....1

CHAPTER 2

LITERATURE REVIEW....8

Introduction....8

Peer Attitudes Toward Disabled Children....9

Factors Influencing Peer Acceptance....11

Familiarity or Contact with Disabled Peers....11
Measurement of Peer Acceptance....12
Ecological Factors of Mainstreamed Setting....14
The Value of a Play Setting....14
Reversed Mainstreaming....15
Handicapped vs. Non-handicapped Ratio....16
Role of Caregivers....17
Characteristics of Disabled Children....18
Types of Handicapping Condition....18
Severity of Handicapping Condition....19
Disabled children's Behavior....20
Social Skill Training....21

Play for Integration....23

Toys and Peer Interactions....24
Play Setting and Peer Interaction....27
Gross-motor Play Equipment and Children's Behavior....29
Encapsulation of Equipment....32
Single vs. Multi-niche Equipment....32
Equipment Complexity....34

RESEARCH AIMS....42

CHAPTER 3

RESEARCH DESIGN....44

Setting....44

Population....45
Methods....46

Caretaker Interview....47
Child Interview....48
Equipment Sampling....54
Information Collected from the Equipment Sampling Method....57
Characteristics of target child....59
Activity focus....60
Social participation....61
Social specific....61
Social partner....64
Response to social speciifc....65
Supervision....65
Group composition at equipment area....66
Social density at equipment area....66
Loose parts and toys....67

CHAPTER 4

RESULTS....69

Introduction....69

Results of the Caretaker Interview....70

Play Equipment with Integrating Potential....71
Reasons for Equipment's Integrating Potential....73
Differences between Caretakers of Disabled and Non-disabled Children....75

Results of the Child Interview....77

Play Equipment Usage....77
Play with Unfamiliar and Disabled Children....79
ND Children's Perception of Activity Affordance....80
Equipment Differences in Activity Affordance....82
Effects of Children's Age, Sex, and Playground Familiarity on their Perception of Activity Affordance....84
Activity Affordance and Children's Equipment Preference and Usage....85
Types of Activities Afforded by Equipment....87
Age and Gender Differences in Reported Activity Types...89

Do Caretakers' Perception of Play Equipment's Integrating Potential Correspond to Children's Reported Behavior ?....90

Results of Equipment Sampling Observation Method....92

Introduction....92
Sample Information....93
Results of Children's Play Activities....99

Types of Play Activities Observed.....99
Effects of Play Equipment on Play Activities.....100
Effects of Group Composition on Play Activities.....102
Effects of Mental Retardation on Play Activities.....102
Effects of Age on Play Activities.....106
Effects of Gender on Play Activities.....107
Effects of Adult Supervision on Play Activities.....108
Effects of Social Density on Play Activities.....109

Summary of Findings on Children's Play Activities.....112

Discussion of Findings on Play Activities.....114

Results of Children's Social Participation.....117

Introduction on Social Participation.....117
Effects of Play Equipment on Social Participation.....118
Effects of Group Composition on Social Participation...119
Effects of Play Equipment and Group Composition on Social Participation.....120
Effects of Mental Retardation on Social Participation..121
Effects of Age on Social Participation.....121
Effects of Gender on Social Participation.....124
Effects of Adult Supervision on Social Participation...125
Effects of Social Density on Social Participation.....128
Effects of Playground Familiarity on Social Participation.....130
Effects of Observation Duration on Social Partcipation.130
Effects of Observation Sequence on Social Partcipation.132
Relationship between Social Participation Partner and Social Participation.....133

Summary of Findings on Children's Social Participation.....137

Discussion of Findings on Children's Social Participation...141

Results of Children's Specific Social Behaviors.....144

Introduction on Specific Social Behaviors.....144
Effects of Play Equipment on Specific Social Behaviors.146
Effects of Group Composition on Specific Social Behaviors.....148
Effects of Play Equipment and Group Composition on Specific Social Behaviors.....149
Effects of Mental Retardation on Specific Social Behaviors.....150
Effects of Age on Specific Social Behaviors.....152
Effects of Gender on Specific Social Behaviors.....153
Effects of Supervision on Specific Social Behaviors....154
Effects of Social Density on Specific Social Behaviors.157

Effects of Playground Familiarity on Specific Social Behaviors.....159
Effects of Observation Duration on Specific Social Behaviors.....159
Effects of Observation Sequence on Specific Social Behaviors.....160

Relationship between Social Interaction Partner and Specific Social Behaviors.....161
Social partners and ND children.....163
Social partners and MR children.....164
Influence of adult supervision on children's social partners.....164
Sequential patterns and social partners.....165
Age differences and social partners.....165
Gender differences and social partners.....166

Relationship between Social Response and Specific Social Behaviors.....166
Social partners and social response.....168
Play equipment areas and social response.....169
Social response for MR and ND children.....169
Age differences in social response.....170
Gender differences in social response.....170

Summary of Findings on Children's Specific Social Behaviors.171

Discussion of Findings on Children's Specific Social Behaviors.....177

CHAPTER 5

SUMMARY AND DISCUSSION.....180

Summary for the Caretaker Interview.....181

Summary for the Child Interview.....182

Correspondence of Caretakers' Perception of Play Areas' Integrating Potential and Children's Reported Behaviors.....184

Summary and Discussion of Findings for the Equipment Sampling Observation Method.....185

Commonalities between Children's Reported Play Activities and Observed Activities.....185

The Impact of Play Equipment on Children's Play and Social Behaviors.....186
Perceived Activity Affordance of Play Equipment Areas and Children's Behaviors.....186

Play Equipment Areas with Toys and Children's Behaviors.....188

The Different Impact of the Play Environment on MR and ND children.....189

The Impact of Mental Retardation on Children's Play and Social Behaviors.....190

The Impact of Group Composition on Children's Play and Social Behaviors.....192

Age and Gender Differences on Children's Play and Social Behaviors.....194

The Impact of Adult Supervision on Children's Play and Social Behaviors.....196

The Impact of Social Density on Children's Play and Social Behaviors.....197

Relationship between Social Partner and Children's Social Behaviors.....199

CHAPTER 6

GENERAL DISCUSSION AND IMPLICATIONS.....201

The Impact of Play Equipment Areas and Toys on the Social Integration od Children.....202

Familiarity and Social Integration of Children.....205

Adult Supervision and Social Integration of Children.....208

Social Integration at the Playground for All Children.....210

Implications for Future Playgrounds for All Children.....211

Implications for Research.....213
A Critique of This Study.....214
Future Research Ideas.....216

APPENDICES

Appendix A. Map of the Playground for All Children.....218

Appendix B. Child Interview Form.....219

Appendix C. Equipment Sampling Method - Data Collection Instructions.....220

Appendix D. Equipment Sampling Method - Coding Manual.....222

Appendix E. List of Play Activity Categories Used for Data Analyses.....243

Appendix F. Computer Output for Loglinear Analysis on Play Activities Using Disability and Age as Explanatory Variables.....244

Appendix G. List of Specific Social Behavior Categories Used for Data Analyses.....246

Appendix H. Computer Output for Loglinear Analysis on Specific Social Activities Using Play Equipment and Group Composition as Explanatory Variables...248

Appendix I. Computer Output for Loglinear Analysis on Specific Social Activities Using Gender and Disability as Explanatory Variables.....250

Appendix J. Computer Output for Loglinear Analysis on Specific Social Activities Using Play Equipment and Social Partners as Explanatory Variables.....252

Appendix K. Computer Output for Loglinear Analysis on Specific Social Activities Using Group Composition and Social Partners as Explanatory Variables.....255

REFERENCES.....257

LIST OF TABLES

Table 1. Percentages of Caretakers' Responses on the Best Places on the Playground for Children's Social Integration.....72

Table 2. Percentages of Caretakers' Responses on the Best Places on the Playground for Children's Social Integration and Reasons for Each Selected Equipment Area.....74

Table 3. Percentages of Caretakers' Responses on the Reasons for Selecting an Equipment Area as some of the Best Places for Integrating Children.....76

Table 4. Child Interview's Respondents' Reported Play Equipment Usage.....78

Table 5. Children's Perceived Activity Affordance for the Four Play Equipment Areas.....82

Table 6. Percentages of Types of Activities Children Perceived to be Afforded by the Four Equipment Areas.....88

Table 7. Number of Subjects in Two Age Groups Obtained for the Equipment Sampling Observation Method for Each Group Composition and Equipment Area.....94

Table 8. Number of Boys and Girls Obtained for the Equipment Sampling Observation Method for Each Group Composition and Equipment Area.....96

Table 9. Percentages of Types of Activities Observed During Children's Play the Four Equipment Areas.....101

Table 10. Percentages of Types of Activities Observed During Children's Play in the Three Group Composition..... 103

Table 11. Percentages of Activity Types Observed Among Children with Different Levels of Mental Retardation 105

Table 12. Percentages of Types of Activities Observed During Children's Play in the Two Density Conditions.....110

Table 13. Percentages of Group Participation Observed within the Equipment Areas and Under Different Group Composition.....119

Table 14. Percentages of Group Participation Observed within the Equipment Areas and for the Two Age Groups.....122

Table 15. Percentages of Group Participation Observed within the Three Group Compositions and for the Two Age Groups.....123

Table 16. Percentages of Group Participation Observed for Boys and Girls and for the MR and ND Groups.....124

Table 17. Percentages of Group Participation Observed Under the Two Supervisory Conditions within the Equipment Areas.....126

Table 18. Percentages of Group Participation Observed Under the Two Density Conditions within the Equipment Areas.....129

Table 19. Breakdown of All Observations of Group Participation by Social Partner and Group Composition 134

Table 20. Breakdown of All Observations of Group Participation by Social Partner and Play Equipment Areas.....135

Table 21. Percentages of Specific Social Activities Observed During Children's Play in the Four Equipment Areas.....146

Table 22. Percentages of Specific Social Activities Observed During Children's Play in the Three Group Composition Conditions...148

Table 23. Percentages of Specific Social Activities Observed During Children's Play for Children with Different Level of MR.....151

Table 24. Percentages of Specific Social Activities Observed During Children's Play for the Two Supervisory Conditions.....155

Table 25. Percentages of Specific Social Activities Observed During Children's Play for the Two Density Conditions.....158

Table 26. Percentages of Children's Social Partners for Each Specific Social Activities Observed During Children's Play 162

Table 27. Percentages of Children's Social Responses for Each Specific Social Activities Observed During Children's Play..167

List of Figures

Figure 1. Play equipment area 1 - Swings.....49

Figure 2. Play equipment area 2 - Climbing net with soft mat floor..50

Figure 3. Play equipment area 3 - Sand box with wooden castle.....51

Figure 4. Play equipment area 4 - Water play area with waterwheel...52

CHAPTER 1

RATIONALE FOR RESEARCH

It has been fourteen years since the passage of the Public Law 94-142, the Education for All children Act, mandating the social and instructional integration of all handicapped children into regular classrooms. A major provision of this legislation, one that has the greatest impact on both professionals and peers in the public school systems, is the Least Restrictive Environment Provision. It mandated that handicapped children must be educated with non-handicapped peers in regular classrooms to the fullest extent possible. Alternatively, disabled children can be educated outside of the regular classroom when supplementary services such as resource rooms are provided or when the regular classroom situation cannot satisfy the individual needs of disabled children. As more and more disabled children are becoming mainstreamed in the public school systems, there is increasing need to study the efficacy of mainstreaming and factors that would lead to successful mainstreaming efforts.

There have been many investigations related to the efficacy of mainstreaming since the enactment of this law. Comprehensive reviews of these investigations suggest that although some disabled children profited from the integrated educational experiences in the regular

classroom, the majority of these students still face major stumbling blocks to successful integration because of negative attitudes toward the disabled demonstrated by non-disabled peers and teachers (Horne, 1985). Children with a wide range of disabilities and severity of handicapping conditions are often placed into regular classrooms whose teachers and students have had little or no preparation for mainstreaming. The "least restrictive environment" concept may ironically result in the regular classroom as being more restrictive than a special education classroom when disabled children are assigned "second class citizen" status by their non-disabled peers and teachers. Proponents of mainstreaming assumed that increased exposure to handicapped children will result in increased social interaction with and social acceptance of handicapped children by non-handicapped peers. However, the mere physical placement of disabled children with non-disabled peers has been demonstrated to be unsuccessful in achieving integration (Gresham, 1982). Most special educators now agree that in order for mainstreaming to work, some form of systematic intervention or programming is essential.

This wholesale mainstreaming effort, however well intentioned, was doomed to failure due to the lack of understanding on what contributes to successful social integration of disabled and non-disabled children. On a more rudimentary level, it ignored the fact that society assigns an inferior status or stigma to disabled individuals and thus reinforces the attitudes held by school children, their parents, or school teachers. In order for successful

mainstreaming to become a reality, the negative attitudes and expectations of those directly participating in the mainstreaming process must be modified, especially those of the non-disabled peers.

It has been well documented that peer relationships occupy a central role in the social, emotional, and intellectual development of all children (Hartup, 1983; Lewis & Rosenblum, 1975; Piaget, 1964). Research shows that poor peer relationships in childhood are among the most powerful predictors of social and emotional problems in adolescence and adulthood (Hartup, 1984). The need to have meaningful peer relations is magnified for disabled children who often lack the opportunity or encouragement for peer interactions within segregated or integrated settings. As Guralnick (1984) asserts, intervention programs for handicapped children historically have been focused on the cognitive, motor, and language development of handicapped youngsters while their social development and peer relations are treated as "by-products" of these more primary developmental domains. Guralnick further asserts that the general absence of systematic efforts to promote peer-related social skills may be the single most important factor limiting the success of mainstreaming. Oftentimes, intervention programs for young handicapped children place emphasis solely on adult-child relationships while ignoring the beneficial contribution of peer interactions (Mueller & Bergstrom,1982). It is unfortunate that disabled children often are found to be either isolated or interacting with adult caregivers rather than with their peers.

However, there is increasing evidence that disabled children's rate of peer interactions improves dramatically when placed in a play situation (Buell et al, 1968; Guralnick, 1978) and that play can be used to increase social interactions between disabled and non-disabled children (Devoney, Guralnick, & Rubin, 1974; Poresky & Hooper, 1984). This is not surprising since much of children's peer interactions were found to occur during play (Rubin, Fein & Vandenberg, 1983). What is surprising, however, is that retarded children were shown to generalize the effect of their integrated experiences in a regular school (i.e. increased positive peer interaction) to their special school during the playground period while no generalization was observed during classroom periods (Pipe, Redman, & White, 1983). Moreover, non-disabled children's attitude towards retarded peers was demonstrated to be more favorable during a play situation than during a class situation (Gottlieb, 1971). Similarly, Marge (1966) found that speech-impaired students were not chosen less by non-disabled classmates for participation on playground games but they received significantly less choices as work or study partners on a sociometric questionnaire.

Several speculations have been put forth to explain why the play setting promotes disabled children's peer interaction or why the play situation effects a more favorable status among retarded children. Gottlieb (1971) proposed that the primary reason for assigning children to special classes is their inability to maintain the academic standard expected from a regular class rather than their

deficiency at play. Guralnick (1978) suggested that the play activities themselves permit both disabled and non-disabled children to explore each other's actions and interactions in a non-threatening situation while providing a setting for practicing social skills. It is obvious that both hypotheses have intuitive merits. The important point is that existing research demonstrates that play can be used as an intervention to encourage social integration of disabled and non-disabled children. The remaining question then is what form of play or what type of play setting best facilitates social integration of disabled children ?

Before any effective interventions can be implemented, programmatic research must first be performed. It has been many decades since we recognized that play occupies an essential role in the development of all children and that much of children's peer interaction occurs during play. Review of both mainstreaming and developmental literature reveals that peer acceptance occurs much more often during play than during any other times; furthermore, more prosocial behaviors were observed among children during play in playground settings with large play equipment than during play in indoor settings with toys (DeStefano & Mueller, 1982; Guralnick, 1981; Peterson, 1982; Smith and Connolly, 1980; Vandenberg, 1981). The finding that a playground setting encourages prosocial behavior among children points to a promising avenue of pragmatic research on the facilitation of social integration between disabled and non-disabled children.

The research proposed here will be a first empirical attempt to study social integration of disabled children in a public outdoor setting. Located in New York City, the research site is this nation's first public outdoor playground designed and managed to support the special needs of all types of disabled children and to encourage their social integration with non-disabled children. The major goal of this study is to assess the impact of various types of play equipment and the social environment on the play and social behavior of mentally retarded and non-disabled children through systematic observations.

Through child interviews, this research also will further the understanding of children's environmental perception and how that perception relates to their observed behaviors. The role that environmental perception plays in guiding our action within the environment has been cogently argued (Ittelson, 1973; Gibson, 1980). A child's perception of how a particular piece of play equipment can facilitate certain play activities no doubt influences the ways the child will explore and subsequently use that piece of equipment. This perception of "activity affordance" can reveal important insights in trying to understand how and why children play and interact differently on different equipment. These insights can be very useful in the design of future play environments aimed at the facilitation of social interactions between disabled and non-disabled children. Furthermore, children's perception of activity affordances for different pieces of equipment can be used not only to understand the properties of different play equipment but also to further

understand developmental differences between disabled and non-disabled children and among children of different age groups and gender.

CHAPTER 2

LITERATURE REVIEW

Introduction

The question of the social acceptance of disabled children has prompted a number of different research approaches to study the problem. This review of literature will present several of those approaches that best represent the current line of inquiry. First, representative research that explores the peer acceptance of disabled children will be reviewed. In order to understand how to best foster peer relations between disabled and non-disabled children, we must first learn about the factors that can influence the attitudes that non-disabled children have toward their disabled peers. Many of the studies of children's reactions to disabled classmates employ sociometric measurements rather than direct observations of behavior and point to the need for scrutinizing these types of assessment. Secondly, studies that examine the impact of the mainstreamed setting will be reviewed.

Research has shown that introducing non-disabled children into a special class of disabled children was found to produce positive results in the social integration of disabled children and that a play setting was shown to achieve better mainstreaming success than an academic setting. The third research approach to be reviewed

explored the characteristics and behaviors of disabled children and how these factors influence their social integration with non-disabled peers. The remainder of the review will present research on the impact of toys and play equipment on peer interactions, which has been the subject of much empirical investigation and also has been demonstrated to be effective in promoting social interactions among non-disabled peers.

Peer Attitudes Toward Disabled Children

Mainstreaming disabled children into a regular school environment will rapidly become a common educational procedure. Based on the majority of the attitudinal surveys, most of these mainstreamed children will be assigned a low status position because of the negative attitudes non-disabled peers have toward their disabilities. Unless these attitudes are modified, the low status assignment will negatively affect the disabled child's overall social, emotional, and intellectual development. The following review illustrates representative research on peer attitudes toward their disabled classmates.

Using sociometric rating techniques, the majority of attitudinal studies on mainstreamed students in regular classrooms found significant differences in social status between handicapped students and their non-handicapped classmates. Low status was ascribed to children of all disabilities - mentally retarded (Gottlieb & Davis,

1973; Reese-Dukes & Stokes, 1978), learning disabled (Bryan,1974; Sheare, 1978), physically handicapped (Billings, 1963; Force, 1956), and speech and hearing impaired (Elser, 1959; Perrin, 1954).

However, some studies contradict the previous findings that all disabled children are rejected by their non-disabled peers. For example, Kennedy & Bruininks (1974) found no significant difference in sociometric ratings between hearing impaired students and non-disabled classmates; in fact, some students with severe hearing loss were chosen more often as friends than non-disabled students. Similarly, Perlmutter, Crocker, Cordray, & Garstecki (1983) found that a few learning disabled (LD) students had sociometric rankings as high as those of popular non-disabled classmates although LD students as a group received lower rankings than non-disabled peers. Prillaman (1981) also found that 11 percent of the LD students were popular "stars" in the regular classroom under investigation and that LD students did not receive lower sociometric rankings than their non-disabled classmates. Some of the factors that influence these disparate results in the social acceptance of disabled youngsters are summarized below. Note that some of the studies presented addressed a specific disability while others addressed a range of disabilities. Whenever possible, the specific disability being discussed in a particular study will be identified.

Factors Influencing Peer Acceptance

Familiarity or Contact with Disabled Peers

Cohen and Zigmond (1986) offered an alternative explanation as to why learning disabled (LD) children often receive lower sociometric ratings in a regular classroom setting. Their study suggested that the lower acceptance or status of LD children was not based on non-disabled peers' perception of their disability but on the fact that mainstreamed LD children usually spend the majority of their time in resource rooms rather than in the regular classroom. Thus, their low status was due simply to the fact that they are not known to their regular class peers. In other words, LD children were "neglected" but not "actively rejected" by regular class peers. This study has demonstrated the importance of considering children's familiarity with their disabled classmates in the assessment of social status of mainstreamed disabled children. However, once the disabled children are known to their regular class peers, whether they will be actively accepted or rejected by them remains unclear. Some research has indicated that mentally retarded (MR) students attending integrated classrooms were rejected more frequently than MR students attending segregated classrooms in the same school (Goodman, Gottlieb, & Harrison, 1972). Similarly, Gottlieb & Budoff (1973) compared the social acceptability of MR children in a traditional school versus an open plan school and found that MR students in the open plan school (physically integrated) were rejected more often than MR students in

the segregated setting. The authors reported that although MR children were known more often in the integrated setting, they were not accepted more. Note that Voltz (1982) reported conflicting results that non-disabled students, particularly girls, increased their acceptance of severely handicapped students after prolonged experience with them. Bear in mind that these findings were collected from sociometric measures that may or may not be accurate reflections of children's attitude or predictor of overt behavior. Furthermore, even if it is assumed that the accurate attitude is measured, can we then assume that the attitude measured will be reflected in children's overt behavior ? In other words, are we so confident in the relationship between attitude and overt behavior that we can use measurements of children's attitude as the sole basis to assess the success of interventional programs aimed at integrating disabled and non-disabled children ?

Measurement of Peer Acceptance

Research has shown that sociometric measures of attitude often do not coincide with actual observed behaviors. Dunlop, Stoneman, & Cantrell (1980) reported a discrepancy between the low sociometric ratings received by disabled preschoolers and their observed behavior in the classroom where minimal differences in solitary or overall social behavior were found between disabled and non-disabled children. This study illustrates that the best and most accurate method to assess social acceptability of disabled children is to observe their

behavior directly in the setting where integration occurs. In fact, direct observation is supported or even recommended by those who have conducted predominantly sociometric surveys as the most accurate assessment of mainstreaming success.

Nevertheless, most studies of children's reactions to disabled peers measure preferences rather than overt behaviors. Moreover, these attitudes are assessed based on the presentation of stories or pictures of disabled children rather than on actual experiences with them. McHale and Simeonsson (1980) designed a study to assess non-disabled children's attitudinal change as a result of specific experiences with autistic peers. The authors reported that children's attitude towards autistic peers remains very positive after extensive contact with them in a play situation. This finding appears to contradict previous sociometric surveys that non-disabled children's attitude toward retarded peers became more negative with increased contact (Gottlieb and Budoff, 1973). However, the two studies addressed children of different disabilities so that the difference in non-disabled children's acceptance of the disabled children may be related to the specific disability rather than to actual contact or experience with them. Put differently, non-disabled children may be more accepting of autistic children than retarded children. The ability to generalize some of these sociometric studies is limited given the different disability addressed and the imprecise specification of the setting and of non-disabled children's experience, if any, with the disabled sample.

Ecological Factors of Mainstreamed Setting

Direct observation of a mainstreamed setting has been argued to be the most accurate evaluation of mainstreaming success. Additionally, relevant information about the mainstreamed setting and sample should also be presented in a study to adequately assess the findings' ability for generalization and the study's application values or limitations. Although children perceive each mainstreamed setting as having discrete components - teachers, classmates, play materials, furniture, etc. - it is the constellation of all these components that children experience which determines their play and social behaviors. With that in mind, the following will review the relevant social and physical components of mainstreamed settings that were found to influence the success of integrating disabled and non-disabled children.

The value of a Play Setting

The value of play in facilitating peer interaction has been well established in the literature (Hartup, 1983; Rubin, Fein, & Vandenberg, 1983). Recently, many researchers on mainstreaming are beginning to recognize the importance of play in enhancing peer relations between disabled and non-disabled children. There is now empirical evidence suggesting that disabled children are better accepted in a play setting and that better social integration can be achieved within play settings than in classroom settings (Gottlieb,

1971; Marge, 1966; Peterson,1982). Furthermore, generalization of increased social play was obtained from a gross-motor play setting to other settings when the initial training was conducted in the play setting (Buell, 1968; Fredericks et al, 1978). Interestingly, when comparisons were made between an indoor play setting and an outdoor gross-motor play setting, the outdoor setting promoted almost twice as much cooperative play than indoor play for both disabled and non-disabled children (Roger-Warren et al, 1980). Similarly, Fields (1984) found that disabled children interacted more with other children (both disabled and non-disabled) than with teachers on the playground and that disabled children imitated their non-disabled peers less in the indoor play setting. A more in-depth review of the environmental influence on mainstreaming will be presented in a later section.

Reversed Mainstreaming

McHale and Simeonsson (1980) suggest that children's initial positive ratings of the autistic classmates may be influenced by two contextual factors. The first factor was that this was a reversed mainstreaming effort in which non-disabled children were introduced to autistic children's classroom where the surroundings were all familiar to the autistic children. Thus, the autistic children avoided the stressful situation of being in an unfamiliar setting. The reversed structure of the integration probably had a positive impact on the autistic children's behavior and this, in turn, influenced the non-

disabled peers' responses to them. This hypothesis is substantiated by other observational studies that utilize the reversed mainstreaming procedure with positive results in integrating disabled and non-disabled children (Devoney et al, 1974; Dunlop et al, 1980). The second factor was that all the interaction sessions involved play as the dominant activity. The authors suggested that the non-disabled peers were accepting of the autistic children perhaps because they appeared to be less deviant in the play context than in a more task-oriented context.

Handicapped vs. Non-handicapped Ratio

In most instances the number of handicapped students in a regular classroom is considerably smaller than the number of non-handicapped peers. This traditional mainstreaming practice in which handicapped students are most likely to constitute a minority group in a mainstreamed classroom makes it more likely for a handicapped child to be rejected by their classmates. Research has indicated that non-handicapped peers were more likely to accept handicapped classmates when there was a high ratio of disabled members than when there was a low ratio of disabled students in the regular classroom. Perlmutter and associates (1983) reported that LD students were more accepted by their non-disabled peers when there was a high ratio (more than 25%) of LD students in the regular classroom. This finding was confirmed in behavioral observations by White (1980) who compared a low handicapped ratio class (18%) and a high handicapped ratio class (39%)

and found that better integration with non-disabled peers was achieved by the high handicapped ratio class. These studies demonstrated that the context under which mainstreaming occurs can have major impacts on its success.

Role of Caregivers

Research has documented that the frequency of contact with adult caregivers or teachers can have an important impact on a disabled child's acceptance by other classmates. Namely, as adult-child interactions decrease and opportunities for child-child interactions increase, the integration of disabled children increases. It also was suggested that adult-child relations are more passive and verbally oriented while child-child relations are more action oriented and are more conducive to social integration (Mueller & Bergstrom, 1982). Similarly, McLean and associates (1983) found that handicapped children judged to be more easily integrated were mildly handicapped children who interacted the least with teachers. She suggested a developmental sequence of non-directed, teacher-directed, toy-directed, to peer-directed activities with peer directed activities as the most socially developed. Other researchers concurred that teachers should take a less controlling stance on children's behavior and to encourage peer interactions rather than adult-child interactions (Ispa, 1981). Teachers should, however, directly prompt disabled children to engage in peer interactions where appropriate (Guralnick, 1978; Poresky & Hooper, 1984).

Characteristics of Disabled Children

Types of Handicapping Condition

Research has demonstrated that some disabilities are more accepted by children than others. Based on the attitude measurement of a group of third to fifth graders, it seems that the order of disability acceptance from the most to the least accepted is: physical, sensory, psychological, and then social handicaps (Harasymiw, Horne, & Lewis, 1976). Perhaps children's acceptance of certain disabilities is based on their awareness or understanding of the disabilities. The pattern of disability awareness proposed by Conant and Budoff (1983) stated that the development of children's awareness of disabilities is analogous to Piagetian intellectual development that progresses from the concrete to the abstract. The authors examined children's awareness of various disabilities and found that at preschool level, children were aware of physical and sensory disabilities such as orthopedic impairments, blindness, and deafness; at primary school level, children were also aware of mental retardation; finally, at junior high school level, children were aware of psychiatric disturbances as well as the aforementioned disabilities. They further suggest that increased contact with the disabled as well as instruction about disabilities may alter the children's development of disability awareness.

Similarly, Gottlieb and Switsky (1982) suggest that the

literature on children's attitudes toward disabled children depicts a confusing and contradictory set of findings because of the failure of these researchers to take into account the developmental cognitive shifts of children's awareness of disabilities. Using an adjective checklist of stereotypic characteristics of retarded children to explore third to sixth graders's developmental changes in attitudes towards retardation, the authors found that increased age was associated with a decrease in general negative ratings of the retarded while positive ratings of the retarded remained unchanged. This demonstrates that older children are more aware or better informed about a disability than younger children and that this age difference needs to be taken into consideration when examining children's attitudes toward various disabilities.

Severity of Handicapping Condition

The severity of a child's disability is rarely considered to be an important factor in exploring attitudes toward disabled children. Conflicting results obtained from studies of children's attitudes toward the disabled may be due partially to the fact that the severity of the children's disability was ignored as an influential factor on attitudes (Gottlieb & Switsky, 1982). In a review of mainstreaming literature by Guralnick (1981), social integration of disabled and non-disabled classmates was reported to be more likely when the handicapping condition of disabled children was mild. However, for practical reasons, most researchers studied intact integrated

classrooms that often have a range in the nature and severity of disabilities. Consequently, systematic analysis of the effects of severity of handicap on social integration is difficult to undertake.

Disabled Children's Behavior

An issue related to the severity of the handicapping condition is the frequency of idiosyncratic behavior exhibited by disabled children. White (1980) reported that non-disabled children's negative behavior toward handicapped peers was directly correlated with (1) the frequency of "strange sounds" or noncommunicative noises emanating from the disabled classmates, (2) the frequency of disabled children's aimless wandering, and (3) the frequency of disabled children's conversation with teachers. It was observed that older handicapped children produce fewer noncommunicative sounds and inappropriate gestures than younger handicapped children. The author suggested that disabled children can be taught to control these idiosyncratic behaviors so that the likelihood of rejection by non-disabled peers can be minimized. Similarly, non-disabled children should also be taught to be more tolerant of the annoying behaviors exhibited by disabled peers.

The visibility of a child's handicap can also affect his or her acceptance by peers. Gentry (1983) reported that non-disabled children tended to be generally accepting of handicapped classmates in her study except when the handicap is severe and visible and when the

child appears to be 'unclean' such as having runny nose or drooling behavior. Again, when it is possible to do so, training disabled children to be more hygienic and training non-disabled peers to be more tolerant of appearance can improve the acceptance of more severely handicapped children.

Social Skill Training

The burden of mainstreaming success is mainly placed upon the disabled children. Many studies have suggested that the lack of systematic efforts in promoting disabled children's peer-related social skills may be the single most important factor limiting the effects of mainstreaming (Gottlieb & Budoff, 1973; Gottman, Gonson, & Rasmussen, 1975; Guralnick, 1984; Strain, 1984;). Most special educators agreed that in order for mainstreaming to be successful, the emphasis on training for the disabled must include social skills as well as the traditional emphasis on cognitive, motor, and language development (Gresham, 1982). Gresham reported that one of the best predictors of handicapped children's social status in a mainstreamed classroom is non-disabled peers' rating of their disabled classmates' misbehavior. Oftentimes, disabled children's "misbehaviors" are a direct result of inappropriate or insufficient social skills. These authors argued that by training handicapped children with the requisite social skills in initiating and maintaining social interaction with their non-handicapped classmates, peer acceptance by non-handicapped children will increase. Gresham also suggested that

social skill training must be conducted within an integrated setting rather than at the special school prior to mainstreaming. Social skill training of disabled youngsters must involve non-disabled children or the likelihood of cross-setting generalization will be lessened (Hendrickson, Gable, Hester, & Strain, 1985). Since disabled children in the special schools lack the necessary social stimulations of non-disabled peers, assessment or training of social skills at the special school setting would be inappropriate (Strain & Shores, 1983). Moreover, it was stressed that the disabled children should be trained in both "social initiator" as well as "responder" roles since turn-taking rules are the basic building blocks for all observed social exchanges.

Unfortunately, social skill training has been met with relatively little success due to the following factors: (1) An important point often overlooked by researchers training a small number of "target handicapped children" is that peer interaction involves two or more children; unless the target handicapped children's playmates are similarly trained and socially skilled, sustained peer interaction is not likely to occur. (2) More importantly, the consistent finding that non-disabled children prefer to interact with other non-disabled classmates in mainstreamed settings suggests that non-disabled children must also be trained or encouraged to interact with their handicapped classmates in order to facilitate meaningful peer interactions or even friendships between disabled and non-disabled classmates. (3) The behavioral strategies

used in training social skills with disabled children often elicited positive but transient and setting specific results. Furthermore, this approach applies the same behavioral principles and methods to all handicapped children of various developmental ages thus neglecting important developmental issues.

Although the major efforts in mainstreaming research are focused on social skill training, there is increasing recognition that there are many other important factors that can influence the social integration of disabled and non-disabled children in mainstreamed classrooms. It was mentioned earlier that the play context, particularly gross-motor play, was demonstrated to facilitate acceptance of disabled children in an integrated setting. The following section will present a more in-depth review of literature relating to the use of toys and gross-motor play equipment on children's peer activities.

Play for Integration

It has been many decades since we recognized that play occupies an essential role in the development of all children and that much of children's peer interaction occurs during play (Rubin, Fein, & Vandenberg, 1983). The importance of peer interaction to the normal development of children and to the general development of disabled children also has been thoroughly documented (Hartup, 1983; Guralnick, 1978; Mueller & Bergstrom, 1982). The use of play to enhance peer

relations between disabled and non-disabled children has been a recent development that has led to many positive and fruitful findings. However, what the specific influences different play materials, equipment, or environments have in facilitating peer interactions are still unclear. We know that attitudes toward disabled children are more favorable in a play setting than in an academic setting (Gottlieb, 1971; Marge, 1966). Comparisons of observed behavior in integrated play areas and academic areas also suggest better social acceptance of disabled children at play than in class (Peterson, 1982). These encouraging findings on the influence of play point to the need to further explore how various play materials and types of play equipment can affect peer relations, particularly between disabled and non-disabled children. Consequently, the following literature review will emphasize the impact of toys and play equipment on peer interactions. Note that much of the literature is concerned only with non-disabled children.

Toys and Peer Interactions

Early childhood educators showed considerable interests in the physical aspects of the preschool classroom setting. Empirical work dating back to the 1930's focused on the effects of toys on children's play and social behaviors (Green, 1933; Hulson, 1930; Markey,1938; Murphy,1937; Updegraff & Herbst, 1933; Van Alstyne, 1976/1932). The pragmatic influence of play materials on young children's play and on their social interaction revealed in these studies continues to be

useful information even today. To illustrate, Van Alstyne (1932) in a nursery school and kindergarten free-play setting, found that materials highest in conversational value and active cooperation were parallel bars, dishes, blocks, dolls, and wagons. Van Alstyne also found that children were observed to be engaged with play materials 98% of the time, thus lending credibility to the importance of the study of play materials. Block play was observed by Updegraff and Herbst (1933) to stimulate social play but also conflict over possession of the play materials while clay stimulated a higher index of sociability and frequency of cooperative behavior. Hulson (1930) compared eighteen different types of toys and found that not only were blocks and sand the most popular toys, they also provided the highest holding power and the most social value as defined by children playing together rather than alone. In similar observational studies, Murphy (1937) found that gross-motor toys such as swings, tricycles, and wagons elicited more cooperative play behavior than other toys. Similar to Van Alstyne's findings, Green (1933) also found that dramatic materials in the doll corner elicited the most cooperative social behavior among preschoolers. As will be seen later, these findings are very similar to those collected in more recent years.

The experimental work of Quilitch and Risley (1973) has been most influential in reviving research interest in studying the effects of play materials on the social behaviors of children. Quilitch and Risley reported that "isolate toys" such as crayons, puzzles, books, and "play doh" generated only 16% social play while "social toys" such

as checkers, cards, and other table games generated 78% of social play among the same group of 7 year olds. Shure (1963) found that the doll corner promoted the most complex and the highest frequency of social interactions while blocks also elicited a high level of social play and were more likely to promote peer interaction than an art corner or books. A more recent study confirms previous findings that dolls and games elicited the most peer social behaviors among nursery school children (Quay, Weaver & Neel, 1986). Interestingly, the researchers reported that 65% of all observations included some social interaction regardless of the type of play materials the children were engaged in at the time of observations. The authors suggested that this high percentage of social behavior may be due to the teacher's lack of interference during observations. They also observed that social behavior tended to be more positive than negative with the negative behavior occurring mostly within the doll and blocks corner. No gender difference was observed in children's positive or negative social behavior.

