

THESIS

VALIDITY AND RELIABILITY OF A
TEST OF ENVIRONMENTAL SUPPORTIVENESS

Submitted by

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WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION
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ABSTRACT OF THESIS

VALIDITY AND RELIABILITY OF A

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Through playful interactions with people and objects an individual gains valuable knowledge about the world around them. These interactions are also crucial to nurturing play. Research shows the most prominent features of the environment that affect a child's play are--caregivers, playmates (of all ages), objects, and the physical surroundings. The development of a valid way to measure these important features is a crucial step in achieving the knowledge needed to promote play and playfulness. The Test of Environmental Supportiveness (TOES) was designed to provide a comprehensive picture of the environmental features that can affect play. The TOES assesses not just if the features are present but whether or not they are supportive for each child's play.

This study investigated the TOES for preliminary validity and inter-rater reliability for use with children 19 to 121 months. The results show promise of both content and construct reliability as well as inter-rater reliability. The TOES was also found to be an easy tool to use requiring no special equipment. Minimal training is needed to score the items.

The most problematic area of the preliminary testing of the TOES was the low reliability of items. The items did not separate into distinct levels. The low reliability appears to be the result of the homogeneous sample that was used.

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DEDICATION

This paper is dedicated to my son Devin who has taught me how to play again and has helped me to understand how to be playful in any environment. He is an exceptional teacher.

This paper is also dedicated to all the Angels who have guided, supported, and enabled me to complete my studies.

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Introduction

"Play is OK. It's an acceptable thing to do, a good thing to do. Go ahead, enjoy! Enjoy!" (Chance, 1979, p. 43).

Play is the primary occupation of children (Kielhofner, 1985).

Play is a transaction between an individual and the environment that is intrinsically motivated, internally controlled, and free of many of the constraints of objective reality (Bundy, 1991; Neumann, 1971).

Similarly Burke, (1993, p.206) suggested "Play is a state of mind that leads the player to act in a certain way when involved in various human and nonhuman interaction." Both these definitions suggest the environment plays a vital role in the success of play. Thus, an understanding of the environment in which play takes place is crucial (Kielhofner). In this study, we focused on the environment and how it supported or detracted from play. Toward that end, we created the Test of Environmental Supportiveness (TOES) and tested it for preliminary validity and reliability.

The environment is critical to nurturing play (Robinson, 1977), either supporting or detracting from a child's developing increasingly complex play interactions (Wortham, 1985). That is, available objects, people, and situations either stimulate a child's interests and provide opportunity for action or limit the child's playfulness. Environmental variables that influence play and playfulness can be separated into two dimensions--human and nonhuman. These two dimensions are often interrelated and have a dynamic relationship (Takata, 1973).

Human Environment

Two aspects of the human environment are important--caregivers and playmates of all ages. Caregivers can promote interest, involvement,

initiative, and exploration in children by being responsive (Chance, 1979; Michelman, 1974; Prescott, Jones & Kritchevsky 1972a; Singer, 1973). Further, Bishop & Chace (1971) found mothers whose attitudes toward play suggest flexibility, exploration, and children's autonomy enhance children's playfulness.

Skillful playmates, regardless of age, promote more elaborate play. For example, adults entering a play situation on the child's terms and being playful themselves encourage more playful behaviors (Knox, 1996). Playing with familiar peers is associated with an increase in the complexity and richness of dramatic and fantasy play (Doyle, Connolly, & Rivest, 1980; Werebe & Baudonniere, 1991).

An adult or older child who actively participates and is a good play model assists children to elaborate play and expand their use of language in play (Chance, 1979; Frost & Klein, 1979; Sutton-Smith, 1980; Howes & Farver, 1987; Mounts & Roopnarine, 1987; Whaley & Kantor, 1992). Similarly, familiar peers enhance play by increasing communicative behaviors that extend and clarify play (Howes, Droege, & Matheson 1992).

Exploration, a precursor to play, is more likely with same-gender playmates (Rabinowitz, Moely, Finkel, & McClinton, 1975 as cited in Rubin, Fein, & Vandenberg, 1983). Further, Rubenstein and Howes (1976) found that even toddlers were more likely to exploit the unique properties of objects and use objects in a nonliteral fashion when with a familiar playmate than when alone.

Nonhuman Environment

As with the human environment two aspects of the nonhuman environment also affect play--toys and surroundings. Children play longer, in more varied ways, and are more social with structures and

toys that can be used in multiple ways, (e.g., blocks, house area, sand, playgrounds without separate, stabilized equipment) (Bruya, 1985; Parten, 1971; Van Alstyne, 1932; Vandenberg, 1981). Structures and toys that offer a wide variety of play opportunities increase imaginative (Michelman, 1974, Neumann, 1971), cognitive, fantasy, and cooperative play (Moore, 1985; Susa & Benedict, 1994) and are preferred over toys that are designed for a specific purpose (Frost & Strickland, 1978; Van Alstyne, 1932).

Physical surroundings also have been shown to promote particular types of play. For example, Henniger (1985) and Sanders and Harper (1976) found that dramatic play was significantly longer for girls and younger children indoors, whereas boys and older children engaged in dramatic play more often outdoors. Similarly, play spaces that are expansive afford the child many more opportunities than space that is limited or confining (Loo, 1979; Takata, 1973).

In summary, both human and nonhuman factors can influence play and playfulness. Both aspects need to be examined when evaluating play and playfulness not just for their presence but for how they affect a particular child's play. Several assessments available to occupational therapists contain items that address the environment (Bradley & Caldwell, 1979; Harms & Clifford, 1980; Prescott, Jones, & Kritchevsky, 1972b). However, these assessments are not devoted to examining how the child and environment interact or whether the environment supports or detracts from play.

Environmental Assessments

Three existing assessments have been designed to assess environmental variables. These are Home Observation for Measurement of

the Environment (HOME) (Bradley & Caldwell, 1979), The Day Care Environmental Inventory (Prescott, Jones, & Kritchevsky, 1972b), and The Early Childhood Environment Rating Scale (Harms & Clifford, 1980)

The HOME focuses on parent-child interactions and the stimulation level of the environment. This assessment is limited to home use with children younger than 3 years and preschools with 3-6 year olds (Bradley & Caldwell, 1979). The HOME looks at how the environment is organized and what play opportunities there are. With regards to human interaction, the HOME looks mainly at the interaction of the child and the primary caregiver: other playmates are not included.

The Day Care Environmental Inventory (Prescott, Jones, & Kritchevsky, 1972b) and The Early Childhood Environment Rating Scale (Harms & Clifford, 1980) both give an overall picture of the children's surroundings, including organization and what types of materials are available for play. These two scales were developed for use in preschools. They also do not assess peer interactions.

In summary, scales currently assessing the environment are limited in the settings in which they can be used, age groups, and the scope of human interactions. Another limiting factor is that these scales look at whether or not features of the environment are present but not whether they are beneficial to a particular child's play.

Because of the importance of the environment to play and the relative paucity of assessments for its systematic evaluation, there is a need to develop a scale that describes the relative supportiveness of human and nonhuman environments and, which can be used in a variety of settings. Important variables include toys, physical surroundings, playmates, and caregivers (Widerstrom, Mowder, & Sandall, 1991).

The purpose of this study was to test the preliminary validity and reliability of the Test of Environmental Supportiveness (TOES). The following research questions were addressed: (a) Do TOES items show evidence of one type of construct validity (goodness of fit)? (b) Can raters reliably score the TOES? (c) Are the results of Rasch analysis describing the relative supportiveness of play environments for 10 children confirmed by the opinions of two experts unaware to the results of the analysis?

Method

Subjects

The subjects for this study were 36 children, who had been videotaped while playing during previous investigations (Hutchinson, 1994; Metzger, 1993). The tapes were selected randomly. The subjects (16 females, 20 males) ranged in age from 19 to 121 months ($\bar{m}=60$ months). Of those, 22% ($\bar{n}=7$) had identified special needs including autism, cerebral palsy, and developmental delays. The remaining 78% ($\bar{n}=29$) had no concerns expressed by parents or teachers in any area of development. The subjects were middle class children from Eastern United States, Chicago, and Toronto. Each child was videotaped during free play for two 15-to 20-minute segments--one indoors and one outdoors. The subjects were a convenience sample--friends and acquaintances of the original research teams (Hutchinson; Metzger).

