Because play is extremely sensitive to environmental conditions, extended hospitalization may have adverse effects on normal play development in young children. This study compared the playfulness, as well as the level of play development, of three 2-year-old children who had been hospitalized most of their lives for tracheostomies, and three 2-year-olds living at home. Data on the children's play were gathered by videotaping in two standardized play settings and one free play setting. Statistically significant differences in the developmental level of play and in playfulness (i.e., the degree of liveliness and joy exhibited) were found between the two groups in all three settings, and the play age of all six children varied by setting. Quantitative data analysis was supported by qualitative findings.

Although the differences between the groups cannot be conclusively attributed to hospitalization alone, certain features of the hospital environment appear to have hampered the development of play.

Occupational therapy has traditionally been concerned with the play of handicapped children because of the recognized importance of play for normal development, and because of the potential for disability to disrupt normal play (1, 2). In addition, the child's environment may influence play adversely or positively (3). Although the question of handicap and play dysfunction has received some attention in the literature (4-7), consideration of the

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possible adverse effects of environments on such children’s play has tended to be both broad and conjectural. One important question is whether the hospital setting negatively affects the development of play in children who must be hospitalized for significant periods of time. This study compared the play of children “living” in hospitals and children living at home.

Review of the Literature

Development involves a process of learning to behave effectively in a variety of environments or contexts. For children, much of this learning is accomplished through play. Motivated by a need to be effective and to be an agent of change in one’s surroundings (8), the playing child gains a sense of kinesthetic awareness, learns rules of social interaction (2, 9), and develops the behavioral flexibility that is essential to the survival of both the individual and the human species (10-12). Play enables the child to increase the general store of knowledge that can be drawn upon in future circumstances (13), thus increasing the information that will be available for problem solving in new situations (10).

Since play is important for learning and adaptation, a disruption of normal play or of the opportunities for normal play might pose a threat to the child’s future ability to use the body effectively, interact with others competently, and problem solve appropriately. Because both human and nonhuman factors in a child’s environment can enhance or inhibit play, the hospital, as a special environment, has the potential to either interfere with or promote the normal development of play. It is therefore relevant to consider the ways in which the environment influences play behavior.

The Play Environment: Legitimacy and Interest. Certain settings contain the potential to facilitate play and learning (14). These settings are characterized by various properties. The most basic is that the setting is legitimately recognized as being a place in which to play: “Space becomes effective play space only when it is ceded to children for this purpose.” (15, p 10) Designation of play time and play space, however, will not elicit play unless the setting is optimally arousing for each child. Arousal refers to the degree of interest and excitement evoked in the child by the environment. Arousal results from a comparison of the child’s past experiences with what is presently being perceived (16, 17). Typically, arousal takes the form of novelty, surprise, incongruity, ambiguity, or complexity (16-17). When a setting does not evoke a sufficient level of arousal, the child will be bored; conversely, too much arousal leads to anxiety.

Arousal in the play setting may come from the physical complexity of the setting (e.g., brightly colored walls, objects that can be entered or climbed upon, varying textures, etc.), toys, the presence of other children, and the mutability of the materials in the setting. Such qualities interact with one another. For example, as children become more familiar with and thus less interested in the physical characteristics of a setting, they may become more interested in their peers whose changing behaviors continue to be the source of novelty or surprise (19).

Younger children are more likely to be overaroused by a strange environment than older children are (20). Similarly, children who have been reared with few opportunities for free exploration with a variety of objects, or who have been chronically deprived, may be too aroused to play when they are suddenly presented with novel stimuli (15, 19).

The Modulating Attributes of Objects. Although the toys and objects within a setting contribute to its overall novelty and complexity (19), they can also communicate expectations for social, cooperative play or for isolated, solitary play (21-23). In addition, different toys have potential to stimulate the senses, stretch the mind, encourage creative expression, and strengthen muscles. The number of available objects and alternatives for how to play with toys will affect play as well (24).

The Presence of Others in the Play Setting. Another important property of the play setting is the availability and attitudes of significant others. Although children often play with objects independently of adults, some materials require adult intervention in order to become meaningful play objects (13). In particular, representative and imaginative play largely involves the participation of an adult (15, 26). Although this adult is most often the mother, other caregivers can have a positive influence on play through their emotional and verbal responsiveness, encouragement (27), and organization and selection of play space and materials (28). Peers and siblings can also affect play in this way. At times, the absence of the mother, or the presence of a stranger, can have a dampening effect on play (20, 29). Children who are less accustomed to playing with their mothers may learn to compensate for a lack of parental responsiveness by seeking feedback from the inanimate environment (30).