A review of toy literature by Phyfe-Perkins (1980) suggests that dolls and house play elicit the most cooperative and dramatic play while puzzles, sand and clay promote solitary and parallel play. Interestingly, she points out that toys involving motion such as tricycles, wagons, swings also encourage cooperative play behaviors. The author concludes that although the effects of play materials on children's behavior is clear, the decision as to which behavior to enhance is a question of educational philosophy and values.

Not only do different types of toys affect peer interaction, the relative amount of toys and play materials also influence children's social behavior. Johnson (1935) compared the same playgrounds before and after a reduction of play materials and found that fewer playthings resulted in children engaging in more social contacts with peers but also more negative social behavior such as teasing, crying, and quarreling. Evidently, much of the increased "undesirable" behavior was over the possession of materials.

Play Setting and Peer Interaction

Large indoor and outdoor play equipment has also been systematically demonstrated to influence children's social behavior. Hayward, Rothenberg, and Beasley (1974) conducted a comparative study of play and social activities in a traditional, contemporary, and adventure playground. Each playground varied in the types of play equipment available. The traditional playground included traditional equipment such as swings, see-saw, slides, monkey bars, etc. while the contemporary playground did not have specific equipment but rather had an arrangement of sculptured sand or concrete forms with built-in slides or tunnels. The adventure or "junk" playground, however, represents another concept of the playground where raw materials for constructing play equipment were supplied and where children are encouraged to use existing tools and materials to build their own playthings. As a result, the adventure playground in this study contained child-built "club houses," tire and telephone structures,

open areas, a dirt hill, a garden, a water-hole and a junk pile. The authors found that more prolonged and creative play as well as more cooperative and socially-oriented activities with peers were observed on the adventure playground while more parallel and isolated activities were observed on the traditional and contemporary playgrounds. There was little difference in social activities between the traditional and contemporary playground. It should be pointed out that the three different playgrounds attracted children of different age ranges with older children and teenagers visited the adventure playground most frequently. This age difference and the concomitant difference in level of adult supervision may partially account for the different behavioral and social pattern found in the playgrounds.

Campbell and Frost (1985) also reported similar results when comparing a traditional playground with a creative or contemporary playground. No difference in social play was observed in the two playgrounds. However, they found considerably higher percentages of dramatic play to occur in the creative playground than in the conventional playground where the predominant activity was gross-motor play. Other comparative studies (Strickland, 1979 cited in Brown & Burger, 1984; Van Valkenberg, 1978; Wolff, 1979) also offer the same type of comparisons on the behavioral influence of different play environments and reported similar results. A more recent study comparing traditional and contemporary playgrounds found that, overall, contemporary designed play setting do not necessarily promote greater amounts of desirable play or social behaviors (Brown &

Burger, 1984). The results obtained by Brown and Burger contradict earlier findings reported by other researchers. Much of this conflicting results may be attributed to the fact that the environmental variables used for comparison were too broadly defined (i.e. traditional vs. contemporary) such that the types and amount of play resources in the same type of playground varied from one study to another. Although these studies are useful to a limited extent, the lack of distinction among various types of equipment within each playground type can offer only very general information on the behavioral influence of play environments. This kind of study calls for more focused research on individual types of equipment or play areas that can offer more detailed information on the relationship between environmental design and the quality of play and social behavior.

Gross-motor Play Equipment and Children's Behavior

It has been argued that traditional children's play equipment is characteristically static and sterile in design and that this type of play equipment presents limited perceptual, cognitive, and motor experiences to children. Aside from financial and political restraints, the inadequacies of existing play equipment derive primarily from the fact that playground designers generally do not make use of existing knowledge of children's play preferences and play patterns nor do they pay attention to the behaviorally-based empirical research on the effects of play equipment design. The following

discussion will illustrate the types of existing research on play equipment and their value in enhancing future design of play equipment aimed at promoting peer interactions.

There are three types of research on play equipment. One type of research is mostly concerned with children's equipment choices, that is, the equipment's popularity and holding power for children's attention. Studies of equipment choices offer useful information on usage pattern and play preferences for a particular setting and for a particular group of children who uses or frequents that setting. For example, Frost and Strickland (1985) conducted a study on young children's equipment choices during free play and found that these children prefer movable and complex equipment over static ones. Naylor (1985) also observed that children prefer equipment that offers "no effort movement" such as different types of swings but that the most popular items on a particular playground are not always the most complex ones. Brown and Burger (1984) found, in one of their research sites, that wheeled vehicles were the most popular equipment on that playground. However, oftentimes generalization of these preferences cannot be extended beyond that environment since each specific play setting is unique in its composition of users, its resources, and its management. In other words, the popularity of a specific piece of equipment is relative to the amount and types of resources available to the particular user group of that specific play environment. Furthermore, equipment popularity is also affected by the type and extent of adult supervision imposed on the children.

The second type of study explores the behavior often associated with different play equipment or play setting. These studies reveal children's play and social behaviors when using specific equipment and are particularly useful in determining what types of equipment promote cooperative peer interactions among children. For example, Rubin and Seibel (1979) found that not only were vehicles the most preferred equipment but they also were associated with the most social interactions. Also, based on a review of existing studies on the behavioral influence of play materials and equipment, Phyfe-Perkin (1980) concludes that friendly and cooperative behaviors occur most frequently in equipment supporting role play and water play. Note that the majority of these findings were obtained from observations of settings with little or no research interventions, especially existing preschool and kindergarten settings.

Rather than limiting the focus to associating specific behaviors with specific play equipment, the third kind of study of gross-motor equipment deals with design elements or qualitative aspects of the equipment that can potentially generate fruitful ideas for the application of research to the design of future play equipment. Some of these studies involve quasi-experimental design that examine the behavioral impact of specific properties of play equipment. Some of these properties include degree of complexity, encapsulation, multi-function versus single function equipment and equipment accommodating one versus multiple children. Studies of the behavioral effects of different equipment structures generate, in my view, the most useful

information on the relationship between play environment design and children's behavior. Consequently, the following review will focus on empirical studies that attempt to explore the connection between equipment design and children's behaviors.

Encapsulation of Equipment

Gramza (1970) devised an experimental study that specifically addressed the behavioral effects of varying degrees of encapsulation. Encapsulation was operationalized as enclosures with 2 to 6 sides and with varied degrees of opaqueness. The results indicate that children overwhelmingly preferred complete enclosures with 6 sides and they also preferred opaque and translucent boxes over transparent boxes. In a later study, Kruidenier (1978) examined the effects of encapsulation in an outdoor setting and reported that more imaginative play was observed in the more encapsulated areas. The positive influence of encapsulation was further substantiated by Brown and Burger (1984) who reported that the playground with the most encapsulated areas also promoted the highest levels of social, motor, and language behaviors.

Single vs. Multi-niche Equipment

Using an ecological approach to the investigation of the behavioral influence of a physical setting on children's behavior, Doyle (cited in Gump, 1975) compared the amount and type of social

interaction among children in various activity settings (e.g. art, science, puzzles, large muscle equipment, water play, etc.) and observed that one of the activity settings with the highest amount of prosocial peer interaction was a "multi-niche" large muscle setting (equipment with places for 2 or more children) while the "single niche" large muscle setting maintained one of the lowest levels of social interactions. Using their own past research as a guide, Mueller and Bergstrom (1982) suggested that multi-niche equipment can be used to foster social interactions among peers. They speculated that large muscle equipment such as double width slides, rocking boats and jungle gyms can accommodate children playing and socializing together while maintaining some barrier to direct physical intrusion and at the same time avoiding the necessity for object possession struggle often associated with small toys or vehicles.

Another empirical study conducted by Rogers-Warren and associates (1980) exploring the social patterns in the play of handicapped and non-handicapped children also demonstrated the social value of multi-niche play apparatus. They concluded from their observational study that one of the ways to increase social interaction between handicapped and non-handicapped peers is to include play equipment that brings children into close physical proximity or equipment that requires more than one child to operate or play.

Equipment Complexity

The following review of studies on equipment complexity will demonstrate that conflicting results have been documented as to whether equipment complexity actually fosters or hinders children's social activities. In part, some of the contradictory findings may be due to the differing definition of equipment complexity; but for the most part, the confounding of important variables such as novelty of the structure, social density of the play setting or the ratio of "amount to do per child" may account for the conflicting results.

Equipment complexity has been defined in many different ways. It has been defined by various researchers as (1) the juxtaposition of different play elements in a particular structure, (2) whether the structure is single or multi-function, (3) the ability of children to manipulate the play structure, (4) whether separate play elements are linked or not linked, or (5) the amount of stimulation a play structure imparts during play.

Regardless of whether equipment complexity increases children's peer interactions or not, one consistent finding is that complexity usually generates a higher level of child-equipment interaction than less complex equipment. According to Berlyne (1960) the developmentally crucial activities of exploration and manipulation can be "aroused" or brought on by environmental stimulations that include complexity, novelty, conflict, or uncertainty. However, it is

questionable whether this increased exploratory behavior, in turn, will promote not only interactions with the environment but also provide opportunities that encourage peer interactions through parallel or group explorations and manipulations. Complexity, in short, is seen as attention-sustaining but whether it can, in turn, foster peer interactions remains to be demonstrated.

Prescott, Jones, and Kritchevsky (1967) were among some of the first researchers to look at the effects of play equipment complexity on children's play and social behaviors. Their definition of a complex play unit involves the juxtaposition of two different types of materials or a unit with subparts. The examples they gave for complex units included a play house with furniture and a water table with various toys and equipment. Based on observations of children within a day care setting, they concluded that the more complex the play unit, the more play choices there are for the child to select in the course of play and that this sustained attention provide more potential for group play and social interactions. Similarly, Bruya (1985) compared single-use traditional types of play structures to contemporary play structures with a unified and linked design. There was a 25% increase in peer physical contacts when children were observed playing on the more complex contemporary play equipment than on the traditional structures. Bruya also observed a decrease in overall interactions with adult caretakers during the more complex condition. Brown (1980) also found that a greater incidence of language behavior was observed on multi-function play structures than

on single function equipment. Interestingly, Brown and Burger (1984) subsequently reported data that appeared to contradict earlier findings when they suggested that there are no significant differences in observed social, language, or motor behavior among children playing on three contemporary designed playgrounds with typically multi-function equipment and on the three traditional playgrounds with mostly single-function equipment. Nevertheless, a closer look at the results indicates that multi-function equipment was preferred by children regardless of whether the playground was categorized as contemporary or traditional. No breakdown of language or social behavior, however, was presented based on the complexity of the play structures. Again, the fact that no behavioral difference was revealed across the different settings in this study may be due mainly to the lack of distinction in degree of complexity among the individual pieces of equipment in each of the playgrounds.

In another study, Bruya and Fowler (1986) compared a playground structure consisting of only basic platforms with the same basic structure but with many elaborations. The elaborations involved installing additional slides, swings, nets, sand boxes, etc. onto each platform. The elaborations were installed so that the researchers could investigate differences in children's interaction with the simple platform structure and with the complex play structure. The apparent increase in complexity and arousal of the structure with the play equipment significantly increased the length of time children interacted with the equipment. However, the authors neglected to

report any findings on how the complexity affected children's peer interaction although they hypothesized that higher complexity would decrease peer interaction. Furthermore, there were 7 play events for each group of 5 children in the complex condition and they were only allowed to play for half an hour on three consecutive days. The amount of activities each child could do was relatively high on the complex structure; thus, the increased activities associated with high complexity led to less sharing or co-exploratory behavior. Also, the half hour play duration was quite short and did not truly allow children to settle into the unfamiliar play environment so that a more accurate assessment of their play and social behavior could be obtained. It would be interesting to compare the play and social behavior on the first and last day of their observations to ascertain whether familiarity with the play environment did, in fact, influence children's play and social behavior in this study.

It has been documented by numerous studies that increasing the environmental complexity of the play apparatus can indeed affect children's play and social behavior. However, the influence of even the most complex play equipment cannot be equalled to the impact of children's playmates. To illustrate, Wade and Ellis (1971) compared the effects of (1) increased group size and (2) increased numbers of play apparatus on the general activity level of children. They found that increased environmental complexity did not elevate the activity level of children whereas increased group size produced more rigorous activities and elevated children's heart rates. Although the

dependent variable for this particular study was only physical activity and did not include the effects on children's social activities, it did succeed in demonstrating that the social variable was more powerful in influencing children activities than the manipulation of the physical environment. The authors offered the following explanation for the obtained results. They suggested that interactions with peers presented an ever-changing stimulus whereas the equipment, once explored, did not provide further stimulation.

Similarly, Weilbacher (1979) found parallel results in her study of the effects of dynamic and static play equipment on children's social and motor behaviors. Weilbacher compared children's behavior when playing with a static, non-movable (low complexity) play structure with a dynamic or moveable (high complexity) play structure. Each structure included the same materials - trestle, ladder, and board. Initially, Weilbacher found that there were more cooperative behaviors occurring on the equipment and a greater number of fantasy themes when playing <u>on</u> the dynamic structure while there were more cooperative behaviors and fantasy games occurring <u>off</u> the equipment when playing with the static structure. The author claimed that there were few overall differences in children's total cooperative and fantasy activities as the degree of manipulation of the play equipment changes in the two conditions. The only change was that the location of the behaviors switched from "on the equipment" to "off the equipment". In fact, with repeated exposures to the two structures, children's focus of interaction shifted from the equipment

to peers in both the dynamic and static conditions. They concluded that familiar peers are more complex and more capable of sustaining children's prolonged interest and attention and that children will benefit from both static and dynamic play equipment.

The preceding review of research on the impact of children's play environment on their social and play activities not only illustrates the various findings in this area of research but also points out the limitations in the interpretation and application of these findings. The most important limitation in much of this work is the failure to acknowledge or account for the complexity of the environment-behavior relationship. Oftentimes, researchers of the physical environment completely ignore the social environment impinging on the children being observed. Unless we assume that the physical environment is the only factor influencing children's play and social behavior, we cannot ignore the impact of the social environment from any play setting, be it an experimental setting or one that had not been set up by the researchers. Minimally, researchers should describe the social environment so that readers can have sufficient information to determine the ecological validity of the study, the plausible alternative explanations to the findings, and to be able to replicate the study. The description of the social environment should include (1) the number of children in the study and the dimensions of the available space within the play setting, (2) a detailed description of the children (sex, age, social economic status, race, familiarity with each other, familiarity with the play

setting or structures) and (3) the adult-child ratio and the supervisory style of the adults (i.e. can the children play and roam freely or are they being closely watched and controlled by the adults.). Whether these relevant variables can be controlled in a particular study is not the major issue here. In fact, it is doubtful whether this degree of control can be feasibly executed. The issue is that in order to truly understand the complex interactions between social and physical variables as they jointly affect children's social and play behaviors, they must be articulated so that the readers can be aware of the research's parameters and limitations and interpret the findings accordingly. The majority of research studies in the area of children's play environments have been exploratory ones that result in descriptions of children's behaviors in a specific physical setting or in multiple settings, few of them adopt a more holistic view of child-environment relations where human behavior is presumed to be influenced by the physical, social, organizational, and cultural aspects of the environment. Additionally, the play settings and the types of equipment in each setting are so different across studies that comparisons and generalizations are difficult.

The study to be reported in subsequent chapters will follow an ecological conception of child-environment relations. The emphasis of the research will be placed on the impact of different types of play equipment on the social and play behaviors of children under different social conditions. In addition, the following information also will be included in the analysis of children's behaviors so that linkages

among the various social and environmental variables can be extracted, allowing for a more holistic description and a more accurate interpretation of findings: (1) density of immediate equipment area, (2) children's characteristics, (3) degree of adult supervision, (4) familiarity with play environment, and (5) familiarity with playmates.

The next section will articulate the goals of this research study and will be followed by a chapter on research design describing how the research goals are operationalized in terms of methodology and execution of the methods.

RESEARCH AIMS

The goal of this study is to elucidate the impact of the complex interplay between the physical and social environment on children's play and social behaviors in a mainstreamed play setting. Specific emphasis will be placed on interactions between mentally retarded and non-disabled children. The play equipment areas selected for this study will be differentiated based on children's perception of each equipment area's activity affordance. It is hypothesized that children's perception of the activity affordance of the physical environment will influence their actions on that environment.

The specific research questions of this study are:

A. How does the type of play equipment differ as assessed by non-disabled children's perception of each equipment area's activity affordance ?

B. Does non-disabled children's perception of an equipment area's activity affordance relate to the activities observed on that equipment area ?

C. Do the following factors have any impact on children's play and social interactions, especially interactions among children who are not acquainted with each other:

1. play equipment areas.
2. child's age.
3. child's gender.
4. whether child is mentally retarded or non-disabled.
5. amount of adult supervision.
6. playmates availability/ group composition in play area (the child's immediate social surrounding in the play equipment area - e.g. all same school peers in area; both non-disabled and mentally retarded children in area, etc.).
7. familiarity with playground.
8. social density in the equipment area.

CHAPTER 3

RESEARCH DESIGN

Setting

The Playground for All Children (PAC) was designed to serve as the prototypical play environment for the integration of disabled and non-disabled children. As this nation's first public outdoor playground designed to support the integration of disabled children, PAC not only attracts a great deal of users but also the attention of special educators and international design professionals. PAC covers an area of approximately 3.5 acres and is equipped with a range of outdoor play equipment that is adapted for the physically handicapped. In addition to traditional equipment such as swings, slides, see-saw, monkey bars, and sand areas, the playground also includes climbing nets with tumbling mats, a child-operated conveyor belt/sand area, rocking bridge, traffic bridge, a water play area with a water wheel, as well as several picnic areas, ball playing areas, gardening areas, and a nature trail for blind children (see Appendix A for PAC's map).

The playground is open from April to the end of November. It opens seven days a week during the summer months and five days a week (3 weekdays and weekends) during the other months. In order to assure the possibility for integration of disabled children with non-disabled peers, the playground reserves weekday mornings (from 10 AM to 1 PM) for both disabled and non-disabled children from schools or

institutions that are scheduled to visit in advance. The data were collected during this time period from July, 1985 to November, 1985 and from May, 1986 to September, 1986. An approximate number of 170 children visited the playground each day during this data collection period. Note that the playground is open to the general public on weekends and weekday afternoons.

Population

To evaluate how well the play environment facilitates the physical and social integration of disabled children, it is essential to examine children whose disability is severe enough to be recognizable by non-disabled (ND) children so that we can observe the degree of their social acceptance of each other. Of the disabled children who visit PAC, ND children were better able to recognize mentally retarded (MR) and physically handicapped (PH) children as visibly or behaviorally deviant than other disabled groups such as learning disabled, hearing impaired, or the emotionally disturbed. However, the number of PH children who visit PAC is relatively low compared to MR children, thus making it difficult to have an adequate sample of PH children. Hence, to assess the integration potential of various play equipment, the two target groups selected were MR and ND children. Comparisons will also be made between 3-5 and 6-12 year olds, between boys and girls, and between first time PAC users and repeated users.

Methods

Three different methods were employed to evaluate the integrating potential of various parts of the playground: (1) "Caretaker interviews" were used to assess caretaker's perception of the integration of disabled and non-disabled children within the entire playground; (2) "Child interviews" were used to elicit the activity affordance of selected equipment areas so that we can better understand the differences among the selected equipment and to see how perception of play relates to observed play activities; and, (3) "Equipment sampling" was the crucial method used to determine social integration of the target disabled group in that the systematic observations would reveal factors that influenced the quantity and quality of social interaction between mentally retarded and non-disabled children.

The purpose of this study is to understand the combined effects of the physical and social environment on the play and social behaviors of children in a mainstreamed setting. Observational data collected by the equipment sampling method will be the essential source of information that will satisfy the goal of this study. Results from the Caretaker and Child interviews will be used to support findings obtained in the Equipment Sampling Method. Each of these three methods will be described in detail below.

1. Caretaker Interview

Children's caretakers ranged from special education teachers to camp counselors. We directed our interviews mainly with the teachers. Caretakers were asked: (1) which play area(s) of the playground you think can best promote integration of disabled and non-disabled children ? (2) Tell me why you think these areas encourage integration? and (3) have you seen social integration occurring in these areas? Twenty caretakers of non-disabled children and 43 caretakers of children from various disability groups were interviewed using these three open-ended questions. The disabilities of the children being supervised by the caretakers included : mental retardation, physical handicaps, cerebral palsy, multiple handicaps, communication disorders, and emotional disorders. These interviews were conducted in an informal setting with no particular sampling strategy; they took place whenever a caretaker gave his or her permission to be interviewed.

Interview responses from caretakers were content analyzed for the types of reasons they cited for each equipment area they felt had the best integrating potential. These data were compared to the results obtained from the other methods to analyze the degree of correspondence between caretakers' perception of integration on the playground and observed integration.

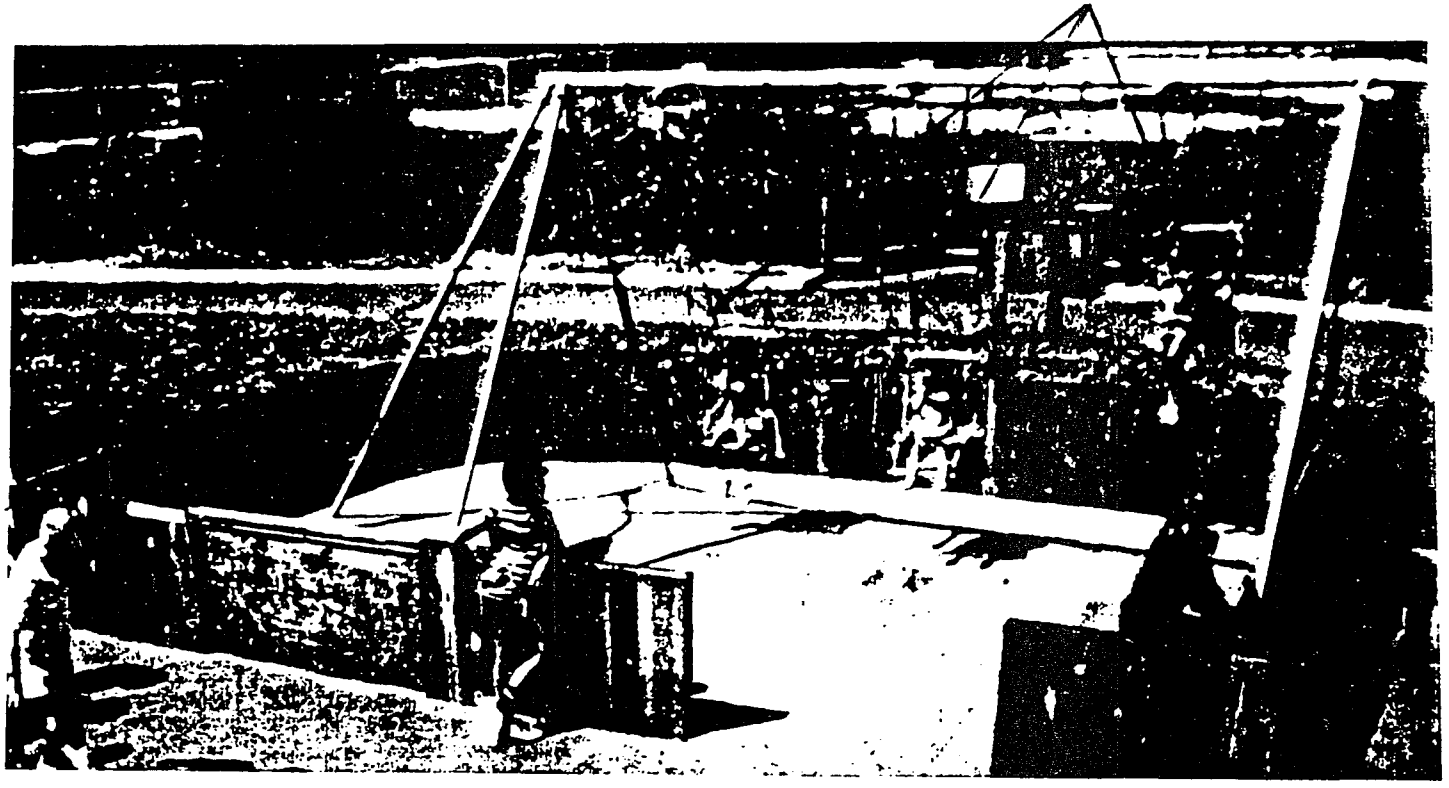
2. Child Interview

Different play equipment affords different kinds of play and social activities. To assess the activity affordance of various kinds of equipment, it is best to generate this information from the users of this equipment - the children. The aim of this interview was to elicit users' perception of activity affordance for each of the play equipment areas selected for this study. Four equipment areas were selected for comparison: (1) swing area - two adjacent areas measuring 20 feet by 10 feet with each area having a row of 3 swings with buckle seats adapted for both disabled and non-disabled children's use; (2) climbing nets - two nearby "pie-shape" areas measuring approximately 12 feet long and 9 feet at the wider end; each area has soft mat floor and 7 feet high enclosure of roped net; (3) sand area - a "V-shape" sand area measuring approximately 13 feet at the wider end and approximately 15 feet long; there is a 2 feet high wooden castle in the center that could accommodate 1 or 2 children inside; and (4) the waterwheel area - a basin area measuring approximately 20 feet by 12 feet; this area resembles a shallow waddling pool and there is a nearby waterwheel situated on top of a passageway that provides a waterfall. (See Figure 1 through Figure 4 for a graphic presentation of each equipment area.)

The selection of these four equipment areas was based on preliminary observations that they represented the children's favorite play areas and that they presented very different play opportunities

Figure 1. Swings

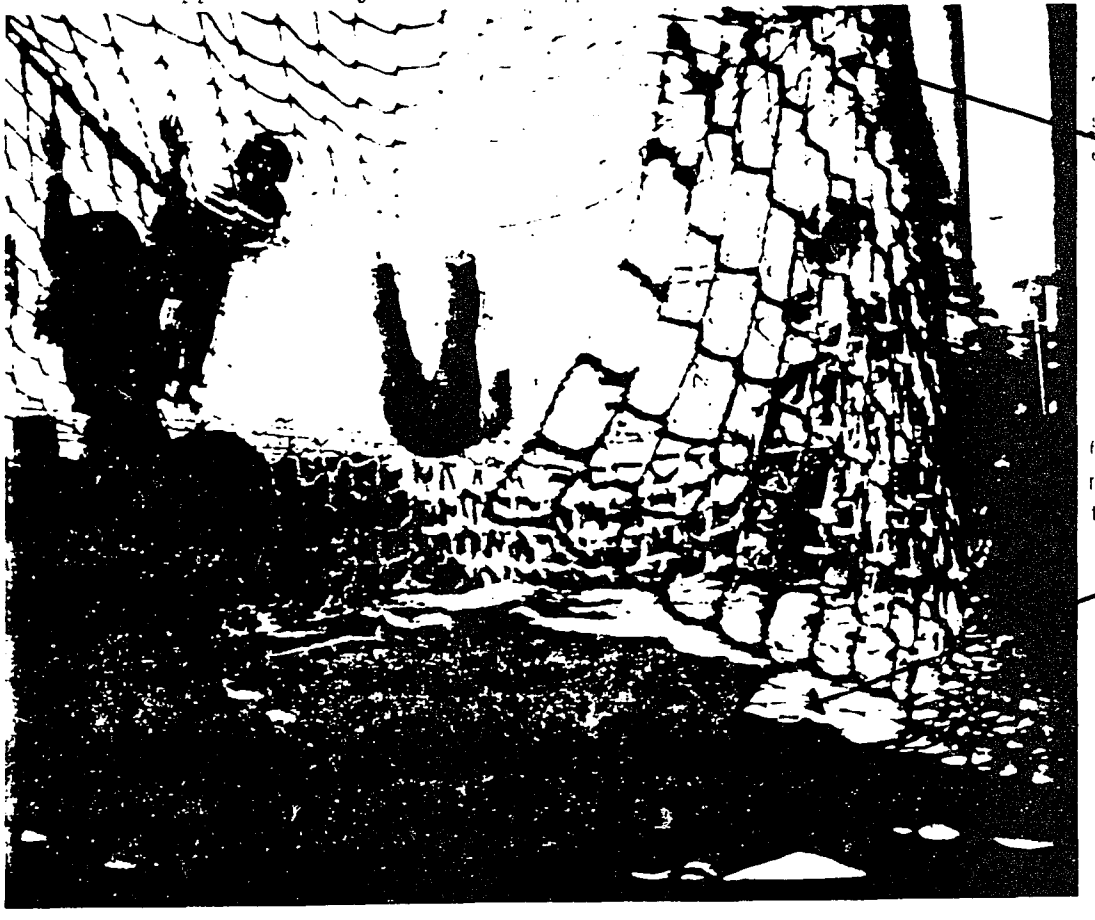
child pulls on chain to propel swing



* Each of the two adjacent swing area measures approximately 20 feet by 10 feet.
* Each of the swing area has three specially adapted swings that are propelled by pulling on a chain.
* Children seated on swings are within talking distance with one another and conversations while swinging have been observed.

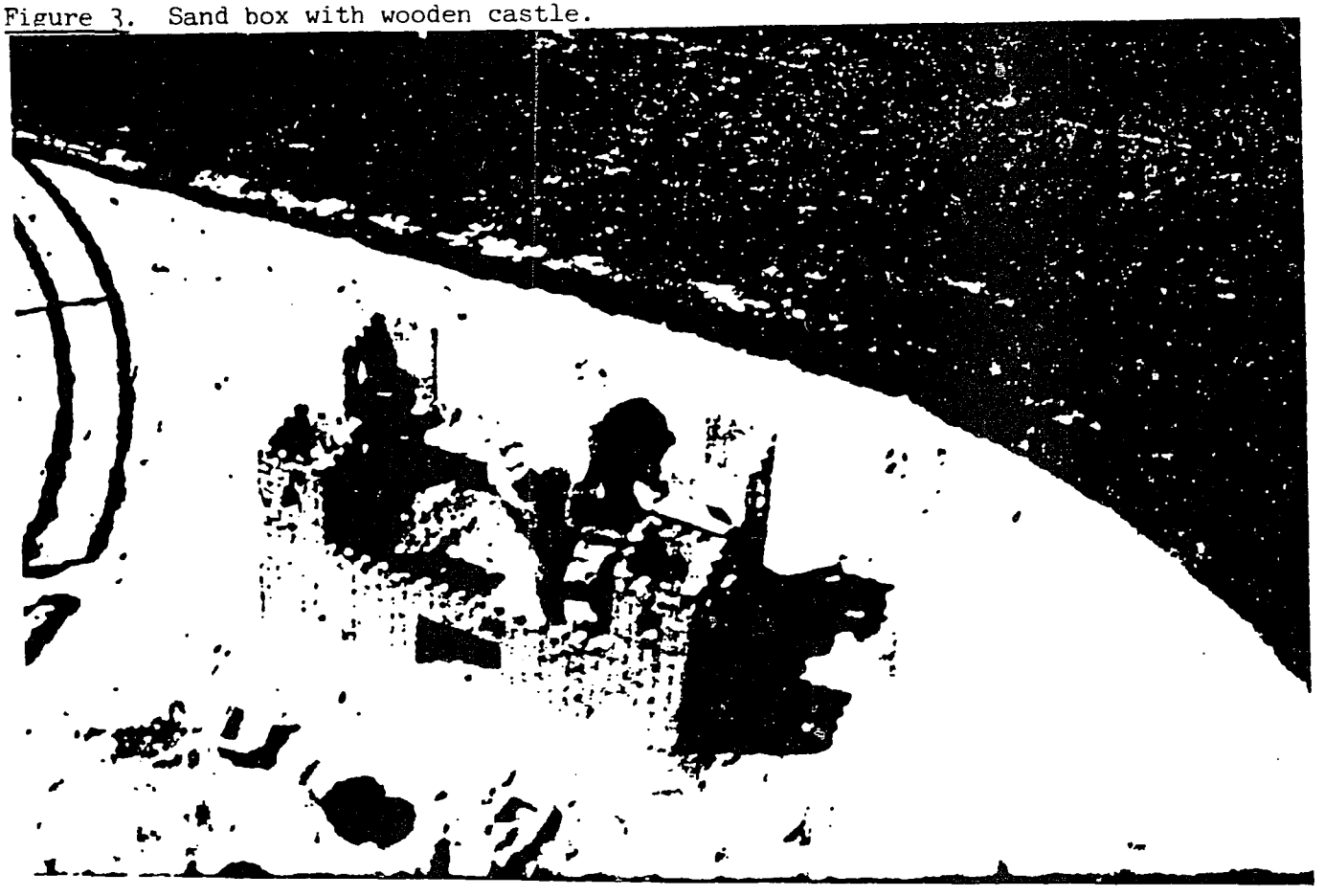
Figure 2. Climbing nets with soft mat floor.

* There are two net areas on the Playground for All Children.
* The net area is pie-shaped and measures approximately 9 feet at the wider end and it is approximately 12 feet long.



* The net area encourages rough and tumble play which, in turn, fosters social interactions.

Figure 3. Sand box with wooden castle.



* This V-shape ground level sand box is approximately 13 feet at the wider end and approximately 15 feet long. The wooden castle is approximately 2 feet high by 2 feet wide and 4 feet long; the castle can accomodate two children inside.

Figure 4. Water play area with waterwheel.

* The waterwheel area is approximately 20 feet long and 12 feet wide.

for children. These observations were subsequently confirmed by data obtained from the behavioral mapping study of the entire playground conducted at the same time as this study (Hart, 1989). The sample included 173 non-disabled children ranging from age 4 to 12 (51 were in the 4-5 age group, 73 were in the 6-8 age group, and 49 were in the 9-12 age group). Ninety boys and 83 girls were interviewed after they had at least one and a half hours of free play on the playground. They were often approached during their lunch break or prior to their departure from the playground. Disabled children were not included in the interview because this method requires a certain level of verbal ability and attention span that many mentally retarded children lack (see Appendix B for a copy of the Child Interview form).

The activity affordance of each of the four types of play equipment were determined by the following criteria: (1) the number of activities cited, and (2) the variety of activities cited by children when asked "Can you tell me all the different kinds of things you can do on (each of the four equipment area)?". Both the number and variety of activities cited by children will indicate the equipment's inherent specificity of play and social functions. High specificity will result in a limited number and variety of functions while low specificity will result in a high number and a great variety of play and social functions. The types of activities cited will also reflect the equipment's potential for encouraging or inhibiting certain target behaviors. For example, an equipment area that is perceived to afford sociodramatic play can lead to the child's subsequent engagement in

sociodramatic play which has been documented to greatly enhance peer interaction opportunities. Similarly, a play area that children perceive as "the" place to go if you want to play rough-housing with a friend or share a particular toy can give us important clues as to why a certain area encourages cooperative play.

Differences in activity affordance for each play equipment were analyzed for the following factors: child's age group, sex, familiarity with playground, and children's preference and usage of the specific equipment. Furthermore, the activities perceived to be afforded by each equipment were compared to activities observed on that equipment using the equipment sampling method described below.

Questions on children's favorite play areas, whether they had played with unfamiliar children and where they played with them were also addressed in the interview.

3. Equipment Sampling

To document target children's play and social activities within the four selected equipment areas, audio-visual recordings of their behaviors as well as the behavior of people surrounding them were conducted. To enable the research team to identify each child's disability and school, each child entering the playground was given a colored ribbon to wear for their entire visit; the ribbons were color-coded for each school visiting the playground each day.

The following procedures were used for the equipment sampling method. A camera person equipped with a lightweight video camera and sound receiver worked in coordination with a sound person equipped with a microphone and sound transmitter to collect data on the four pieces of equipment. The camera team was instructed to select one target child at a time. Target child selection was determined at the beginning of each day by the project manager who kept a log of the age, gender, disability, and equipment area of the subjects that were already videotaped. The camera team focussed on each target child and his or her social surroundings for no more than ten minutes but no less than one minute as long as the child stayed within the boundaries of the equipment area. The one minute minimum ensures us of some continuous information on the child's behavior while the ten minute maximum can provide ample continuous data on a particular child and still allow us enough time to collect data on a number of other children.

It should be noted that all children scheduled to visit the playground were sent parental consent forms informing them of our research intentions as well as a request for their approval of our videotaping of their children during the playground visit (see Appendix C for detailed information on Equipment Sampling procedures).

The original sample design was to include a total of 160 target children, 40 for each of the 4 selected equipment and 40 for each of the 4 conditions to be described below. In other words, a four by

four table with ten subjects in each cell was the goal. An attempt was also made to balance the number of children in each gender and in the two age groups (3-5 and 6-12 year olds). However, given the unpredictability and ecology of a naturalistic field research setting, it was not possible to obtain the sample originally proposed for this method. A detailed description of the sample will be presented in the result section.

Data collection began when one of the following conditions was satisfied for any one of the four selected equipment:

(1) Physically integrated condition - a MR child is playing in an area where one or more ND children is also present;

(2) Isolated MR - a MR child is playing in an area with his or her own group only;

(3) Mixed MR - a MR child is playing in an area where one or more MR children from another institution is present;

(4) Mixed ND - a ND child is playing in an area where one or more ND children from another school is present.

Note that condition 1 provides valuable information on the degree of social integration that takes place between MR and "unfamiliar" ND children within each of the four equipment areas while condition 2 provides baseline behavioral data on the MR children and condition 3 provides behavioral data on MR children when playing with other "unfamiliar" children but with a similar disability. Condition

4 is included to provide a comparison between ND children's behaviors and MR children's behavior with unfamiliar ND children.