Instrumentation

The TOES is an observational assessment administered during free play. The scale consists of 17 items reflecting various elements of the human and nonhuman environment. Each item represents a continuum of relative supportiveness. The elements of the human environment that are

evaluated are caregivers and playmates. Playmates include adults, peers, and younger playmates. The elements of the nonhuman environment include play objects (including toys) and physical surrounding. (See Appendix B for protocol sheet, see Table I for summary of items).

Table I

Item Summary

Caregivers	Promote player's activities and opportunities Adhere to consistent boundaries/rules Adhere to reasonable boundaries/rules
Playmates Adults Peers Younger	Response to player's cues, supports the play transaction Gives clear cues that support the play transaction Participate as equal with player
Objects	Natural/Fabricated objects support activity of player
Physical Surroundings	Amount and configuration of space supports activity Sensory environment offers adequate invitation to play Space is physically safe Space is accessible

Procedure

Development of the TOES has proceeded in four stages. This study reflects Stages 3 and 4. In Stage 1, we developed items for a preliminary version of the TOES. These were reviewed by approximately 10 experienced occupational therapists, at least 3 of whom had particular interest in assessment of the environment. Based on their feedback, we revised the items.

In Stage 2, the items were piloted by a group of occupational therapy students from the Medical University of South Carolina trained

to administer the assessment. These students observed 17 anonymous, typically-developing children whose ages were within those of our sample. Their data were subjected to Rasch analysis (Linacre, 1994) to examine preliminary goodness of fit. Since all items fit the model (see Data Analysis), we proceeded to Stage 3.

In Stage 3, the TOES was used to score the videotapes of children in this sample. Three raters each scored between 10 and 30 tapes. One rater was a professional master's level OT student. The other two raters received minimal training (reading the manual plus training using 2 tapes of children playing in two different environments) on the TOES. These two raters did not have training in OT. Their data were subjected to Rasch analysis and examined for goodness of fit.

In Stage 4, ten tapes representing those identified by Rasch analysis as the most and least supportive environments were selected. Two expert occupational therapists unfamiliar with the results of the Rasch analysis viewed the tapes and determined how much they felt the environment supported or detracted from children's playfulness using the Environmental Inventory created for this study (See Appendix B). The experts both have an MS degree in Occupational Therapy and have done research with children's play and the environment. They also identified the specific aspects of the human and nonhuman environments that led to their conclusions. The descriptive information was compared with that gained through the TOES to examine further the validity of the scale.

Data Analysis

To answer the research questions related to preliminary construct validity and rater reliability, many-faceted Rasch analysis (Linacre, 1994) was used. Rasch analysis is a one-parameter latent trait model

used as an alternative to traditional psychometric methods for detailed item analysis in developing criterion referenced tests (Hambleton, 1989). Rasch measurement allows for the creation of an equal-interval linear scale, defining the relative supportiveness of the environment based on simultaneous consideration of three facets: item difficulty, supportiveness of an environment for a child, and rater severity. Measures of relative supportiveness of an environment, item difficulty, and rater severity are expressed in logits (log-odds probability units).

Rasch analysis allows for examination of item validity and inter-rater reliability. Validity and reliability are examined in a large part through the use of fit statistics generated by the Rasch analysis. That is measure scores are examined to determine how well they "fit" along a unidimensional line describing environmental supportiveness.

Relative fit is determined by how well the assumptions of Rasch analysis are met by the data. Rasch is based on three assumptions with regard to this study: (a) a more supportive environment will yield higher scores on harder items; (b) easier items are more likely to yield high scores in any environment; and (c) more lenient raters are more likely to give high scores in all environments. If these three assumptions are met, data are said to "fit the model."

Two statistics Mean Square, (MnSq) residual and standardized " χ^2 " statistics, provide measures of fit. The MnSq is a ratio of the observed score and the score expected by the measurement model. The desired MnSq Value is 1.0. The " χ^2 " value represents the standardized difference between the observed and expected performance; the desired " χ^2 " value is 0. No standard criteria exist with regard to how much deviation is acceptable in the MnSq statistic. For this study, items,

supportiveness of the environment for a child, and raters having MnSq values that deviated more than $\pm .4$ from the expected value of 1.0 simultaneously with t values $\geq +2$ and ≤ -2 failed to fit the model and were targeted for further investigation.

Items may fail to fit the model when an unexpectedly high score is given on a hard item, a unexpectedly low score is given on an easy item, or when scores are too consistent. Raters may fail to fit if they are too consistent (unacceptably low fit statistics) or erratic (unacceptably high fit statistics) in their scoring. Environments fail to fit when they receive unexpectedly high or low scores or when their scores are too consistent. Erratic scores mean a low score is given on an easy item or a high score is given on a hard item when scores for easier items are lower. Too consistent means the scores were all the same or the scoring was too perfect.

To answer the question of how well the statistical analysis predicted the experts' opinions, descriptive analysis was used. Data obtained from the experts were compared with the results of the Rasch analysis. The expert check was used to make sure items on the TOES discriminate in a way that is desirable. If the experts indicated that the environment was supportive for a particular child, then we expected the measure score from the Rasch analysis to be at the upper end of the scale. If the experts concluded that the environment detracted from the child's playfulness, we expected the measure score to be on the lower end of the scale generated by the Rasch analysis.

Results

The results from the Rasch analysis (Linacre, 1994) are reported as measure logits. High positive measure scores indicate easier items, more lenient raters, and a more supportive environment. For example, the item "Space is Physically Safe" (#16) is the easiest item with a logit measure of 1.29. The item "Younger Playmate Gives Clear Cues that Support the Transaction" (#11) had a logit measure of -1.08 making this the hardest item (See Appendix C). Subject # 31 outside was found to have the most supportive environment with a logit measure of 4.05 (See Appendix D). Rater #1 was the most lenient rater having a logit measure of .14 (See Appendix E).

Scale Validity

To investigate the TOES as reflecting a unidimensional construct of environmental supportiveness, the fit of the items to the Rasch measurement model was examined. The TOES is defined by the calibrations of the 17 items along a linear continuum. All 17 items of the TOES fit the model; that is, their fit statistics fell within acceptable values. Their MnSq and " χ^2 " values did not simultaneously deviate more than $\pm .4$ and ± 2 (See Appendix C).

Examination of the relative difficulty of the items provided further evidence for scale validity. To represent a valid scale, the relative difficulty of the items must make sense. The items "Consistent Rules" and "Safe" are the easiest items, and a "Younger Playmate Giving Cues" and "Younger Playmate Being an Equal Player" are the hardest items.

Person Response Validity

Supportiveness of an environment for a child also was examined for fit along a unidimensional line. Four of the thirty six (11%) subjects (#05, #16, #18, & #29) failed to fit the model (See Appendix D). This indicates when the scale was applied to the environments in which these children played, the response pattern was unexpected. Three of the subjects (#14, #16, & #18) had scores that were unexpectedly low on easy items. One subject (#05) had scores that were too consistent.

Inter-rater reliability

To answer the question of whether raters used the TOES reliably, rater fit statistics were examined. All raters were found to use the scale reliably (Appendix E). When reliability was examined through analysis of individual item ratings, 96% were found to fit the model; four percent were unexpected.

Experts Opinion

To answer the question of whether the results of the Rasch Analysis could be confirmed by the experts, descriptive information gathered from two independent experts was examined. Overall, the experts agreed with the results of the Rasch analysis in 65% (13/20) of the cases. When the Rasch analysis identified a child as playing in a very supportive environment, both experts agreed in 100% of cases (10/10). With the least supportive environments Expert 1 agreed with the Rasch analysis in 2/5 cases, Expert 2 agreed in only 1/5 cases (See Table II).

Scale reliability

Rasch analysis also examines how well the TOES separates supportive from nonsupportive environments. In creating items, we

Table II

	Experts Results				
	Expert 1	Expert 2	Child	Rasch Measure	Error
Most	+	+	16	3.93	1.86
Supportive	+	+	10	3.84	1.85
Environments	+	+	05	3.83	1.03
	+	+	07	2.84	0.62
	+	+	28	2.82	0.75
Least	-	-	21	0.29	0.34
Supportive	-	-	27	0.21	0.29
Environments	+	-	32	-0.21	0.34
	-	+	15	-1.09	0.41
	+	-	35	-1.67	0.55

+ Experts Agree with Rasch

-Experts Disagree with Rasch

wanted to define a discernible line of increasing intensity (Wright & Masters, 1982). The items must spread out to define distinct levels along the variable of how supportive the environment is for play. The separation value for the subjects is 1.7, indicating that the TOES failed to separate into two distinct environments.

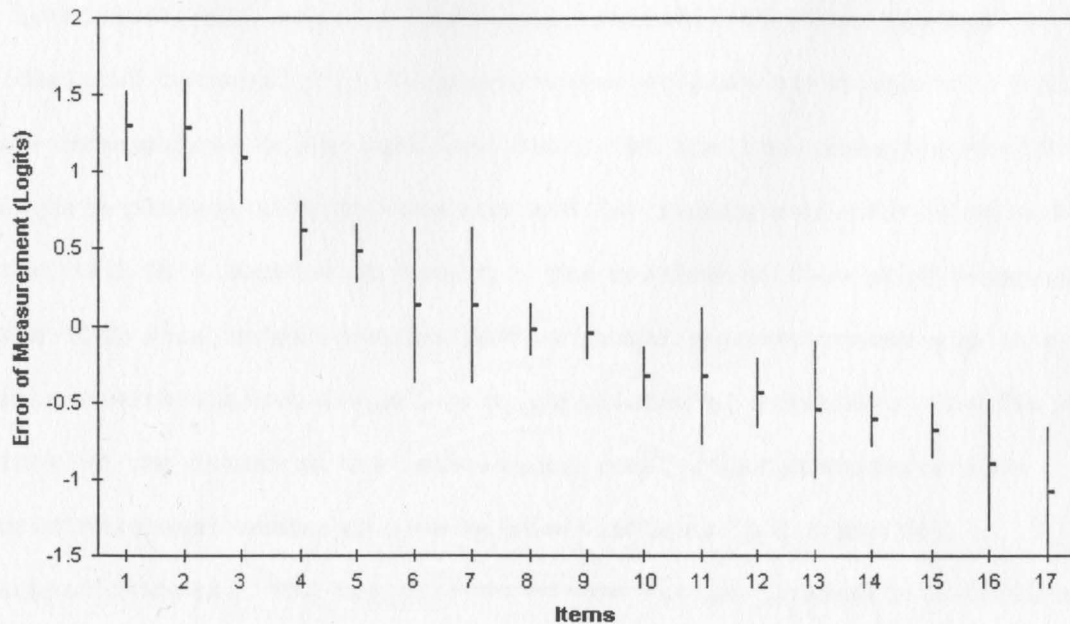
Similarly, the sensitivity for the 17 items was examined by the separation values. As with the environments, the separation value was low (1.94) indicating that there was not a discernible line of increasing difficulty of the items (Wright & Masters, 1982) (See Figure 1).

Error of measurement

To further investigate reliability of the TOES, the model errors for items were examined. The desired model error is .25 logits or less. The model error for 9 of 17 items exceeded the desired value. Low model error helps to create separation between items.

Figure I

Error of Measurement of Items



Item #	Item
1	<u>Space is physically safe</u>
2	<u>Consistent boundaries/rules caregivers</u>
3	<u>Reasonable boundaries/rules caregivers</u>
4	<u>Amount and configuration of space</u>
5	<u>Natural/fabricated objects</u>
6	<u>Reads cues adult playmate</u>
7	<u>Gives cues adult playmate</u>
8	<u>Sensory environment adequate</u>
9	<u>Space is accessible</u>
10	<u>Gives cues peer playmate</u>
11	<u>Reads cues younger playmate</u>
12	<u>Caregiver promotes activities</u>
13	<u>Participates as equal adult playmate</u>
14	<u>Reads cues peer playmate</u>
15	<u>Participates as equals peer playmate</u>
16	<u>Participates as equals younger playmate</u>
17	<u>Gives cues younger playmate</u>

DISCUSSION

Scale Validity

The purpose of this investigation was to examine preliminary construct validity and inter-rater reliability of an assessment tool designed to measure the supportiveness of play environments. With any assessment tool it is important that, (a) the tool measures what the authors profess that it measures and (b) raters can administer and score the tool in a consistent manner. The results of this study suggest that the TOES does indeed measure environmental supportiveness and that raters with minimal training can administer it reliably. The fit of 100% of the items to the measurement model offered evidence of a unidimensional scale that we believe reflects environmental supportiveness. The fit of 100% of the raters attests to interrater reliability. In contrast with items and raters, the scores of 4 (11%) of the subjects (environments) failed to fit the measurement model. The four subjects were all typically developing children. One of those subjects scores was "too perfect" and thus of less concern than the 8% of Subjects whose scores were erratic. While 95% fit to the model is desired, 92% (excluding the too perfect subject) is acceptable for a pilot study.

The three subjects (8%) who failed to fit the model due to erratic scores had unexpectedly low scores on easy items. The items that these subjects scored low on were #16 "Safety" and #14 "Amount and Configuration of the Play Space". Although items #16 and #14 fit the model, these two items not only gave these subjects difficulty, they accounted for almost half (46%) of the unexpected responses.

Item # 16 "Space is Physically Safe" was the easiest item but it was unexpectedly difficult for 6 children. This item is defined in the manual as the "Space" being physically safe; no objects/surfaces pose a threat to player's safety. Raters may differ in their interpretation of potential harm and whether or not it affects the child's play. Raters' preconceived opinions as to the safety of a given environment may be neutralized by more comprehensive training and direction. Further clarity and training is needed as to whether the child's play is affected by potential harm and the extent to which it affects the play. This item may also need to specify that the environment is a good match for the child's ability and the activity (Michelman, 1974).

The second item, #14 "The amount and configuration of space available" received unexpectedly low scores for 6 children. Further all raters gave at least one unexpected rating on this item. Additional clarity and training on whether the configuration of space is affecting play and to what degree it may be beneficial to decrease unexpected responses on this item is indicated.

Another factor that may have contributed to the difficulty of scoring this item is the way in which the environment is assessed. Play typically is assessed by direct naturalistic observations of play sessions (Widerstrom, Mowder, & Sandall, 1991). The videotapes utilized for this study were originally used for research into children's playfulness; the environment was not the primary focus. Thus the videotapes limited the full range of observation and raters' ability to develop a feel for the total environment. There also may be other factors of the environment that are not being accurately assessed or accounted for due to the limiting view of the camera.

In addition to the aforementioned items, two of the subjects who failed to fit the model also had low scores for caregiver items that typically received higher scores. Raters gave these items low scores because although the caregivers were present only briefly, their lack of involvement seemed to have a clear affect on the play.

The TOES showed further evidence of validity through the descriptive analysis of the experts' opinions. The experts agreed and identified the most supportive environments as being the same as those identified by the Rasch analysis. There were discrepancies with the environments identified by Rasch as being the least supportive. Three of the environments identified by Rasch as being unsupportive were also identified by at least one of the experts as being unsupportive.

Examining the raw scores from the TOES and the ratings from the experts there is a higher agreement (80%). The experts identified (8/10) of the unsupportive environments (identified by Rasch analysis) as being less supportive than the five most highly supportive cases, rating only 3/10 as actually being unsupportive. The raw scores from the TOES also indicate these environments were less supportive. One reason for the discrepancy between the raw score and the Rasch score is that the separation between supportive and unsupportive environments is low. Of the total number of scores given only 17% (129/764) of the scores given were unsupportive. In other words the number of subjects receiving an unsupportive score on any one item was low. The number of scores given as unsupportive may be in part due to the limited variability within the sample.