To explore how different play equipment and play activities influence the amount and types of social interaction that take place between mentally retarded and non-disabled children, the analysis of social integration places heavy emphasis on observational data collected by the equipment sampling method. The analysis of the audio-visual data focussed on the social interactions of each target child and his or her social surroundings. To preserve the continuity of behavior observed, social interactions of target children from each of the four equipment sampling conditions were coded using a 5 second time sample. Note that other intervals of time sampling were tried (i.e. 3 seconds interval, 10 seconds interval, and 15 seconds interval), but the 5 seconds interval was selected because it allowed the coder to capture all the relevant information without unnecessary duplication. Other salient information illustrated below were also coded for each time sample.

Information Collected from the Equipment Sampling Method

A coding system for the observational data has been developed to include the following information (see Appendix D for the Equipment Sampling Coding Manual with lists of codes included for each of the following variables) :

(1) characteristics of target child (age, sex, disability,

first or repeated to PAC);

(2) activity focus of target child (includes thirty-three activities ranging from unfocused activity to games with rules);

(3) social participation of target child (solitary play, parallel play, group play);

(4) social specific of target child (includes forty-seven types of specific social interactions ranging from "initiation of social activity" to "conversation");

(5) social partner (the children or adult with whom the target child interacts or tries to interact with);

(6) social response (how the target child responded to other's social initiations or how others responded to the target child's social initiations);

(7) adult supervision of target child (whether target child is being closely watched by an adult or not);

(8) group composition at equipment area (the four different observational conditions mentioned - physically integrated with MR and ND, isolated MR, mixed ND, mixed MR);

(9) social density of equipment area (how many children in same area as the target child);

(10) loose parts or toys used by target child.

Intercoder reliability for the coding of the equipment sampling method was obtained by comparing percent of agreement of sample codes of three independent coders. A random sample of a three minute sequence was selected for intercoder reliability. The overall

reliability was 95.5% for all categories combined. Individual reliability coefficients were also obtained for each category of codes: (1) social participation (97%), (2) social participation partner (97%), (3) Social specific (85%), (4) social specific partner (97%), (5) response to social specific (88%), (6) same social partner as before (91%), (7) activity focus (91%), (8) supervision (100%), (9) group composition (100%), (10) social density (100%), (11) location on equipment (100%), and (12) objects used (100%).

Characteristics of target child.

The following information was collected for each target child : age, sex, mentally retarded or non-disabled, the level of mental retardation (mild, moderate, or severe) for each MR child, and whether this is the child's first visit to PAC (playground familiarity). The target child's age, disability level and information concerning the first visit to the playground were obtained from the child's caretaker. In addition to the assessment of developmental and gender differences among children's play and social activities, the impact of children's familiarity with the play environment on his or her interactions with the play equipment and playmates was also explored. Furthermore, the level of retardation of a mentally retarded target child may also influence social interactions directed at them as well as how others react to the disabled child's social initiations.

Activity focus.

Since the literature provides limited information on how play activities influence simultaneous or subsequent social behaviors, both the activity categories and social interaction categories are kept at a highly detailed level so that descriptive information as well as additional hypotheses can be generated from the data. For statistical analysis, however, categories were combined to facilitate interpretation and presentation of results.

There are a total of thirty-three categories of activities included in this coding system. It is developed for use in a large-scale play research project in which equipment sampling is one of the two observational methods using this coding system. The categories are generated from previous observations on PAC as well as from the literature. They include both play and non-play behaviors that capture the wide range of activities observed on the playground.

The 33 activity categories were recoded into 8 derived classifications (1) non-play - e.g. unfocused activity, fidgeting, or personal needs; (2) locomotion / play preparation - any type of locomotion, waiting or preparing for use of play equipment; (3) functional play - gross-motor activities such as swinging, climbing, jumping, rough and tumble, and running; (4) sensory play - e.g. tactile stimulation; (5) object play - playing with any objects or toy; (6) constructive play - constructing or dismantling play

materials; (7) games / social - focus was on social interactions alone or on formal and informal games with others; and (8) fantasy play (see Appendix E for table of play categories with list of original codes).

Social participation.

The categories included in the social participation variable are : (1) parallel play and (2) social or group play. These categories were adapted from Parten's (1932) social participation scale for studying children's play and social development. The social participation scale can provide us with a general index of each target child's level of social development. More importantly, this category allows us to see whether the different equipment areas and the child's social surroundings have different impacts on children's general social behaviors.

Social specific.

This category provides content information on the specific types of social interactions observed while the "social participation" category provides information on whether the child is engaged in group activities or not. To fully explore the level of social acceptance or rejection of disabled children on PAC and the factors that influence peer acceptance, we need to focus on the specifics of the interactions that take place and then examine relevant variables that may influence or are associated with those interactions. The following section

presents the rationale for including certain categories in this coding scheme.

Asher et al. (1977) have established that certain specific social behaviors such as sharing, greetings, asking for and giving of information, and making conversation are predictive of social acceptance. These specific behaviors are incorporated into the coding scheme (e.g. code # 2,3,5,6,9,10,38.) Additional categories that indicate social acceptance are included (e.g. code #11, #12 - receives or gives verbal approval, #13, #14 - receives or gives non-verbal positive expression. The ability to exhibit certain social skills has also been shown to be necessary to gain peer acceptance (LaGreca & Mesibov, 1979). Some of those social skills included here show a child's initiatives such as asking for a turn or a toy, giving directions, or assistance to others, praise, positive physical contact (code #6,28,32,43).

Social behaviors that signify rejection such as receives or gives verbal negative expression (code # 16,17); receives or gives non-verbal disapproval (code #18,19); and receives or gives overt aggression (code #39,40) are also included.

The literature reports that social interaction between disabled and non-disabled children does not occur frequently, especially when they are unfamiliar with each other. Thus, it is important to include categories that can be considered preliminaries to social interaction;

for example, a child observing people or group activities (code #1). The notion that observation is an attempt at being social is supported by previous research on play group entry strategies. To illustrate, Mallay (1935) revealed five different types of entry strategies into a play group: looking, vocalizing, making physical contact, engaging in parallel activities, and engaging in cooperative activities. Puttallaz and Gottman, (1981) also found that unpopular children tend to hover about a play group and observe their play prior to employing more direct strategies at entering into the play group.

It is well established that children's caretakers play an important role in influencing or even determining a child's activities. Shore, Hester, and Strain (1976) found that unsupervised children tended to verbalize more and engaged in significantly more cooperative play than supervised children. Furthermore, decreases in teacher's structure of free play has been shown to facilitate social acceptance of disabled children (White, 1980). Teacher's presence at the child's immediate play area was also reported to reduce children's play and that their play became more passive (Novak, Olley, & Kearney (1980). Thus, specific social categories are included that provide information on how much assistance, direction, or choice is given to the target child (code# 4,25,27,29,31).

The remaining social specific categories give us insights on the equipment themselves in terms of safety (code # 36,37 - receiving or giving accident prevention) or ingress or egress problems (code #33 -

ask for assistance, # 41,42 - asking or being told to move away) as well as the availability of resources (code# 24). Code #44 and #46 refer to many instances when the target child is obviously being social to another but the nature of the social interaction is not clear due to mumbling, ambient noise, or blocked camera view.

Social partner.

Whenever the target child socially interacted or played with someone, the social or play partner was identified. There are eleven categories of possible social partners: (1) PAC staff, (2) a child or children from the same school, (3) a disabled child or children from another school, (4) a non-disabled child or children from another school, (5) combination of #2 and #3, (6) combination of #3 and #4, (7) combination of #2 and #4, (8) combination of #2, #3, and #4, (9) caretakers, (10) camera or sound person, and (11) combination of adults and children.

Information on the social partners of the target child is particularly crucial for determining the frequency of the child's interaction with his or her caretakers,or with familiar or unfamiliar peers. Research has shown that disabled children who interact less with caretakers have a better chance to be successfully mainstreamed since less interactions with adults allow for more opportunity for interactions with peers (McLean et al, 1983). Also, Gentry (1983) reported that children prefer playing with other children with the

same cognitive level for certain types of play requiring higher level of skills. Thus, not only does the information of a child's social partner reveal the degree of social integration on the playground but also the amount of adult-child interactions.

Response to social specific.

The category "response to social specific" provides key information on the most important feature of all social interactions - reciprocity. This category was used for coding how a child responds to others' initiations as well as how others respond to the target child's social initiations. In other words, this code reveals the degree to which the target child is accepted by others or is accepting of others by noting whether the social partners (1) ignore each other, (2) respond positively, or (3) respond negatively to one another's social initiation.

Supervision.

The amount of supervision a child receives from his or her caretakers is partially documented from the amount and types of social interaction in which a child engages with the caretakers. However, to fully document the supervisory role of a caretaker and the amount of influence he or she exerts on the child, even when there is no apparent interaction occurring between the child and the caretaker, a simple two category coding scheme is used to record whether or not a

child is being watched very closely by a caretaker. This category informs us of the presence of a caretaker and the amount of supervision or assistance a child receives without relying solely on the social interactions that take place between the child and his or her caretakers.

Group composition at equipment area.

This category documents the availability of social partners that a child has for engaging in play or in social interaction within the equipment area. Although actual observation of target children begins only when one of four conditions occurs: (1) MR integrated with ND, (2) isolated MR group, (3) mixed MR groups, or (4) mixed ND groups. The ease to which each condition can be met for each of the selected equipment areas can provide clues as to how well an area supports the physical integration of disabled and non-disabled children.

Social density at equipment area.

Similar to the "group composition at equipment area" category, the social density of an area also tells us the availability of social partners a child has for play and peer interaction. These two categories differ in that "group composition" records who the possible social partners are, whereas "social density" records how many of the possible social partners exist in the equipment area. It also indicates the relative amount of play resources (toys, desirable

location in area, etc.) available to the target child. Research in this area has demonstrated that variations in the availability of resources in a play environment can have similar effects on children's play and social activities as variations in the number of children in the environment (Smith & Connolly, 1980).

Because it is not always possible to retrieve the exact number of children in an equipment area directly from the video data (the camera does not always frame in the entire equipment area or that the view is partially blocked), the categories are kept at a level where the information is retrievable either from the video recording or from the sound person's voice-over of the approximate number of children in the area. The following categories are chosen also because they provide us with the most crucial distinctions of social density within the selected equipment areas. The categories are: (1) target child is alone, (2) one other child is in the area with target child, (3) three to four children in the area, and (4) five or more children in the area.

Loose parts and toys.

The contribution of loose parts and toys to the overall quality of play on a playground has been documented in many research studies (e.g. Haywood et al, 1974; Frost & Strickland, 1985). The fact that toys and loose parts are available in the sand area with the wooden castle and at the waterwheel area presents an opportunity to explore

how the use or non-use of loose-parts within these two areas influences play and social activities between familiar and unfamiliar children as well as between mentally retarded and non-disabled children. The types of toys or loose parts children used will be recorded. The categories used are presented in details in Appendix D. They included the following: action figures, arts and crafts, board games, books, big blocks, little blocks, costumes, dolls, sports equipment, large wheeled toy, sand toy, musical instruments, stuffed animals, miniature vehicles, water toys, and miscellaneous toys.

CHAPTER 4

RESULTS

Introduction

Results from the three different methods described earlier will be presented in this section. We will begin with the Caretaker interview and findings on caretakers' perception of the integrating potential of various pieces of play equipment and areas on the playground. We will then present results of the Child interview with children's perception of play and activity affordance of various pieces of play equipment and areas. Children's self-reported play equipment usage and social interactions with unfamiliar children on the playground will also be presented. Finally, results obtained from the observational method of Equipment Sampling will be reported in three parts - (1) findings on children's play activities, (2) findings on children's social participation, and (3) findings on children's specific social behaviors.

Results of the Caretaker Interview

To explore the views of children's caretakers on whether and how the playground promotes integration of disabled and nondisabled children, a total of 63 caretakers were interviewed during their visits to the playground. Twenty of those interviewed were caretakers of nondisabled children and 43 were caretakers of disabled children with a range of disabilities. The caretakers we interviewed were mostly children's teachers or teachers' aides. The caretakers were asked the following question : " Tell me which play areas or equipment are the best places for your children to play and socialize with disabled children and why (or nondisabled children if addressing caretakers of disabled youngsters) ? ". They were then questioned with the following probes: " Have you noticed your children playing with disabled children today (or with nondisabled children if addressing caretakers of disabled youngsters) ? " ; if so, " Where was that ? " and " Why do you think that happened ? " The caretakers' responses were then written down on the interview forms and content analyses were performed.

Content analyses of caretakers' explanations as to why certain pieces of play equipment or areas are especially suitable for integration of disabled and nondisabled children yielded seven general categories. They are as follow:

(1) Spatial openness - accessibility, openness of the area or that the area can accommodate many children at the same time;

(2) Popularity - activities offered by the equipment or play area attracts children or that children enjoy themselves there;

(3) Proximity - the play area brings children together, it provides close proximity to others in an enclosed or confined space;

(4) Accomplishment - the area allows all children to play and accomplish something on their own skill level, the area is unstructured and can afford a range of activities;

(5) Supervision - the area requires less adult supervision or intervention;

(6) Social - the area encourages sharing, talking, or cooperative play; and

(7) Toys - the area facilitates sharing because it contains toys.

An intercoder reliability test was performed on the seven categories described above. Two independent coders coded all the responses collected from the caretaker interview and the percent of agreement on these seven categories was .82.

Play Equipment with Integrating Potential

The results indicate that caretakers of disabled and nondisabled children agreed on which play equipment and areas were the best places for integrating children but varied slightly on the emphasis they placed on why those play areas had the most integrating potential. Play areas most often cited by caretakers are : (1) sand areas, (2) waterwheel area, (3) nets, and (4) soft play area with loose parts.

Table 1

Percentages of Caretakers' Responses on the Best Places on the Playground for Children's Social Integration.

Play Equipment Areas	Caretakers of Disabled Children n (col%)	Caretakers of Non-disabled Children n (col%)	All Children n (col%)
Sand Areas (with toys)	43 (33.1)	24 (42.1)	67 (35.8)
Waterwheel (with toys)	27 (20.8)	8 (14.0)	35 (18.7)
Nets	19 (14.6)	9 (15.8)	28 (15.0)
Soft Play Area (with toys)	17 (13.1)	7 (12.3)	24 (12.8)
Other Play Areas	24 (18.5)	9 (15.8)	33 (17.6)
All Areas	130 (100%)	57 (100%)	187 (100%)

The 63 caretakers also mentioned other play areas as the best places on the playground for integration of children; the number of responses for the following areas ranges from seven to one response. In order of decreasing frequencies, they were: see-saw, arts and crafts activity area, swings, monkey bars, slides, the rocking bridge, the sports area, and the eating areas.

Reasons for Equipment's Integrating Potential

Table 2 describes the reasons given by the caretakers for the integrating potential of different equipment areas. Caretakers were encouraged to give as many reasons as they wished and for as many equipment areas they felt had integrating potential. In general, the most popular explanation provided by the caretakers for an equipment area's integrating potential was that it facilitated social activities. Twenty-four percent of the caretakers gave this type of reason. Examples of this type of explanation are: "... (it) promotes mingling and sharing" , or " kids can sit in there sharing and talking". The second most frequent explanation, consisting of 23% of all responses, concerns the proximity of other children; typical response in this category are: "kids can interact because they're right next to each other", or "small enclosed areas where kids are more likely to communicate by asking each other to share or for help or to be on a team.". The third category relates to the ability for all children to play and accomplish at own skill level because the equipment or play area affords a range of activities that required different skill levels. Nineteen percent of all explanations belonged to this category and the following are some illustrations: "...something they can all do", or "it's not structured...,whether you're physically disabled or not, kids can play and achieve some success at it.", or "it's a place where everyone can go and make things which everyone can relate to.".

Table 2

Percentages of Caretakers' Responses on the Best Places on the Playground for Children's Social Integration and Reasons for Each Selected Equipment Area

Play Area/ Equipment	Reasons for Play Area's Integrating Potential for the Two Caretaker Group					
	Reasons	Disabled		Nondisabled		Total	
		n	(%)	n	(%)	n	(%)
Sand Areas (with toys)	Social	6	(14.0)	8	(33.3)	14	(20.9)
	Proximity	8	(18.6)	5	(20.8)	13	(19.4)
	Accomplish	8	(18.6)	4	(16.7)	12	(17.9)
	Toys	10	(23.3)	2	(8.3)	12	(17.9)
	Spatial Open	6	(14.0)	4	(16.7)	10	(14.9)
	Supervision	4	(9.3)	0	(0.0)	4	(6.0)
	Popularity	1	(2.3)	1	(4.2)	2	(3.0)
	Subtotal	43	(100%)	24	(100%)	67	(100%)
Waterwheel (with water toys)	Supervision	6	(22.2)	1	(12.5)	7	(20.0)
	Popularity	4	(14.8)	2	(25.0)	6	(17.1)
	Proximity	4	(14.8)	2	(25.0)	6	(17.1)
	Accomplish	5	(18.5)	1	(12.5)	6	(17.1)
	Social	5	(18.5)	0	(0.0)	5	(14.3)
	Spatial Open	2	(7.4)	2	(25.0)	4	(11.4)
	Toys	1	(3.7)	0	(0.0)	1	(2.9)
	Subtotal	27	(100%)	8	(100%)	35	(100%)
Nets	Accomplish	5	(29.4)	4	(44.4)	9	(32.1)
	Proximity	5	(29.4)	3	(33.3)	8	(28.6)
	Social	4	(23.5)	2	(22.2)	6	(21.4)
	Supervision	4	(23.5)	0	(0.0)	4	(14.3)
	Popularity	1	(5.9)	0	(0.0)	1	(3.6)
	Subtotal	19	(100%)	9	(100%)	28	(100%)
Soft-Play Area (with sedentary games & toys)	Social	5	(29.4)	3	(42.9)	8	(33.3)
	Proximity	3	(17.7)	1	(14.3)	4	(16.7)
	Spatial Open	2	(11.8)	2	(28.6)	4	(16.7)
	Toys	3	(17.7)	0	(0.0)	3	(12.5)
	Accomplish	2	(11.8)	1	(14.3)	3	(12.5)
	Supervision	2	(11.8)	0	(0.0)	2	(8.3)
	Subtotal	17	(100%)	7	(100%)	24	(100%)
Other Equipment or Areas Cited	Social	8	(33.3)	4	(44.4)	12	(36.4)
	Proximity	7	(29.2)	5	(55.6)	8	(24.2)
	Accomplish	5	(20.8)	0	(0.0)	5	(15.2)
	Spatial Open	2	(8.3)	0	(0.0)	2	(6.1)
	Popularity	2	(8.3)	0	(0.0)	2	(6.1)
	Subtotal	24	(100%)	9	(100%)	33	(100%)

Spatial openness is fourth in frequency (11%) of explanations given by caretakers. They often comment on how the "wide open" feeling and accessibility of an area can attract many children to the area, thus bringing about integration; the sand areas were mentioned 50% of the time within the "spatial openness" category. Less adult supervision was the fifth most frequent explanation offered by the caretakers. Nine percent of all responses were related to the fact that the activities afforded by the equipment or play area were either unstructured or that they require less adult supervision or intervention. The availability of toys and that toys promote sharing and interactions consisted of 8.6% of the explanations provided by caretakers. It is not surprising to find that 75% of all "toys" responses were referred to the sand areas. Lastly, only 6% of the responses relates to the popularity of the equipment or how the area attracts children to come together; interestingly, 55% of the "popularity" responses were directed at the waterwheel area. (see table 2 for the percentages of explanations within each play equipment or area cited by caretakers.)

Differences between Caretakers of Disabled and Caretakers of Nondisabled Children

Caretakers of disabled and nondisabled children were very close in agreement with the top three reasons why a certain area or piece of equipment encouraged social integration; that is, (1) social, (2) proximity, and (3) accomplishment. However, caretakers of disabled

children also placed much emphasis on how less adult supervision or more unstructured activities can promote integration; 12.3% of their responses were related to supervision while only 1.8% of nondisabled children's caretakers had this concern. Table 3 shows the different emphases by caretakers of disabled and caretakers of non-disabled children.

Table 3

Percentages of Caretakers' Responses on the Reasons for Selecting an Equipment Area as some of the Best Places for Integrating Children.

Reasons for Play Areas' Integrating Potential for the Two Caretaker Group			
Reasons	Disabled Children n (col%)	Non-disabled Children n (col%)	All Children n (col%)
Social	28 (21.5)	17 (29.8)	45 (24.1)
Proximity	27 (20.8)	16 (28.1)	43 (23.0)
Accomplish	25 (19.2)	10 (17.5)	35 (18.7)
Spatial Open	12 (9.2)	8 (14.0)	20 (10.7)
Supervision	16 (12.3)	1 (1.8)	17 (9.1)
Toys	14 (10.8)	2 (3.5)	16 (8.6)
Popularity	8 (6.2)	3 (5.3)	11 (5.9)
Total	130 (100%)	57 (100%)	187 (100%)

The difference between the two groups of caretakers was also evidenced in their different emphasis on how toys can help children to

learn sharing and interaction; 10.8% of the responses from caretakers for the disabled stated the value of toys for integration while only 3.5% of the responses from the other group of caretakers mentioned the social value of toys.

Results of the Child Interview

A sample of 173 nondisabled children was interviewed at the end of their visit to the playground (see Appendix B for the Child Interview form). Children were asked about their usage of the various parts of the playground and their perception of the different types of activities they can do on four specific pieces of equipment: nets, swings, sand boxes, and the waterwheel area. They were also asked whether they played or interacted with children from other schools and particularly with disabled children and where this occurred on the playground.

There were 90 boys and 83 girls interviewed. Thirty percent of this sample were preschoolers (3 to 5 years old) and the remainder ranged from age 6 to 12. Also, 58% of these children were first time visitors to this playground.

Play Equipment Usage

Table 4 presents in ranked order the percentages of respondents who reported the various pieces of equipment and play areas they used

that day on the entire playground. Note that all four equipment areas selected for more in-depth analyses were among those reported to be most frequently used by children on the playground.

Table 4

Reported Play Equipment Usage for Respondents to the Child Interview

Play Equipment or Area	Frequency	% of Respondents
Net areas	141	82.0%
Swings	120	69.8%
Sand areas	110	64.0%
Slides	96	55.8%
Waterwheel area	93	54.1%
Rocking bridge	73	42.4%
Soft play toy area	59	34.3%
See-saw	52	30.2%
Monkey bars	48	27.9%
Traffic bridge	25	14.5%
Running track	14	8.1%
Sports areas	13	7.6%
Garden	7	4.1%
Other areas	13	7.6%

Note. The % of respondents was based on 172 cases.

Not surprisingly, these children also indicated that three of their favorite play equipment areas on this playground were the net areas, the waterwheel, and the swings. Although the waterwheel area was reported to be one of the children's favorites on the playground, this area was only fifth in their reported frequency of usage. Some children indicated that they would have liked to use the waterwheel but were unable to do so either because they did not come prepared for water play (children were required to have bathing suits or an extra set of dry clothes in order to play in the waterwheel area) or that the waterwheel was closed due to the weather or they were not scheduled to play in the area because there were too many groups on the playground that day and the playground staff could not schedule every group to play in the waterwheel area. Because of the popularity of the waterwheel area, children can play there only when the playground staff schedules their group to be there.

Play with Unfamiliar and Disabled Children

When children were asked whether they played with unfamiliar children from other schools, only 37 (21%) of the 173 children sampled indicated they had done so. Of these 37 children, 27% reported that they had played with unfamiliar children in the net areas and 25% indicated the sand areas. Other areas mentioned but with lower frequencies were the soft play areas, the slides, the rocking bridge, the waterwheel area, and the monkey bars. However, when children were asked whether they had played with disabled children, they had

difficulty in understanding what "disabled" meant and distinguishing disabled children from nondisabled children. Consequently, only 8 (5%) of the 173 children interviewed indicated they had played with disabled children and the play equipment where this integration took place were the swings, the nets, the sand areas, and the rocking bridge.

It should be noted 87% of those who indicated they had played with unfamiliar children were older children (6-12 age group). Also, males were over-represented (64%) in the reported play with unfamiliar children when compared to female respondents even though the sample was balanced for gender.

Non-disabled Children's Perception of Activity Affordance

Many play researchers have explored how different types of play equipment or toys influenced children's play and social behaviors (Brown and Burger, 1984; Bruya and Fowler, 1986; McLoyd,1983; Prescott, Jones, and Kritchevsky, 1967; Weilbacher,1979). However, the classification of "types" of equipment or toys like "multi-function" versus "single function" or "complex" versus "simple" or "low specificity" versus "high specificity" has always been based on the researchers' constructs or their version of a child's reality. This is not to say that their classifications were entirely invalid but rather that they may have made some erroneous assumptions about children's perception of equipment's play possibilities that may have

had profound impact on their research results. This is one of the reasons why children were interviewed in this study. We wanted to be aware of whether children perceived play possibilities for different pieces of equipment and if they did, what those possibilities were for the four selected equipment areas.

ND Children were asked to name all of the different types of activities one can do in each of the following play equipment areas: nets, swings, sand boxes, and the waterwheel area. This question addresses several issues that are of interest to this study: (1) to explore the differences in ND children's perception of activity affordance for the four equipment areas to aid in interpreting children's preference for and their reported usage of these areas; (2) to explore whether ND children's age, gender, and familiarity with the playground had any influence on their perception of equipment's activity affordance; and (3) whether the types of activities perceived to be afforded by an equipment area were related to the types of activities observed in the equipment sampling method (to be reported in a later section).

Activity affordance of an equipment area was measured in two ways that take into account the mean number of responses and the variety of responses. The first method involved counting the number of responses each child provided for each piece of equipment and then calculating the mean number of responses for each piece of equipment and for each group that was being compared. The second method was

simply to combine all of the different responses provided for each equipment area in order to yield an overall index of the variety of activities perceived for each equipment area. Both indicators were used to determine the activity affordance of play equipment since each provides a different aspect of equipment's activity affordance.

Equipment Differences in Perceived Activity Affordance

Table 5 shows both indices of ND children's perceived activity affordance for the four equipment areas.

Table 5

Non-disabled Children's Perceived Activity Affordance for the Four Play Equipment Areas

Equipment Areas	(N)	Indices of Perceived Activity Affordance	
		Mean Number of Activities	Variety or Total Number of Different Activities
Nets	130	2.7	20
Waterwheel	107	2.5	32
Sand Areas	127	2.1	24
Swings	132	1.3	12

Of the four equipment types, the nets and waterwheel were similarly high on perceived activity affordance (AF) while the sand

areas were moderately high in perceived activity affordance and the swings were low. The AF differences among the different equipment areas was significant (F (3,387) = 50.0, $p<.01$). Note that the swing, which was traditionally regarded as a single function play equipment, was actually perceived by children to have many functions. Looking at the mean number and variety of activities provided by children showed that overall there were many different things one can do in the waterwheel area but that on the average, each child thought of the nets as the place to do the most number of things. In fact, some children mentioned as many as eight different activities one can do on the nets while the maximum number of activities children provided for the swings was only four.

Occasionally, a few children presented novel and imaginative responses given the play equipment in question. For example, the following responses were given for the waterwheel area: "pretend to be Duke of Hazard with hat," "meet some people," "play dodge ball and soccer," "dancing through the water," "may be do cartwheels," and "ski on water." Although most of the novel responses were associated with the waterwheel, there were also some given for the other areas: some unusual responses for the nets were: "playing flies," "pretend there was a spider climbing on you," "hide under the mats," or you can "do everything." The children also produced some unusual responses for the sand areas - "trap a guy up and cut him," "somersault in sand," and "make monsters." Children provided the least number of unusual responses for the swings but there were a few

worth mentioning : "twist apple turnover," "racing" (to see who go faster or higher), and "slide" (on the seat). In most instances, however, children gave typical responses like "make sand castles," "play with toys," or "dig in the sand" for the sand areas; for the waterwheel area, common activities given were: "run under water," "play with boats," "swim," or "play with water." For the net areas, most of the responses involved climbing, jumping, hanging, wrestling or flipping on the nets while "swinging" consisted of the majority of the responses given for the swing area.

The purpose of pointing out examples of children's responses is to fully illustrate the behavioral possibilities children perceive an equipment area can afford. The examples on the more imaginative responses demonstrate that all four equipment areas are capable of encouraging imaginative and creative activities but that the waterwheel, nets and sand areas surpassed the swings in that capability.

Effects of Children's Age, Sex, and Playground Familiarity on their Perception of Activity Affordance

Children's perception of activity affordance for play equipment areas can be influenced by other factors such as previous experience with the environment or similar ones, or their own demographic characteristics. For example, school age children were able to perceive more activity affordance than preschool children. The mean

number of activities reported for the four equipment areas was 7.5 by older children and 5.1 by the younger group. Interestingly, when comparing children of three age groups (3 to 5; 6 to 8; and 9 to 12), statistically significant age differences were obtained only for the nets ($F(2,127)=4.95$, $p<.01$) and swings ($F(2,129)=5.16$, $p<.01$) but not for the sand areas or the waterwheel. This finding suggests that perhaps younger children were more familiar with sand and water play in other settings and were thus able to perceive those equipment areas' activity affordance as older children.

There was no statistically significant gender difference in children's perception of activity affordance; males reported an average number of 6.5 activities and females reported a mean of 7.1 activities. Children's familiarity with the playground also did not result in any statistically significant difference in activity affordance; first time visitors to the playground reported a mean of 6.4 activities while repeated visitors reported a mean of 7.2 activities for the four pieces of equipment.

Activity Affordance and Children's Equipment Preference and Usage

The question remains, does children's perception of an equipment area's activity affordance influence their preference for and their usage of the play equipment areas ? It appeared that children's preference for an equipment area is related to their perception of its activity affordance, especially affordance of specific activities like

dramatic play and action play. However, other intervening factors such as equipment design and other social factors contribute to children's overall equipment preference. Recall that children's favorite equipment areas on the playground were (1) the nets, (2) the waterwheel, and (3) the swings. It is speculated that the high activity affordances provided by both the nets and the waterwheel are related to children's preference for those equipment areas. However, also recall that the swing had low activity affordance but was reported as one of children's favorite equipment. It is evident that other factors are also important in determining children's preferences for play equipment. Consider the point that swings have always been documented as one of the favorite pieces of play equipment in numerous playground studies (e.g. Frost and Campbell,1985; Naylor,1985). These researchers asserted that children preferred equipment that was (1) action oriented, (2) with moveable features, and (3) equipment that promoted dramatic play. Swings appeared to satisfy the first two of these criteria while the waterwheel and nets satisfied all three of the criteria.

The relationship between children's perception of an equipment area's activity affordance and equipment usage is more difficult to assess in a naturalistic field setting because so many other factors influenced children's equipment usage. First and foremost, adult caretakers often determined when and where children could play on the playground. Secondly, the availability of the play equipment also determined where children played. For instance, play in the

waterwheel area was strictly scheduled by the playground staff and the area was often closed due to the weather while sand play was available throughout the playground. Nevertheless, the two areas with high to moderately high activity affordance were among the three most used areas as reported by the children - the nets and the sand areas.

Types of Activities Afforded by Equipment

All the activities children reported to be afforded by the four equipment areas were categorized into the following seven activity types: (1) non-play (e.g. resting, walking, sitting), (2) functional play (e.g. swinging, climbing, swimming), (3) sensory play (e.g. "putting face in water," "getting wet," play with sand or water - note that sensory play here is defined as tactile experience where no other object or physical activity was mentioned), (4) object play (e.g. play with wheeled toys, sand toys, or water toys), (5) constructive play (e.g. "make castles," make roads, footprints, etc.) (6) social games or other social activities (e.g. "make friends," race on the swings for the highest or fastest), and (7) dramatic play (e.g. "pretend to be a spider" on the nets, "be Duke of Hazard " in the waterwheel). Table 6 shows the types of activities children reported for the four different equipment areas.

Table 6

Percentages of Types of Activities ND Children Perceived to be Afforded by the Four Equipment Areas

Activity Types	Play Equipment Areas				
	Nets (n) (col%)	Swings (n) (col%)	Sand (n) (col%)	Waterwheel (n) (col%)	All Areas (n) (col%)
Non-Play	11 3.1%	3 1.7%	0 0%	15 5.6%	29 2.7%
Functional Play	327 93.2%	166 93.3%	28 10.3%	135 50.2%	656 61.4%
Sensory Play	0 0%	0 0%	22 8.1%	46 17.1%	68 6.4%
Object Play	0 0%	0 0%	78 28.8%	55 20.4%	133 12.4%
Constructive Play	0 0%	0 0%	137 50.6%	0 0%	137 12.8%
Games/Social	7 2.0%	9 5.1%	1 0.4%	11 4.1%	28 2.6%
Dramatic Play	6 1.7%	0 0%	5 1.8%	7 2.6%	18 1.7%
Total	351 100.0%	178 100.0%	271 100.0%	269 100.0%	1069 100.0%

For all four equipment areas combined, functional play accounted for 61.4% of all responses with the majority of responses concentrated in the nets and swings. Constructive play was the category with the next highest percentage (12.8%) and was reported exclusively for the sand areas. The percentage of object play was 12.4% and was reported only in areas with toys - the sand and waterwheel areas. There were also a total of 6.4% of sensory play reported and most of these responses were for the waterwheel and sand areas. The remaining three categories were all under 3% of the responses. It is interesting to note that of the four equipment areas, the swing area was the only area that did not elicit any perception of dramatic play response.

Age and Gender Differences in Reported Activity Types

Males reported twice as much object play as females. This may be due to the fact that more "male oriented" toys such as cars, trucks, and boats were placed in the sand and waterwheel areas. There was no overall gender difference in dramatic play responses except in the nets area where it was reported only by girls (3.3% of their overall responses for the nets). Girls also reported more constructive play responses in the sand areas (58.7% compared to 43.4% for males).

Older children expressed more functional activities (64%) than the preschooler group (52.5%) for the four equipment areas. In the sand areas only, the preschoolers had a higher percentage of object

play (39.3%) than older children (24.1%) while older children reported more constructive play (56.1% vs. 38.1% for preschoolers). Children in the older age group also had a higher percentage of social responses in the swings (5.8% vs. 2.4% for preschoolers) and more dramatic responses for the waterwheel area (3.3% vs. 0% for preschoolers).

In sum, males and younger children tended to report more object play while females tended to report more constructive play responses and older children expressed more functional play responses. Note that children's familiarity with the playground made no difference in their reported activity types for the four equipment areas. Functional play was the most frequent type of activity children perceived to be afforded by three of the most popular equipment areas on the playground - nets, swings, and the waterwheel. Whether children's perception of equipment's activity affordance is related to their observed behaviors on those play equipment areas will be addressed in the results section for the Equipment Sampling method.

Do Caretakers' Perceptions of Play Equipment's Integrating Potential Correspond to Children's Reported Behavior ?

Recall that results presented earlier on the caretaker interview showed that the following play areas were reported by caretakers of nondisabled children as having the most integrating potential on the entire playground : (1) sand areas (42%), (2) nets (16%), (3) waterwheel (14%), and (4) the soft play area (12%). Nondisabled

children who responded to the child interview were also asked to name the play equipment or areas where they had played with unfamiliar children, specifically disabled children, to explore whether the play areas children named correspond to the areas caretakers named as having integrating potential.

Although only 21% of the 173 children responded that they had played with unfamiliar children in the same play equipment area, the play equipment areas they reported were similar to those chosen by their caretakers. In descending order of frequencies, children named the following play areas : (1) nets (27%), (2) sand (25%), (3) soft play area (10%), slides (10%), and rocking bridge (10%), and (4) waterwheel (6%), and swings (6%). With the exception of the waterwheel area, caretakers' responses corresponded to that of the children. This result may lead one to conclude that children's caretakers can be a moderately reliable source of information concerning the play of the children they supervise.

Findings on children's perceptions of their own play and social behaviors afforded by different play equipment areas obtained from the child interview will be compared to the observed play and social behaviors obtained in the Equipment Sampling method. This will be presented in the next section.

Results of the Equipment Sampling Observation Method

Introduction

Findings of children's social and play behaviors observed within the four play equipment areas - the swings, nets, sand area with castle, and the waterwheel - will be presented in three sections. The first section will be a description of children's play activities or activity focus. The second section will report on children's social participation as originally defined by Parten (1932) and modified in this study to include only parallel and group participation. Lastly, the third section will present data on children's social interactions which include information on the specific type of social behaviors observed and the responses to those behaviors. For each of the three dependent variables outlined above, the effects of the following explanatory variables will be discussed individually - (1) play equipment areas, (2) mental retardation, (3) group composition at equipment area (i.e. integrated, isolated MR, mixed ND, or mixed MR), (4) children's age, (5) gender, (6) amount of adult supervision, (7) density of equipment area, (8) playground familiarity (first time visitors vs. repeated users), (9) time interval of observation period (beginning, middle, or end of observation), (10) duration of observation period and (11) Social partner of the social activities.

Sample Information

Before providing detailed findings on children's play and social behaviors, some basic descriptive information of the sample is needed. Table 7 shows the distribution of the 163 subjects included in the sample, broken down by age group, for each of the four equipment areas and roughly for each of the four group compositions (note the group composition may change from one type to another during the observation of each subject). Note also that there are very few subjects in the "mixed MR group composition" where we collected observational data when there were MR children from at least two different schools or institutions. This low number of subjects is mainly due to the fact that usually only one MR group visited the playground during a particular day. Overall, it was very difficult to be certain that the groups scheduled to visit would indeed arrive and also have parental approval for participation in the research study. Of course, no observations were possible unless the audio-visual equipment was also in working order and that the weather was conducive to outdoor observations.

Note that it was even more difficult to predict whether the sample we were interested in observing would be playing in one of the four selected equipment areas and with one of the four group compositions. Additionally, attempts were made to balance the number of subjects within each equipment area and group composition by both age group and gender. However, this was not always possible due to

the lack of control over the subjects' activities, mobility, and scheduling.

Table 7

Number of Subjects in Two Age Groups Obtained for the Equipment Sampling Observation Method for Each Group Composition and Equipment Area

Equipment Area	Age	Number of Subjects: Integrated (MR & ND)	Isolated MR	Mixed MR	Mixed ND	Total
Swings	3-5	5	9	0	13	27
	6-12	4	15	0	7	26
Sand Area with Castle	3-5	5	8	0	13	26
	6-12	5	4	1	9	19
Nets	3-5	4	7	0	10	21
	6-12	4	7	0	8	19
Waterwheel	3-5	2	1	0	7	10
	6-12	3	4	3	5	15
Subtotal	3-5	16	25	0	43	84
	6-12	16	30	4	29	79
Total		32	55	4	72	163

Despite the sampling difficulties, the only equipment area that fell short of the 40 subjects from the original sample design was the waterwheel area (see Table 3). For each equipment area, we were also able to balance the number subjects in each age group; as a result, a total of 84 preschoolers (3-5 year olds) and 79 school age children (6-12 year olds) comprised the sample. A total of 25 subjects were collected for the waterwheel area, 53 for the swings, 45 for the sand area with the wooden castle, and 40 for the nets. The collection of the targeted number of subjects was not possible for the waterwheel area because it only operated during the summer months and was closed down due to a drought during one of the two summers we were conducting this research on the playground. Nevertheless, aside from the mixed MR condition for all equipment areas and the integrated and isolated conditions for the waterwheel area, we were able to obtain and even surpass the number of subjects required from the original sample design for the remaining research conditions.

Table 8

Number of Boys and Girls Obtained for the Equipment Sampling Observation Method for Each Group Composition and Equipment Area

Equipment Area	Sex	Number of Subjects: Integrated (MR & ND)	Isolated MR	Mixed MR	Mixed ND	Total
Swings	M	7	14	0	6	27
	F	2	10	0	14	26
Sand Area with Castle	M	3	5	0	12	20
	F	7	7	1	10	25
Nets	M	5	7	0	8	20
	F	3	7	0	10	20
Waterwheel	M	4	4	2	4	14
	F	1	1	1	8	11
Subtotal	M	19	30	2	30	81
	F	13	25	2	42	82
Total		32	55	4	72	163

Table 8 presents the sample according to the subjects' gender. A total of 81 boys and 82 girls were observed. A proportional sample also was obtained for each gender in the four equipment areas and in

each of the four group compositions. However, there remains a proportional sampling problem in the waterwheel area where the total number of subjects was low and also in the integrated conditions for the other equipment areas. The non-proportional number of subjects in these research conditions should be taken into consideration when considering the findings. Whenever possible, different conditions will be combined to avoid bias in the data presented.

The sample comprised of 72 non-disabled (ND) and 91 mentally retarded (MR) children. Of the MR children, 59% were mildly retarded, 37% were moderately retarded and 4% were severely retarded. The mean age for the MR sample was 6.5 years old while the mean age for ND sample was 5.8 years old. Of all the subjects, 89 were first-time visitors to the playground and 70 visited previously. Seventy-three percent of the MR sample received one-on-one adult supervision compared to 30% of the ND sample. The preschool sample was more closely supervised than the older age group. There was no difference in the degree of supervision for boys and for girls.

The duration of observations differed for the MR and ND groups. MR children tended to be less mobile and were therefore often observed for a longer period of time; the mean number of minutes observed for MR was 5.1 while mean for ND children was 3.5 minutes. However, there was no difference in observation time for the two age groups.

Density on the playground was high overall (5 or more children

in an area but often much higher); especially within the waterwheel and nets areas which were the two most popular equipment areas as reported by children in the interview presented earlier. Of the observations made, the percentages of high density was observed for the following equipment area : the waterwheel (96%), the nets (78%), the sand area (75%), and the swings (53%). Note that the density does not remain constant throughout the observations of a particular child (similar to group composition and supervision) since other children and caretakers can come and go while the target child was being observed within an equipment area. The percentages presented here represent the initial coding of density at the onset of observation.

The description outlined above on subjects' demographics and observation conditions was based on 163 individual subjects. The data to be presented on children's play and social activities, however, will be based on the 5 second time samples used to code children's play and social activities. In other words, a child who was observed for 5 minutes will have 60 samples of data with all of his/her play and social activities, characteristics, as well as other information we collected for that target child.

We shall begin with findings on children's play activities.

Results on Children's Play Activities

Types of Play Activities Observed

Eight types of activity categories were used to describe children's activities, whether play or non-play, that occurred during observations of them on the four selected pieces of play equipment : swings, nets, sand area with castle, and the waterwheel. The eight activity categories are : (1) non-play - e.g. unfocused activity, fidgeting, or personal needs; (2) locomotion / play preparation - any type of locomotion not included as play, waiting or preparing for use of play equipment; (3) functional play - gross-motor activities such as swinging, climbing, jumping, rough and tumble, and running during play; (4) sensory play - e.g. tactile stimulation; (5) object play - playing with any objects or toy; (6) constructive play - constructing or dismantling play materials; (7) games / social - focus was on social interactions alone or on formal and informal games with others; and (8) fantasy play (see Appendix E for table of play categories with list of original codes).

Functional play was found to be the most frequent activities observed (41.3%) while non-play activities was the second most frequent (21.6%). Games and social focus occurred only 7.6% of the time whereas dramatic play was rarely observed (0.5%).

Effects of Play Equipment on Play Activities

Play equipment made a significant impact on the type of activities observed (χ^2 (21,N=9456) = 7005.8, p<.0001). Table 9 presents the types of activities observed on the four equipment areas. It is not surprising to find that 86.8% of the activities found on the swings was functional play while play in the sand area comprised mostly of constructive (35.5%), object play (21.9%), and non-play (19.4%). Functional play was also the most frequent category found in the net area (41.9%) but it was interesting to find that 35.9% of the activities in the nets was non-play activities. It was even more revealing to find that non-play activities (mainly looking or watching and unfocused activities) was the most frequent activity found in the waterwheel area (44.1%) and functional play only a distant second place (18%) in frequency. Note that games and social focus (12.8%) were observed to be most frequent in the waterwheel area and least frequent in the swings. Dramatic play and sensory play were both infrequent in all areas.

Table 9

Percentages of Types of Activities Observed During Children's Play in the Four Equipment Areas

Activity Types	Play Equipment Areas				
	Nets (n) (col%)	Swings (n) (col%)	Sand (n) (col%)	Waterwheel (n) (col%)	All (n) (col%)
Non-Play	800 35.9%	48 1.7%	557 19.4%	639 44.1%	2044 21.7%
Locomotion/ Preparation	253 11.4%	233 8.1%	132 4.66%	162 11.2%	780 8.3%
Functional Play	933 41.9%	2499 86.8%	210 7.3%	261 18.0%	3903 41.4%
Sensory Play	0 0%	0 0%	60 2.1%	3 0.2%	63 0.7%
Object Play	21 0.9%	19 0.7%	628 21.9%	177 12.2%	845 9.0%
Constructive PLay	0 0%	0 0%	1016 35.5%	0 0%	1016 11.2%
Games/Social	211 9.5%	76 2.6%	248 8.7%	186 12.8%	721 7.7%
Dramatic Play	7 0.3	3 0.1%	14 0.5%	20 1.4%	44 0.5%
Total	2226 100.0%	2878 100.0%	2865 100.0%	1448 100.0%	9417 100.0%

Effects of Group Composition on Play Activities

Fantasy play was found predominantly under the mixed ND condition (1.1%) and it was almost non-existent in the other MR group conditions (each 0.1%). The majority of the fantasy play occurred in the waterwheel and sand areas where there were toys and loose parts to encourage dramatic activities. ND children were also found to engage in twice the frequencies of constructive play (16.6%) than MR children. Children in the isolated MR condition exhibited the highest rate of functional play (51.8%) compared to 40.4% in the integrated condition and 32.7% in the mixed ND condition. Note that the analysis of group composition on children's play activities did not include the "mixed MR" condition because the number of cases in that condition was too low for valid comparison with other conditions. Overall, significant activity differences were found for the three group compositions ($\chi^2(14, N=9131)=507.2$, $p<.0001$).

Effects of Mental Retardation on Play Activities

The degree of MR children's mental retardation had a significant impact on children's rate of functional, object, and constructive play (χ^2 $(21, N=9456)=1030.6, p<.0001$). The frequency of functional play decreased as children's level of mental retardation increased (52.9% of functional play for mild MR, 36.6% for moderate MR, and 18.5% for severe MR children). The same trend was true for constructive play (9.6% for mild MR, 5.1% for moderate MR, and 0% for severe MR

Table 10

Percentages of Types of Activities Observed During Children's Play in the Three Group Compositions

Activity Types	Group Compositions			
	Isolated MR (n) (col%)	Mixed ND (n) (col%)	Integrated MR & ND (n) (col%)	Total (n) (col%)
Non-Play	498 14.5	790 22.9	600 26.6	1888 20.7
Locomotion/ Preparation	339 9.9	249 7.2	175 7.8	763 8.4
Functional Play	1773 51.8	1130 32.7	912 40.4	3815 41.8
Sensory Play	43 1.3	6 .2	13 .6	62 .7
Object Play	244 7.1	369 10.7	196 8.7	809 8.9
Constructive PLay	303 8.8	574 16.6	176 7.8	1053 11.5
Games/Social	221 6.5	296 8.6	180 8.0	697 7.6
Dramatic Play	4 .1	37 1.1	3 .1	44 .5
Total	3425 37.5	3451 37.8	2255 24.7	9131 100.0

children). However, the reverse trend was true with object play where severely retarded children had the highest rate of object play (50.7%) compared to 12.4% for moderate MR and 3.8% for mild MR children (see Table 11 for percentages of other activities). This pattern of findings reflects that object play represents a less developed form of play and requires less skill than functional and constructive play. However, this suggestion is speculative since the sample for the severely retarded was small.

Overall, ND children engaged in higher rates of constructive play, games/social activities, and dramatic play than MR children. However, in the net area, MR children were found to have higher rates of games/social activities (10.6%) than the ND group (7.5%) and the same rate of dramatic play (0.3%). One explanation can be offered for this set of findings. Results showed that children in the net area with one-on-one adult supervision engaged in significantly more games/social activities than those with less supervision; it is suspected that MR children's higher rate of games/social activities in the net area was due mainly to their interactions with their adult caretakers.

Table 11

Percentages of Activity Types Observed Among Children with Different Levels of Mental Retardation as Compared to Non-disabled Children

Activity	Non-Disabled (n) (col%)	Level of Mental Retardation: Mild (n) (col%)	Moderate (n) (col%)	Severe (n) (col%)
Non-Play	795 22.7%	635 17.1%	595 28.5%	19 13.9%
Locomotion/ Preparation	250 7.1%	336 9.0%	180 8.6%	14 9.6%
Functional Play	1142 32.6%	1969 52.9%	765 36.6%	27 18.5%
Sensory Play	6 0.2%	22 0.6%	32 1.5%	3 2.1%
Object Play	370 10.6%	143 3.8%	258 12.4%	74 50.7%
Constructive PLay	592 16.9%	357 9.6%	107 5.1%	0 0%
Games/Social	306 8.7%	258 6.9%	148 7.1%	9 6.2%
Dramatic Play	37 1.1%	4 0.1%	3 0.1%	0 0%
Total	3498 100.0%	3724 100.0%	2088 100.0%	146 100.0%

Effects of Age on Play Activities

The only age difference in children's frequency of activities was found in object play. Preschoolers were observed to engage in object play (11.4%) twice as frequent as older children (6.4%); age differences were significant ($\chi^2(7, N=9456)=90.7$, $p<.0001$). In contrast, when looking at the sand area alone, older children engaged in constructive play (46.3%) at a much higher rate than preschoolers (27.2%). These findings could serve as additional evidence to support the assertion put forth earlier that object play represents a less developed form of play than, for instance, constructive play.

When children's rate of play activities were analyzed[1] using both disability and age group as explanatory variables, an interesting pattern of results emerged. The analysis indicates that ND preschoolers engaged in object play (16.4%) significantly more than MR from the same age group (7.8%); but in the older age group, ND rarely

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[1]Using the logit model of the log-linear analysis with play activities as the logit variable with disability and age as the explanatory variables, a multi-way crosstabulation table was created. By analyzing the adjusted residuals of the no-effect or null model (see Appendix F for an example), it was possible to note whether each observed frequency significantly deviated from the expected frequency; thus pinpointing which cell(s) or category(ies) bear responsibility for the no-effect model's failure to fit the data. Note that an adjusted residual of more than 2 points (either positive or negative) will indicate a significant deviation from the expected frequency; a significant positive deviation (i.e. $\geq$ +2 adj. resid.) means that the frequency observed for that category significantly exceeded the expected frequency and is likely to occur more often than expected. A significant negative deviation (i.e. $\leq$ -2 adj. resid.) indicates that the category is less likely to occur than the expected frequency.

played with objects (2.8%) while older MR's rate of object play was almost identical to that of MR preschoolers (8.1%). The opposite trend was observed in children's constructive play - MR preschoolers engaged in more constructive play (11.9%) than their ND counterparts (7.1%) while older ND children were found to engage in 30.1% of constructive play compared to only 4% by older MR children (see Appendix F for the log-linear output with observed and expected frequencies for each category).

Effects of Gender on Play Activities

Boys were found to engage in a higher rate of functional play (48.5%) than girls (34.6%). However, girls were found to engage in a much higher percentage of constructive play (16.3) than boys (5.7%). The gender differences were significant ($\chi^2(7, N=9456)=404.4$, $p<.0001$). This is consistent with patterns found in other studies where boys were found to be more active than girls while girls were found to prefer sedentary activities over gross-motor activities (Rubin et al, 1983).

Another gender difference in play was observed in the sand area. Girls preferred constructive play (42.5% for girls and 23.7% for boys) while boys preferred object play (31.2% for boys and 16.4% for girls). When both age and gender were taken into consideration, group differences were even more striking. For example, in all four equipment areas, older girls engaged in constructive play 20.8% of

their time while it was a merely 2.5% for older boys. School age girls also engaged in more dramatic play than any other group.

It is well documented that dramatic play represents a more developed play form requiring more cognitive skills than other forms of play (e.g. Piaget (1962), Rubin (1980), Smilansky (1968), Vygotsky (1981)). However, few studies have suggested that object play represents a less developed form of play than constructive or functional play. Based on the group differences obtained for object play in this study, it is speculated that play with objects, especially objects with specific play functions (much like the ones supplied in the sand and waterwheel area) is a precursor to more developed forms of play. Object play allows the child to explore the functions of objects or practice its use before the child can engage in constructive play using multiple objects or to use ambiguous objects with unspecified functions.

Effects of Adult Supervision on Play Activities

Not surprisingly, children with close adult supervision were found to have a higher rate of non-play (24.1%) than those with less supervision (17.7%). Substantially higher rates of constructive play and fantasy play were also found with less adult supervision ($\chi^2(7, N=9453) = 258.8$, $p<.0001$). The freedom from close adult supervision appeared to have the most beneficial effects on ND children; as much as five times more constructive activities was found

for ND children under less supervision (4.3% under close supervision and 22.5% under less supervision) and that the majority of their fantasy activities was observed under less supervision.
For MR children, however, close supervision was actually associated with higher constructive play. It is likely that close adult supervision had more value for MR children than for ND children because the adults supported MR children in their access to and use of materials for constructive play. The same explanation also can be offered for younger children. Since the overwhelming majority of MR preschoolers were closely supervised, no comparison on the impact of supervision can be made for that group.

Effects of Density on Play Activities

Two different patterns of density effects were observed. Table 12 shows the percentages of activity types for the two density levels. On the one hand, low density conditions appeared to facilitate play since more non-play activities were observed under high density (26.3%) than under low density (10.2%) and at the same time, a higher rate of functional activities was recorded for low density (65.5%) than for high density (31.4%). On the other hand, high density conditions appeared to facilitate sedentary types of play since higher rates of constructive play, games/social focus, dramatic play, as well as sensory and object play were found under high density conditions.

Table 12

Percentages of Types of Activities Observed During Children's Play in the Two Density Conditions

Activity Types	Density Conditions		
	Low (n) (col%)	High (n) (col%)	Total (n) (col%)
Non-Play	279 10.2	1765 26.3	2044 21.6
Locomotion/ Preparation	217 7.9	563 8.4	780 8.2
Functional Play	1792 65.5	2111 31.4	3903 41.3
Sensory Play	2 .1	61 .9	63 .7
Object Play	119 4.3	725 10.8	844 8.9
Constructive Play	191 7.0	865 12.9	1056 11.2
Games/Social	132 4.8	589 8.8	721 7.6
Dramatic Play	5 .2	39 .6	44 .5
Total	2737 28.9	6718 71.1	9455 100.0

This pattern of findings may be a result of the different density conditions observed in different equipment areas which fostered different types of play activities. Alternatively, some of the more socially oriented activities (games/social, dramatic play) may actually required close proximity to others before the activities can be carried out. It is also possible that under high social density condition, children were less able to engage in certain functional play activities (e.g. swinging, tumbling, etc.) and were thus forced to pursue other types of activities or to wait for their turns to participate in functional play activities. Overall, the impact of social density on children's activities was significant (χ^2 (7,N=9455)=996.9, p<.0001).

Summary of Findings on Children's Play Activities

* Of the eight activity categories used to describe children's activity pattern on the four play equipment areas, functional play was the most frequently observed (41.3%), non-play activity was the second most frequent category (21.6%), the percentages for the remaining categories are as follows: constructive play (11.2%), object play (8.9%), locomotion/play preparation (8.2%), games/social focus (7.6%), sensory play (0.7%), and dramatic play (0.5%).

* The type of play equipment and the availability of toys in certain equipment areas had an important influence on the type of activities observed, especially in the swing and sand areas. Games/social and dramatic play were found most frequently in the waterwheel area.

* ND children exhibited higher degrees of constructive play, games/social and dramatic play than MR children in the isolated and integrated conditions. Within the MR sample, there was an inverse relationship between children's percentages of functional and constructive play and their level of mental retardation; the opposite was true for object play where severely retarded children exhibited the highest percentages of object play.

* Preschoolers were also found to have higher percentages of object play and lower percentages of constructive play than older children. The same trend was observed with different gender where boys have higher percentages of object play and lower percentages of constructive play than girls. It is speculated that object play represents a less developed form of play than constructive and functional play.

* Substantially higher percentages of constructive play, peer play and dramatic play were found when children were observed under less adult supervision; this difference was more pronounced for ND children than for MR children.

* Except for functional play, high social density appeared to be associated with both non-play and other forms of play activities. This finding suggests that high density is not necessarily undesirable since it was associated with higher percentages of both games/social and dramatic play.

Discussion of Findings on Play Activities

The pattern of play activities observed in this study is typical of conventional public playgrounds where the majority of children's activities are gross-motor or functional play and where socio-dramatic play rarely occurred (Frost & Campbell, 1985; Haywood et al., 1974). However, the activity pattern presented here represents only selected equipment areas and not the entire playground. (See Hart, 1989, for a comprehensive evaluation of activities on the entire playground.)

Note that the children included in this study were infrequent users of the playground and often found themselves in an unfamiliar social and physical setting. The literature suggests that this type of unfamiliar setting does not promote social or dramatic play activities as demonstrated by the observed play behaviors in this study (Doyle et al., 1980, Rubin et al., 1983). Most studies of play or playgrounds place a higher value on socio-dramatic play than on gross-motor play because dramatic play signifies a child's greater cognitive and language development while functional play is labeled as the "least mature" form of play (Rubin et al., 1983). However, studies have demonstrated that greater social integration of disabled children were achieved during gross-motor play than sedentary forms of play (Guralnick, 1981; Peterson, 1982). Thus, the high percentage of gross-motor play observed in this study may have facilitated greater social integration of MR children in this mainstreamed setting than other forms of play.

Although differences in the play of MR and ND children were observed in this study, it is difficult to compare them with the results found in other similar studies because of both methodological and developmental problems. For example, other comparison studies of play often have small sample sizes and heterogeneous mixes of disabled children, not to mention very different play environment or setting than the current research setting.

The gender differences on children's play found in this study further substantiates the findings from the literature. Although more recent studies suggest that the gap between boys and girls' play may be decreasing as more girls are beginning to prefer more "active" types of play while both boys and girls are encouraged to engage in more "cognitive" or educational games and toys while indoors (Sutton-Smith, 1979, cited in Rubin, 1983).

The impact of adult supervision on children's play activities has been demonstrated by this study. The fact that adult supervision had different impacts on ND children and for MR children raises the important question of whether MR children should be closely supervised or not given that children's physical safety is amply protected. Research have shown that disabled children learned to be dependent on adults for activity guidance even though they were capable of independent activities (Guralnick, 1978; Schwartzman, 1988). Although adults' prompts and interventions can be beneficial for disabled children's development or even necessary for severely limited disabled

children, adult attention can often distract disabled children from interactions with peers. The use of peer intervention, especially trained non-disabled peers, has been shown to have lasting therapeutic influence on disabled children. This strategy has been demonstrated to help disabled children in the development of social play behaviors, reduction of self-directed behaviors and withdrawal, and increase in language use (Guralnick, 1978).

Results of Children's Social Participation

Introduction on Social Participation

This study adapted the original four categories used by Parten (1932) in her study of preschool children's social participation to distinguish between "parallel" activities and "group" activities. Since we only initiated observation of children in one of the four group compositions outlined earlier, "solitary" activities were rare and were therefore excluded from the analyses of children's social participation. Children were coded as engaged in "parallel" play, where play is defined as self absorbed even though the child is using the same toys as others in the equipment area. Children were described as engaging in "group" play (a combination of Parten's two categories: "associative" and "cooperative" play) to reflect activities that signify overt recognition by members of their common interests through either verbal or gestural communications. Group play may also exhibit highly organized activities that include division of labor to achieve a common goal by members of the group.

Studies have shown that younger children and disabled children tend to engage more in solitary and parallel activities while older and non-disabled children are more prone to participate in group activities (e.g. Guralnick & Weinhouse, 1984; Mindes, 1982; Parten, 1932). This suggests that solitary and parallel activities represent a lower level of social and cognitive development. Other researchers

(e.g. Rubin, Maioni, and Hornung, 1976) have argued that solitary and parallel participation do not necessarily indicate poor social and cognitive adjustments especially if the child is also engaging in constructive activities or socio-dramatic play. With that in mind, we begin now to present the ways different explanatory variables influenced children's social participation.

Effects of Play Equipment Areas on Social Participation

An average of 18.2% of the sample participated in group activities while the remaining 81.8% engaged in parallel activities. Of the four equipment areas, group play was observed most frequently in the nets area (26.7%). As shown on Table 13, the percentages of group play for the other three areas were as follows: sand area (21.7%), waterwheel area (18.8%), and swings (7.9%). This represents a statistically significant difference among the four equipment areas (χ^2 (3,N=9472) = 339.4, $p<.0001$). This demonstrates that the nets encouraged children to engage in socially oriented activities more than the other play equipment areas under investigation; however, the following analysis reveals variations in this pattern for the different sub-samples.

Table 13

Percentages of Group Participation Observed within the Equipment Areas and Under Different Group Composition

	Percentages of Group Participation			
Equipment Area	Integrated (MR & ND)	Isolated MR	Mixed ND	Total
Swings	4.8%	9.0%	9.1%	7.9%
Sand Area	12.9%	10.7%	37.6%	21.7%
Nets	20.8%	37.7%	17.4%	26.7%
Waterwheel	2.0%	12.5%	28.8%	18.8%
Total	11.5%	16.8%	24.6%	18.2%

Effects of Group Composition on Social Participation

The "mixed ND" condition produced the highest percentage of group play (24.6%). For the MR population, there was a significant difference between the two MR conditions - 16.8% of group play observed in the "isolated MR" condition while only 11.5% of group play was observed in the "integrated" condition where MR were in same area as ND children. The differences in percentages of group participation across the three group compositions was statistically significant

(χ^2 (2,N=9146) = 166.1, p<.0001). Put differently, ND children in the mixed ND condition, playing with both familiar and unfamiliar ND children, engaged in more group participation than MR children in the other group conditions. MR children playing with familiar children from their own school engaged in more group activities than MR peers playing in the same area with a combination of unfamiliar ND children and children from same school. The analyses of group composition on children's social participation did not include the "mixed MR" condition because the number of cases in that condition was too low for valid comparisons with other conditions.

Effects of play equipment and group composition on social participation.

When the percentage of children's group participation was analyzed using both play equipment and group composition as explanatory variables, an interesting pattern of behavior emerged. Group participation for both the MR and ND sample appeared to be encouraged by different types of play equipment. For ND children in the "mixed ND" condition, the highest rate of group participation was observed in the sand area (37.6%), followed by the waterwheel area (28.8%), the nets (17.4%), and the swings (9.1%). For MR children, the net areas appeared to be the best of the four equipment areas in promoting group participation; this was true in both the "isolated" condition where group participation in the nets (37.7%) reached a level that equalled ND children and even in the "integrated" condition

where group participation in the nets reached as high as 20.8% (see Table 7 for percentages in other equipment areas).

Effects of Mental Retardation on Social Participation

Overall, mentally retarded children lagged behind nondisabled children in their percentages of group participation (14.1% vs. 25.2%) even though MR children in this sample were approximately 8 months older than the ND group. Within the MR group, mildly retarded children's percentages of group participation (19.6%) was closest to the percentages observed among ND children (25.2%) than moderate MR (5.2%) and severe MR children (0%). This difference in group participation was significant ($\chi^2(3, N=9489)=389.5$, $p<.0001$). Except for the swing area where percentages of group participation were equally low for both MR and ND, there were generally major differences found between MR and ND group in other equipment areas. For example, in the sand and waterwheel areas, the percentages of group participation for ND children was close to four times that of the MR group. Interestingly, the only equipment area where MR exceeded ND in group activities was the net area.

Effects of Age on Social Participation

Children's age had a significant impact on their percentages of group participation ($\chi^2 (1, N=9472) = 278.0$, $p < .0001$). All preschool children (3 to 5 year olds) engaged in group participation only 11.7%

of the time they were observed. School age children's (6 to 12 year olds) degree of group participation at 25% was more than double that of preschoolers.

Table 14

Percentages of Group Participation Observed within the Equipment Areas and For the Two Age Groups

	Percentages of Group Participation		
Equipment Area	Preschool	School Age	Total
Swings	2.6%	13.8%	7.9%
Sand Area	15.2%	30.2%	21.7%
Nets	18.6%	33.6%	26.7%
Waterwheel	13.4%	23.2%	18.8%
Total	11.7%	25.0%	18.2%

Table 14 shows that the age difference was found in all four equipment areas but was most pronounced in the nets and sand areas where school age children reached over 30% in group activities while the rate for the younger group ranged from 15 to 18%.

Age did not have any significant influence on group participation for MR children in an integrated group condition but had an influence in an isolated group condition . The percentage of group participation for all preschoolers was equally low in all group composition conditions. However, there were significant differences among the different group conditions for older children; group participation for older children in the mixed ND condition was the highest at 40.2% while the rate for older MR children was higher in the isolated condition (22.3%) than in the integrated condition (12.2%).

Table 15

Percentages of Group Participation Observed within the Three Group Compositions and For the Two Age Groups

	Percentages of Group Participation		
Group Compositions	Preschool	School Age	Total
Isolated MR	10.9%	22.3%	16.8%
Mixed ND	12.9%	40.2%	24.6%
Integrated ND MR	10.9%	12.2%	11.5%
Total	11.7%	25.0%	18.2%

Effects of Gender on Social Participation

Girls engaged in group participation at a significantly higher percentage than boys with 23.4% and 12.7% respectively (χ^2 (1,N=9472) = 181.4, p <.0001).

When both gender and age were examined together, the effects of the two variables on children's group participation were compounded. School age girls exhibited the highest degree of group participation at 31.8%; this percentage was considerably higher than other groups - school age boys (16.9%), preschool girls (14.5%), and the lowest percentage was exhibited by preschool boys at 9%.

Table 16

Percentages of Group Participation Observed for Boys and Girls and For the MR and ND Groups

	Percentages of Group Participation		
Group	Boys	Girls	Total
MR	13.1%	15.3%	14.1%
ND	11.3%	32.0%	25.2%
Total	12.7%	23.4%	18.2%

Table 16 shows that ND girls engaged in the highest amount of

group participation than any other group. The rates for males were equally low for both ND and MR group (13.1% and 11.3% respectively). ND girl were found to have a higher rate of group participation (32%) than MR girls (15.3%). Note also that girls outnumbered boys in group activities by a wide margin in every equipment area except for the swings where group participation was equally low for both genders.

Effects of Adult Supervision on Social Participation

The degree of adult supervision children received when being observed in this study was recorded in one of two categories: (1) one-on-one supervision (61.1% of all observations) - the caretaker is only supervising the target child at that moment of observation, or (2) not one-on-one supervision (38.9% of observations) - when the caretaker is not caring for the target child only or when the target child had no caretaker in the area.

Not surprisingly, children without the one-on-one supervision engaged in group activities (27.2%) significantly more than those with close supervision (12.5%) -(χ^2 (1,N=9469) = 326.4, p <.0001). Thus, the closer the adult supervision is, the less likely children engage in group play. However, despite close supervision, the net area was observed to have higher percentages of group play than other equipment areas (see Table 17). This percentage is still 12% less than the rate observed in the nets under less supervision but considerately higher than the same supervisory condition in other equipment areas.

Table 17

Percentages of Group Participation Observed Under the Two Supervisory Conditions within the Equipment Areas

Equipment Area	Percentages of Group Participation		
	One-on-one Supervision	Not One-on-one Supervision	Total
Swings	3.5%	15.2%	7.9%
Sand Area	13.0%	33.5%	21.7%
Nets	22.0%	34.0%	26.7%
Waterwheel	14.9%	26.3%	18.8%
Total	12.5%	27.2%	18.2%

The impact of adult supervision on children's social activities is clear; the important question for this study is how this varies from one condition to another. For MR children, close adult supervision made no difference on group participation in the "integrated" group condition but had an impact on MR children's group participation under the "isolated" condition. This is an important finding in that a great difference in the rate of group participation was found between the two supervisory conditions (10.7% for close supervision condition and 37.1% for less supervision condition).

The following analyses apply to the MR sample in all group composition conditions. When the level of retardation was used to analyze the effect of supervision on group play, the results showed that mildly retarded children (62.5% of MR sample) were most affected by the type of supervision on their group participation; that is, the less supervision, the more group participation. Note that the overwhelming majority of MR preschoolers were closely supervised regardless of their level of retardation (96% to 100%); consequently, the impact of supervision on MR preschoolers cannot be determined since no comparison can be made. However, for older MR children, one-on-one supervision increased with the level of retardation (51.8% for mild MR and 74.9% for moderate MR). For school age mildly retarded children, the rate of group play increased from 18.7% to 30.3% with less supervision; for the moderately retarded school age children, the rate of group play increased from 4.3% to 18.3% during less supervised play.

For the ND group, supervision had a different effect for preschoolers and school age children. With less supervision, ND preschoolers had a lower rate of group participation (10.4%) than with close supervision (18.3%). Note that ND preschoolers received one-on-one supervision 48% of the time compared to the 96% of their MR counterparts while older ND children were closely supervised only 11.5% of the time. For ND school age children, however, higher rate of group play was observed for those with less supervision (40.9%) than for those with close supervision (34.5%).

Effects of Density on Social Participation

Social density within each equipment area was analyzed with two categories : "high" - there were five or more children in the equipment area, or "low" - there were four or fewer children in the area. Overall, there was little difference in children's group participation due to density conditions. The rate for group activities was slightly higher for the high density condition (18.8%) than for the low density condition (16.6%) but the difference was not significant.

For MR children, a higher rate of group participation was observed under low density than high density in the integrated condition (14.8% and 10.6% respectively) and in the isolated condition (17.7% and 15.8% respectively). Interestingly, this trend was reversed for ND children. The percentage of group participation for ND children was almost doubled under the high density condition (25.6%) when compared to the low density condition (13.2%). These results suggest that MR children were inhibited by crowded conditions to pursue or engage in social play while ND children were encouraged or stimulated by the increased social density to initiate and maintain their interests in group play.

The impact of social density on the rate of group participation was also influenced by the type of play equipment in which children were observed. Table 18 illustrates these differences.

Table 18

Percentages of Group Participation Observed Under the Two Density Conditions within the Equipment Areas

Equipment Area	Percentages of Group Participation		
	Low Density	High Density	Total
Swings	9.8%	5.6%	7.9%
Sand Area	6.2%	24.9%	21.7%
Nets	53.4%	19.7%	26.7%
Waterwheel	12.0%	19.5%	18.8%
Total	16.6%	18.8%	18.2%

In the sand with castle area, density played an important role in encouraging group participation; the rate of group play jumped from 6.2% under the low density condition to 24.9% under the high density condition. The reverse was observed in the nets. Group participation was 53.4% under the low density condition but dropped to 19.7% under the high density condition in the nets area. Recall that MR children's rate of group play was highest in the net area and that their rate dropped in the high density condition. Also recall that ND children's rate of group play was highest in the sand area and that their rate increased under the high density conditions. It is very likely that the pattern of group participation found among the

different play equipment areas reflects in part the different impact of density on MR and ND children.

Effects of Playground Familiarity on Social Participation

First time visitors to the playground were compared with repeated users on their percentages of group participation. Ironically, children who were less familiar with the playground (first time users) engaged in 21.2% of group participation which was significantly higher than the 14.5% for repeated users (χ^2 (1,N=9217) =67.3, p<.0001). However, this general trend reflected primarily observations of group participation in the sand area where first time visitors engaged in group play 33.7% of the time while only 4.7% for repeated users of the playground. For the net area, playground familiarity had an opposite effect on children's rate of group play although rates were high under both conditions - 21.4% for first time users and 35.2% for repeated users. Playground familiarity were not associated with any differences on group play in the swings or waterwheel areas.

Effects of Observation Duration on Social Participation

Recall that children were observed for a period ranging from one minute to ten minutes depending on whether the necessary conditions for observation remained; that is, the target child stayed within the selected equipment area and that the group composition remained to be one of the four conditions under investigation. The sample of

subjects was split evenly into two groups - "short" observation duration (less than 4 minutes, mean = 2.2 minutes) or "long" observation duration (4 or more minutes, mean = 7.3 minutes). Not surprisingly, those who were observed longer had a higher rate of group participation (19.4%) than those observed for less than 4 minutes (13.6%) - (χ^2 (1,$\underline{N}$=9472) = 35.9, $\underline{p}$<.0001). Although we made efforts to initiate observation of each child as he or she entered the equipment area, this was not always possible because of it was difficult to find subjects of the selected demographics in the selected equipment areas and in the selected group composition conditions. Consequently, keep in mind that the length of observation did not always mean the length of stay in an area for each target child.

The length of observation time in an area affected group participation only in the net area where the rate was 14.6% for those with short observation duration and 31.1% for those with long observation duration. In other words, the longer the children stayed in the nets while observation was taking place, the more likely they were to engage in group play; this was not the case in the other three equipment areas.

In sum, group participation increased with longer observation duration in each of the group composition conditions. The rate of increase was especially prominent in the mixed ND condition where the percentage increased from 15.3% to 28.8% for longer durations.

Effects of Observation Sequence on Social Participation

To explore whether children's rate of group participation changed over the duration of the observation period, the ten minute sequence was divided into three segments (initial, middle, and end) with equal number of cases so that we can see whether any pattern of group participation exists as a function of the observation sequence. The analysis revealed a definite increase in children's rate of group participation from the initial observation segment to the end of the segment. A group participation rate of 14.9% was observed at the initial observation segment, 19.0% for the middle segment and 20.7% for the end segment - ($\chi^2(2, N=9472) = 38.0$, $p<.0001$).

In all four equipment areas, the rate of group play increased from the beginning to the middle segment. Rate increases from the middle to the end segment was only evidenced in two of the four equipment areas - the nets and swings. For the other two play areas, the rate of group play dropped off in the last observation segment.

Preschool children engaged in group participation at a uniformly low rate (10.7 to 13%) regardless of the observation sequence. However, school age children exhibited a clear trend of increased group participation as their stay at a play area lengthened (from 19.2% for beginning segment to 25.5% for middle, and 29.7% for end segment of observation).

MR children, especially in the isolated condition, also showed the same trend of increased group play with the observation sequence (from 10.2% to 15.2% to 24.9% in the end segment). ND children did not show a similar trend.