The experts were asked to identify specific aspects of the environment that either supported or detracted from the children's play.

These aspects provided further support for the comprehensiveness of the TOES items. The aspects identified by the experts closely corresponded to the items on the TOES. Further, TOES raters gave high scores on items reflecting environmental aspects the experts listed as supportive and low scores on items reflecting environmental aspects the experts listed as detracting from play.

One additional piece of support for the validity of the TOES is that the relative difficulty makes sense. The easiest items are that children must feel safe and have consistent rules and reasonable rules (which provide some boundaries) in order to play. The hardest items reflect elements of the human environment, giving and reading cues and playing as equals. Cue reading is an abstract concept: playing as equals requires negotiation which, in turn, is dependent on giving and reading cues.

Even within the more difficult items reflecting the human environment, the order makes sense. The easier items reflect behaviors of adult and peer playmates who should be more adept at reading and giving cues than younger playmates. Younger playmates giving cues and being equal players were the most difficult items. Younger playmates are not usually expected to play at the same level as the "player" and if they are quite young, still may be experimenting and learning how to give out good cues.

Conclusions and Future Implications

The results show the TOES has the potential to be a valid and reliable assessment. The items show evidence of both content and construct validity. As with all assessments, more research is needed to examine validity. There are several advantages to using the TOES.

The TOES provides a significant amount of good information about the environment. The TOES gives a relatively more complete picture of environmental features and how they are affecting the player than other existing assessments. The TOES highlights caregivers and playmates of all ages. The TOES also considers objects and the physical environment.

Each child is different and the way in which the environment supports his or her play is different. In other words, an environment that is thought to be very supportive may not be supportive for every child. The TOES assesses not just whether an environment should be supportive but whether or not it is supportive for each child.

Another advantage of the TOES is that it is easy to use and does not require much training or equipment. The TOES can be used in a variety of environments. This study included indoor and outdoor settings at schools, home, and on the playground.

The most problematic area of the TOES is the fact in this study, the items did not separate into distinct levels. Further research with children playing in a greater range of environments will provide a better picture of the separation of items, and thus reliability of the instrument.

APPENDICES

EXTENDED LITERATURE REVIEW

Introduction

Play is a phenomenon that begins very early in life. Through playful transactions with people and objects infants gain valuable knowledge about the world around them (Fenson & Schell, 1985). Play continues to be a means for learning throughout childhood. Kielhofner (1985) suggested that play is the primary occupation for children, although for many children play is not a natural phenomenon and they have difficulty playing. Similarly Burke, (1993, p.206) suggested "play is a state of mind that leads the player to act (playfulness) in a certain way when involved in various human and nonhuman interaction." Both these definitions consider the individual's playfulness and the importance the environment plays.

Since play is so important to the child, when a child cannot play there should be intervention, with improved playfulness as the goal. Occupational therapy looks at the interaction of individual's and their environments (Mims & Chandler, 1992). The ability to play and interact with peers and environment (part of play) is a desired outcome of occupational therapy (Michelm, 1971). Thus in order to provide appropriate intervention for children who have difficulty playing, assessments measuring the supportiveness of the environment must be identified. The intent of this paper is to provide a look at variables within the environment that affect play and playfulness. Environmental assessments currently being used are also addressed.

Environment

The environment must be taken into account in order to provide appropriate intervention with regard to play. "The individual's environment is critical to nurturing play" (Robinson, 1977 p.25). The environment either supports or detracts from a child's developing increasingly complex play interactions (Wortham, 1985). Within the environment, the variables affecting play can be divided into two dimensions, human and nonhuman.

The two dimensions, human and nonhuman, are often interrelated and that relationship is dynamic (Takata, 1973). That is, available objects, people, and situations either stimulate a child's interests and provide opportunity for action or limit the child's playfulness. Bishop and Chase (1971) suggested limiting factors are any "conditions surrounding play or the environment which impose restrictiveness, control, or a moral oughtness, which would rob play of the freedom, spontaneity, joy, and exploratory actions that presumably characterize playfulness" (p. 322).

Human Environment

The human environment includes all the individuals, especially playmates, parents, and other caregivers who influence a child's play and playfulness. The human factor can impose structure and influence play by determining how much time there is for play, where play is to take place, and the content of the play (Kielhofner & Miyake, 1981). Vandenberg (1981) found safety, rules, environmental manipulation, and a playful attitude by the people interacting with children to be important influences on how playful the child will be.

Adults

Adults can enhance the quality of play and playfulness of children in many ways. Three variables emerge from the literature on how adults can influence play interactions: (a) the number of restrictions an adult places on a child (Bishop & Chase, 1971; Siegel & Kohn, 1959), (b) the manner in which the adult plays with a child (Chance, 1979; Sutton-Smith, 1980), and (c) the responsiveness of an adult to the individual needs and cues of each child during the play interactions (Chance 1979; Michelman, 1974). Each of these areas will be explored more in depth.

Restrictiveness. The literature on restrictiveness suggests fewer restrictions promote more playful behaviors. Siegel & Kohn (1959) found the presence of a familiar encouraging adult (who is less restrictive) tended to promote increased self-expression. A nonpermissive adult restrained and limited behavior. Similarly, Chance (1979) suggested adults should create an atmosphere of freedom--freedom to move about, to explore, to make mistakes, and to perform imperfectly.

Prescott, Jones, and Kritchevsky (1972a) also attained similar results regarding teacher manner. Teachers who were rated as highly encouraging had high warmth (approachability and accessibility by children) and a child-centered role concept. Teachers who were restrictive had low warmth and an adult-centered role concept. Prescott, Jones, and Kritchevsky also found less structured activities (e.g., free choice and free play) were associated with more interested and involved behaviors by young children than structured, supervised play.

Bishop and Chase (1971) correlated mothers' conceptual development of abstractness, their attitudes toward play, and the conditions of the

home play environment with potential creativity in their children. Bishop and Chase found mothers who were abstract and whose attitudes toward play suggested flexibility, exploration, and children's autonomy appeared to enhance their children's playfulness.

Similarly Rubenstein and Howes (1976) found more positive affective exchanges occurred when fewer restrictions were placed on the infants. Rubenstein and Howes noted that highly restrictive adults engaged in less social play involving mutual delight with their infants and had higher frequencies of reprimanding (e.g., irritated or angry scolding), giving directions/orders, prohibitions, and suggestions about what the infant should do.

Playing with children. Play also can be affected by the manner in which an adult plays with a child (Frost & Klein, 1979; Sutton-Smith, 1980). By entering the play situation on the child's terms and being playful themselves, caregivers can encourage more playful behaviors (Knox, in press). An adult can facilitate a child's play by taking on the coach or spectator roles (e.g., giving suggestions and cheering) in addition to the coplayer role (Frost & Klein; Sutton-Smith). In a facilitative role, adults can assist children to elaborate play and expand their use of language through play interactions.

While there seems to be agreement that facilitative, rather than directive adults are needed in children's play environments (Frost & Klein, 1979), there is no consensus about the form facilitation should take. For example, Chance (1979) focused on facilitating play and playfulness as a coplayer rather than from the outside, suggesting adults need to actively participate and be good play models. Smilansky (cited in Neumann, 1971) disagreed, suggesting that adult involvement

limits a child's freedom and reduces permissiveness within the environment. However, Smilansky indicated that some children may need more intervention from adults to be made aware of play possibilities in a situation. Bolig, Fernie, and Klein (1986) suggested that when children, as opposed to adults, control the content and outcome of play, greater mastery may be achieved.

When adults do participate in play, they often take on different styles. For example, mothers and fathers play differently with their children and provide different types of social stimulation. Mothers tend to be more verbal (Lamb, 1977), object focused, supportive, quiet, and didactic (Ross & Taylor, 1989) whereas fathers are more physical in their playful interactions with infants (Parke & Tinsley, 1981).

Ross and Taylor (1989) also studied parental styles in relation to different types of play environments. They observed 3-year-old boys playing with each parent in two playrooms--one conducive to maternal style of play and one to paternal style of play. They found parents adapted their play style to match the environment. Perhaps because boys usually prefer physical play, Ross and Taylor also found boys reacted more positively to both parents when their play style was more physical and active.

Responsivity. Increased responsivity of the adult has been shown to elicit more interest, involvement, and exploration in children (Michelman, 1974; Prescott, Jones & Kritchevsky 1972a) and thus to encourage playfulness. There is a variety of terminology to describe the concept of responsivity; Chance (1979) provided a very encompassing definition: responsiveness includes verbal, nonverbal, and tactile cues in response to behaviors of a child.

Several studies (Michelman, 1974; Prescott, Jones & Kritchevsky 1972a) provide support for adults being responsive in order to create an environment conducive to play. Michelman found meaningful contacts with accepting, responsive adults stimulated action, interaction, and initiative. Similarly, Singer (1973) suggested the responsive, "nonsmothering" mother is more likely than the "smothering" mother to have a child who explores and plays independently. Disagreeing with the decreased restrictiveness but agreeing with responsiveness in increasing play and playfulness, van der Poel, de Bruyn & Rost (1991) found more playful 9-to 12-year-olds had parents who were firm in limit setting, demanding of maturity in their children, and respectful of their children's points of view.

In terms of responsivity in the classroom, teachers perceived as sensitive or friendly also used significantly more encouragement and provided fewer restrictions. Prescott, Jones & Kritchevsky (1972a) found teachers rated as sensitive and friendly by investigators were associated with high quality space and interested and involved children. Low quality space and neutral and insensitive teachers were associated with children who were less involved and less interested.

Adults who are responsive to childrens needs create attachments that help them with exploratory behavior and thus encourage their play and playfulness. Several studies have shown the effects of attachment. Infants who have feelings of comfort, security, and increased attachment (produced, in part, by responsive and sensitive parenting) are more likely to explore the physical environment when in the presence of their mothers (Bakeman & Brown, 1980; Blehar, Lieberman, & Ainsworth, 1977).

Lieberman (1977) found securely-attached children are more sociable than their less secure counterparts.

Summary. Caregivers can influence children's play and playfulness by creating environments that give children permission to play; one that suggests "play is OK. It's an acceptable thing to do, a good thing to do" (Chance, 1979, p. 43). Caregivers can do this through their interactions with children including playing with them, being responsive to children's play, and allowing freedom from a highly restrictive environment.

Peers

Aguilar (1985) suggested the immediate family is more influential to a child than to a young adult; as one gets older, peer influence increases. However, one study (Rubenstein and Howes, 1979) suggested positive peer influence can start at a very young age. The data suggest that peers influence play and playfulness. When peers are involved, the variables that affect quality of play are (a) familiarity (Neumann 1971; Rubenstein & Howes, 1976; Scholtz & Ellis 1975), and (b) gender and age (Rabinowitz, Moely, Finkel, and McClinton, 1975 as cited in Rubin, Fein, & Vandenberg, 1983).

Play Categories. Two categories of play behaviors are used in studies of peer play. Both play systems suggest higher levels of play require peer involvement. One describes level of social play, the other cognitive levels of play.

Parten (1932) described six sequential categories of social play as (a) unoccupied behavior, (b) solitary play, (c) onlooker behavior, (d) parallel play, (e) associative play, and (f) cooperative play. As

children pass through each stage, sequentially higher forms of play emerge.

Another system of play categories often used in studies of peer influence is one by Smilansky (1968) utilizing cognitive modes of play, patterned after Piaget's work. Smilansky identified four levels of play which she labeled as follows: (a) functional (simple repetitive muscle movements with or without objects), (b) constructive (manipulating objects to build something), (c) dramatic (pretend activities), and (d) games with rules (acceptance of prearranged rules and the adjustment of these rules).

While most studies confirm that when peers are involved, play is at a higher level, there is some disagreement about solitary play. In fact, the relative level of certain kinds of solitary play are really quite mature (Sutton-Smith, 1985). For instance, Johnson & Ershler (1991 as cited in Roopnarine et al., 1992) suggested that solitary play may be more mature than parallel play. Some children who play alone may remove themselves from others to explore an object further or engage in quiet transformation.

Neumann (1971) suggested solitary and group play provide different aspects of playfulness. As the number of players increases, individual internal control of the play decreases and disperses. Spontaneity also diminishes because there is increasing external constraint on the child. Individual play enables self-pacing, self-selection, self-direction, and self-expression. However, group play fosters social development.

Howes and Matheson (1992) used the Howes Peer Play Scale to capture social play with peers. The scale assumes that children can engage in more structurally complex play interactions as social competence is

gained. The most complex form of play included interactions based on role reversals or exchanges (e.g., tag, in which the player becomes both the runner and chaser) Lower levels of social play included parallel or simple imitative or turn taking exchanges (Howes & Matheson, 1992).

Familiarity. Although there is some controversy in how peers affect the play situation, there is consensus that familiar peers enhance the play situation. Studies focusing on how peers influence play agree that play with a familiar peer generally involves higher level play interactions than solitary play or play with an unfamiliar peer (Doyle, Connolly, & Rivest, 1980; Rubenstein & Howes, 1976). Howes, Droege, & Matheson (1992) found long-term friends were more likely to use communicative behaviors that extended and clarified play. These behaviors included agreeing with the suggestion of the partner, making a comment that extended the pretend of the partner or maintained the joint play.

Rubenstein and Howes (1976) found that, even with toddlers, there was a higher level of toy play between familiar peers than between a toddler and an adult, or the toddler by himself. Toddlers played with, imitated more, and offered objects to peers more often than to their mothers. Toddlers also were more likely to exploit the unique properties of objects and use objects in a nonliteral fashion when with a familiar playmate than when alone.

Scholtz and Ellis (1975) concluded that peers were more complex and interesting than objects. As children became more familiar with the setting, their attention shifted to peers who were more unpredictable. In a study using repeated exposure, Scholtz and Ellis found that 4-and

5- year-olds' interest went down after becoming familiar with objects and play settings but interest levels in peers did not decrease.

Dramatic and fantasy play have been found to be more complex, longer, and richer between friends than non-friends (Doyle, Connolly, & Rivest, 1980; Werebe & Baudonniere, 1991). Richer play consisted of the following behavioral traits: more role-taking; substitution of objects or transformations of their functions; introduction of absent objects (e.g., food, animals, or people) or assignment of specific features to absent objects; inanimate objects treated as animate; and simulation of natural phenomena (e.g., rain or sun) or fear.

Gender and age of playmate. Another type of peer influence is the gender of the play partner. Rabinowitz, Moely, Finkel, and McClinton (1975 as cited in Rubin, Fein, & Vandenberg, 1983) found that preschoolers were more likely to explore novel objects with same-gender playmates than with opposite-gender playmates. Reasons for this can be attributed to cultural influences and a social need to be with same-gender peers (Lloyd, 1989 & Thorne, 1993 as cited in Tyler unpublished).

Roopnarine et al. (1992), using Smilansky's and Parten's play categories in a nested system, looked at mixed age and same age classrooms with regard to gender and found only in the same age classrooms was there a significant gender preference. Roopnarine et al. also found inconclusive evidence to suggest children in mixed age classrooms engaged in lower forms of play. Their conclusion was a lower form served as a "meeting ground" for all the children involved in the play.

Other studies contradict these findings in that younger children in mixed-age group settings can engage in more interactive and complex play

with older peers (Howes & Farver, 1988; Mounts & Roopnarine, 1987; Whaley & Kantor, 1992). Vygotsky (1992 as cited in Whaley & Kantor) supported this notion that development is achieved through interactions with more competent peers and adults.