Relationship between Social Participation Partner and Social Participation

We have presented a description of how different variables ranging from play equipment to observation sequence influenced children's group participation. However, we know little about the social significance of the group participation except that it involved some level of verbal or gestural social interactions during play. When we look into the social partners of the group participation, an important set of findings emerges that informs us whether children interacted with familiar or unfamiliar peers or with adults. The results showed that of all the group participation observed, 77.1% was with children from same school, 17.7% with adults, 4.7% with other ND children, and only 0.5% with other MR ($\chi^2(3, N=9484) = 2503.8$, $p < .0001$). The finding that only a total of 5.2% of all group play occurred with children from other schools suggests that the playground was not successful in its major goal of encouraging social integration among children from different schools.

Table 19

Breakdown of All Observations of Group Participation By Social Partner and Group Composition

Social Partner	Percentages of Group Participation			
	Integrated (MR & ND)	Isolated MR	Mixed ND	Total
Adults	55.8%	23.3%	0.5%	17.7%
Same School Children	30.4%	76.7%	93.5%	77.1%
Other MR Children	3.1%	-	-	0.5%
Other ND Children	10.8%	-	6.1%	4.7%
Total	100%	100%	100%	100%

Table 19 shows the breakdown of group participation by social partner and by group composition. In the mix ND condition, 93.5% of ND children's group participation was with ND children from same school while only 6.1% was with unfamiliar ND children from other schools. By comparison, MR children in the integrated condition participated in group activities with unfamiliar children for a total of 13.8% of their group play. (Keep in mind that ND children had a much higher overall rate of group participation (24.6%) than MR children in the integrated condition (11.5%)). It is surprising to find that MR children in an unfamiliar social setting appeared to be more socially integrated than ND children in a similar setting.

Nevertheless, ND children were found to engage in more peer play than MR children since a large proportion of MR children's group play was with adults (55.8% in the integrated condition and 30.5% in the isolated condition).

Among the four equipment areas, the highest rate of social integration or group play with children from other schools was observed in the net area (7.7%) compared to the lowest rate found in the sand area (2.1%). The highest rate of peer play was observed in the waterwheel area (94.6%) while the lowest rate was observed in the nets (72.2%) as shown in Table 20.

Table 20

Breakdown of All Observations of Group Participation By Social Partner and Play Equipment Areas

Social Partner	Percentages of Group Participation				
	Swings	Sand	Nets	Water-wheel	Total
Adults	10.0%	16.2%	27.8%	5.4%	17.7%
Same School Children	86.1%	80.9%	64.5%	88.5%	77.1%
Other MR Children	0.4%	1.3%	-	-	0.5%
Other ND Children	3.5%	1.6%	7.7%	6.1%	4.7%
Total	100%	100%	100%	100%	100%

Ironically, the net area encouraged social integration with unfamiliar children but appeared to lag behind other equipment areas in promoting peer activities with familiar children from same school. This is probably a reflection of the unintentional nature of many of the interactions in this area due to the type of play (e.g. rough and tumble play) encouraged in this area. Keep in mind that generally the net area facilitated the highest rate of group play compared to other areas and that the rates presented in this section on social partners were based on total group participation observations and therefore did not reflect the different rates of group participation among the equipment areas.

Summary of Findings on Children's Social Participation

* Overall, an average of only 18.2% of group participation was observed for the entire sample. Parallel play was observed for the remaining 81.8%. A percentage of 20% or more of group participation would be considered a statistically significant high percentage.

* Of the four equipment areas, the highest percentage of group participation was observed in the net area (26.7%).

* Group participation was highest at the "mixed ND" group composition (24.6%), followed by "isolated MR" condition (16.8%), then by the "integrated MR" condition (11.5%).

* For MR children, the nets were associated with the highest rate of group participation, especially in the "isolated" condition (37.7%). However, the sand area appeared to encourage group participation for ND children (37.6%) compared to other equipment areas.

* An overall age difference in group participation was found where the percentage of 25% for older children was double that of younger preschool children (11.7%). However, an age difference was found only for ND children not for MR children, and only for the nets and sand areas.

* Girls engaged in group participation at a significantly higher percentage than boys with 23.4% and 12.7% respectively. Older ND girls were found to be more likely to engage in group participation than any other groups.

* Children with one-on-one adult supervision were found to have a lower percentage of group participation (12.5%) than children with less adult supervision (27.2%). Note, however, that younger and MR children were more likely to be closely supervised than older and ND children. Nevertheless, after accounting for age and disability, the intensity of supervision still made an important impact on children's group participation, especially for older mild and moderately retarded children.

* Social density appeared to have the opposite influence on group participation for MR and ND children. For MR children, higher social density was associated with lower amounts of group participation especially in the net area. For ND children, higher social density was associated with higher amounts of group participation.

* The effect of playground familiarity on group participation was found to be different for various play equipment areas. First time visitors to the playground were observed to exhibit seven times (33.7%) the group participation observed

for repeated users (4.7%) in the sand area. The opposite trend was observed in the net area where repeated users engaged in more group play (35.2%) than first time visitors (21.4%). No difference was observed in the swings or waterwheel areas.

* The duration of observation of children ranged from one to ten minutes. The duration of observation appeared to have influenced children's group participation only in the net area where the percentage was 14.6% for those with short duration and 31.1% for those with longer duration. That is, the longer a child stayed in the net area, the more likely he or she would engage in group play; this was not the case for other equipment areas.

* Analysis of the sequence of observations (initial, middle, and end segment of observations) revealed a clear trend of gradual increase in group play from the initial segment (14.9%) to the middle segment (19%) and to the end segment (20.7%). This trend was more prominent for all school age children and especially for MR children.

* The social significance of the percentages of group participation becomes more meaningful when we consider the social partner of these group play. Of all the observed group participation, 77.1% was with children from same

school, 17.7% with adults, and only 5.2% with children from other schools. This suggests there was little social integration among children from different schools. The highest percentage of social integration was found in the net area where 7.7% of group play occurred with unfamiliar children compared to the lowest rate of 2.1% found in the sand area.

* Although ND children had a much higher overall percentage of group play than MR children (24.6% and 11.5% respectively), their choice of social partners indicate that MR children in the integrated condition appeared to be socially integrated to the same extent as ND children in a similarly unfamiliar social condition. That is, 13.8% of MR children's group play in the integrated condition were with unfamiliar children while only 6.1% of ND children's group play were with unfamiliar children.

Discussion of Findings on Children's Social Participation

At first glance, the 18.2% of group participation observed for this study appeared to be lower than the percentage observed for other studies (25% for Barnes, 1971; 40% for Parten, 1932; and 40% for Rubin et al., 1976). However, it should be stressed that children's demographics for these studies were different from the current study and the contextual factors for each of the studies were also different. The sample for these studies have all been non-disabled, mostly middle class preschoolers observed in a familiar indoor nursery play setting. Studies on social participation with mentally retarded samples are difficult to find and have the same methodological problems as other studies given that the research site for this study is a unique integrated outdoor play setting. Consequently, a valid direct comparison of this study's findings on children's group participation with other studies is difficult to make given these methodological problems.

The finding that MR and ND children were encouraged to engage in group participation by different play equipment areas (net areas for MR children and sand area for ND children) poses an interesting question concerning design and programming for an integrated playground. Since the goal of an integrated playground is to encourage group participation of disabled and non-disabled children together in the same equipment area, it would have been easier to interpret the findings from a design intervention point of view to

have the same equipment area that encourage group play for both MR and ND children. Perhaps this difference is a reflection of the different activities MR and ND children engaged in while playing in the net area. The findings also showed that the net areas encouraged group participation with unfamiliar peers more than any other equipment areas while the sand area encouraged the least percentage of group participation with unfamiliar children. Furthermore, in an integrated MR and ND group setting, the net areas also encouraged the highest amount of group participation than any other type of equipment. In short, the net areas were found to be most facilitating of social integration than any other equipment areas. Perhaps this finding can be best explained by the nature of activities that took place in the net areas. The climbing, jumping, rough and tumble type of play constantly brought children into contact with one another unintentionally. By contrast, the sand, swings, and to a lesser extent, the waterwheel area required children's conscious efforts to initiate contact.

Playground familiarity was found to have different influences on children's group participation for different equipment areas. One explanation for this pattern of results is that with repeated exposures to the sand area, children's interests shifted from the novelty of this equipment area and the social surrounding to the toys and loose parts provided in this area. It had been documented that the availability of play resources (toys and loose parts) can decrease children's peer activities (Smith and Connolly,1980). Although the

nets were able to sustain high rates of group activities for both user groups, some repeated users may be more interested or stimulated by the social environment than by the physical play environment so that group participation became higher for the repeated user group.

In conclusion, children's social participation on the playground was influenced by a complex interplay of factors, the most important of which were children's age group and whether they were mentally retarded or non-disabled. The type of play equipment and the level of social density appeared to have an impact on children's group participation but the impact seemed to be different for the MR and for the ND group. Adult supervision is another factor that played an important role in facilitating group play but the impact was limited to older MR children.

In the next section, we will explore factors that influenced children's specific social behaviors to see whether the pattern of social behaviors is similar to the pattern revealed for children's social participation in this section.

Results of Children's Specific Social Behaviors

Introduction to Specific Social Behaviors

The previous section on social participation provided us with a global sense of children's social behaviors on the playground and how different factors influenced their group participation at play. This section will attempt to further explore children's social activities in greater depth by identifying different types of social interactions observed among children and then examine relevant variables that may have influenced or were associated with those types of interactions. By focusing our attention on specific types of social interactions, it will be possible to address one of the goals of this study which is to identify factors related to peer acceptance and peer rejection.

Eight categories of social behaviors were identified out of the 47 original codes for detailed social activities. The reduction of the list of codes must be done in order to present and understand how important factors and combination of factors influenced children's social behaviors. Three of the original social activity codes were left intact while the remaining codes were combined to create five additional categories of social interactions. The eight categories are :

(1) negative social interactions - receiving or giving verbal or physical aggression (this category can include rejection);

(2) observation - observing people or ongoing social interactions (this category may represent the initial phase of social activities);

(3) assistance - receiving or asking for assistance or protection;

(4) directions/ approval - receiving or asking for directions, approval, or permission;

(5) ambiguous social - receiving or giving playful mockery that can have either negative or positive connotations; interactions that cannot be classified;

(6) implicit social - engaging in ongoing group play with no other specific social interactions (this category marks the beginning of unmistakable positive social interactions);

(7) explicit social - positive social interactions such as conversation, greetings, play related talk, giving nonverbal or physical approval, assistance, etc;

(8) initiate play - child initiated a play activity with others (this category represents the most socially desirable act of social behavior.

An additional category of "no social behavior" was included for the purpose of comparing total percentages of social activities for each explanatory factor under scrutiny. (see Appendix G for the Table of recoded categories).

Effects of Play Equipment on Specific Social Behaviors

Table 21

Percentages of Specific Social Activities Observed During Children's Play in the Four Equipment Areas

Specific Social Categories	Play Equipment Areas				
	Nets (n) (col%)	Swings (n) (col%)	Sand (n) (col%)	Waterwheel (n) (col%)	All (n) (col%)
Negative	10 0.4%	15 0.5%	72 2.5%	60 4.1%	157 1.7%
Observation	580 25.9%	576 19.7%	451 15.7%	400 27.1%	2007 21.1%
Assistance	47 2.1%	347 11.9%	155 5.4%	14 0.9%	563 5.9%
Directions	164 7.3%	258 8.8%	183 6.4%	76 5.2%	681 7.2%
Other	61 2.7%	75 2.6%	60 2.1%	79 5.4%	275 2.9%
Implicit Social	311 13.9%	26 0.9%	356 12.4%	128 8.7%	821 8.6%
Explicit Social	164 7.3%	165 5.7%	195 6.8%	86 5.8%	610 6.4%
Initiate Play	48 2.1%	10 0.3%	30 1.0%	11 0.7%	99 1.0%
No Social	857 38.2%	1445 49.5%	1366 47.6%	620 42.1%	4288 45.1%

Of the four play equipment areas studied, the net area appeared to encourage the highest percentage of positive social activities observed (13.9% implicit social, 7.3% explicit social, and 2.1% initiate play - a total of 23.3% of positive social activities), the lowest percentage of negative behaviors (0.4%), and the lowest percentage of "no social" activities (38.2%). The sand area had the next highest percentage of positive social interactions (20.2%) while a rate of 15.2% was observed for the waterwheel area and a rate of only 6.9% for the swing area (see Table 21).

The highest rates of negative behavior were found in the waterwheel area (4.1%) and in the sand area (2.5%); note that both of these areas were equipped with toys and loose parts which may have influenced the high rates of negative behavior since conflict over play resources accounted for much of the negative behaviors in other play research studies (e.g. DeStefano & Mueller, 1982; Doyle, cited in Gump, 1975; Quay, Weaver, & Neel, 1986).

The rate of assistance and getting directions and approval was highest in the swing area in which adult assistance was often needed to mount and dismount the swings. Rate of assistance was lowest in the waterwheel area where adults generally stayed in the periphery of the area to avoid getting wet. Overall, the type of play equipment made a significant difference on the types of social interactions observed (χ^2 (24,$\underline{N}$=9501) = 965.6, $\underline{p}$ <.0001).

Effects of Group Composition on Specific Social Behaviors

Table 22

Percentages of Specific Social Activities Observed During Children's Play in the Three Group Composition Conditions

Specific Social Categories	Group Composition Conditions: Isolated MR (n) (col%)	Mixed ND (n) (col%)	Integrated MR & ND (n) (col%)	All (n) (col%)
Negative	32 0.9%	82 2.4%	29 1.3%	143 1.6%
Observation	698 20.3%	722 20.8%	527 23.3%	1947 21.2%
Assistance	306 8.9%	47 1.4%	193 8.5%	546 6.0%
Directions	361 10.5%	137 3.9%	170 7.5%	668 7.3%
Other	53 1.5%	114 3.3%	86 3.8%	253 2.8%
Implicit Social	230 6.7%	461 13.3%	105 4.6%	796 8.7%
Explicit Social	231 6.7%	241 6.9%	124 5.5%	596 6.5%
Initiate Play	43 1.3%	35 1.0%	18 0.8%	96 1.0%
No Social	1477 43.0%	1639 47.1%	1010 44.7%	4176 45.0%

Of the three group compositions, the "mixed ND" condition had the highest percentage of positive social interactions (21.2%) followed by "isolated MR" with 14.7% and then by "integrated" condition with only 10.9% of positive social activities. Interestingly, in the isolated MR condition where the immediate social surrounding was familiar, there was the lowest rate of negative behaviors (0.9%) and the highest rate of "initiate play" (1.3%). The highest rate of negative behaviors was observed in the mixed ND condition (2.4%). Not surprisingly, ND children in the mixed ND condition received the lowest percentage of assistance and directions (5.3%) while MR children in other conditions received much higher rates (16% for integrated condition and 19.4% for the isolated MR condition). "Specific social" behaviors were found to be significantly different due to group composition differences (χ^2 (16, N=9171) = 519.4, p <.0001).

Effects of group composition and play equipment area on specific social behaviors.

The net area had the lowest percentage of negative behavior and assistance as well as the highest rate of positive social interactions. This pattern of behavior was consistent for all three group compositions, especially for the isolated and integrated conditions. Except for the net area, it appeared that the amount of assistance and directions received was inversely related to the amount of both negative and positive social behaviors. That is, more

assistance and directions were associated with less positive and negative social interactions in the waterwheel, sand and swing areas. Consistent with the social participation results presented earlier, the net area was most effective in encouraging positive social interactions for the MR sample while it was the sand area that facilitated positive interactions most for the ND sample. Both the nets and waterwheel areas also encouraged ND children to engage in positive social interactions more often than statistically expected but in a less dramatic way than the sand area. (see Appendix H for the log-linear output with observed and expected frequencies for each group composition category in each equipment area).

Effects of Mental Retardation on Specific Social Behaviors

In general, ND children engaged in more negative (2.4%) and more positive social interactions (a total of 16.7% when percentages for "implicit social", "explicit social", and "initiate play" were combined) when compared with MR children. Within the MR sample, mild MR children were closest to the ND sample in terms of both negative (1.5%) and positive social interactions (15.7%) than moderate MR children who were observed to engage in 0.8% of negative behavior and a total of 8.6% positive interactions (see Table 23 for percentages for each social category within each MR group). A very small sample of severely retarded children were observed to exhibit only 3.4% of social interactions.

Table 23

Percentages of Specific Social Activities Observed During Children's Play for Children with Different Level of MR as Compared to Non-disabled Children

Specific Social Categories	Level of Mental Retardation			
	Mild (n) (col%)	Moderate (n) (col%)	Severe (n) (col%)	Non-disabled (n) (col%)
Negative	57 1.5%	17 0.8%	0 0%	83 2.4%
Observation	735 19.7%	539 25.8%	9 6.2%	724 20.5%
Assistance	257 6.9%	155 7.4%	104 71.2%	47 1.3%
Directions	361 9.7%	165 7.9%	13 8.9%	142 4.0%
Other	122 3.3%	38 1.8%	1 0.7%	114 3.2%
Implicit Social	299 8.0%	50 2.4%	0 0%	472 8.6%
Explicit Social	245 6.6%	109 5.2%	4 2.7%	252 7.1%
Initiate Play	42 1.1%	21 1.0%	1 0.7%	35 1.0%
No Social	1619 43.3%	999 47.7%	14 9.6%	1656 47.0%

Severely retarded children also were observed to received a total of 80.1% of assistance and directions. By comparison, mild MR children received 16.6% of assistance and directions while moderate MR children received 15.3% and ND children received only a total of 5.3% of assistance and directions.

It is interesting to note that severe MR children engage in observation only 6.2% of the time while the other groups ranged from 19.7% to 25.8% of observation. Severe MR children's lack of focussed observations may explain why they generally do not model ND children's behavior well in a mainstreamed setting. In sum, the amount of social interaction for ND and mild MR children were very similar, especially for negative and positive interactions while severe MR differed significantly from the other groups since the majority of their interactions were receiving assistance and directions.

Effects of Age on Specific Social Behaviors

Consistent with the social participation results presented earlier, school age children's percentage of positive interactions (20%) exceeded that of preschoolers (12.3%). Note that there was no difference between the two age groups in the percentage of the "initiate play" category. As might be expected, preschoolers' percentage of assistance and directions received (16.3%) was higher than that of school age children (9.7%). The rates for all other categories were similar.

Although the percentages of some behaviors appeared to be similar for preschoolers and school age children overall, they occurred in different equipment areas for different age group. For preschoolers, the highest rate of both negative and positive behaviors occurred mostly in the sand area. For school age children, the waterwheel area was associated with the majority of negative behaviors while positive behaviors were observed most in the nets. Preschoolers were found to also engage in twice as much observation than school age children in the waterwheel area (38% and 18% respectively).

School age children in the mixed ND condition engaged in implicit social activities 22.9% of the time while school age MR in the isolated condition had the next highest percentage (7.8%). This is only one-third of the rate when compared to that of older ND children. The percentages for preschoolers in all group compositions did not exceed 6% of implicit social. For explicit social activities, the highest percentage was observed for older children in the mixed ND condition (8.9%) while the lowest percentage was found for preschool MR children in the integrated condition (3.7%).

Effects of Gender on Specific Social Behaviors

The percentage of positive social interactions for girls was double (21%) that of boys; this again is consistent with the social participation results reported earlier where girls' percentage of

group participation (23.4%) was also double that of boys (12.7%). The percentages for all other categories were similar for both genders.

However, when age group is taken into consideration, school age females were found to receive less assistance and directions as well as more positive behaviors than other groups. Mental retardation also played a role in gender differences; ND children regardless of gender engaged in a higher percentage of negative behaviors than MR children while only ND girls had a significantly higher percentage of positive behaviors (26.4%) than other groups including ND boys (11.6%). Note that even MR girls' percentage of positive interactions (16%) exceeded that of ND boys (11.6%). (See Appendix I for log-linear output of gender and disability effects on observed and expected frequencies of specific social behaviors.)

Effects of Supervision on Specific Social Behaviors

As shown in Table 24, the percentage of positive social interactions for those under one-on-one supervision (12.7%) was considerably less than those with less adult supervision (21.5%). Again, this result was consistent with the social participation findings. T ɔse with close supervision received five times more assistance and directions (19.1%) than those with less supervision

Table 24

Percentages of Specific Social Activities Observed During Children's Play for the Two Supervisory Conditions

Specific Social Categories	One-on-one Supervision (n) (col%)	Not One-on-one (n) (col%)	All (n) (col%)
Negative	93 1.6%	64 1.7%	157 1.7%
Observation	1306 22.5%	701 18.9%	2007 21.1%
Assistance	544 9.4%	19 0.5%	563 5.9%
Directions	562 9.7%	119 3.2%	681 7.2%
Other	163 2.8%	107 2.9%	270 2.8%
Implicit Social	313 5.4%	508 13.7%	821 8.6%
Explicit Social	378 6.5%	232 6.3%	610 6.4%
Initiate Play	45 0.8%	54 1.5%	99 1.0%
No Social	2389 41.2%	1896 51.2%	4285 45.1%

(3.7%) since the overwhelming majority of assistance and directions were given by adult caretakers.

Initiate play, the most desirable positive social behavior, was found to be encouraged most by the net area under less adult supervision (3.9%) compared to 1% under one-on-one supervision; although this activity occurred infrequently, the percentage found in the less supervised condition in the nets was four times the overall expected percentage (1%). Regardless of supervision, the percentage of initiate play was around 1% for the sand area and much less for the swings and waterwheel areas. Implicit social activities was also found to be encouraged much more under less supervision, especially in the sand (21.3% vs. 5.9% with close supervision), nets (21.2% vs. 9.2% with close supervision), and waterwheel (11.1% vs. 7.4% with close supervision) areas.

The group composition condition also influenced the effect of supervision on the percentages of specific social activities, especially play-related interactions such as initiate play and implicit social activities. With less supervision, play-related social interactions were increased in both the mixed ND and isolated MR conditions while both activities remained low in frequencies in the integrated condition regardless of the amount of adult supervision.

To summarize, close adult supervision not only influenced the

amount of assistance and directions received by children but also their play-related social activities.

Effects of Density on Specific Social Behaviors

Higher social density appeared to encourage more positive social interactions (17.6%) than under low density conditions (12.4%), especially with categories associated with play - "implicit social/engage in group play" and "initiate play" categories. Under low density, a higher rate of assistance and directions (19.3%) was found when compared to high density condition (10.6%). However, negative behavior was slightly higher under high social density (1.9%) than low (1.1%) but both rates are too small for the difference to be noteworthy. Thus it appeared that, overall, higher social density has more beneficial effects on social interactions than low density conditions (see Table 25 for percentages for individual categories under the two density conditions).

When we explored the effects of density in individual equipment areas, we found that positive interactions in the sand area was indeed encouraged by higher density (23% positive behaviors observed under high density while only 7% observed under low density condition). However, for the net area, the pattern was reversed although both density conditions appeared to encourage high percentages of positive interactions (37.5% with low density conditions and 19.7% with high

Table 25

Percentages of Specific Social Activities Observed During Children's Play for the Two Density Conditions

Specific Social Categories	Low Density (n) (col%)	High Density (n) (col%)	All (n) (col%)
Negative	29 1.1%	128 1.9%	157 1.7%
Observation	534 19.5%	1473 21.8%	2007 21.1%
Assistance	266 9.7%	297 4.4%	563 5.9%
Directions	264 9.6%	417 6.2%	681 7.2%
Other	62 2.3%	209 3.1%	270 2.8%
Implicit Social	131 4.8%	690 10.2%	821 8.6%
Explicit Social	198 7.2%	412 6.1%	610 6.4%
Initiate Play	12 0.4%	87 1.3%	99 1.0%
No Social	1243 45.4%	3044 45.0%	4287 45.1%

density conditions). Density conditions made little differences in the swings and waterwheel areas where the rates of positive interactions were low.

Effects of Playground Familiarity on Specific Social Behaviors

Children who were less familiar or first time visitors to the playground were observed to engage in more play-related social interactions (implicit social - 11.5%; initiate play - 1.4%) than repeated users of the playground (implicit social - 4.7%; initiate play -0.6%). Again, this unexpected finding coincided with the social participation results where less playground familiarity were associated with higher percentage of group participation. Note however, that explicit social interactions, regardless of positive or negative, were found to have similar rates for both repeated and first time users of the playground. Much like the effects of density, playground familiarity influenced only play-related social interactions while explicit positive and negative social interactions were not effected.

Effects of Observation Duration on Specific Social Behaviors

Overall, there was no difference in children's specific social interactions due to the observation duration. Observation duration appeared to have some influence on social interactions when we look at individual equipment areas. Negative behaviors seemed to be much more

frequent for children with short observation durations in the sand area (5.2% vs. 2% for those with long durations) but the opposite was true for the waterwheel area. Additionally, children with longer observation durations have higher rates of positive interactions than those with short duration, especially in the net area (26.2% for those with long durations and 15.2% for those with shorter observation durations).

Effects of Observation Sequence on Specific Social Behaviors

In exploring children's specific social behaviors over time, that is, over the course of the observation from the initial segment to the middle segment to the end segment, the only linear trend found was that children received less assistance with time (from 7% in the initial segment to 4.5% in the end segment). There appeared to be no differences in the other categories.

For the net area only, play-related social interactions increased considerably as the observation sequence progresses from the initial segment (10%) to the middle segment (14.8%) to the end segment (23%). This sequential pattern of positive interactions increasing with observation time segments was found for school age children only. For preschoolers, the only sequential pattern found was that their rate of receiving assistance decreased with each time segment.

Relationship Between Social Interaction Partner and Specific Social Behaviors

Table 26 presents the crosstabulation of specific social behaviors and social partners. For all social categories combined, 44% of the interactions were with children from same school, 43.9% with adults, 11.5% with ND children from other schools, and only 0.6% with MR children from other schools. Of the three positive social interaction categories (implicit social, explicit social, and initiate play), 67.6% was with familiar children from same school, 25.8% with adults, and only 6.6% with unfamiliar ND and MR children from other schools. It should be emphasized that the rate of "initiate play" with unfamiliar ND children was quite high at 20.4% while "implicit social/engage in group play" was at a low of only 1.8% with unfamiliar ND children. Perhaps this pattern suggests that attempts were made by children to initiate play with unfamiliar children but the attempts did not easily meet with success; at the same time, initiation of group play with familiar children was often successful as indicated by the rate of "implicit play" with children from same school (82.4%). Not surprisingly, 96.3% of assistance and 80.3% of directions were provided by adults.

Although both the sand and net areas supported high percentages of positive social interactions, the net area emerged as the one area that fostered the highest rate of play initiation, especially with unfamiliar ND children (5.3% compared to only 1.1% in the sand area).

Table 26

Percentages of Children's Social Partners for Each Specific Social Activities Observed During Children's Play

Specific Social Categories	Social Partner: Adults (n) (row%)	Same School (n) (row%)	Other MR (n) (row%)	Other ND (n) (row%)
Negative	26 16.6%	86 54.8%	0 0%	45 28.7%
Observation	616 32.5%	868 45.8%	23 1.2%	387 20.4%
Assistance	542 96.3%	18 3.2%	0 0%	3 0.5%
Directions	547 80.3%	121 17.8%	0 0%	13 1.9%
Other	94 39.0%	109 45.2%	0 0%	38 15.8%
Implicit Social	128 15.6%	675 82.4%	1 0.1%	15 1.8%
Explicit Social	245 40.8%	292 48.6%	7 1.2%	57 9.5%
Initiate Play	19 19.4%	59 60.2%	0 0%	20 20.4%

Even with familiar schoolmates, the net area promoted a higher rate of play initiation (4.7%) compared to the sand area (2.4%). (see Appendix

J for log-linear output of equipment and social partner effects on the frequencies of specific social behaviors.)

Social partners for ND children.

For ND children, much of their interaction with familiar same school children (52.9%) was associated with implicit and explicit social activities. Of the social interactions with unfamiliar ND children, only 14.5% was implicit and explicit social activities. In fact, 59.8% of the social interactions with unfamiliar ND children was only observations of them. Finally, only 7.9% of the interactions with adults was associated with positive social activities while the remaining interactions were either observing or receiving assistance and directions from adults. It is interesting to note that a higher percentage of ND children's interactions with unfamiliar ND children was initiate play (4.7%) compared to 1.5% with same school children. Although few in number, this suggests that more attempts were made to engage unfamiliar ND children to play than with familiar ND children; perhaps play with familiar ND children was more spontaneous and required less formal play initiation than play with unfamiliar ND children. (See Appendix K for log-linear output of group composition and social partner effects on the observed and expected frequencies of specific social behaviors.)

Social partners for MR children.

MR children observed in the isolated condition engaged in positive social interactions at the rate of 42.2% of their interactions with familiar MR children from same school while the rate for MR children observed in the integrated condition was only 24.3%. Note that in the integrated condition, 66% of MR children's interactions with unfamiliar ND children was simply observation of them while only 10.9% was positive interactions and 6.2% was negative interactions. The rates of positive interactions (approximately 18%) as well as assistance and directions (approximately 51%) with adults are the same in both MR conditions.

Influence of adult supervision on children's social partners.

The amount of adult supervision appeared to make a difference in children's social partners. Under close supervision, children received a high rate of assistance and directions from adults (51.4%); with less supervision, the amount of assistance and directions from adults decreased to only 15.2%. Positive interactions with same school children also increased dramatically when children were under less adult supervision (from 31.5% under one-on-one supervision to 56.5% under less supervision). Positive interactions with unfamiliar ND children doubled under less supervision (from 13.1% under close supervision to 27% under less supervision).

Sequential patterns and social partners.

A number of sequential social interaction patterns were observed when children's social partners were examined from the initial observation segment to the end segment. It appeared that negative behaviors increased with time when the social partners were unfamiliar ND children (from 4.5% for the initial segment to 5.3% for the middle segment to 10.2% for the end segment) but the negative behaviors decreased somewhat with time when the partners were familiar same school children (from 4.8% to 4% to 2.8%). Adult assistance decreased from 30.4% to 22.4% to 20.7%) while directions from adults remained constant over the duration of the observation. There appeared to be no other sequential pattern found in the other social categories.

Age differences and social partners.

Some age differences were found for children's behaviors with different social partners. Interestingly, preschoolers engaged in more negative interactions with unfamiliar ND children (9.6%) than school age children (4.4%). Although both age groups observed unfamiliar ND children to a high degree, preschoolers also observed familiar schoolmates more (51.3%) when compared to the amount for older children (31.1%). This pattern was reversed when we looked at positive interactions where preschoolers' percentage of positive interactions with schoolmates was 36.7% while it was 51.9% for older children. Older children also had a higher percentage of positive

interactions with unfamiliar ND children (18.9%) than the younger group (14.1%).

Gender differences and social partners.

Gender also played a role on behavioral differences with social partners. For instance, girls were shown to engage in more negative behaviors with unfamiliar ND children (12.1%) than boys (3%). Girls were also found to engage in more positive interactions with familiar schoolmates (49.3%) than boys (38.3%). Both genders were similar in their amount of positive interactions with unfamiliar ND children with the sole exception that boys engaged in more play initiations (4.9%) than females (1.4%). This set of findings suggests that girls in this study were more sociable overall than boys but they tended to be more friendly towards familiar schoolmates while boys tended to be less exclusive in their positive social interactions and attempted to engage unfamiliar children in play more often than girls.

Relationship Between Social Response and Specific Social Behaviors

To further understand the effectiveness of children's social interactions or the reciprocity of these interactions, their response to these interactions were recorded. Children's response to specific social activities were recorded as either: (1) ignore the social stimulus, or (2) respond negatively to social stimulus, or (3) respond positively to social stimulus. Note that not all specific social

Table 27

Percentages of Children's Social Responses[1] for Each Specific Social Activities Observed During Children's Play

Specific Social Categories	Social Responses			
	Ignore (n) (row%)	Negative Response (n) (row%)	Positive Response (n) (row%)	Total (n) (col%)
Negative	87 57.2%	43 28.3%	22 14.5%	152 7.2%
Assistance	81 14.4%	8 1.4%	474 84.2%	563 26.5%
Directions	288 42.5%	32 4.7%	357 52.7%	677 31.9%
Other	78 35.9%	30 13.8%	109 50.2%	217 10.2%
Explicit Social	145 34.6%	24 5.7%	250 59.7%	419 19.7%
Initiate Play	28 29.5%	16 16.8%	51 53.7%	95 4.5%
Total	707 33.3	153 7.2%	1263 59.5%	2123 100%

[1] Note that no social responses were recorded for observations, implicit social, and no social activities. Consequently, the total percentages for each specific social category are higher than those found in other tables.

categories warranted a response; no response was recorded for "observation" and "implicit social" categories.

Table 27 shows that for the two positive social behavior categories of "explicit social" and "initiate play", 58.6% of the responses was positive, 33.7% of the behaviors was ignored, and only 7.8% of the responses was "negative". For "negative" behaviors, 57.2% of the behaviors was ignored, 28.3% elicited a negative response, and ironically, 14.5% elicited a positive response. Assistance was received positively 84.2% of the time while directions were responded to positively 52.7% of the time and ignored 42.5% of the time. In general, the majority of children's social behaviors received a positive response (59.4%) or was ignored (33.5%) but rarely was responded to negatively (7.1%) with the exception of negative interactions.

Social partners and social response.

Differences in social partners influenced the type of response given. Negative interactions with familiar schoolmates were more often negatively reciprocated (33.5%) than ignored (16.2%). Negative interactions with unfamiliar ND children were equally likely to be ignored (28.2%) or negatively reciprocated (26.3%). Play initiation with unfamiliar ND children was more likely to be ignored (47%) than positively reciprocated (26%). The opposite was true with familiar schoolmates where play initiation was more likely to be positively

reciprocated (54%) than ignored (28%). These findings suggest that children ignored unfamiliar children more easily than children they knew from the same school.

Play equipment areas and social response.

Positive interactions were responded to differently in different play equipment areas. Play initiation was more likely to be positively reciprocated in the nets and waterwheel areas and ignored in the swing area. Explicit social interactions were positively reciprocated over 70% of the time in the nets and waterwheel areas but only about 50% of the time in the sand and swing areas.

Social response for MR and ND children.

It appeared that ND children reacted differently to social overtures than MR children. MR children in the integrated condition were most likely to ignore negative overtures (69%) while MR children in the isolated condition were most likely to reciprocate positively to play initiation (65%) than the other group composition conditions. ND children, however, were less likely to react positively to play initiations (38.2%) than the MR group (62.3%).

Age differences in social response.

There were also some age differences in children's responses to social overtures. On the one hand, younger children tended to be more positive in their responses to assistance and directions (94.6% and 58.2% respectively) than older children (57.6% for reactions to assistance and 45.3% for directions). On the other hand, older children were more positive in their responses to play initiation (75.6%) than preschoolers (37%).

Gender differences in social response.

Females generally responded more positively than males, especially to assistance (90% vs. 79% for males) and directions (61% vs. 44% for males) as well as play initiation (67% compared to 42% for males). With negative overtures, males were twice as likely to respond negatively than females.

Summary of Findings on Children's Specific Social Behaviors

* Eight categories of specific social activities were used to describe children's social behaviors observed on the four equipment areas. Overall, 45.1% of the observations did not include any social behaviors; of the eight social activities observed, the most frequent was observing people or social activities (21.1%). Positive social categories (implicit social, explicit social, and initiate play) consisted of another 16% while receiving assistance and directions were observed 13.1% of the time. Negative social behaviors comprised only 1.7% of all observations.

* Of the four equipment areas studied, the net area was associated with the highest percentage of positive social activities (23.3%) and the lowest percentage of negative behaviors. The sand area also facilitated a higher percentage of positive social interactions (20.2%) while both the waterwheel (15.2%) and swings (6.9%) fell short of the statistically expected percentage of positive social activities (16%).

* ND children were found to exhibit the highest percentage of positive social interactions (21.2%) followed by MR children in the "isolated" condition (14.7%) and then by MR children in the "integrated" condition (10.9%). The sand area was

associated with positive interactions for ND children while it was the net area that was associated with the highest percentage of positive social behaviors for MR children.

* Except for the net area, the amount of positive and negative social behaviors was conversely related to the percentage of receiving assistance and directions.

* Mild MR children's amount of positive and negative social behaviors were closest to ND children's amount when compared to moderate and severe MR children. MR children's level of retardation was also found to be related to the amount of assistance and directions received with mild MR receiving less than the other MR groups.

* School age children's percentage of positive interactions (20%) exceeded that of preschoolers (12.3%). For preschoolers, the highest percentage of both negative and positive behaviors occurred in the sand area while for older children, the waterwheel was associated with most of their negative behaviors and the nets were associated with the highest percentage of positive social behaviors.

* The percentage of positive social interactions for girls was double (21%) that of boys. Furthermore, ND girls had the highest percentage of positive interactions (26.4%). Even

MR girls' percentage of positive interactions (16%) exceeded that of ND boys (11.6%).

* Children with less adult supervision were found to exhibit higher percentages of positive social interactions (21.5%) than those with one-on-one supervision (12.7%). Predictably, those with close supervision received five times more assistance and directions than those with less supervision. Adult supervision appeared to influence play related social activities (implicit social and initiate play) most, especially in the mix ND and isolated MR conditions.