Summary. Research suggests playing with familiar peers can enhance play and playfulness in many ways. Play can be extended and the complexity and richness of object, dramatic, and fantasy play increases. The data on playmates age and gender are not so clear with regard to their influence on play and playfulness. Clearly, more research must be done in this area.

Nonhuman Environment

The second dimension is the nonhuman environment, which has a variety of aspects including toys, equipment one uses during play and the physical setting in which play occurs.

Objects are not neutral to the child but have an immediate psychological effect on its behavior: many things attract the child to eating, to climbing, to grasping, to manipulating, to sucking, to raging at them, etc. These imperative environmental facts--we shall call them valences--determine the direction of behavior. (Lewin, 1931, p. 6).

Toys

Toys have been recognized as having importance since the 18th century (Brewer, 1979; & Mergen, 1982 as cited in Chase, 1992), although their form and function have been met with varying opinions. Dewey argued children's own interest should govern play; if children want to play with a broom give them a real broom and let them clean (Weber, 1979). Froebel and Montessori recognized the importance of toys for learning concepts and created their own learning materials (Weber, 1979). On the other hand, Kooij and Vrijhof (1981) identified toys as

important to either initiate play or be a stimulating factor during play. Chase, Williams, & Fisher (1974) demonstrated that the physical features of toys powerfully influence play duration, as well as the experience an infant can have during a play episode.

Exploration of toys. A number of researchers (Hutt, 1966 as cited in Chase, 1992) suggested exploration of an object must be done prior to the actual playing with the object. "Earliest contacts with new objects are often slow, deliberate, and serious. Once an object becomes more familiar, actions become quicker, more confident, and more lighthearted. As mastery is achieved, playfulness and a willingness to share objects with others emerges" (Chase, 1992, pg. 5). Based on the research what makes a toy interesting enough for a child to explore and then play with is multi-faceted. The attributes, the type, the number, and familiarity of toys all can have an influence on the child's willingness to play.

Variety of uses a toy has. Toys can be used in a variety of ways or in a limited way. Research on toys that have multiple uses has focused on the duration of play time, and how the toy influences imagination or pretend play. Van Alstyne (1932) found materials that had multiple uses (e.g., blocks, clay, dolls) had more appeal than materials that had only one or a few uses (e.g., pyramid of rings, pull toys). Neumann (1971) suggested that the greater the range in diversity and complexity of objects, the greater the potential to encourage a wide range of play behavior. All of these studies suggest that play objects with many uses support play and playfulness.

Chance (1979) suggested that less realistic, less structured toys lead to more imaginative play as they require inventiveness. Fein (cited in Chance, 1979) found 5-year-olds who were highly imaginative

and adept at pretend play preferred toys that could be used in multiple ways. Less imaginative 5-year-olds preferred toys that had fewer uses.

There is some evidence of differences in the kinds of playthings children prefer due to gender and age. Girls prefer to play with unrealistic toys while boys prefer more realistic toys (Fein cited in Chance 1979). As children get older, they benefit more from less realistic toys (Fein). Younger children find more realistic toys easier to use (Fein). These findings suggest younger children and boys are less imaginative. However, Cole & LaVoie (1985) did not support a difference between gender or age with regards to imagination.

Other researchers agree that imagination increases as the uses of toys increases. Michelman (1974) found that raw materials or indestructible toys (e.g., blocks and household objects) lent themselves to imaginative play in children more than did miniature replicas of the adult world designed by commercial manufacturers. Neumann (1971) also suggested that realistic materials limited the range of possible behavior. Pulaski (1970, as cited in Frost & Klein, 1979) showed less structured toys elicited a greater variety of fantasy themes than highly structured toys.

Duration of time has also shown to increase with toys that can be used in a variety of ways. Raw materials (e.g., water, sand, clay, and paints) that lend themselves to being used in many different ways engage a child's senses and activate his interests (Michelman, 1974).

Type of toy. Many toys pull for certain behaviors such as social interaction, gross motor, fine motor, active play, or quiet play. Quilitch & Risley (1973) evaluated 150 children's toys and classified them as either "isolate" (primarily played with by one child at a time)

or "social" (played with by two to four children at a time) toys. They then examined and found the effect of the type of toy on social and cooperative play.

Parten (1971) also found more social play with certain toys and materials. House and dolls were highly associated with cooperative play. Paper, clay, swings, beads, and paints were associated with parallel pursuit. Block play was associated with every type of social intercourse. Tizard, Philips, & Plewis, (1976) found the use of art construction materials was accompanied by non-social, constructive play. Vandenberg (1981) found children were more likely to play in a more social way in an environment that contained toys and equipment that promoted gross motor play.

The amount of activity a toy promotes also can influence play behavior. Van Alstyne (1932), and Lehman and Witty (1976) found boys were more interested in materials that make for active play (e.g., blocks, wagon, small cars) whereas girls preferred materials associated with less active play (e.g., clay, crayons, scissors, dolls).

Familiarity of toys. Although research is scarce in this area, probably because it overlaps with exploration, play can be affected by the familiarity of the toys. Scholtz & Ellis (1975) found preference for interaction with play objects decreased as a result of repeated exposure. The rate of decrease was influenced by the complexity of the physical setting. There is some research to suggest a preference for novelty (Hebb, 1949; Berlyne, 1950) while others (Zajonc, 1968 as cited in Ellis & Scholtz,) suggest preference is a function of familiarity.

Number of toys. Although not well supported, social play also has been found to be affected by the number of toys. Busse, Ree, & Gutride

(1970) found play behavior of boys was more cooperative in preschool classrooms enriched with toys than was girls' play. However, no differences were found between enriched and control classrooms with regard to aggression during play. The number of materials also can influence interest and participation in play. Doke & Risley (1972) found participation levels of preschoolers dropped as supply of materials dropped and when the number of activities was limited.

Summary. Toys can affect playful behaviors in a variety of ways. Toys that are not limited in the ways in which they can be used increase duration of play time and imagination, and are preferred over toys that have more specific and limited uses. The type of toys can promote different play behaviors and stimulate the development of social skills. There also is evidence that novel toys are preferred by children. More research needs to be done with how the number of toys affects play behaviors before conclusions can be made.

Outdoor Play Equipment

Just as toys are important to aspects of play and playfulness, so are the structures on which children play. Playgrounds that offer a variety of play equipment with unlimited possibilities provide for optimal play opportunities. Aguilar (1985) suggested that playground equipment which remains static and cannot be manipulated by the user (e.g., slides, swings, bars, etc.) can be an environmental barrier detracting from play and playfulness.

Bruya (1985) found as the complexity of the structure increased there was an increased and more varied use of the playground. Moore (1985) found there was more cognitive, fantasy, constructive, and cooperative play on adventure playgrounds which allows children to

create their own environment and equipment out of old tires, discarded lumber, packing crates, etc. Susa & Benedict (1994) found more pretend play occurred on the contemporary playground (continuous structure that is aesthetically pleasing and often includes undefined enclosed play areas) than on the traditional sites (slides, swings, seesaws, etc.). Susa & Benedict did not include adventure playgrounds in their study.

Studies show that preferred playgrounds had moveable equipment or features, and action equipment over static or single function play items (Frost & Campbell, 1985; Naylor, 1985). Campbell & Frost (1985) found an increase of play behaviors on creative playgrounds that incorporate a wider range of play opportunities for the child. Frost & Strickland (1978) also found children preferred more complex equipment as well as action-oriented equipment.

Contrary to other researchers, Hart and Sheehan (1986) in comparing traditional (less structured, moveable equipment, and more space) and contemporary (stationary equipment, sculptured with novel forms & textures, and less space) playgrounds found only slight differences in passive physical activity on the contemporary playground. Hart and Sheehan found no significant differences in verbal interaction, cognitive play or social play behaviors.

Summary. Studies of playgrounds show that equipment that can be used in a variety of ways to increase playful behaviors including: duration of play time, cooperative or social play, and fantasy or pretend play. "Equipment should adjust to more than one purpose, more than one child, and more than one developmental level. Encourage graduated use for developing mind and bodies" (Michelman, 1974, p.194).