* Higher social density was associated with higher amount of both positive and negative social activities, especially in the sand area. For the net area, the opposite trend held true.

* Less play-related social activities were observed among repeated users (5.3%) of the playground than first time users (12.9%).

* Children who were observed longer had higher percentages of positive interactions (26.2%) than those who were observed for a shorter period (15.2%).

* Over the course of the observation period, children were found to receive less and less assistance. For the net area only, play related social interactions increased dramatically as observation progressed from the initial segment (10%) to the end segment (23%).

* For all social categories combined, 44% of the interactions were with children from same school, 43.9% with adults, and 11.5% with ND children from other schools, and only 0.6% with MR children from other schools. For positive social interactions, 67.6% was with children from same school, 25.8% with adults, and only 6.6% with unfamiliar ND and MR children from other schools. Assistance and directions were provided mostly by adults.

* The net area was associated with the highest amount of play initiation with both schoolmates and unfamiliar ND children than the other three equipment areas.

* Although ND children engaged in group play with schoolmates at a high percentage, they made more attempts at play initiation with unfamiliar ND children than with schoolmates. Perhaps play with schoolmates was more spontaneous and required less formal play initiation than play with unfamiliar ND children.

* MR children in the isolated condition were found to have a higher amount of positive interactions with peers than MR children observed in the integrated conditions.

* The amount of positive interactions with peers (both familiar and unfamiliar) doubled under less adult supervision than under one-on-one supervision.

* Preschoolers' amount of negative interactions with unfamiliar peers was double that of older children. Older children had much higher rates of positive interactions with schoolmates and with unfamiliar peers than preschoolers.

* Girls appeared to be more sociable than boys overall but girls tended to be more friendly towards schoolmates than with unfamiliar children. Boys were found to be less exclusive in their positive interactions and attempted to initiate play with unfamiliar children more often than girls.

* Children's responses to social stimuli were mostly positive (59.4%), especially to assistance and positive interactions. Of the social stimuli that were ignored (33.5%), negative behaviors and directions were among the most frequent. Only 7.1% of the social stimuli were ever responded to negatively; they were mostly negative behaviors.

* Children were more likely to ignore unfamiliar than familiar peers, especially with negative behaviors and play initiation.

* Positive interactions were more likely to be reciprocated positively in the nets and waterwheel areas than in the sand and swing areas.

* Older children were more positive in their responses to play initiation than preschoolers but preschoolers reacted more positively to assistance and directions.

* Overall, girls responded more positively than boys while boys were more likely to react negatively to negative overtures.

Discussion of Findings on Children's Specific Social Behaviors

The total amount of social interactions observed in this study cannot be directly compared with the amount observed in other studies since a particular sample of children and a particular play setting can have considerable influence on the amount and type of social interactions observed among children. The fact that the research site for this study is uniquely the first public outdoor integrated play setting in this country with special design features and playground management makes comparisons with other studies even more difficult. As Phyfe-Perkins (1980) points out, the amount of social behaviors observed among children can differ widely depending on the "activity setting" in which observations were made. For example, Phyfe-Perkins cited that the highest percentage of social activities (as much as 70%) had been observed in activity settings such as "preparation/ clean-up", "role-play" area, and large-muscle "multi-niche" play equipment while the lowest percentages of social interactions (as low as 9%) were observed in activity settings such as "single-niche" large-muscle play equipment, "audio-visual" display area, and area with puzzles. Thus, comparisons with other studies must be made on the level of individual types of equipment. However, empirical research on children's social behaviors that focused on individual types of play equipment is rare, the few exceptions that will be used for comparisons here include both indoor and outdoor settings. Keep in mind that the samples for these comparison studies are mostly ND

children and their familiarity with the play setting varied for each study.

Given that the net and waterwheel areas are unique play equipment design, comparisons with other studies can only be made on a global level. There is a consensus among playground researchers that "multi-niche" gross-motor type of play equipment enhances children's peer social interactions more than other types of play equipment (Brown, 1980; Doyle, 1975; Mueller and Bergstrom, 1982; and Rogers-Warren et al., 1980). This finding supports this study's observation that the net area, the only multi-niche and multi-function gross-motor equipment area selected for observation, facilitated the highest amount of positive social interactions (23.3%) and the lowest amount of negative interactions (0.4%) when compared to the other three equipment areas. Research have also shown that encapsulated play areas promoted higher levels of social and language behaviors than open play areas (Brown and Burger, 1984; and Kruidenier, 1978), this finding offers additional explanation for the positive social effects of the net area since this area also was the most encapsulated equipment area among those selected for comparison.

Expectedly, the single-niche and "single-function" swings were found to encourage only about 7% (ND and MR children combined) of social interactions which is very close to the 9% of "responsive communications" or conversations recorded for children playing on swings in the playground study conducted by Hayward, Rothenberg, and

Beasley (1973). The similarity was even more astounding when the percentage of positive social behaviors for ND children on the swings (9.7%) in this study was compared to the 9% obtained for the Hayward and associates' study.

Hayward and associates' study also compared water play areas from three different playgrounds, social interactions were observed in varying degrees depending on the playground (1.5% for traditional playground, 3.8% for the contemporary playground, and 16.7% for the adventure playground). The authors suggested that the differences in the amount of social interactions observed for their study may be attributable not only to the type of playground but also to the age of the children users and to the amount of supervision received in the different playgrounds. Thus, the amount of social interactions observed in the waterwheel area for this study cannot be easily compared to the results obtained for water play in other studies since so many factors can influence the results. However, in a review article concerning the influence of the physical environment on preschool children's behaviors (Phyfe-Perkins, 1980), water play was concluded to be an activity that promoted prosocial behaviors among preschoolers. The results for this study do not appear to support Phyfe-Perkins's conclusion since the highest percentage of negative behaviors was observed in the waterwheel area. However, the inclusion of water toys in the area may have influenced the amount of negative behaviors in this area. The issue of toys and loose parts will be explored further in the next chapter.

CHAPTER 5

SUMMARY AND DISCUSSION

Three methods were used to evaluate whether different play equipment on the Playground for All Children had different impacts on the social integration of disabled and non-disabled children. Caretaker and Child Interview methods were used to explore users' perceptions of the play and social potential of different equipment areas on the playground. An Equipment Sampling Observational method was used to provide more detailed description of both mentally retarded (MR) and non-disabled (ND) children's play and social behavioral pattern on four specific pieces of equipment - the swings, nets, sand area with castle, and the waterwheel area. A summary of major findings for each method will be presented in this section. More importantly, similarities of results obtained from the different methods will be highlighted to illustrate correspondence between reported behaviors and observed behaviors. Discussion will be emphasized on the findings obtained from the Equipment Sampling method.

Summary for the Caretaker Interview

Caretakers of both ND and disabled children (N=63) were asked to point out the play equipment that they thought best promoted the social integration of disabled and ND children on the playground. Of all the play areas cited, the sand areas were perceived to have the highest integrating potential followed by the waterwheel area, the net areas, and the soft play area with toys. Caretakers were also asked to provide the reasons why they thought certain play areas have more integrating potential than others. The most frequently given explanations were: (1) social - the area promoted sharing, talking, or cooperative play; (2) proximity - the area brings children together in an enclosed or confined area; and (3) accomplishment - the area allowed all children to play and accomplish on own skill level; other reasons such as accessibility and spatial openness of area, less need for adult supervision, and popularity of equipment area were also provided as explanations for the area's integration potential.

Note that the caretakers of disabled children placed much more emphasis on how equipment areas requiring less supervision can promote integration than caretakers of ND children. However, there appeared to be a discrepancy between what the caretakers said and what they did. The observational data from the equipment sampling method indicate that caretakers of MR children engaged in much more close supervision of their children than caretakers of ND children.

Summary for the Child Interview

A sample of 173 ND children were asked to provide information on (1) their play equipment usage on the entire playground, (2) play equipment preference, (3) play with unfamiliar children, and (4) their perception of activity affordance for four equipment areas selected for in-depth study. Of the five equipment areas children most often cited that they had used that day, four of those cited were the equipment selected for in-depth analyses (nets, swing, sand, and the waterwheel). Three of these equipment areas were also cited as children's favorite play equipment on the playground (nets, waterwheel, and swings). Only 21% of the sample reported that they had played with unfamiliar children on the playground and that they played with them mostly within the net and swing areas. Note that the net and swing areas were among the top three areas cited by children's caretakers as the best places on the playground for social integration of disabled and ND children. However, rarely did children indicated they had played with disabled children perhaps because children (especially younger children) had difficulty understanding what "disabled" meant and how to distinguish disabled from non-disabled children (with the exception of physically disabled children).

In order to differentiate the four selected equipment areas based on the child's perspective, children were also asked to name all the different activities they can do on each of the four play equipment. Children's perception of an equipment area's activity

affordance was measured by taking into account both the mean number and variety of different activities cited by children. Results showed that both the nets and waterwheel area were perceived to be high in activity affordance (AF) while the sand area was moderate in AF and the swings was low in AF. Not surprisingly, older children were found to perceive more AF in the play equipment than younger children but difference in their verbal ability may be a factor in this finding.

Children's perception of an equipment area's AF bears some relationship with their equipment preference (the nets and waterwheel were both high in AF and were cited as children's favorite play areas) but other factors such as equipment design (e.g. moveable features such as those provided by the swings) and specific activities afforded by the equipment (e.g. action play, socio-dramatic play) contributed to children's overall equipment preference. Relationship between children's equipment usage and their perception of an equipment area's AF is less clear since so many other factors impacted on children's equipment usage (e.g. caretakers' preference and directions, limited availability of certain equipment for children's use, etc.).

The activities children reported to be afforded by the equipment areas were categorized into seven activity types : (1) non-play, (2) functional play, (3) sensory play, (4) object play, (5) constructive play, (6) social games or other social activities, and (7) dramatic play. Of all the responses, functional play accounted for the

majority of the responses while constructive play and object play were second and third in frequency of response. Relationship between children's reported activities and observed activities will be discussed in the summary of findings for the Equipment Sampling method.

Correspondence of Caretakers' Perception of Play areas' Integrating Potential and Children's Reported Behaviors

The play areas that caretakers of ND children perceived to have the most integrating potential were found to be similar to those areas reported by ND children when they were questioned as to where they had played with unfamiliar children. With the exception of the waterwheel area, both caretakers and children reported the following areas most often: the sand areas, the nets, and the soft play area. One explanation for why the waterwheel area was excluded on children's list of areas for integrated play was that entry into the waterwheel area was dependent on a strictly enforced playground schedule for visiting groups and that this procedure discouraged any spontaneous mixing of different groups of children. Nevertheless, the similar results obtained from these two interview methods suggests that children's caretakers can be a reliable source of information concerning the behaviors of the children they supervised.

Summary and Discussion of Findings for the Equipment Sampling Observation Method

A sample of 163 children were observed playing in the nets, swings, sand area with castle, and the waterwheel area. Of the sample, 72 were ND children and 91 were MR children. The sample comprised of an equal number of boys and girls as well as an approximately equal number of preschoolers (age 3 to 5) and school age children (6 to 12). The duration of observations ranged from one to ten minutes and was recorded on audio-visual tapes. Observations were made in those four equipment areas only when one of the following four group composition conditions were met: (1) Isolated MR -only one MR group in area; (2) Mixed ND -two or more ND groups in area; (3) Mixed MR - two or more MR groups in area; and (4) Integrated - at least one MR and one ND group in area.

Commonalities Between Children's Reported Play Activities and Observed Activities

Using the same play categories as the child interview, results obtained from the observation method were remarkably similar to those reported by children in the child interview. Of the play activities, both methods found that functional play was the most frequently reported or observed play on those four equipment areas; furthermore, both methods found constructive play and object play were second and

third in frequency while dramatic play was lowest in frequency. However, more non-play activities were observed than reported while the frequency of reported sensory play was higher than the percentage actually observed. More revealing is the fact that the same gender and age differences were found in both methods. To illustrate, boys reported and were observed to have significantly more object play than girls while girls had significantly higher percentages of constructive play in both sets of results. Similarly, younger children were found by both methods to have higher percentages of object play than older peers while older children engaged more in functional and constructive play than preschoolers.

In sum, the correspondence of the findings from the interview and observation methods suggests that children can be a reasonably reliable source of information on their use of a play environment.

The Impact of Play Equipment on Children's Play and Social Behaviors

Perceived Activity Affordance of Play Equipment Areas and Children's Behaviors

The type of play equipment where children were observed and the availability of toys made an important difference on the type of activities observed, especially in the swing (mostly functional play) and sand areas (mostly constructive and object play). Activities

observed in the other two equipment areas (waterwheel and nets), where children were perceived to have high activity affordance, were less predictable and had high percentages of non-play and games/social activities. Meanwhile, equipment with low activity affordance (swings) had very low percentages of non-play and games/social activities. Perhaps equipment with low activity affordance encouraged more play but less group activities. More importantly, equipment with high or moderately high activity affordance (AF) were associated with high percentages of group participation and high percentages of positive social interactions compared to equipment with low AF.

Similar results were reported by McLoyd (1984) in a study comparing toys with "low specificity of function" (analogous to high activity affordance) and toys with "high specificity of function" (analogous to low activity affordance). She suggested that toys with specific functions promoted more solitary play and less group play than toys with ambiguous functions. The author also indicated that toys with ambiguous or many functions were associated with more social initiation and greater tendency for outsiders to join ongoing group activities. This finding may explains why the highest percentage of "initiate play" and group participation with unfamiliar children were observed in the net area when compared to the other three equipment areas since the net area was perceived to have high AF. Note that the waterwheel area, which also was perceived to have high AF, also had a high percentage of group participation with unfamiliar children;

however, only a low percentage of "initiate play" was observed in the area while a relatively high percentage of negative behaviors was found. As suggested earlier, the high negative behaviors may be a function of the availability of water toys in the area.

Play Equipment Areas with Toys and Children's Behaviors

Research has shown that children most often establish contact through objects and toys and that toys play a dominant role in the initiation and maintenance of peer interactions (Eckerman & Whatley, 1977; Hartup, 1983; Mueller & DeStefano, 1974; Quay, Weaver, & Neel 1986; Rubin, 1983). However, toys not only encourage positive social interactions among peers but also negative interactions, primarily conflict over possession of toys (Dawe, 1934; DeStefano & Mueller, 1982; Hartup, 1974; & Johnson, 1935). Furthermore, when children's social behaviors were compared when playing with small toys and when playing with large-muscle types of play equipment, more negative behaviors invariably occurred in the small toy setting (DeStefano & Mueller, 1982; Doyle, 1975; Smith & Connolly, 1980). This finding is in accord with this study's observation that the highest percentages of negative behaviors occurred in the two equipment areas with toys - the waterwheel and sand areas. Indeed, about 40% of the negative behaviors that occurred in those two areas was actually object possession struggle; it is conceivable that more incidence of negative behaviors was a result of object struggle that occurred moments earlier in the observation sequence. This study has demonstrated

that the inclusion of toys in play areas can make a profound impact on both children's play and social activities. The implication of this finding is that special care need to be taken in the selection and distribution of toys in a play setting so that children need not feel compelled to possess a particular toy.

The Different Impact of the Play Environment on MR and ND Children

The types of play equipment were shown in this study to have different impact on MR and ND children. For example, MR children demonstrated high percentages of group participation and positive social interactions in the net area only whereas ND children had higher percentages of group play and positive interactions in the sand areas than other areas. This is an important finding in that it warns researchers that results obtained from a ND population are not always generalizable to a disabled population. This is not only to say that MR children may play or socialize in different ways than ND children, but also that different factors impinge on MR and ND children in different ways. One of these factors is the different amount and type of adult supervision MR and ND children received. This will be discussed further under the supervision section.

The Impact of Mental Retardation on Children's Play and Social Behaviors

When comparing the play and social behaviors of ND and MR children, it is important to keep in mind that the comparison was made not simply to document MR children's developmental lag over their ND peers but rather to explore how the social and physical environment may inadvertently contribute to that lag.

ND children were observed to have higher percentages of constructive, games/social, and dramatic play than MR children. Within the MR sample, the percentage of object play increased with their level of mental retardation while their percentages of functional and constructive play decreased with their MR level with mild MR having percentages closest to those of ND children.

Within the MR group, differences in play and social behaviors were found among MR children with different levels of mental retardation and for MR children in the two different group compositions. The percentage of group participation for mildly retarded children was found to be lower than the high percentage observed among ND children but much higher than the percentages observed for moderate or severe MR children. This finding was consistent with results obtained for other studies (Guralnick & Weinhouse, 1984; Mindes, 1982) The same trend was found for children's negative and positive social interactions in which mild MR

youngsters had lower percentages of group play and social interactions than their ND peers but their percentages surpassed those observed among moderately and severely retarded children by a wide margin.

The differences in social behaviors found among MR children of different level of retardation suggests that mild MR children were more accepted or more socially integrated than moderately and severely retarded children. One explanation for the differences can be that mild MR children have better play and social skills than their moderately and severely retarded peers and were thus better able to initiate and sustain play and social interactions. An alternative explanation can be the difference in physical appearance among children with different levels of retardation. It should be pointed out that mildly retarded children in this sample did not have physical appearance that suggest they were different from ND children; this was, however, not the case with moderately and severely retarded children in this sample. Recall from the "child interview" findings that only a small number of ND children who were interviewed knew what the term "disabled" meant and how to distinguish disabled from non-disabled children. Even the few children that indicated they were able to distinguish disabled children can only verbalize the difference in terms of : "they look funny" or "they have to use crutches or wheelchair to get around". This level of children's awareness of disability is supported by Conant and Budoff's (1983) study on children's understanding of disabilities. Their study found that preschoolers can understand physical disabilities while only

upper primary grades students can understand mental retardation. In short, unlike moderately and severely retarded children, mild MR children were probably not perceived by unfamiliar children to be disabled and were treated as though they were ND children. It is possible that mild and moderately retarded children may both possess the necessary play and social skills to engage in the group participation and social interactions observed but that their appearance may have influenced the reciprocity and consequently the amount of social interactions observed in the integrated play setting.

The Impact of Group Composition on Children's Play and Social Behaviors

Fantasy play was observed predominantly within the mixed ND group condition and usually located in the waterwheel and sand areas where toys and loose parts were available. ND children also engaged in considerably more constructive play than MR children in other group conditions. These findings are expected since MR children lagged behind ND children developmentally.

MR children in the isolated condition engaged in (1) more overall play activities, (2) more group play, and (3) more positive social interactions than MR peers in the integrated condition. The differences may be attributable to the familiarity of the social surrounding in the two conditions. In the isolated MR condition, MR children played within a familiar social surrounding where play, group

participation, and social interactions in the play area can be viewed by the MR children as a natural extension of activities in the classroom. However, in the integrated ND and MR condition, MR children were placed in an unfamiliar social setting where they were surrounded by both familiar and unfamiliar children. This unfamiliar setting may be viewed by MR children as novel and they may engaged in more exploration than play or social activities. Indeed, more observations were recorded for MR children in the integrated setting than in the isolated setting. Furthermore, the novelty of the integrated setting may also caused uncertainty and fear among MR children and increase their dependence on their caretakers. This speculation was supported by the fact that MR children in the integrated condition engaged in group play with their caretakers more than twice the frequency observed in the isolated condition. This finding suggests the need for caretakers to encourage MR children to play with unfamiliar peers when the opportunity of integrated play arised rather than allow MR children to increase their dependence on them. Afterall, the major reason for the disabled children to visit this playground was the opportunity to play and socialize with non-disabled children and children with other disabilities.

Unfortunately, caretakers of disabled children often forget the purpose of their visit to the Playground of All Children and may inadvertently discourage rather than encourage social integration of their children with youngsters from other schools. To illustrate, there have been observations in which caretakers of MR children warned ND children in an integrated equipment area with the following: "be

careful or you'll hurt my kids" or "hey! watch it!". There were also times when caretakers removed their disabled children from an integrated situation where children were engaged in rough and tumble play because they were afraid that their children might get hurt by ND children.

Despite caretakers' general over-protectiveness, MR children were observed to demonstrate positive interactions with unfamiliar ND and MR children in the integrated condition. Note that the percentage of MR children's interactions with unfamiliar peers was not that much lower than ND children's percentage of positive interactions with unfamiliar ND children in the mixed ND condition. In fact, the percentage of group participation with unfamiliar ND children was higher in the integrated condition than in the mixed ND condition. This finding suggests that although MR children in the integrated condition tended to rely more on their caretakers, there were a number of MR children who took advantage of the integrated situation and participated in group play with ND children. This is a particularly encouraging observation that indicates that mainstreaming can work in a play setting given that both disabled and ND children were given the opportunities.

Age and Gender Differences in Children's Play and Social Behaviors

Preschoolers were found to have a higher percentage of object play and a lower percentage of constructive play than older children.

Older children's percentages of group participation and positive social interactions were almost doubled that of preschoolers. These differences have been found in other research (reviewed in Hartup, 1983). Interestingly, younger children's positive interactions were observed mostly in the sand area while these interactions were observed mostly in the net area for older children. One speculation for this finding is that the sand areas were more appropriate for younger children than for older children so that school age children get bored with sand play more easily than preschoolers. Nevertheless, school age children were observed to engage in twice the amount of group participation in both areas than preschoolers.

Boys were found to have a higher percentage of object play and a lower percentage of constructive play than girls. Girls were also observed to have twice as much group participation and positive social interactions than boys. Overall, ND girls had the highest percentage of positive social interactions followed by MR girls and than by ND boys in frequency. Gender differences in play and social interactions had been an important topic for research and differences have been documented (Hartup, 1983; Maccoby and Jacklin, 1974; Rubin, 1983; Sanders and Harper, 1976). However, girls were not always shown to be the more "sociable" gender, especially not in the review of literature conducted by Maccoby and Jacklin in which boys were shown to be more sociable with agemates than girls. Perhaps the results obtained in this study reflect the change in children's socialization which, in turn, is influenced by the changing role of females in the

modern society in which women are beginning to be an active and powerful force in the workplace and in the government.

The Impact of Adult Supervision on Children's Play and Social Behaviors

Overall, higher percentages of peer play, dramatic play and constructive play were observed when children were under less adult supervision. The adverse effect of adult supervision is more salient for ND children's play than for MR children since MR children demonstrated a higher percentage of constructive play under close supervision than under less supervision. However, no beneficial effect on children's peer social behaviors was found for close adult supervision in any group. In fact, less adult supervision made a drastic difference on MR children's group participation and play related social interactions (especially play initiation). In the mixed ND and isolated MR conditions, the percentages were considerately higher in the less supervised condition than in the closely supervised condition. No difference on the percentage of group participation was found for MR children in the integrated condition due to supervision; however, MR children in the integrated condition were shown to participate in group play with their caretakers more than with their schoolmates. Note that the impact of supervision on preschoolers was difficult to evaluate since the majority of them, especially MR preschoolers, were under close supervision.

As discussed earlier, caretakers can be a dramatic influence on children's play and social interactions. Put simply, the closer the supervision, the more the adult-child interactions and the less the child-child interactions. Hartup (1974, 1978, 1980, 1983) convincingly argued that children need peer relationships in order to develop into sociable, confident, and responsible adults. He pointed out that child-child interactions are "equalitarian" whereas adult-child interactions are "authoritarian" in nature. He stressed that children need "equal" peers to learn communication skills necessary for reciprocity, aggression, dominance, and also for their general intellectual and emotional development. Adult-child interactions are always constrained in that the child must always assume the submissive role. This is supported by this study's finding that almost 50% of all adult-child interactions were adults providing assistance or directions to the child. In contrast, only 6% of child-child interactions involved assistance or directions to one another. In short, if close adult supervision can inadvertently deprive children of the important peer interactions during play, then perhaps caretakers should consider "backing off a bit" and use alternative strategies to promote desired behaviors in their children.

The Impact of Social Density on Children's Play and Social Behaviors

The issue of play space density has been shown to be an important factor in influencing children's play and social behaviors (Hutt &

Vaisey, 1966; Johnson, 1935; Loo, 1972; McGrew, 1972; Smith & Connolly, 1980). The findings from these studies generally indicated that as play space density increased, less positive social interactions, less vigorous activities, and less rough and tumble play occurred while more parallel play and more aggressive behaviors occurred. However, other studies found higher amount of social contacts with higher density (e.g. Johnson, 1935). Some of the conflicting results may be attributable to the confounding of different variables in the same study : novelty, social density, spatial density, and resource density. However, in a more controlled study, Smith and Connolly (1980) found that the availability of play resources accounted for more of the variance in social interactions and aggressive behaviors than spatial or social density with the exception of extremely crowded conditions.

In this study, higher social density in some equipment areas was associated with higher percentages of games/social and dramatic play observed. The influence of social density on positive social interactions was found to be different for different equipment areas. Higher density was associated with more play-related interactions as well as negative interactions in the sand area but the opposite trend was observed in the net area. Overall, higher social density was found to have more beneficial than adverse effects on children's play and social behaviors. In other words, certain play activities such as sand and water play require a "critical mass" or achieve a certain degree of density before children can sustain or enjoy the play

activities. However, other types of activities such as rough and tumble play or vigorous physical activities such as jumping and climbing in the net areas can only be accommodated under less congested conditions. This may explain why more play and social activities occurred in the net areas under lower density while the opposite was true for the sand area.

Relationship between Social Partner and Children's Social Behaviors

The social significance of children's percentages of group participation and social interactions is obscured unless we also examine their social partners. Furthermore, the degree of social integration on the playground can only be ascertained with the knowledge of how frequently children interact or play with unfamiliar children. Of the observed group participation and positive social interactions, the majority of the social partners was familiar or same school children while unfamiliar MR or ND children represented only a small percentage (5 to 7%) of children's social partners. This suggests that overall, the level of social integration was very low on the playground or within the selected equipment areas. This is not surprising given that the children observed in this study were transient users of the playground and that research has demonstrated that children often prefer familiar playmates in an unfamiliar setting and that familiar playmates promoted more sophisticated play and more social interactions (Doyle, connolly, & Rivest, 1980; Rubinstein &

Howes, 1976). Another explanation for the lack of observed integrated play is the protective role caretakers assume over their children when there is a physically integrated situation.

Of the four equipment areas, the net area stood out as the play equipment area that supported the highest level of integrated play and social interaction. Although both the sand and net areas encouraged high percentages of group play and positive interactions, the net area undoubtedly fostered more group play and play initiation with unfamiliar peers than the sand area. The success of the net areas can be better explained by a number of factors. First, the type of rambunctious activities this area encouraged will naturally causes more physical contacts among children, whether intentionally or unintentionally. Secondly, the design of the play areas with the soft mats on the floor and the encapsulation within the roped nets provided a secure feeling for both the children and caretakers. This will, in turn, influence the caretakers to provide less supervision and allow the children to be more sociable with their peers. A third explanation is that the net areas can accommodate many different activities that require different skill levels so that children with different abilities can come into the nets and join in the fun. Finally, the fact that no toys were allowed in the area probably encouraged social interactions and avoided the problem of toy possession struggle.

CHAPTER 6

GENERAL DISCUSSION AND IMPLICATIONS

Children's play and social behaviors on the playground were influenced by a complex array of factors. Some of the most important factors were (1) children's characteristics - age group, gender, and whether they were MR or ND; (2) the play environments in which children were observed; and (3) the social environment which included factors such as group composition, adult supervision, social density, and social partners. Since the goal of this study is to evaluate the degree of social integration achieved on the playground and whether the play environment has an impact on that social integration, what follows is a discussion of how much social integration actually did occur and what factors may have contributed to this degree of social integration.

As summarized in the section above, there appeared to be a very low degree of social integration observed on the four equipment areas. Although the net area was revealed to be the most facilitating for play and social interactions with unfamiliar peers, the frequency of integration was still disappointing in light of the playground's mandate. The following is a discussion of how each selected piece of play equipment contributed to the overall social integration of MR children.

The fact that the net area was found to be associated with higher percentages of peer group play and social integration than other equipment areas indicates that play environments do have important consequences on children's social behaviors. In addition to being an equipment area perceived to have high activity affordance by children in this study, the net area also has design features that were associated with high percentages of social behaviors in other research studies. For example, the net area is a "multi-niche" equipment area that can accommodate many children at the same time and was found to foster more prosocial peer interactions than single-niche equipment (Doyle, cited in Gump, 1975; Rogers-Warren et al, 1980). The net area is also a "complex" piece of equipment which offers different play surfaces and play choices for children with different levels of skill (climb ropes, bounce on mats, etc.). Studies have reported more social interactions on complex pieces of equipment because they tend to sustain children's interests more than simple equipment (Prescott et al, 1967). Furthermore, the nets provided some encapsulation (enclosure) that was found to facilitate imaginative and social play (Brown & Burger, 1984; Gramza, 1970). Note that all of these design concepts were mentioned by caretakers (though not given in those terms) in the Caretaker Interview as their explanations for citing the net area as having integrating potential for their children.

It is more difficult to assess the success of the waterwheel area, another area perceived to have high activity affordance, in promoting social integration among peers. Although this area facilitated group participation with unfamiliar peers much like the net area, it did not encourage positive interactions with peers; in fact, the highest percentage of negative behavior was observed in the waterwheel area. Similar conflicting results were found for the sand area where a high percentage of group participation and positive interactions were observed but the social partners were predominantly children's familiar classmates. Furthermore, social interactions with unfamiliar children in the sand area were more negative than positive.

Perhaps the toys and loose parts provided in these two areas inadvertently encouraged children to compete for resources rather than to learn to share them which was the original intent. Conflict involving possession of toys is commonly reported in toy studies (e.g. DeStefano & Mueller, 1982; Hartup, 1970; Smith & Connolly, 1980). There is increasing evidence that suggest that fewer or no toys play setting is more likely to increase peer interactions than settings with many toys (Eckerman & Whatley, 1977). In order to facilitate more prosocial play among unfamiliar children, findings from this study and others cited suggest that more attention should be placed on the quantity of toys available and also the selection or placement of toys for children's use. Perhaps more toys, especially those found to be prosocial, or more identical toys should be provided on these

two equipment areas to lessen future conflicts over toy possession among children playing in these areas. However, the placement of more toys in the equipment areas to avoid conflict over possession may inadvertently decrease the amount of peer interactions. The problem of quantity and types of toys to be available in a play setting that best promote social integration obviously is in need of additional research before programmed toy interventions can be implemented in a mainstreamed setting.

Based on the percentage of social behavior observed on the swings, an equipment area that was perceived by children to have low activity affordance, one can say with some certainty that this area did not promote group play or social interactions with familiar or unfamiliar peers. This is not to say that the swings are of no value in an integrated playground. In fact, children were found to be observing unfamiliar children at a high percentage in the swing area; perhaps the "no-risk" observations of unfamiliar peers in the swing area may lead to more meaningful social interactions in other equipment areas. Besides, children appeared to enjoy and even prefer playing on the swings even if they can only perform limited play functions on them.

The impact of the play environment on the social integration of children has been established. The foregoing analysis suggests that large-muscle type of play equipment that can accommodate a multiple number of children and can encourage play activities with a range of

skill levels will be successful in integrating unfamiliar children. The following is a discussion of other factors that influenced the low degree of social integration observed on the four equipment areas.

Familiarity and Social Integration of Children

Familiarity - whether it was familiarity with the immediate social surrounding (group composition, sequence of observation segment, and social partner) or with the playground - emerged as one major factor that influenced children's group play and social interactions. The more familiar the social setting was ("isolated" vs. "integrated" condition, end and middle segment vs. initial observation segment, same school social partner vs. one from another school), the more likely group participation or positive social interactions occurred. During our months of observations on the playground, very few opportunities were given to children where they could become familiar with other children on a more sustained and meaningful fashion. To illustrate, children in our sample visited the playground very infrequently and the time alloted for free play during each visit was short so that there was little time to spend in each play area. It was also mentioned earlier that caretakers were generally not enthusiastic in mixing their children with those from other schools. Consequently, the amount of social integration, indicated in this study as group participation or social interactions with unfamiliar children, was extremely small for both ND and MR children.

Keep in mind, however, that although the amount of social integration for MR children was low, the playground succeeded in bringing children of different disabilities together with ND children. ND children's exposure to disabled children at an early age can perhaps increase their future acceptance and even friendship with disabled children; this may serve as an interesting future research agenda for mainstreaming researchers. Similarly, disabled children placed in a mainstreamed setting can also benefit from the exposure to ND children even though no social contacts occurred. Peer modelling of ND children had been shown to be effective in some studies although some form of additional interventions such as teacher prompting, social skill training, or peer reinforcement is needed before disabled children can successfully model ND peers' behaviors (Devoney, Guralnick, & Rubin, 1974; Guralnick, 1981; Peterson, 1982).

Many research studies have demonstrated that the introduction of ND children into the handicapped children's environment can be a valuable educational and therapeutic resource in the development of disabled children's cognitive and social skills (Guralnick, 1978; Norquist, 1978; Mueller & Bergstrom, 1982; Poresky & Hooper, 1984). Furthermore, the attempt to promote the social integration of disabled children in an outdoor playground is an excellent idea with great potential since mainstreaming researchers have demonstrated how a play setting, especially an outdoor play setting with large-muscle play equipment, can socially integrate disabled and ND children better than an indoor setting (Gottlieb, 1971; Peterson, 1982). However, the

success of integrating ND and disabled children can only begin to work when some basic requirements are met. For example, both MR and ND children need to be provided with opportunities to become more familiar with each other. The play literature shows that children playing with familiar playmates engaged in more social play and socio-dramatic play than when playing with unfamiliar peers (e.g. Doyle, Connolly, & Rivest, 1980; Rubin, Fein & Vandenberg, 1983).

In all fairness, the playground did make some attempts to help children from different schools to get acquainted through organized events such as arts and crafts, games, and sports. In the arts and crafts activities, children from the same school often grouped together and little efforts were made to help integrate the children physically. The games and sports events encouraged more physical integration but the competitive nature of the activities do not usually promote social acceptance. In fact, a study conducted by Rynders, Johnson, Johnson, and Schmidt (1980) showed that significantly more positive interactions and greater interpersonal attraction of disabled teenagers were oberved when ND and disabled peers were placed in a "cooperative goal structure" (bowling) situation than when placed in either a "competitive" or "individualistic" goal structure. Furthermore, Gottlieb and Strichart (1971) found that voluntary social contacts resulted in more favorable attitudes towards disabled children than when the social contacts were enforced or organized by adults. Taking these findings into consideration, one suggestion that may help ND and disabled peers

to be more familiarized in a non-threatening, cooperative, and voluntary way is to "pair-up" one ND and one disabled child during the free-play period on the playground. This can be done on a voluntary basis with parental and teacher encouragement for ND children to participate in the "special friend" program. Perhaps this can be arranged prior to the playground visit so that ND and disabled children can be prepared for the experience. Preparation for ND children may include "sensitization" training and education about diversity. For disabled children, preparation may include social skill training that encompasses both social initiation and responses. It should be stressed that peer interactions will occur more often and be more meaningful for disabled children when their caretakers learn to take a less protective stance and encourage these children to interact with other children. This brings us to the next topic of discussion - adult supervision.

Adult Supervision and Social Integration of Children

The impact of children's caretakers on children's play and social interactions has been demonstrated in this study. When possible, caretakers should be encouraged to be less protective of their children and allow them to have more freedom to play and socialize with other children. Research has shown that disabled children who interacted the least with teachers were more easily integrated than those who depended on their teachers for guidance and social interactions (McLean, 1983; Mueller & Bergstrom, 1982). In

other words, caretakers should encourage peer interactions during these play outings, especially with unfamiliar peers, rather than trying to establish adult-child interactions. Since children's movement on the playground was heavily influenced by their caretakers, perhaps some efforts should be made to familiarize children's caretakers from different schools with each other. This may lead to a higher likelihood that caretakers from different schools would congregate together in the same play areas, thereby influencing the physical integration of unfamiliar groups of children.

In another study conducted in the same location as the present one, the researcher found that teachers of retarded youngsters often imposed an educational goal on their children's play during these playground visits and tended to redirect a child's focus to learning tasks rather than allowing the child to pursue his or her own interests (Schwartzman, 1988). The study also revealed that teachers of ND children rarely imposed educational goals on their children during these playground visits. In short, the teachers of retarded children often extended their classroom teaching activities with their children during these play visits at the expense of depriving their children the valuable opportunities to play and interact with their peers or perhaps to model ND children's behaviors or even to make new friends.

Social Integration at the Playground for All Children

Gresham (1982) asserted that one of the most misguided assumption in mainstreaming is that the mere physical placement of disabled children in a mainstreamed setting will result in an increase in the social integration of disabled and nondisabled children. Unfortunately, this is also the underlying assumption for the Playground for All Children. The playground was built with the assumption that once disabled and nondisabled children were exposed to one another on this integrated playground, all children will naturally play and interact together. However, this expectation is unrealistic for the transient population it serves and the brevity of the playground visit each child experienced. It is an unrealistic expectation also because the playground did not provide adequate preparation for both disabled and nondisabled children for the mainstreamed experience. Gresham (1982) also pointed out that disabled children placed in a mainstreamed setting without the requisite social skills crucial for social interaction will result in further social isolation from nondisabled peers. Although the playground staff did provide some form of disability sensitization to nondisabled children during the winter months when the playground was not in operation, the long time lapse between the sensitization session and the actual playground visit probably did not result in much change in nondisabled children's attitude towards their disabled peers. In short, the finding that there was only a small degree of social integration observed between mentally retarded and nondisabled

children on the four selected equipment areas in the Playground for All Children was an expected one.