Setting

The setting also influences play and playfulness. A number of factors influence play within a setting including (a) the amount of space per child, (b) the quality and novelty of the space, and (c) the physical setting of the space.

Amount of play space. Play spaces that are expansive afford the child many more opportunities than space that is limited or confining (Takata, 1974). Harper & Sanders (1977) found boys use more space to play in than girls. Loo (1979) found there was significantly more activity toy-play in low density (4.0 m/per child) than high density (2.0 m/per child) conditions. Activity toy-play consisted of more movement around the room, more walking, more toy changes, and less onlooking.

A comparison of very high density (1.2 m per child) nursery schools in the Netherlands with moderate (2.3 m) and very low density (10.5 m) schools in the United States did not support the idea that increased density leads to increasingly negative effects. More positive interactions were found with the Dutch children (Fagot, p. 142 as cited in Gump, 1978). The Dutch schools were a more managed play, having no free choice of play spaces and materials. Whereas the studies of Loo (1979) and Prescott, Jones, and Kritchevskys' (1972a) focused on more free time play.

Quality and novelty of the play space. Prescott, Jones, and Kritchevsky (1972a) found high quality space was associated with more interested and involved behavior by young children. The novelty of environments also affects play by offering different experiences (Robinson, 1977). Novelty brings spontaneity, tapping a child's inner

drive (Burke, 1993). Novelty and a variety of experiences are necessary to incite curiosity and exploration: however, too much variety may overwhelm or frighten a child (Knox, 1973).

Physical setting of the play space. Sutton-Smith (1985) found space to have a significant effect on play behaviors of children both indoors and outdoors. The effects include changes in interaction level, play complexity, and child interest and involvement (Prescott, Jones, & Kritchevsky, 1972a, Rubin, 1977, and Scholtz & Ellis, 1975). Indoor and outdoor environments that are adjusted to the child's physical and mental powers will assure a good match between his abilities, interests, and environmental expectations thus making the child feel safe (Michelman, 1974).

Henniger (1985) compared indoor and outdoor settings. Henniger found there was more constructive play indoors, equal amounts of social play indoors and outdoors, and the incidence of indoor dramatic play was significantly larger for both girls and younger children. Boys and older children engaged in dramatic play more often outdoors which is supported by the findings of Sanders and Harper (1976). Harper and Sanders (1977) also looked at the amount of time spent indoors and outdoors. They found boys and older children spend the most time outdoors.

Moore (1985) and Naylor (1985) cited several studies showing children preferred and made greater use, of everyday outdoor environments (front yards, corner lots, back alleys) than designated playgrounds. Naylor (1985) took this idea further and found 6-to 9-year-old boys used more unowned areas than girls. Girls spent more time at designated areas such as playgrounds. Naylor also found mixed age

and mixed gender groups engaged in more social types of play in informal neighborhood play settings. Reviewing the literature, Sutton-Smith (1985) found children play more maturely in home settings and less maturely in public settings.

Summary. The evidence supports that the different settings and structures on which children play can enhance the qualities of play and playfulness. The amount of space contributes directly to a child having more or less opportunities to play. Both the quality and novelty of the play area offers a variety of play possibilities. The physical setting of the play space, both indoors and outdoors, effect play behavior. Studies show that outdoor space provides more space and freedom.

Assessments of Play Environments

Play is typically assessed by direct naturalistic observations of play sessions. Important variables include types of toys, access to toys, space, and social partners (e.g. parent(s), caregivers, or peers) (Widerstrom, Mowder, & Sandall, 1991).

There are also instruments used to assess the environment directly. Takata's "The Play History" uses an interview format to elicit information on the materials, actions, people, and settings that are part of the child's everyday world (Burke, 1993).

The Early Childhood Environment Rating Scale (Harms & Clifford, 1980) looks at the overall picture of the surroundings that have children and adults share in an early childhood setting. The environment as defined for this scale includes use of space, materials and experiences to enhance children's development, daily schedule and the supervision provided. The scale assesses 37 items which are

organized into 7 sections: (a) personal care routines of children, (b) furnishings and display, (c) language-reasoning experiences, (d) fine and gross motor activities, (e) creative activities, (f) social development, and (g) adults' needs. Within the activities and experiences, the scale looks for a variety of both structured and unstructured materials in good repair.

The Environmental Inventory (Prescott, Jones, & Kritchevsky, 1972b) is used to assess the arrangement and use of space. The inventory assesses a number of features of the environment, the degree of organization, the complexity, the ratio of play opportunities to number of children, and the variety of play equipment.

The Caldwell HOME Inventory (Caldwell, Huder, & Kaplan, 1966) assesses the quality of stimulation available to the child in the home. There are six subscales: (a) emotional and verbal responsivity of the mother; (b) avoidance of restriction and punishment; (c) organization of the environment; (d) provision of appropriate play materials; (e) maternal involvement with the child; and (f) opportunities for variety in daily stimulation.

Summary

The assessments currently being used look at a variety of features in the environment. None of the assessments look at the interaction of peers. They also cannot be used in any setting and focus on whether features exist in the environment no how the features interact with the child's play. The assessments do not look at whether or not the feature is actually supporting the child's play or detracting from it.

TEST OF ENVIRONMENTAL SUPPORTIVENESS -- DRAFT

CONTINUA OF ITEMS					Comments
	2 = strongly favors description on right 1 = slightly favors description on right 1 = slightly favors description on left -2 = strongly favors description on left NA = not applicable				
Caregivers interfere with player's activities and opportunities	-2 -1 1 2 NA	Caregivers promote player's activities and opportunities			
Caregivers change the rules	-2 -1 1 2 NA	Caregivers adhere to consistent boundaries/rules			
Caregivers enforce unreasonably strict boundaries or fail to set boundaries	-2 -1 1 2 NA	Caregivers adhere to reasonable boundaries/rules			
Peer playmate's response to player's cues interferes with transaction	-2 -1 1 2 NA	Peer playmate's response to player's cues supports transaction			
Peer playmates do not give clear cues or give cues that interfere with the transaction	-2 -1 1 2 NA	Peer playmates give clear cues that support the transaction			
Peer playmates are dominated by player or dominate players	-2 -1 1 2 NA	Peer playmates participate as equals with player			
Adult playmate's response to player's cues interferes with transaction	-2 -1 1 2 NA	Adult playmate's response to players cues supports transaction			

Adult playmates fail to give clear cues or give cues that interfere with transaction	-2	-1	1	2	NA	Adult playmates give clear cues that support the transaction	
Adult playmates are dominated by or dominate player	-2	-1	1	2	NA	Adult playmates participate as equals with player	
Younger playmate's response to player's cues interferes with transaction	-2	-1	1	2	NA	Younger playmate's response to player's cues supports transaction	
Younger playmates fail to give clear cues or give cues that interfere with transaction	-2	-1	1	2	NA	Younger playmates give clear cues that support the transaction	
Younger playmates are dominated by or dominate player	-2	-1	1	2	NA	Younger playmates participate as equals with player	
Natural/fabricated objects do not support activity of player	-2	-1	1	2	NA	Natural/fabricated objects support activity of player	
Amount and configuration of space does not support type of play	-2	-1	1	2	NA	Amount and configuration of space supports activity of player	
Sensory environment does not offer adequate invitation to play	-2	-1	1	2	NA	Sensory environment offers adequate invitation to play	
Space is not physically safe	-2	-1	1	2	NA	Space is physically safe	
Space is not accessible	-2	-1	1	2	NA	Space is accessible	

ENVIRONMENTAL INVENTORY

Name : _____

Tape: _____

Place: _____

-2	-1	1	2
Markedly Detracts	Slightly Detracts	Slightly Supportive	Markedly Supportive

Which aspects of the human and nonhuman environment were most important to your decision making above? Give just enough detail so we can understand exactly what you saw.