To summarize suggestions made earlier, some of the ways to increase the degree of social integration between disabled and nondisabled children during play include:

(1) prepare disabled children for mainstreaming through social skill training;

(2) prepare nondisabled children for mainstreaming through disability sensitization immediately prior to the mainstream experience;

(3) increase children's familiarity with each other through frequent visits to the playground and establish a "special friend" program that pair-up a disabled child with a nondisabled peer to encourage modeling behavior or even friendship;

(4) inform caretakers that they should encourage child-child interactions rather than adult-child interactions through less stringent and protective supervision; and

(5) encourage cooperative and social play through prudent selection of toys and gross-motor play equipment (e.g. multi-function, multi-niche play area that supports play activities requiring different skill levels such as the net area).

Implications for Future Playgrounds for All Children

In order for the Playground for All Children to be truly a public playground for children of all disabilities, it must be easily

accessible to all children, including those with physical disabilities. It is unfortunate that the playground is only accessible to the physically handicapped only by private means of transportation. The closest public transportation is at least a fifteen minute walk from the playground and is inaccessible to the physically handicapped because it is an elevated subway station without an elevator. Future playgrounds with similar mainstreaming goal should be located in an area accessible through public means of transportation since private transportation can be expensive or unavailable to some children and would inevitably discourage frequent use of the playground.

It has been argued by playground researchers that playgrounds located in a neighborhood setting provide a more prosocial environment for children to interact with one another (Berg & Medrich, 1980; Hayward et al, 1974). Additionally, this study's finding that children familiar with one another engaged in more peer interactions than children unfamiliar with one another suggests that future integrated playgrounds may better serve their purpose when located in a neighborhood setting. This will decrease the accessibility problem as well as increase children's independence from adults' supervision. More importantly, an integrated playground in the neighborhood will increase the likelihood of frequent visits to the playground and thus increase children's familiarity with one another. A neighborhood integrated playground can be smaller in scale and requires less playground staff than the current Playground for All Children. Again,

in order for this type of playground to be successful in integrating disabled and nondisabled children, a prudent selection of types of play equipment is essential to encourage prosocial peer play and to attract disabled and nondisabled children to visit the playground.

Implications for Research

This study has demonstrated that the play environment has an impact on the social integration of ND and MR children. Furthermore, the importance of the social environment in influencing children's play and social behaviors has also been documented. This study shows that children's social environment played an equally important role in regulating their social activities as the physical environment as other studies have shown (e.g. Wade & Ellis, 1971; Weilbacher, 1979). However, the findings and suggestions presented in this study are limited in that they are based on a limited selection of play equipment areas and a limited sample of only MR and ND children. Before any practical guidelines on the design of integrated play environments can be set, more programmatic research on the influence of the play environment on the play and social activities of disabled and nondisabled children is needed. The research should consist of a series of investigations examining the various physical and social dimensions of an integrated play environment. Replications with samples of children with various disabilities will be necessary to validate the findings before recommendations can be made to playground designers. The following is a list of suggestions for improvement of

the current study. This will be followed by a discussion of ideas for future research.

A Critique of This Study

Although this study generated useful data on the play and social behaviors of MR and ND children, some improvements on the current research design could be made if more funding resources were to become available for additional research. The following is a list of suggestions for improvement on the current study that would provide more generalizable or more meaningful results:

(1) Include more play equipment areas for observation of children's play and social behaviors, especially more pieces of multi-niche, multi-function gross-motor play equipment. This would help validate the results obtained for the net areas.

(2) Establish a coding system to enable sequential analysis of "vignettes" of rare occurrences of integrated MR and ND social play or interactions. Although the aggregate data presented in this study provide a useful description of MR and ND children's play and social behaviors under different environmental and social conditions, analyses of the sequence of integrated interactions could lead to a deeper understanding of the dynamics of peer acceptance or rejection in a mainstreamed setting. For example, the aggregate data in this study showed that the highest

percentage of negative behaviors was observed in the waterwheel area. Sequential analysis of these negative interactions could perhaps show that some of the negative interactions were forums for initial peer contact and further analysis of the sequence might show that the negative interactions could turn into prosocial interactions when the initial conflict is resolved.

(3) In addition to interviews with ND children, MR children should also be interviewed on their playground usage, play preferences, and their perception of the activity affordance of play equipment areas.

(4) In addition to the "isolated MR", "integrated MR and ND", and "mixed ND" group composition conditions, it would be useful to include an "isolated ND" condition so that an ND/MR comparison could be made with the "isolated MR" condition.

(5) The social density definition for each of the play equipment areas should be fine-tuned since the square footage varied from one play area to another.

(6) The social interactions should also be coded as either same-gender or cross-gender interactions since research has shown that same-gender and cross-gender interactions can result in a different quality and quantity of social behaviors.

Future Research Ideas

Given that the overwhelming majority of research on the influence of the play environment on children's play and social behaviors was based on observations of nondisabled children, there is a general need for research on the influence of environmental variables on disabled children. It must be emphasized that environmental research must be conducted on samples of children with different disabilities and different ages before practitioners can apply the research findings to the design of play settings aimed at the encouragement of prosocial peer interactions. The following are suggestions for future research. Some of the research problems are specific questions raised by the results obtained from this study that need further investigations.

(1) The findings from this study suggest that familiarity with playmates and with the play environment can influence children's play and social activities. As a follow-up to the current study, it would be worthwhile to conduct a longitudinal study on several groups of MR and ND children who visit the Playground for All Children on a regular basis. This would enable the researchers to explore how increased familiarity with the playground and with their disabled playmates (or nondisabled) would increase the quantity and quality of social integration observed.

(2) This study's findings also indicated that toys, adult supervision, and play equipment complexity can have an influence on children's peer play. Further investigations that explore what the optimal amount of each of these three variables are needed.

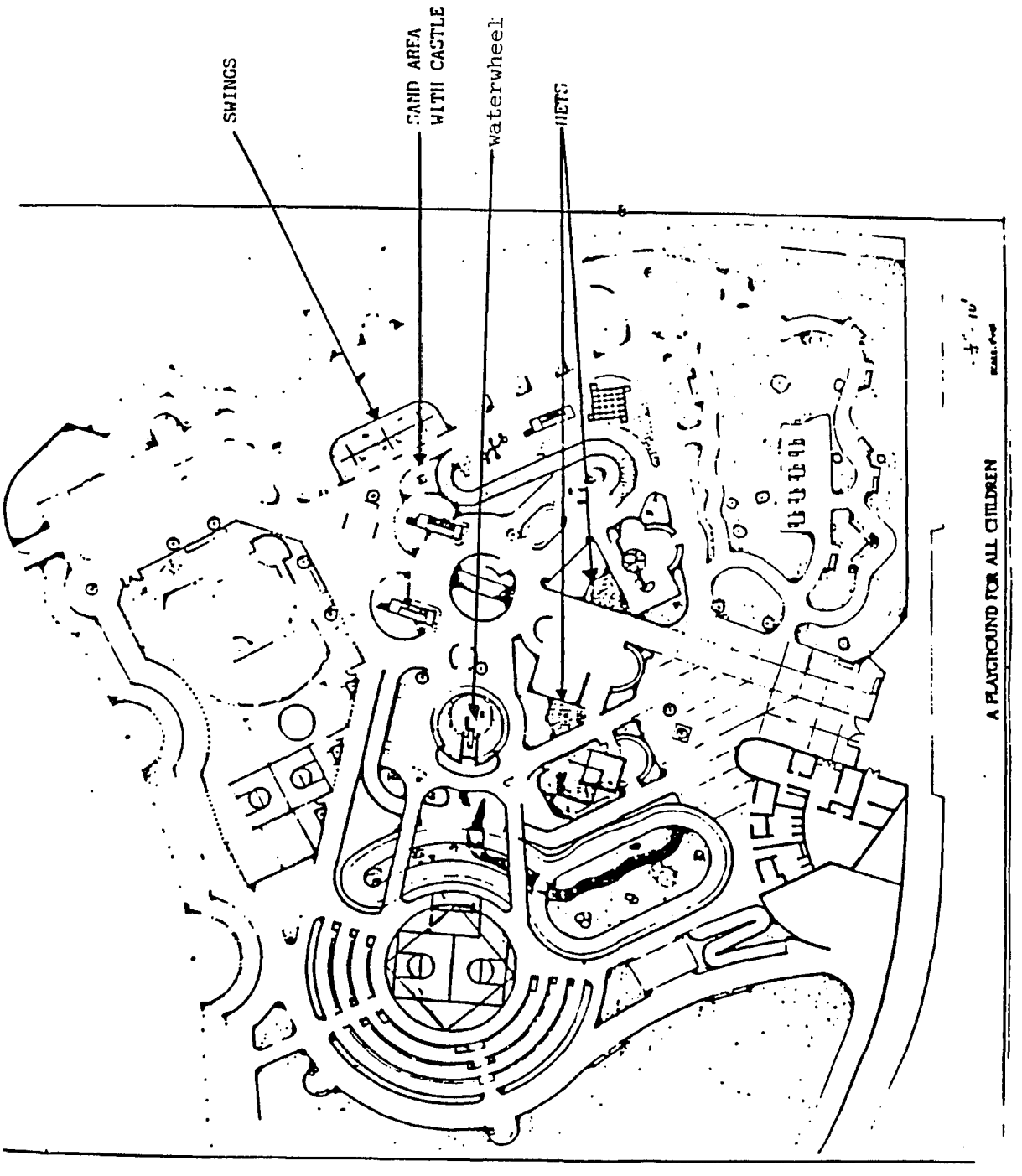
(a) Toys - what type of toys and what amount of toys should be made available to children in a play setting so as to promote peer play but not aggressive object struggle ? Or is object struggle a necessary component of social development which should not be discouraged ?

(b) Adult supervision/intervention - how much supervision should be provided to children of different ages and disability so that children do not engage in excessive unfocused behaviors, feel secure and motivated to explore on their own, and engage in peer activities while avoiding the problem of adults competing for peer attention ?

(c) Equipment complexity - how complex should a piece of play equipment be so as to sustain children's interest to stay in the equipment area and play with peers but not to divert children's attention away from peers ?

(3) Since the social integration of disabled and ND children can only occur when physical integration takes place, it would be interesting to investigate how physical integration can be facilitated by play equipment or playground design.

APPENDIX A


SWINGS
SAND AREA WITH CASTLE
Waterwheel
NETS
A PLAYGROUND FOR ALL CHILDREN

PLAYGROUND FOR ALL CHILDREN
EQUIPMENT SAMPLING STUDY
CHILD INTERVIEW

Date:__/__/____

Name:_____ Ribbon Color:_____

Age:_____ Sex:_____ # of Visits to PAC:____

Disability:_____

****

		YES	NO
1. Have you played in the	a) net area today?	____	____
	b) swing area?	____	____
	c) low sand boxes?	____	____
	d) waterwheel area?	____	____

2. Where else did you play today?_____
_____
_____.

3. Can you tell me all the different kinds of things you can do on:

a) the nets_____
_____.

b) the swings_____
_____.

c) the sand boxes_____
_____.

d) in the waterwheel area_____
_____.

4. Most Favorite Equipment:_____
Second Favorite Equipment:_____
Third Favorite Equipment:_____

5. a) While you were playing today, did you play with children you've never seen before? YES_____ NO_____. Where?_____

b) Did you notice any disabled children playing in the same area as you today? (Explain 'Disabled' if child does not understand) YES_____ NO_____.

c) If yes, how are they different from you? Did you play with them?_____
_____
_____
_____
_____
_____
_____.

APPENDIX C

EQUIPMENT SAMPLING INSTRUCTIONS

Equipment

1. Swings
2. Nets
3. Sandbox with Castle
4. Waterwheel

Target Child Selection

At the beginning of each data collection day, the camera team should be aware of the disability and age groups of the children visiting PAC that day. Based on that information, the team should look up the table with group breakdowns and record the number of children needed for each piece of equipment for each of the target groups visiting PAC that day. The team should circulate around the three pieces of equipments and try to maximize opportunities to observe target children in the selected equipments.

Age, disability and visit: when selecting a target child, always ascertain whether this is the child's first visit to the playground as well as the age and disability of the child from the child's caretaker. If no caretaker is around, make a note to ask afterwards. The child can tell you his/her own age also.

After Selection of the Target Child

The sound person must voice over the 1) time of day, 2) age, 3) disability, 4) whether this is the child's first visit to the playground, 5) ribbon color and 5) description of child.

The camera person must do a close-up of the target child and then pull back the camera frame to include the child and her social surroundings. (e.g. if she's playing with a group of children, include the entire group in the frame, or if she's talking to a caretaker on the side, include the caretaker in the frame.)

The camera pserson should also start the "stop watch" timer and date on the camera for each target child.

The camera person should also keep track of the duration of time for each target child. Remember the maximum time is 10 minutes for each child. When the time is up, alert the sound person.

Voice Over 'Musts' for the Sound Person

When the target child is interacting with other child(ren) the sound person must voice over the ribbon color of all the other child(ren).

Also voice over when there is a change in the mix of ribbon colors in the equipment area (e.g. for swings, voice over the ribbon colors of the children immediately next to the target child; or in the net area, voice over whether all the children inside the nets are of the same ribbon color or if not, indicate the different ribbon colors, etc.)

When there is more than one child in the equipment area voice over when the target child said something and to whom, and when possible repeat what the child said but don't make subjective interpretations of what's being said.

The sound person should make eye-contact with the camera person from time to time to get a sense of what the camera can see. Be alert to times when the child's back is facing the camera, then the sound person should voice over any prolonged (5 seconds) observation done by the target child and also indicate the object of the observation.

APPENDIX D

Revised July 14, 1986/MC

PLAYGROUND FOR ALL CHILDREN
CODING MANUAL
EQUIPMENT SAMPLING STUDY

The Five Second Rule

Coders will code the behavior that is occurring at the 5 second chop. If this behavior is not completed, as with social interactions, then the coder may wind foward or backward on the tape to discover how the social exchange was completed. This means for example that if a caretaker initiates an intervention but you are unable to determine within the 5 seconds if that behavior was responded to by the child then you will wind forward to answer this question.

Coding When There Are Simultaneous Behaviors

Sometimes it may be that two behaviors may be ocurring at the same time. In these instances whichever of the activities involved language would be the one chosen. If neither activity involves language then the code chosen should be that which most closely describes what the target child is doing rather than what others might be doing to the child, e.g. a caretaker is lifting a child from a wheelchair at the sme time that the child is saying "no I can raise myself". This would be coded as child gives verbal disaproval rather than child receives assistance.

Use of "Comments" Column

Whenever the category "other interactions" is used a detailed description of this should be given in the "Comments" column.

Revised July 14, 1986/MC

	Institutions	Code
ID#_____	leave blank	
EQUIPMENT_____	swings	1
	sand castle	2
	nets	3
DISABILITY_____	mild MR	1
	moderate MR	2
	severe MR	3
	non-disabled	4
DISABILITY VISIBILITY_____	visible	1
	not visible	2
AGE_____	code as is	
SEX_____	MALE	1
	FEMALE	2
VISIT_____	first visit	1
	repeated visit	2
DATE RECORDED_____	code as is (e.g. 10/31/86 should be 103186 or 7/3/86 should be 070386	
RIBBON COLORS_____	write in actual color in pencil.	
TOTAL TIME_____	code as is (e.g. 10:00, 02:45)	
VIDEO TAPE#_____	code as is or with padded zeros (e.g. 1115A, 0709)	
COUNTER #_____	code as is (e.g. 0030, 1708, etc.)	
CODER_____	Arwen	1
	Casandra	2

Revised July 14, 1986/MC

ACTIVITY FOCUS CATEGORIES

NOTES: If a child is in momentary transition from one activity to another the activity should be coded as belonging to the subsequent activity. If child, at 5 second mark, is buckling him/herself into swing, code this as swinging.

Focus (intention)	Code	Description
Unfocused Activity	01	Used for aimless, non-directed behavior without any sustained observation or focus. This category includes a person walking, standing or sitting, showing no activity other than restless movement.
Gross-motor/locomotion	02	Used when the child is walking, with primary behavior being to go from one location to another.
Wheeled/Locomotion	03	Used when the child is utilizing wheelie/scooter toys for playing purposes. Includes being pushed by someone.
Carried/Locomotion	04	Used when the child is being carried from one location to another.
Fidgeting	05	This category includes diffuse and repetitive body movements.
Waiting	06	In sometimes in anticipation of an activity. Can be waiting for availability of equipment, being held back by a caretaker or waiting for a caretaker to help.
Wheelchair/ambulator locomotion	07	Child is moving in either a wheelchair or ambulator. Includes being pushed by someone.

Revised July 14, 1986/MC

Focus (intention)	Code	Description
Social	08	All other activities have ceased in order to engage in a social interaction.
Sensory Stimulation	09	Used when the child's activity is for tactile stimulation or experience. Do not include gross-motor activities like swinging or sliding. Includes play with water, mud, sand, dirt, and leaves.
Constructive Play	10	The child is involved with constructive play like building sand castles, putting sand in a bucket, and making sand molds, blocks, putting pieces of a puzzle together.
Dismantling	11	The child is dismantling play materials at hand, e.g. kicking down sand castles or throwing toys around or taking apart a toy/equipment, etc. (do not code activities that can be coded as rough and tumble play).
Dramatic/Fantasy play	12	Included here is make-believe behavior such as playing house, cowboys and indians, or talking with a make-believe friend. This is distinguished from other forms of play with its non-literal quality or make-believe element.
Preparatory for Using Play Equipment	13	Caretaker assists child in his/her preparation of intended activity. Example: buckling child in or out of swing, lifting in or out of sand tables, or shaking sand off clothes.

Focus (intention)	Code	Description
Swinging	14	An activity usually performed on the swings, but includes swinging motion on other surfaces.
Pushing	15	Child's activity is pushing, e.g., pushing a swing, a wagon, etc. (do not include pushing someone aggressively).
Climbing	16	An activity usually performed on the slides, jungle gym, nets but includes climbing on other objects. Actions prior to climb, but that are in preparation of climbing are included here.
Tumbling/Jumping	17	Includes tumbling, rolling, jumping & hopping or jumping down from a high level.
Blocked View /Technical Failure	18	Code this only when camera view of target child is blocked for a sustained period, no voice over on the child activity is recorded, and no other visual indicator of child's activity prior to or after the blocked view.
Infantile Games	19	Examples: peek-a-boo and patty-cake.
Informal Games	20	A play situation with or without language, where the child is playing an informal game with another child. These are spontaneously and loosely organized, e.g. following one another around while chanting, chasing game, hiding in a corner and giggling, or holding hands and jumping.

Revised July 14, 1986/MC

Focus (intention)	Code	Description
Rough and tumble play	21	This activity involves more than one person and is obviously playful rather than aggressive and/or restraining behavior in a playful manner. (If the behavior becomes overtly aggressive code as "Social" and as "Overt Agression" in the social specific column.
Music/Dance	22	Dancing, playing musical instrument. Active, semi-patterned rhythmic movements with or without music. Includes rhythmic clapping or stamping.
Object Exploration	23	Includes exploration of objects through touching and close scrutiny, but no evidence for dramatic/fantasy, constructive play or sensory activities.
Observation	24	All activities have ceased in order to observe people, activities or objects for a sustained period (two seconds or more).
Personal Needs	25	Includes dressing or undressing, including shoes and toileting activities. This includes drinking from a water fountain. Includes waiting or lining up for drinking or eating.
Running	26	Done for sake of enjoyment. Includes skipping, hopping etc. Note: If obviously part of a game-see game categories. Also, could involve moving one place to another -but that is not primary focus, e.g. running start to jump.

Focus (intention)	Code	Description
Sliding	27	Activity usually performed on slide but includes sliding on other surfaces. Includes actions immediately preceeding the slide, but are in preparation of sliding are included in this category.
See-Saw	28	Riding a see-saw.
Sports	29	Organized sport involving rules and more than one person.
Manufactured Games	30	Manufactured games, board games.
Games with Rules	31	Conventional Games, e.g., tag, hide and seek, parachute, etc.
Water play	32	Running under water, splashing water, being splashed with water, pouring water, kicking or jumping in water, or swimming.
Manipulating objects	33	e.g. play with toys or other objects.

Revised July 14, 1986/MC

SOCIAL PARTICIPATION AT PLAY CATEGORIES FOR TARGET CHILD

This category is only to be recorded when the child is recorded as playing in the Focus column, and only to their play participation not social interaction

Categories	Code	Description
Solitary	1	Child is playing all alone according to designated region.
Parallel	2	Child is playing in area that contains others, but is not sharing space or objects with others even though similar activity is played or similar toys are used.
Group	3	Child is playing with others in same space or sharing objects. It is apparent that child is interacting with at least one other person in play (they are engaged in a common activity and that they are aware of and acknowledged each other's presence by either verbal or gestural communications).

Caution: The "participation with" category should refer only to the play partners, not social partners.

Revised July 14, 1986/MC

SOCIAL SPECIFIC CATEGORIES FOR TARGET CHILD*

Categories	Code	Description
Observing/Social	01	Sustained observing, looking at someone or watching over a social interaction or organized activity ocurring between two or more individuals.
Greeting/Farewell	02	Includes both verbal and nonverbal greetings or goodbyes (e.g., calling someone's name, waving hand, saying hi, etc.)
Received Question on Play Choice	03	Child was asked by someone or negotiated with someone whether he wants to continue ongoing activity or go on to other activities; also include negotiating roles.
Negotiates Play	04	
Receives Verbal Request for a turn or for a toy	05	Child receives request/asks for a turn on equipment or for an object or toy.
Asks for a turn or a toy	06	
Initiation of Play	07	Solitary or parallel play becomes group play (e.g. asking for play access or starting a play activity spontaneously).
Engaging in Play	08	Child is engaging in group play with other(s).
Received Request for Information	09	Child was asked by someone or asks for specific information not related to play or play choice.
Asked for Information	10	

*note: When social specific is directed at a group which includes the target child, code the social specific as directed to target child.

Revised July 14, 1986/MC

Categories	Code	Description
Receives Verbal Approval	11	The child receives/gives positive expressions like encouragement, praise, comments like "very good".
Gives Verbal Approval	12	
Receives Non-verbal Positive Expression	13	There is no verbal approval but the child receives/gives expressions of approval or togetherness like a very obvious nodding of head for "yes" or clapping of hands. Or the child receives/gives physical indications of approval or togetherness like smiling, patting, touching.
Gives Non-verbal Positive Expression	14	
Request for approval	15	Child asks for for verbal or non-verbal approval by saying e.g., "look at me" or "see" or "look".
Receives Verbal Negative Expression	16	The child receives/gives admonishment, or warnings, criticism, correction, name calling. Do Not include verbal directions.
Gives Verbal Negative Expression	17	
Receives Non-verbal Disapproval	18	There is no verbal disapproval but the child receives/gives expressions of disapproval like a very obvious shaking of head for "no" or wagging finger.
Gives Non-verbal Disapproval	19	
Receives Physical Punishment	20	The child receives/gives severe handling or treatment, i.e. hitting, contingent upon a misdead or misconduct.
Gives Physical Punishment	21	
Receives playful mockery or provocations	22	The child receives/gives playful mocking or teasing expression such as laughing at someone, throwing sand at others.
Gives playful mockery or provocations	23	
Conflict over possession	24	Target child is fighting or arguing over a toy or a turn on a piece of equipment with another child.

Categories	Code	Description
Receives Permission	25	The child receives/gives permission or authorization for some proposed behavior.
Gives Permission	26	
Receives Verbal Directions/Suggestions	27	The child receives/gives solicited or unsolicited directions or suggestions (instructions, reminders, rules) for a particular activity, the use of materials or where to go.
Gives Verbal Directions/Suggestions	28	
Receives Non-Verbal Directions /Suggestions	29	The child gives/receives solicited or unsolicited non-verbal directions for a particular activity, the use of materials or where to go. This includes physical prompts such as moving a child's hand from one object to another, pointing to something or someplace or demonstrating the use of something or some activity, or leading somone by the hand to someplace.
Gives Non-Verbal Directions /Suggestions	30	
Receives Assistance	31	The child gives/receives (or asks for) solicited or unsolicited physical contact as a support for tasks or activity. This includes physical help or giving physical objects such as toys or food.
Gives Assistance	32	
Asks for Assistance	33	

Revised July 14, 1986/MC

Categories	Code	Description
Receives Protection/ Intervention	34	The target child receives/gives verbal or non-verbal indications of protection; or takes anticipatory action to defend a child or intervene in an incident.
Gives Protection/ Intervention	35	
Receives Accident Intervention	36	The child receives or provides assistance or care in response to an accident.
Provides Accident Intervention	37	
Conversation	38	Code this when there is mutual participation in the conversation, including questions.
Receives Overt Agression	39	The child receives/directs overt or physical agression from/at someone e.g., attacking, hitting, scratching, arguing, pushing, cursing, etc. (code this only if it has no play overtone, otherwise code as "rough and tumble play". Also if agression is over space, code #40 or #41 or over the possession of toys, code 24)
Gives Overt Agression	40	
Receives Request to Move	41	Target child is involved in conflict over access, egress, or personal space. The child is asked/asks someone to move out of the way or is physically pushed/pushes someone out of the way.
Asks someone to Move	42	
Physical Contact	43	Mutual physical contact between two persons such as holding hands. When one person is pulling the other this would be coded elsewhere (29,30) or when one is assisting the other (31,32)

Revised July 14, 1986/MC

Categories	Code	Description
Cannot distinguish	44	The child is obviously being social to others, but due to mumbling, ambient noise, or blocked camera view, the nature of the social interaction cannot be distinguished.
Other Interactions	45	Other interactions not captured by categories listed. Some description of this event should be written in the "Comments" column. This may be subsequently categorized.
Respond nonverbally	46	Child is responding to someone or something but the source for the response cannot be determined (because we cannot hear or see the source) e.g. child shrugs shoulder.
Received request for approval	47	Child received request for verbal or non-verbal approval (see e.g. in #15)

Revised July 14, 1986/MC

"SOCIAL WITH" AND "PARTICIPATE WITH" CATEGORIES FOR TARGET CHILD

1. PAC Staff.
2. Other child(ren) from same institution.
3. Other disabled child(ren) from other institution.
4. Other non-disabled child(ren) from other institution.

5. Combination of 2 and 3.

6. Combination of 3 and 4.

7. Combination of 2 and 4.

8. Combination of 2,3 and 4.

9. Caretaker(s)
10. Camera or sound person.

11. Combination of adults and children.

SAME SOCIAL PARTNER AS BEFORE

CODE	CATEGORIES
1	Yes
2	No

RESPONSES
(to social specific-not applicable to social specific code #1,8,37,42,43,44)

CODE	CATEGORIES
1	target child is ignored
2	target child ignored social stimulus
3	target child's social initiation is positively responded
4	target child's social initiation is negatively responded
5	target child responded positively to other's initiation
6	target child responded negatively to other's initiation

SUPERVISION

CODE	CATEGORIES
1	one on one supervision of target child, child is being closely watched by caretaker
2	not one on one supervision of target child

GROUP COMPOSITION AT EQUIPMENT AREA

CODE	CATEGORIES
1	all one ribbon color-same as target child
2	different ribbon colors-all non-disabled
3	different ribbon colors-mixed disability
4	different ribbon colors-both disabled and non-disabled
5	different ribbon colors-all MR

SOCIAL DENSITY AT EQUIPMENT AREA

CODE	CATEGORIES
1	child is alone
2	one other child is in the equipment area
3	three to four children in area
4	more than four children in the area

LOCATION ON EQUIPMENT

SWINGS: on swing - 1
off swing - 2

SAND AREA
WITH CASTLE: inside castle - 3
outside castle - 4
on periphery - 5

NETS: on upper net - 6
on lower net - 7
on mats - 8

Waterwheel- 9
Waterwheel- 0

Revised July 14, 1986/MC

Categories	Code	Description
Action Figure	01	E.G., GI Joe, Go-Bot, He-Man, etc.
Arts and Crafts	02	Materials used during Arts & Crafts
Board Games	03	Mr. Big Mouth, Checkers, etc.
Books	04	
Big Blocks	05	
Little Blocks	06	
Costume	07	Cape, Masks, etc.
Dolls	08	
Physical Activity Equipment	09	Sports equipment
Puzzle	10	
Large Wheeled Toy	11	E.G., Big Wheel
Sand Toy	12	Shovel, Pail, Buckets, Mold, etc.
Sound Making Device	13	Musical Instruments
Stuffed Animals	14	
Miniature Vehicles	15	E.G., Hot Wheels, Dump Trucks
Miscellaneous	16	
Water toys	17	boats, inflated balls, etc.

VERBAL BUT NON-SOCIAL BEHAVIOR

Categories	Code	Description
Singing	1	Child is singing while engaging in other play activity.
Laughing/Giggling	2	Child is making sounds indicating happiness or excitement.
Vocal Emmission	3	Child is vocalizing repetitive and rhythmic sounds aimed at self stimulation.

SUMMARY OF CODES FOR EQUIPMENT SAMPLING METHOD

ACTIVITY FOCUS CATEGORIES

Unfocused Activity.....01
Gross-motor/locomotion.....02
Wheeled/Locomotion.....03
Carried/Locomotion.....04
Fidgeting.....05
Waiting.....06
Wheelchair/ambulator locomotion.07
Social.....08
Sensory Stimulation.....09
Constructive Play.....10
Dismantling.....11
Dramatic/Fantasy play.....12
Preparatory for Using
Play Equipment.....13
Swinging.....14
Pushing.....15
Climbing.....16
Tumbling/Jumping.....17
Blocked View/Tech.Failure.....18
Infantile Games.....19
Informal Games.....20
Rough and tumble play.....21
Music/Dance.....22
Object Exploration.....23
Observation.....24
Personal Needs.....25
Running.....26
Sliding.....27
See-Saw.....28
Sports.....29
Manufactured Games.....30
Games with Rules.....31
Water play.....32
Manipulating objects.....33

SOCIAL SPECIFIC CATEGORIES FOR TARGET CHILD

Observing/Social.....01
Greeting/Farewell.....02
Received Question
on Play Choice.....03
Negotiates Play 04
Receives Verbal Request
for a turn or for a toy.....05
Asks for a turn or a toy.....06
Initiation of Play.....07
Engaging in Play.....08
Received Request for
Information.....09
Asked for Information.....10
Receives Verbal Approval.....11
Gives Verbal Approval.....12
Receives Non-verbal Positive Ex.13
Gives Non-verbal Positive Exp...14
Request for Approval.....15
Receives Verbal Negative
Expression.....16
Gives Verbal Negative
Expression.....17
Receives Non-verbal Disapproval.18
Gives Non-verbal Disapproval....19
Receives Physical Punishment....20
Gives Physical Punishment.....21
Receives playful mockery
or provocations.....22
Gives playful mockery or
provocations.....23
Conflict over possession.....24
ReceivesPermission.....25
Gives Permission.....26
Receives Verbal
Directions/Suggestions....27
Gives Verbal
Directions/Suggestions.....28
Receives Non-Verbal Directions
/Suggestions.....29
Gives Non-Verbal Directions
/Suggestions.....30
Receives Assistance.....31
Gives Assistance.....32
Asks for Assistance.....33
Receives Protection/
Intervention.....34
Gives Protection/
Intervention.....35
Receives Accident Intervention..36
Provides Accident Intervention..37
Conversation.....38
Receives Overt Agression.....39
Gives Overt Agression.....40
Receives Request to Move.....41
Asks someone to Move.....42
Physical Contact.....43
Cannot distinguish.....44
Other Interactions.....45
Respond nonverbally 46
Received Request for Approval...47

SOCIAL PARTICIPATION AT PLAY CATEGORIES FOR TARGET CHILD

Solitary..... 1
Parallel..... 2
Group..... 3

GROUP COMPOSITION AT EQUIPMENT AREA

target child is alone 0
all one ribbon color-same as target child.....1
different ribbon colors-all non-disabled.....2
different ribbon colors-mixed disability.....3
different ribbon colors-both disabled and non-disabled.....4
different ribbon colors-all MR.....5

"SOCIAL WITH" AND "PARTICIPATE WITH" CATEGORIES FOR TARGET CHILD

01. PAC Staff.
02. Other child(ren) from same institution.
03. Other disabled child(ren) from other institution.
04. Other non-disabled child(ren) from other institution.
05. Combination of 2 and 3.
06. Combination of 3 and 4.
07. Combination of 2 and 4.
08. Combination of 2,3 and 4.
09. Caretaker(s)
10. Camera or sound person.
11. Combination of adults and children.

SAME SOCIAL PARTNER AS BEFORE

1 Yes
2 No

SOCIAL DENSITY AT EQUIPMENT AREA

child is alone 1
one other child is in the equipment area.. 2
three to four children in area..... 3
more than four children in the area..... 4

RESPONSES (to social specific -not applicable to social specific code #1,8,37,42,43,44)

target child is ignored..... 1
target child ignored social stimulus.. 2
target child's social initiation is positively responded.. 3
target child's social initiation is negatively responded.. 4
target child responded positively to other's initiation.. 5
target child responded negatively to other's initiation.. 5

SUPERVISION

one on one supervision of target child, child is being closely watched by caretaker....1
not one on one supervision of target child.....2

VERBAL BUT NON-SOCIAL BEHAVIOR

Singing..... 1
Laughing/Giggling..... 2
Vocal Emmission..... 3

LOCATION ON EQUIPMENT

SWINGS: on swing - 1
off swing - 2

SAND AREA WITH CASTLE: inside castle - 3
outside castle - 4
on periphery - 5

NETS: on upper net - 6
on lower net - 7
on mats - 8

WATER WHEEL - 9

WATER BASIN - 0

LOOSE PARTS/TOYS/GAMES

Action Figure(s).....01
Arts and Crafts.....02
Board Games.....03
Books.....04
Big Block.....05
Little Blocks.....06
Costume.....07
Dolls.....08
Physical Activity Equipment.09
Puzzle.....10
Large Wheeled Toy.....11
Sand Toy.....12
Sound Making Device.....13
Stuffed Animals.....14
Miniature Vehicles.....15
Miscellaneous.....16
Water toys.....17

ID#______(1-4) EQUIPMENT__________(5) DISABILITY_______________(6-7) DA. VISIBILITY______(8)

AGE______(9) SEX____(10) VISIT____(11) DATE RECORDED__________(12-17) RIBBON COLOR____________(18)

TOTAL TIME___:___(19-22) VIDEOTAPE#_________(23-27) COUNTER#_________(28-31) CODER_____________(32)

TARGET CH. NAME________

(33-36) Time	(37-38) Activity Focus	(39) Social Partici-pation	(40-41) Partici-pate with	(42-43) Social Specific	(44-45) Social Partner	(46) Same social partner as before	(47) Response to social specific	(48) Supervi-sion	(49) Group composi-tion	(50) Social Density	(51) Specific Location on equip.	(52-53) Objects used	(54) verbal	comments			

Appendix E

Analyses on play activities were conducted using the eight categories listed below. Each category was derived from one or more original activity focus category(ies) defined in Appendix D.

Play Activity Categories Used For Analyses	Original Activity Focus Categories Included	Original Codes
1. Non-play :	Unfocused Activity	01
	Fidgeting	05
	Observation	24
	Personal Needs	25
2. Locomotion / Preparation for Play :	Grossmotor Locomotion	02
	Wheeled Locomotion	03
	Carried/ Locomotion	04
	Waiting	06
	Wheelchair Locomotion	07
	Preparation for using play equipment	13
3. Functional Play :	Swinging	14
	Pushing	15
	Climbing	16
	Tumbling /Jumping	17
	Rough and Tumble Play	21
	Running	26
	Sliding	27
	See-saw	28
	Water Play	32
4. Sensory Play :	Sensory Stimulation	09
5. Object Play :	Object Exploration	23
	Manipulating Objects	33
6. Constructive Play :	Constructive play	10
	Dismantling	11
7. Games/Social :	Social Focus	08
	Infantile games	19
	Informal games	20
	Sports	29
	Manufactured games	30
8. Dramatic Play :	Dramatic/ Fantasy play	12

APPENDIX F

LOGLINEAR OUTPUT FOR PLAY ACTIVITIES
USING DISABILITY AND AGE AS EXPLANATORY VARIABLES

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
ACTIVITY FOCUS	NON-PLAY					
DISABILITY	MR					
AGE	PRESCH	515.00 (18.17)	612.15 (21.60)	-97.1520	-3.9266	-5.2977
AGE	SCH AGE	734.00 (23.39)	677.89 (21.60)	56.1062	2.1549	2.9764
DISABILITY	NON-DISABLED					
AGE	PRESCH	490.00 (24.44)	433.13 (21.60)	56.8652	2.7323	3.4757
AGE	SCH AGE	305.00 (20.43)	322.53 (21.60)	-17.5288	-.9760	-1.2011
ACTIVITY FOCUS	LOCOMOTION					
DISABILITY	MR					
AGE	PRESCH	254.00 (8.96)	233.92 (8.25)	20.0835	1.3131	1.6377
AGE	SCH AGE	276.00 (8.80)	259.04 (8.25)	16.9621	1.0539	1.3456
DISABILITY	NON-DISABLED					
AGE	PRESCH	168.00 (8.38)	165.51 (8.25)	2.4898	.1935	.2276
AGE	SCH AGE	82.00 (5.49)	123.25 (8.25)	-41.2453	-3.7153	-4.2262
ACTIVITY FOCUS	FUNCTIONAL PLAY					
DISABILITY	MR					
AGE	PRESCH	1263.00 (44.57)	1168.43 (41.23)	94.5667	2.7665	4.3111
AGE	SCH AGE	1498.00 (47.74)	1293.92 (41.23)	204.0832	5.6735	9.0510
DISABILITY	NON-DISABLED					
AGE	PRESCH	666.00 (33.22)	826.74 (41.23)	-160.7378	-5.5903	-8.2136
AGE	SCH AGE	476.00 (31.88)	615.62 (41.23)	-139.6207	-5.6272	-7.9981
ACTIVITY FOCUS	SENSORY PLAY					
DISABILITY	MR					
AGE	PRESCH	28.00 (.99)	19.36 (.68)	8.6363	1.9626	2.3525
AGE	SCH AGE	29.00 (.92)	21.44 (.68)	7.5567	1.6319	2.0026
DISABILITY	NON-DISABLED					
AGE	PRESCH	5.00 (.25)	13.70 (.68)	-8.7010	-2.3507	-2.6567
AGE	SCH AGE	1.00 (.07)	10.20 (.68)	-9.2023	-2.8810	-3.1499
ACTIVITY FOCUS	OBJECT PLAY					
DISABILITY	MR					
AGE	PRESCH	221.00 (7.80)	253.37 (8.94)	-32.3669	-2.0334	-2.5455
AGE	SCH AGE	254.00 (8.09)	280.58 (8.94)	-26.5772	-1.5867	-2.0334
DISABILITY	NON-DISABLED					
AGE	PRESCH	328.00 (16.36)	179.27 (8.94)	148.7274	11.1080	13.1110
AGE	SCH AGE	42.00 (2.81)	133.49 (8.94)	-91.4932	-7.9188	-9.0418

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
ACTIVITY FOCUS	CONSTRUCTIVE PLAY					
DISABILITY	MR					
AGE	PRESCH	338.00 (11.93)	316.51 (11.17)	21.4941	1.2082	1.5313
AGE	SCH AGE	126.00 (4.02)	350.50 (11.17)	-224.4970	-11.9914	-15.5595
DISABILITY	NON-DISABLED					
AGE	PRESCH	142.00 (7.08)	223.95 (11.17)	-81.9472	-5.4760	-6.5440
AGE	SCH AGE	450.00 (30.14)	166.76 (11.17)	283.2403	21.9336	25.3562
ACTIVITY FOCUS	GAMES/SOCIAL					
DISABILITY	MR	.				
AGE	PRESCH	201.00 (7.09)	216.26 (7.63)	-15.2616	-1.0378	-1.2899
AGE	SCH AGE	214.00 (6.82)	239.49 (7.63)	-25.4869	-1.6469	-2.0957
DISABILITY	NON-DISABLED	.				
AGE	PRESCH	185.00 (9.23)	153.02 (7.63)	31.9818	2.5854	3.0299
AGE	SCH AGE	121.00 (8.10)	113.94 (7.63)	7.0567	.6611	.7495
ACTIVITY FOCUS	DRAMATIC PLAY					
DISABILITY	MR					
AGE	PRESCH	.00 (.00)	13.68 (.48)	-13.6782	-3.6984	-4.4287
AGE	SCH AGE	7.00 (.22)	15.15 (.48)	-8.1472	-2.0933	-2.5663
DISABILITY	NON-DISABLED					
AGE	PRESCH	21.00 (1.05)	9.68 (.48)	11.3218	3.6393	4.1090
AGE	SCH AGE	16.00 (1.07)	7.21 (.48)	8.7933	3.2755	3.5776

GOODNESS-OF-FIT TEST STATISTICS

LIKELIHOOD RATIO CHI SQUARE = 959.82702 DF = 21 P = .000
PEARSON CHI SQUARE = 1070.26831 DF = 21 P = .000

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

Appendix G

Analyses of children's specific social behaviors were conducted using the nine categories listed below. Except for the "no social" category, each category was derived from one or more original social specific category(ies) defined in Appendix D.

Specific Social Categories Used For Analyses	Original Social Specific Categories Included	Original Codes
1. Negative :	Receives verbal negative expression	16
	Gives verbal negative expression	17
	Gives non-verbal disapproval	19
	Receives physical punishment	20
	Gives physical punishment	21
	Conflict over possession	24
	Receives overt aggression	39
	Gives overt aggression	40
2. Observation :	Observing (people or social interactions)	01
3. Assistance :	Receives assistance	31
	Asks for assistance	33
	Receives protection/ intervention	34
	Receives accident intervention	36
4. Directions/ Approval :	Receives verbal approval	11
	Request for approval	15
	Receives non-verbal disapproval	18
	Receives permission	25
	Receives verbal directions/ suggestions	27
	Receives non-verbal directions/ suggestions	29
5. Other Social :	Receives playful mockery or provocation	22
	Gives playful mockery or provocation	23
	Receives request to move	41
	Asks someone to move	42
	Cannot distinguish	44
	Other interactions	45
	Respond nonverbally to unknown stimulus	46

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Specific Social Categories Used For Analyses	Original Social Specific Categories Included	Original Codes
6. Implicit Social :	Engaging in play	08
7. Explicit Social :	Greeting / farewell	02
	Received question on play choice	03
	Negotiates play	04
	Receives verbal request for a turn or a toy	05
	Asks for a turn or a toy	06
	Received request for information	09
	Ask for information	10
	Gives verbal approval	11
	Receives non-verbal positive expression	13
	Gives non-verbal positive expression	14
	Gives permission	26
	Gives verbal directions or suggestions	28
	Gives non-verbal directions or suggestions	30
	Gives assistance	32
	Gives protection or intervention	35
	Provides accident intervention	37
	Conversation	38
	Physical contact	43
	Received request for approval	47
8. Initiate Play:	Initiation of play	07
9. No social :	Not on original list of social specific categories; this was included in the analyses to show group differences in their rates of total social activities.	

LOGLINEAR OUTPUT FOR SPECIFIC SOCIAL ACTIVITIES
USING PLAY EQUIPMENT AND GROUP COMPOSITION AS EXPLANATORY VARIABLES

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	** ADJ. RESID.
SPECIFIC SOCIAL:	NEGATIVE					
EQUIP	SWING					
GPCOMP	ISOLATED	9.00 (.63)	22.86 (1.60)	-13.8575	-2.8985	-3.1796
GPCOMP	MIX NO	6.00 (.77)	12.52 (1.60)	-6.5244	-1.8436	-1.9431
GPCOMP	INTEGRATED	.00 (.00)	10.76 (1.60)	-10.7611	-3.2804	-3.4351
EQUIP	SAND					
GPCOMP	ISOLATED	5.00 (.57)	14.08 (1.60)	-9.0760	-2.4191	-2.5645
GPCOMP	MIX NO	39.00 (3.48)	17.95 (1.60)	21.0531	4.9696	5.3468
GPCOMP	INTEGRATED	28.00 (3.41)	13.15 (1.60)	14.8517	4.0958	4.3270
EQUIP	NETS					
GPCOMP	ISOLATED	6.00 (.71)	13.58 (1.60)	-7.5801	-2.0570	-2.1766
GPCOMP	MIX NO	4.00 (.50)	12.72 (1.60)	-8.7164	-2.4443	-2.5781
GPCOMP	INTEGRATED	.00 (.00)	9.31 (1.60)	-9.3144	-3.0519	-3.1790
EQUIP	WATERWHEEL					
GPCOMP	ISOLATED	12.00 (4.40)	4.37 (1.60)	7.6332	3.6528	3.7383
GPCOMP	MIX NO	33.00 (4.24)	12.44 (1.60)	20.5555	5.8269	6.1397
GPCOMP	INTEGRATED	1.00 (.49)	3.28 (1.60)	-2.2791	-1.2586	-1.2832
SPECIFIC SOCIAL:	ASSISTANCE / DIRECTIONS					
EQUIP	SWING					
GPCOMP	ISOLATED	357.00 (24.98)	189.37 (13.25)	167.6268	12.1810	14.2314
GPCOMP	MIX NO	58.00 (7.41)	103.76 (13.25)	-45.7643	-4.4927	-5.0432
GPCOMP	INTEGRATED	180.00 (26.76)	89.16 (13.25)	90.8447	9.6211	10.7301
EQUIP	SAND					
GPCOMP	ISOLATED	166.00 (18.86)	116.62 (13.25)	49.3811	4.5727	5.1630
GPCOMP	MIX NO	50.00 (4.46)	148.69 (13.25)	-98.6891	-8.0934	-9.2741
GPCOMP	INTEGRATED	121.00 (14.72)	108.93 (13.25)	12.0673	1.1562	1.3009
EQUIP	NETS					
GPCOMP	ISOLATED	135.00 (15.90)	112.51 (13.25)	22.4892	2.1202	2.3894
GPCOMP	MIX NO	37.00 (4.65)	105.35 (13.25)	-68.3546	-6.6595	-7.4809
GPCOMP	INTEGRATED	38.00 (6.53)	77.17 (13.25)	-39.1692	-4.4588	-4.9466
EQUIP	WATERWHEEL					
GPCOMP	ISOLATED	9.00 (3.30)	36.18 (13.25)	-27.1784	-4.5185	-4.9251
GPCOMP	MIX NO	39.00 (5.01)	103.10 (13.25)	-64.1017	-6.3130	-7.0846
GPCOMP	INTEGRATED	24.00 (11.71)	27.17 (13.25)	-3.1669	-.6076	-.6598
SPECIFIC SOCIAL:	OBSERVATION / OTHER SOCIAL					
EQUIP	SWING					
GPCOMP	ISOLATED	359.00 (25.12)	342.67 (23.98)	16.3266	.8820	1.1007
GPCOMP	MIX NO	146.00 (18.65)	187.76 (23.98)	-41.7630	-3.0478	-3.6547
GPCOMP	INTEGRATED	142.00 (21.11)	161.33 (23.98)	-19.3278	-1.5217	-1.8129
EQUIP	SAND					
GPCOMP	ISOLATED	134.00 (15.23)	211.02 (23.98)	-77.0235	-5.3022	-6.3951
GPCOMP	MIX NO	161.00 (14.35)	269.06 (23.98)	-108.0550	-6.5876	-8.0636
GPCOMP	INTEGRATED	183.00 (22.26)	197.12 (23.98)	-14.1152	-1.0054	-1.2084

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
EQUIP	NETS					
GPCOMP	ISOLATED	174.00 (20.49)	203.59 (23.98)	-29.5897	-2.0738	-2.4966
GPCOMP	MIX ND	261.00 (32.83)	190.64 (23.98)	70.3594	5.0958	6.1150
GPCOMP	INTEGRATED	196.00 (33.66)	139.64 (23.98)	56.3613	4.7696	5.6523
EQUIP	WATERWHEEL					
GPCOMP	ISOLATED	84.00 (30.77)	65.47 (23.98)	18.5347	2.2908	2.6673
GPCOMP	MIX ND	268.00 (34.45)	186.56 (23.98)	81.4360	5.9621	7.1473
GPCOMP	INTEGRATED	92.00 (44.88)	49.16 (23.98)	42.8411	6.1103	7.0875
SPECIFIC SOCIAL: POSITIVE (IMPLICIT SOCIAL, EXPLICIT SOCIAL, INITIATE PLAY)						
EQUIP	SWING					
GPCOMP	ISOLATED	101.00 (7.07)	231.97 (16.23)	-130.9739	-8.5993	-10.2241
GPCOMP	MIX ND	76.00 (9.71)	127.11 (16.23)	-51.1068	-4.5331	-5.1784
GPCOMP	INTEGRATED	24.00 (3.57)	109.21 (16.23)	-85.2114	-8.1539	-9.2541
EQUIP	SAND					
GPCOMP	ISOLATED	103.00 (11.70)	142.85 (16.23)	-39.8531	-3.3344	-3.8312
GPCOMP	MIX ND	381.00 (33.96)	182.14 (16.23)	198.8623	14.7351	17.1826
GPCOMP	INTEGRATED	97.00 (11.80)	133.44 (16.23)	-36.4378	-3.1544	-3.6118
EQUIP	NETS					
GPCOMP	ISOLATED	274.00 (32.27)	137.82 (16.23)	136.1793	11.5999	13.3034
GPCOMP	MIX ND	126.00 (15.85)	129.05 (16.23)	-3.0548	-.2689	-.3074
GPCOMP	INTEGRATED	110.00 (18.89)	94.53 (16.23)	15.4711	1.5913	1.7965
EQUIP	WATERWHEEL					
GPCOMP	ISOLATED	26.00 (9.52)	44.32 (16.23)	-18.3169	-2.7515	-3.0520
GPCOMP	MIX ND	154.00 (19.79)	126.30 (16.23)	27.7049	2.4653	2.8154
GPCOMP	INTEGRATED	16.00 (7.80)	33.28 (16.23)	-17.2783	-2.9952	-3.3097
SPECIFIC SOCIAL: NO SOCIAL ACTIVITIES						
EQUIP	SWING					
GPCOMP	ISOLATED	603.00 (42.20)	642.12 (44.94)	-39.1219	-1.5439	-2.2640
GPCOMP	MIX ND	497.00 (63.47)	351.84 (44.94)	145.1585	7.7387	10.9035
GPCOMP	INTEGRATED	316.00 (46.97)	302.31 (44.94)	13.6944	.7876	1.1025
EQUIP	SAND					
GPCOMP	ISOLATED	472.00 (53.64)	395.43 (44.94)	76.5715	3.8506	5.4570
GPCOMP	MIX ND	491.00 (43.76)	504.17 (44.94)	-13.1713	-.5866	-.8437
GPCOMP	INTEGRATED	393.00 (47.81)	369.37 (44.94)	23.6339	1.2297	1.7367
EQUIP	NETS					
GPCOMP	ISOLATED	260.00 (30.62)	381.50 (44.94)	-121.4986	-6.2205	-8.7990
GPCOMP	MIX ND	367.00 (46.16)	357.23 (44.94)	9.7663	.5167	.7286
GPCOMP	INTEGRATED	229.00 (39.33)	261.66 (44.94)	-32.6633	-2.0192	-2.8117
EQUIP	WATERWHEEL					
GPCOMP	ISOLATED	142.00 (52.01)	122.67 (44.94)	19.3273	1.7450	2.3873
GPCOMP	MIX ND	284.00 (36.50)	349.59 (44.94)	-65.5947	-3.5082	-4.9415
GPCOMP	INTEGRATED	72.00 (35.12)	92.12 (44.94)	-20.1169	-2.0960	-2.8566

GOODNESS-OF-FIT TEST STATISTICS

LIKELIHOOD RATIO CHI SQUARE = 1480.89556 DF = 44 P = 4E-32

PEARSON CHI SQUARE = 1533.89410 DF = 44 P = 4E-32

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

APPENDIX I
LOGLINEAR OUTPUT FOR SPECIFIC SOCIAL ACTIVITIES
USING GENDER AND DISABILITY AS EXPLANATORY VARIABLES

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
SPECIFIC SOCIAL: NEGATIVE						
SEX	MALE					
DISABILITY	MR	38.00 (1.11)	56.71 (1.65)	-18.7123	-2.4848	-3.1350
DISABILITY	MD	31.00 (2.70)	19.00 (1.65)	11.9967	2.7520	2.9599
SEX	FEMALE					
DISABILITY	MR	36.00 (1.42)	42.04 (1.65)	-6.0385	-.9313	-1.0975
DISABILITY	MD	52.00 (2.19)	39.25 (1.65)	12.7541	2.0359	2.3705
SPECIFIC SOCIAL: ASSISTANCE / DIRECTIONS						
SEX	MALE					
DISABILITY	MR	567.00 (16.52)	449.36 (13.09)	117.6359	5.5493	7.4480
DISABILITY	MD	69.00 (6.00)	150.57 (13.09)	-81.5736	-6.6478	-7.6061
SEX	FEMALE					
DISABILITY	MR	488.00 (19.18)	333.10 (13.09)	154.9050	8.4875	10.6397
DISABILITY	MD	120.00 (5.05)	310.97 (13.09)	-190.9673	-10.8293	-13.4133
SPECIFIC SOCIAL: OBSERVATION / OTHER SOCIAL						
SEX	MALE					
DISABILITY	MR	771.00 (22.47)	824.32 (24.02)	-53.3158	-1.8570	-2.6555
DISABILITY	MD	236.00 (20.52)	276.21 (24.02)	-40.2130	-2.4196	-2.9608
SEX	FEMALE					
DISABILITY	MR	673.00 (26.45)	611.03 (24.02)	61.9687	2.5069	3.3609
DISABILITY	MD	602.00 (25.35)	570.44 (24.02)	31.5600	1.3214	1.7504
SPECIFIC SOCIAL: POSITIVE (IMPLICIT SOCIAL, EXPLICIT SOCIAL, INITIATE)						
SEX	MALE					
DISABILITY	MR	364.00 (10.61)	552.67 (16.10)	-188.6745	-8.0256	-10.9631
DISABILITY	MD	133.00 (11.57)	185.19 (16.10)	-52.1910	-3.8352	-4.4661
SEX	FEMALE					
DISABILITY	MR	407.00 (16.00)	409.67 (16.10)	-2.6748	-.1321	-.1686
DISABILITY	MD	626.00 (26.36)	382.46 (16.10)	243.5403	12.4531	15.6989

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

CON'T APPENDIX I

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS (CONT.)

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID. **
SPECIFIC SOCIAL: NO SOCIAL ACTIVITIES						
SEX	MALE					
DISABILITY	MR	1692.00 (49.30)	1548.93 (45.13)	143.0666	3.6351	6.1403
DISABILITY	MD	681.00 (59.22)	519.02 (45.13)	161.9809	7.1100	10.2383
SEX	FEMALE					
DISABILITY	MR	940.00 (36.95)	1148.16 (45.13)	-208.1604	-6.1432	-9.6920
DISABILITY	MD	975.00 (41.05)	1071.89 (45.13)	-96.8872	-2.9593	-4.6131

GOODNESS-OF-FIT TEST STATISTICS

LIKELIHOOD RATIO CHI SQUARE = 663.26697 DF = 12 P = .000
PEARSON CHI SQUARE = 644.87438 DF = 12 P = .000

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

CON'T APPENDIX J

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
CON'T SPECIFIC SOCIAL: ASSISTANCE / DIRECTIONS						
EQUIP	NETS					
SOCIAL PARTNER:	ADULTS	173.00 (33.92)	125.55 (24.62)	47.4507	4.2348	5.1415
SOCIAL PARTNER:	SAME SCH	33.00 (5.16)	157.31 (24.62)	-124.3058	-9.9110	-12.2058
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.58 (24.62)	-.5848	-.7647	-.8810
SOCIAL PARTNER:	OTHER MD	5.00 (2.31)	53.17 (24.62)	-48.1738	-6.6064	-7.7755
EQUIP	WATERWHEEL					
SOCIAL PARTNER:	ADULTS	72.00 (30.38)	58.34 (24.62)	13.6565	1.7879	2.1089
SOCIAL PARTNER:	SAME SCH	18.00 (3.57)	124.07 (24.62)	-106.0722	-9.5228	-11.5540
SOCIAL PARTNER:	OTHER MR	.00 (.00)	4.44 (24.62)	-4.4395	-2.1070	-2.4311
SOCIAL PARTNER:	OTHER MD	.00 (.00)	28.08 (24.62)	-28.0848	-5.2995	-6.1733
SPECIFIC SOCIAL: OBSERVATION / OTHER SOCIAL						
EQUIP	SWING					
SOCIAL PARTNER:	ADULTS	264.00 (28.95)	383.90 (42.09)	-119.9046	-6.1196	-8.8749
SOCIAL PARTNER:	SAME SCH	181.00 (58.39)	130.49 (42.09)	50.5061	4.4213	5.9953
SOCIAL PARTNER:	OTHER MR	3.00 (42.09)	3.00 (42.09)	.0000	.0000	.0000
SOCIAL PARTNER:	OTHER MD	92.00 (73.02)	53.04 (42.09)	38.9606	5.3497	7.1187
EQUIP	SAND					
SOCIAL PARTNER:	ADULTS	160.00 (28.67)	234.89 (42.09)	-74.8890	-4.8964	-6.8046
SOCIAL PARTNER:	SAME SCH	247.00 (31.87)	326.23 (42.09)	-79.2347	-4.3868	-6.2603
SOCIAL PARTNER:	OTHER MR	7.00 (36.04)	8.18 (42.09)	-1.1752	-.4110	-.5412
SOCIAL PARTNER:	OTHER MD	92.00 (61.33)	63.14 (42.09)	28.8578	3.6316	4.8443
EQUIP	NETS					
SOCIAL PARTNER:	ADULTS	181.00 (35.49)	214.68 (42.09)	-33.6835	-2.2989	-3.1245
SOCIAL PARTNER:	SAME SCH	276.00 (43.19)	268.99 (42.09)	7.0142	.4277	.6009
SOCIAL PARTNER:	OTHER MR	1.00 (42.09)	1.00 (42.09)	.0000	.0000	.0000
SOCIAL PARTNER:	OTHER MD	166.00 (76.85)	90.92 (42.09)	75.0752	7.8733	10.5730
EQUIP	WATERWHEEL					
SOCIAL PARTNER:	ADULTS	105.00 (44.30)	99.76 (42.09)	5.2353	.5241	.7054
SOCIAL PARTNER:	SAME SCH	273.00 (54.17)	212.16 (42.09)	60.8422	4.1771	5.7826
SOCIAL PARTNER:	OTHER MR	12.00 (66.54)	7.59 (42.09)	4.4097	1.6001	2.1065
SOCIAL PARTNER:	OTHER MD	75.00 (65.74)	48.02 (42.09)	26.9762	3.8927	5.1738

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

APPENDIX J

LOGLINEAR OUTPUT FOR SPECIFIC SOCIAL* ACTIVITIES USING PLAY EQUIPMENT AND SOCIAL PARTNERS AS EXPLANATORY VARIABLES

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
SPECIFIC SOCIAL: NEGATIVE						
EQUIP	SWING					
SOCIAL PARTNER:	ADULTS	4.00 (.44)	30.06 (3.30)	-26.0558	-4.7527	-5.3336
SOCIAL PARTNER:	SAME SCH	5.00 (1.61)	10.22 (3.30)	-5.2163	-1.6320	-1.7124
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.23 (3.30)	-.2349	-.4846	-.4932
SOCIAL PARTNER:	OTHER NO	6.00 (4.76)	4.15 (3.30)	1.8476	.9067	.9336
EQUIP	SAND					
SOCIAL PARTNER:	ADULTS	2.00 (.36)	18.39 (3.30)	-16.3894	-3.8219	-4.1184
SOCIAL PARTNER:	SAME SCH	39.00 (5.03)	25.54 (3.30)	13.4592	2.6632	2.9409
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.64 (3.30)	-.6400	-.8000	-.8151
SOCIAL PARTNER:	OTHER NO	31.00 (20.67)	4.94 (3.30)	26.0566	11.7194	12.0967
EQUIP	METS					
SOCIAL PARTNER:	ADULTS	2.00 (.39)	16.81 (3.30)	-14.8075	-3.6119	-3.8716
SOCIAL PARTNER:	SAME SCH	5.00 (.78)	21.06 (3.30)	-16.0588	-3.4994	-3.8050
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.08 (3.30)	-.0783	-.2798	-.2846
SOCIAL PARTNER:	OTHER NO	3.00 (1.39)	7.12 (3.30)	-4.1185	-1.5436	-1.6041
EQUIP	WATERWHEEL					
SOCIAL PARTNER:	ADULTS	18.00 (7.59)	7.81 (3.30)	10.1895	3.6459	3.7969
SOCIAL PARTNER:	SAME SCH	37.00 (7.34)	16.61 (3.30)	20.3902	5.0031	5.3595
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.59 (3.30)	-.5943	-.7709	-.7853
SOCIAL PARTNER:	OTHER NO	5.00 (4.38)	3.76 (3.30)	1.2402	.6396	.6578
SPECIFIC SOCIAL: ASSISTANCE / DIRECTIONS						
EQUIP	SWING					
SOCIAL PARTNER:	ADULTS	556.00 (60.96)	224.51 (24.62)	331.4884	22.1233	28.1199
SOCIAL PARTNER:	SAME SCH	43.00 (13.87)	76.31 (24.62)	-33.3143	-3.8135	-4.5323
SOCIAL PARTNER:	OTHER MR	.00 (.00)	1.75 (24.62)	-1.7544	-1.3246	-1.5266
SOCIAL PARTNER:	OTHER NO	6.00 (4.76)	31.02 (24.62)	-25.0181	-4.4921	-5.2390
EQUIP	SAND					
SOCIAL PARTNER:	ADULTS	288.00 (51.61)	137.37 (24.62)	150.6343	12.8524	15.6863
SOCIAL PARTNER:	SAME SCH	45.00 (5.81)	190.79 (24.62)	-145.7856	-10.5546	-13.2012
SOCIAL PARTNER:	OTHER MR	.00 (.00)	4.78 (24.62)	-4.7810	-2.1865	-2.5232
SOCIAL PARTNER:	OTHER NO	5.00 (3.33)	36.93 (24.62)	-31.9263	-5.2539	-6.1423

* THERE ARE ONLY FOUR SPECIFIC SOCIAL CATEGORIES PRESENTED HERE SINCE THERE ARE NO SOCIAL PARTNER INFORMATION FOR THE "NO SOCIAL" CATEGORY; THUS, THE OBSERVED AND EXPECTED PERCENTAGES HERE ARE HIGHER THAN THOSE PRESENTED IN APPENDICES F,G,I & J BECAUSE THE "NO SOCIAL" CATEGORY WAS OMITTED.

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

CON'T APPENDIX J

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
SPECIFIC SOCIAL: POSITIVE (IMPLICIT SOCIAL, EXPLICIT SOCIAL, INITIATE PLAY)						
EQUIP	SWING					
SOCIAL PARTNER:	ADULTS	88.00 (9.65)	273.53 (29.99)	-185.5281	-11.2178	-14.7957
SOCIAL PARTNER:	SAME SCH	81.00 (26.13)	92.98 (29.99)	-11.9755	-1.2420	-1.5317
SOCIAL PARTNER:	OTHER MR	.00 (.00)	2.14 (29.99)	-2.1375	-1.4620	-1.7486
SOCIAL PARTNER:	OTHER ND	22.00 (17.46)	37.79 (29.99)	-15.7901	-2.5686	-3.1085
EQUIP	SAND					
SOCIAL PARTNER:	ADULTS	108.00 (19.35)	167.36 (29.99)	-59.3560	-4.5882	-5.8109
SOCIAL PARTNER:	SAME SCH	444.00 (57.29)	232.44 (29.99)	211.5611	13.8765	18.0101
SOCIAL PARTNER:	OTHER MR	7.00 (36.04)	5.82 (29.99)	1.1752	.4869	.5831
SOCIAL PARTNER:	OTHER ND	22.00 (14.67)	44.99 (29.99)	-22.9882	-3.4273	-4.1578
EQUIP	NETS					
SOCIAL PARTNER:	ADULTS	154.00 (30.20)	152.96 (29.99)	1.0402	.0841	.1060
SOCIAL PARTNER:	SAME SCH	325.00 (50.86)	191.65 (29.99)	133.3504	9.6325	12.3097
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.71 (29.99)	-.7125	-.8441	-1.0091
SOCIAL PARTNER:	OTHER ND	42.00 (19.44)	64.78 (29.99)	-22.7830	-2.8306	-3.4571
EQUIP	WATERWHEEL					
SOCIAL PARTNER:	ADULTS	42.00 (17.72)	71.08 (29.99)	-29.0813	-3.4493	-4.2218
SOCIAL PARTNER:	SAME SCH	176.00 (34.92)	151.16 (29.99)	24.8398	2.0204	2.5437
SOCIAL PARTNER:	OTHER MR	1.00 (5.55)	5.41 (29.99)	-4.4087	-1.8957	-2.2697
SOCIAL PARTNER:	OTHER ND	6.00 (5.26)	34.22 (29.99)	-28.2165	-4.8238	-5.8308

GOODNESS-OF-FIT TEST STATISTICS

LIKELIHOOD RATIO CHI SQUARE = 2050.91939 DF = 45 P = 4E-32
PEARSON CHI SQUARE = 2125.80984 DF = 45 P = 4E-32

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

APPENDIX K

LOGLINEAR OUTPUT FOR SPECIFIC SOCIAL* ACTIVITIES USING GROUP COMPOSITION AND SOCIAL PARTNERS AS EXPLANATORY VARIABLES

OBSERVED, EXPECTED FREQUENCIES AND RESIDUALS

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
SPECIFIC SOCIAL: NEGATIVE						
GPCOMP	ISOLATED					
SOCIAL PARTNER: ADULTS		10.00 (.88)	34.57 (3.05)	-24.5668	-4.1785	-4.8365
SOCIAL PARTNER: SAME SCH		22.00 (3.25)	20.67 (3.05)	1.3271	.2919	.3192
SOCIAL PARTNER: OTHER MR		.00 (.00)	.00 (.00)	.0000	.0000	.0000
SOCIAL PARTNER: OTHER NO		.00 (.00)	.57 (3.05)	-.5670	-.7530	-.7662
GPCOMP	MIX NO					
SOCIAL PARTNER: ADULTS		5.00 (1.58)	9.65 (3.05)	-4.6494	-1.4967	-1.5714
SOCIAL PARTNER: SAME SCH		51.00 (4.30)	36.22 (3.05)	14.7843	2.4567	2.8641
SOCIAL PARTNER: OTHER MR		.00 (.00)	.07 (3.05)	-.0727	-.2697	-.2740
SOCIAL PARTNER: OTHER NO		26.00 (8.25)	9.62 (3.05)	16.3812	5.2818	5.5448
GPCOMP	INTEGRATED					
SOCIAL PARTNER: ADULTS		.00 (.00)	21.20 (3.05)	-21.1980	-4.6041	-5.0456
SOCIAL PARTNER: SAME SCH		12.00 (3.81)	9.62 (3.05)	2.3812	.7678	.8060
SOCIAL PARTNER: OTHER MR		.00 (.00)	.64 (3.05)	-.6351	-.7969	-.8111
SOCIAL PARTNER: OTHER NO		17.00 (7.00)	7.42 (3.05)	9.5798	3.5168	3.6633
SPECIFIC SOCIAL: ASSISTANCE / DIRECTIONS						
GPCOMP	ISOLATED					
SOCIAL PARTNER: ADULTS		606.00 (53.53)	280.99 (24.82)	325.0132	19.3891	25.4854
SOCIAL PARTNER: SAME SCH		60.00 (8.86)	168.05 (24.82)	-108.0460	-8.3348	-10.3513
SOCIAL PARTNER: OTHER MR		.00 (.00)	.00 (.00)	.0000	.0000	.0000
SOCIAL PARTNER: OTHER NO		1.00 (5.39)	4.61 (24.82)	-3.6087	-1.6810	-1.9424
GPCOMP	MIX NO					
SOCIAL PARTNER: ADULTS		108.00 (34.18)	78.44 (24.82)	29.5620	3.3379	3.9796
SOCIAL PARTNER: SAME SCH		64.00 (5.40)	294.39 (24.82)	-230.3907	-13.4277	-17.7768
SOCIAL PARTNER: OTHER MR		.00 (.00)	.59 (24.82)	-.5913	-.7690	-.8871
SOCIAL PARTNER: OTHER NO		12.00 (3.81)	78.19 (24.82)	-66.1898	-7.4854	-8.9236
GPCOMP	INTEGRATED					
SOCIAL PARTNER: ADULTS		345.00 (49.70)	172.31 (24.82)	172.6851	13.1551	16.3711
SOCIAL PARTNER: SAME SCH		15.00 (4.76)	78.19 (24.82)	-63.1898	-7.1461	-8.5191
SOCIAL PARTNER: OTHER MR		.00 (.00)	5.16 (24.82)	-5.1624	-2.2721	-2.6260
SOCIAL PARTNER: OTHER NO		3.00 (1.23)	60.32 (24.82)	-57.3178	-7.3802	-8.7301

* THERE ARE ONLY FOUR SPECIFIC SOCIAL CATEGORIES PRESENTED HERE SINCE THERE ARE NO SOCIAL PARTNER INFORMATION FOR THE "NO SOCIAL" CATEGORY; THUS, THE OBSERVED AND EXPECTED PERCENTAGES HERE ARE HIGHER THAN THOSE PRESENTED IN APPENDICES F,G,I & J BECAUSE THE "NO SOCIAL" CATEGORY WAS OMITTED.

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

CON'T APPENDIX K

FACTOR	CODE	OBS. COUNT & PCT.	EXP. COUNT & PCT.	RESIDUAL	STD. RESID.	ADJ. RESID.**
SPECIFIC SOCIAL: OBSERVATION / OTHER SOCIAL						
GPCOMP	ISOLATED					
SOCIAL PARTNER:	ADULTS	311.00 (27.47)	475.18 (41.98)	-164.1777	-7.5316	-11.2684
SOCIAL PARTNER:	SAME SCH	308.00 (45.49)	284.18 (41.98)	23.8159	1.4128	1.9972
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.00 (.00)	.0000	.0000	.0000
SOCIAL PARTNER:	OTHER ND	16.00 (86.17)	7.79 (41.98)	8.2062	2.9394	3.8662
GPCOMP	MIX ND					
SOCIAL PARTNER:	ADULTS	176.00 (55.70)	132.65 (41.98)	43.3532	3.7642	5.1084
SOCIAL PARTNER:	SAME SCH	423.00 (35.67)	497.85 (41.98)	-74.8452	-3.3544	-5.0549
SOCIAL PARTNER:	OTHER MR	1.00 (41.98)	1.00 (41.98)	.0000	.0000	.0000
SOCIAL PARTNER:	OTHER ND	216.00 (68.57)	132.23 (41.98)	83.7730	7.2852	9.8858
GPCOMP	INTEGRATED					
SOCIAL PARTNER:	ADULTS	195.00 (28.09)	291.40 (41.98)	-96.4023	-5.6473	-7.9996
SOCIAL PARTNER:	SAME SCH	211.00 (66.98)	132.23 (41.98)	78.7730	6.8504	9.2957
SOCIAL PARTNER:	OTHER MR	8.00 (38.47)	8.73 (41.98)	-.7301	-.2471	-.3251
SOCIAL PARTNER:	OTHER ND	193.00 (79.42)	102.00 (41.98)	90.9963	9.0098	12.1315
SPECIFIC SOCIAL: POSITIVE (IMPLICIT SOCIAL, EXPLICIT SOCIAL, INITIATE PLAY)						
GPCOMP	ISOLATED					
SOCIAL PARTNER:	ADULTS	205.00 (18.11)	341.27 (30.15)	-136.2688	-7.3765	-10.0585
SOCIAL PARTNER:	SAME SCH	287.00 (42.39)	204.10 (30.15)	82.9020	5.8029	7.4765
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.00 (.00)	.0000	.0000	.0000
SOCIAL PARTNER:	OTHER ND	1.00 (5.39)	5.60 (30.15)	-4.5975	-1.9432	-2.3294
GPCOMP	MIX ND					
SOCIAL PARTNER:	ADULTS	27.00 (8.54)	95.27 (30.15)	-68.2658	-6.9941	-8.6508
SOCIAL PARTNER:	SAME SCH	648.00 (54.64)	357.55 (30.15)	290.4516	15.3605	21.0965
SOCIAL PARTNER:	OTHER MR	.00 (.00)	.72 (30.15)	-.7182	-.8475	-1.0142
SOCIAL PARTNER:	OTHER ND	61.00 (19.37)	94.96 (30.15)	-33.9644	-3.4853	-4.3104
GPCOMP	INTEGRATED					
SOCIAL PARTNER:	ADULTS	133.00 (19.16)	209.28 (30.15)	-76.2828	-5.2730	-6.8076
SOCIAL PARTNER:	SAME SCH	77.00 (24.44)	94.96 (30.15)	-17.9644	-1.8435	-2.2799
SOCIAL PARTNER:	OTHER MR	7.00 (33.66)	6.27 (30.15)	.7301	.2916	.3496
SOCIAL PARTNER:	OTHER ND	30.00 (12.35)	73.26 (30.15)	-43.2582	-5.0541	-6.2022

GOODNESS-OF-FIT TEST STATISTICS

LIKELIHOOD RATIO CHI SQUARE = 1831.43387 DF = 33 P = 4E-32
PEARSON CHI SQUARE = 1821.54058 DF = 33 P = 4E-32

** NOTE THAT ADJ. RESID. OF >=+2 OR <=-2 INDICATES THAT THE OBSERVED FREQUENCY (OBS. COUNT & PCT.) DEVIATED SIGNIFICANTLY FROM THE EXPECTED FREQUENCY (EXP. COUNT & PCT.).

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