	PROMOTE	STIFLE
HUMAN		
NONHUMAN		

Item Measures

Model		Infit		Outfit			
Measure	S.E.	MnSq	Std	MnSq	Std	Nu	Item
1.29	0.23	1.7	2	1.4	1	16	safe
1.28	0.32	1.1	0	0.9	0	2	consist rules cg
1.09	0.31	1.1	0	0.8	0	3	reas rules cg
0.61	0.19	1.4	2	1.4	1	14	space
0.47	0.19	1.0	0	0.8	0	13	objects
0.13	0.51	0.4	-1	0.3	-1	7	reads cues ap
0.13	0.51	0.6	0	0.7	0	8	gives cues ap
-0.02	0.17	0.7	-2	0.7	-2	15	sens environ
-0.05	0.17	1.0	0	1.0	0	17	access
-0.33	0.19	0.7	-1	0.7	-1	5	give cues pp
-0.33	0.45	1.6	1	1.4	0	10	reads cues yp
-0.44	0.23	0.9	0	0.9	0	1	opportun cg
-0.55	0.45	0.4	-2	0.4	-1	9	equals ap
-0.61	0.18	0.8	-1	0.8	-1	4	reads cues pp
-0.68	0.18	1.2	0	1.1	0	6	equals pp
-0.90	0.43	1.5	1	1.4	0	12	equals yp
-1.08	0.42	0.5	-1	0.6	-1	11	give cues yp
Separation		1.94	Reliability		0.79		

Note. Std. = Standardized "t" statistic

TABLE II
SUBJECT MEASURE

Measure	Model S.E.	Infit MnSq	Std	Outfit MnSq	Std	Subj*	
(3.93	1.86)	Maximum				16	OUT 2PP
(3.84	1.85)	Maximum				10	OUT 2AP
4.05	1.02	1.0	0	0.9	0	31	OUT 1PP
3.83	1.03	0.8	0	0.5	0	05	OUT 2PP
3.65	1.04	0.7	0	0.4	0	30	IN 1YP
3.04	0.76	1.1	0	1.3	0	31	IN 1PP
2.84	0.62	0.6	0	0.5	-1	07	OUT 2PP
2.82	0.76	1.1	0	1.2	0	08	IN 1PP
2.82	0.75	0.8	0	0.6	0	28	IN 1AP
2.78	0.48	0.7	0	0.5	-1	06	OUT 0PM
2.73	0.76	0.6	0	0.4	0	05	IN 3PP
2.73	0.76	0.7	0	0.5	0	07	IN 2PP
2.73	0.76	0.6	0	0.4	0	02	OUT 2PP
2.53	0.56	0.8	0	0.7	0	17	IN 1PP 2YP
2.53	0.56	0.6	0	0.5	0	22	OUT 2PP
2.40	0.46	0.6	-1	0.7	0	12	IN 3PP
2.40	0.44	1.4	0	1.8	1	34	IN 1AP
2.35	0.63	0.7	0	0.7	0	35	IN 1AP
2.34	0.54	0.7	0	0.6	0	32	IN 0PM
2.32	0.50	0.5	-1	0.5	-1	36	IN 1AP
2.24	0.65	0.4	-1	0.4	-1	24	OUT 2PP
2.04	0.37	1.1	0	1.4	0	19	OUT 1PP
1.87	0.40	0.5	-1	0.5	-1	11	OUT 3PP
1.87	0.54	0.5	-1	0.7	0	25	OUT 3PP
1.78	0.36	0.3	-3	0.3	-2	29	IN 1PP
1.74	0.79	0.4	-1	0.4	-1	33	IN 2PP
1.72	0.51	0.4	-1	0.4	-1	10	IN 2AP
1.67	0.55	0.7	0	0.7	0	30	OUT 1YP
1.67	0.44	0.4	-2	0.4	-1	23	IN 3PP
1.60	0.38	1.2	0	1.2	0	01	IN 2PP 1YP
1.55	0.54	0.3	-1	0.4	-1	03	IN 2PP
1.55	0.54	1.0	0	0.9	0	03	OUT 2PP
1.55	0.54	2.6	2	3.8	3	05	OUT 3PP
1.50	0.28	1.0	0	0.9	0	01	OUT 2PP 1YP
1.43	0.37	0.7	-1	0.8	0	11	IN 3PP
1.43	0.37	0.8	0	0.7	0	20	IN 3OP
Measure	Model S.E.	Infit MnSq	Std	Outfit MnSq	Std	Subj*	

Note. Std. = Standardized "t" statistic

*Most supportive to least supportive environment

**Number is sujet #, next is setting, then playmates, AP is Adult Playmate, PP is Peer Playmate, OP is Older Playmate and YP is Younger Playmate

***Subjects who were sent to the experts are underlined

Subject Measures Cont.

Measure	Model S.E.	Infit MnSq	Infit Std	Outfit MnSq	Outfit Std	Subj*			
1.42	0.58	0.8	0	0.7	0	36	SCH	OP	
1.40	0.46	0.8	0	1.0	0	04	IN	1PP	
1.30	0.36	1.2	0	1.2	0	20	OUT	3OP	
1.29	0.29	1.1	0	1.0	0	19	IN	1OP	
1.27	0.52	1.3	0	1.3	0	33	OUT	2PP	
1.19	0.45	0.6	-1	0.6	-1	13	IN	3PP	
1.18	0.35	0.6	-1	0.6	-1	26	OUT	1PP	
1.12	0.38	0.5	-1	0.5	-1	25	IN	3PP	
1.10	0.76	0.3	-1	0.3	-1	12	OUT	3PP	
1.02	0.50	0.6	0	0.7	0	02	IN	2PP	
1.00	0.44	3.6	4	4.5	4	18	IN	2PP	
0.98	0.27	1.9	3	2.1	3	16	IN	1PP	1YP
0.87	0.49	1.8	1	2.0	1	08	OUT	1PP	
0.81	0.43	1.0	0	1.0	0	24	IN	2PP	
0.75	0.33	1.4	1	1.3	1	06	IN	0PM	
0.74	0.44	0.6	-1	0.6	-1	26	IN	1PP	
0.63	0.42	1.1	0	1.2	0	18	OUT	2PP	
0.60	0.41	1.0	0	1.0	0	14	IN	2PP	
0.41	0.29	1.1	0	1.1	0	29	OUT	1PP	
0.29	0.34	1.6	1	1.6	1	21	OUT	1YP	
0.21	0.29	0.7	-1	0.7	-1	27	IN	1AP	
0.14	0.51	0.6	-1	0.6	-1	09	OUT	1PP	
-0.09	0.34	1.4	1	1.4	1	15	IN	3OP	
-0.21	0.41	0.9	0	0.9	0	32	SCH	0PM	
-1.38	0.65	0.1	-2	0.1	-2	09	IN	1PP	
-1.67	0.55	1.6	1	1.4	0	35	SCH	3PP	
Separation 1.72 Reliability 0.75									

Note. Std. = Standardized "t" statistic

*Most supportive to least supportive environment

**Number is subject #, next is setting, then playmates, AP is Adult Playmate, PP is Peer Playmate, OP is Older Playmate and YP is Younger Playmate

***Subjects who were sent to the experts are underlined

Raters Measure							
	Model		Infit		Outfit		
	Measure	S.E.	MnSq	Std	MnSq	Std	
	0.14	0.08	1.0	0	1.0	0	1
	0.05	0.13	1.2	1	1.2	1	2
	-0.19	0.12	0.7	-3	0.7	-2	3
Separation 0.74 Reliability 0.35							

Note. Std. = Standardized "t" statistic

*Most lenient rater to severe rater

Misfitting Subjects										
Model		Infit		Outfit						
Measure	S.E.	MnSq	Std	MnSq	Std	Subj*				
1.78	0.36	0.3	-3	0.3	-2	29	IN	1PP		
1.55	0.54	2.6	2	3.8	3	05	OUT	3PP		
1.00	0.44	3.6	4	4.5	4	18	IN	2PP		
0.98	0.27	1.9	3	2.1	3	16	IN	1PP	1YP	

Note. Std. = Standardized "t" statistic

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