Variety of Play Settings. As the
child explores and becomes familiar with the opportunities and resources in one setting, she or he must have the chance to encounter new materials and try out new behaviors in other settings. Behavioral flexibility, a willingness to experiment with new attitudes and actions, and an eagerness to explore the world are ultimately affected by the range of settings in which the child has opportunity to play. Thus, the child must have access to a variety of settings to facilitate discovery of the world. Without experience in varied environments, competence and understanding of the world is negatively affected (31).

Play in the Hospital Environment. Since hospitalization for acute problems can be a traumatic emotional experience for children, play is sometimes used as a means of reducing children’s fears and to prepare them for medical procedures (32). A less frequently addressed issue is that long-term hospitalization may adversely affect play. If this were the case, then there is reason to be concerned since a suppression of play may impede normal development.

Frequently, there is no legitimate place or time for play in the hospital, or if there is, it may be restricted to certain hours and activities. Consequently, play itself becomes overly defined and constricted. Further, the hospital, with its profusion of bewildering and frightening equipment, the procession of strange people, and the changing levels of noise may be overstimulating and too arousing for the child to feel safe enough to play (34). Simultaneously, hospitalized children may be exposed to the same objects and toys for long periods (18). As these toys lose their novelty, their potential to arouse the child sufficiently may decrease as well.

| Table 1 |
|-----------------|--------|--------|--------|
| **Subjects’ Sex, Age, and Race** |       |        |        |
| **Subject** | **Sex** | **Age (yrs)** | **Race** |
| Hospitalized Children | | | |
| 1 | F | 2.21 | Black |
| 2 | M | 2.29 | Black |
| 3 | M | 2.21 | Black |
| Nonhospitalized Children | | | |
| 4 | M | 2.04 | White |
| 5 | M | 1.96 | Black |
| 6 | F | 2.04 | White |

The objects and props in the physical setting are frequently much richer and more diverse at home than in the hospital: “At home there is a wider assortment of environmental props such as alleys, junk piles, convenient shopping areas, familiar streets, while the institution is more barren with regard to such accoutrements . . .” (33, p 20) Such differences can directly affect the type of play in which the child engages (33).

The activity patterns and values of adults within the hospital setting may also differ from those of adults at home (35). Although nursing, occupational therapy, and other staff may play with children and be supportive caregivers, the continuance and responsiveness that exist for the child at home may be lacking.

Ultimately, the hospitalized child’s opportunity to explore and play in new settings and a concomitant “discovery of the world” may be restricted to exploration and discovery of the hospital world alone.

Method

Subjects. Three hospitalized children (i.e., children who had spent from 60 to 80 percent of their lives in the hospital) and three nonhospitalized children were subjects of this study. Each of the hospitalized children had required a tracheostomy early in their admission to facilitate breathing. Although further minor surgeries to excise tracheal scar tissue were performed periodically, the need for skilled tracheostomy care was the major reason for continued hospitalization. However, these children were not chronically ill, nor did they exhibit any clinically observable cognitive deficits or emotional disturbances. Because the situation of these children’s hospitalization approximates a condition in which the effects of long-term hospitalization on play could be isolated, they appeared to be a natural group in which to observe the effects of hospitalization.

The nonhospitalized children were a convenience sample. They were matched to the hospitalized children for age and sex. Racial matching was not considered necessary since preliminary observations of children of different racial backgrounds did not suggest any play differences. Characteristics of the subjects are illustrated in Table 1.

Procedures. Each of the subjects was videotaped while playing during separate sessions in three different environments: 1. the child’s familiar play environment with a caretaker present and participating—this was the hospital playroom in the case of hospitalized children, and the child’s typical play space at home for the nonhospitalized children; 2. a standardized play environment with an adult caretaker present but passive (caretaker was instructed to “remain seated and to respond to the child, but not to initiate any interaction or demonstrate anything to the child”); and 3. the same standardized play environment with an adult caretaker pres-
ent and participating (caretaker was instructed to "behave as one normally might when playing with the child").

The hospital playroom was comparable in play resources to the children's home environment. It was large and had a varied selection of toys that were routinely available to the children. In the familiar environment, the child and the caretaker (either parent, staff, relative, or other adult with whom the child was most familiar) were allowed to choose and engage in whatever behaviors they wished. The standardized play environment was a room approximately 15 by 11 feet in

Figure 1
Standardized playroom for all participants in study
which play objects were prearranged (see Figure 1). The video camera was situated in sight behind a 4-foot-high partition that separated the play area from the experimenter. The child was allowed to become accustomed to the camera's presence a few minutes before taping. The videorecordings in the familiar environment were 30 minutes long; in the standardized environment they were each 20 minutes long.

**Instruments.** The videorecordings were viewed by raters in order to determine the developmental level of each child's play in each setting and the degree of playfulness exhibited by the child.

A revised version of the Preschool Play Scale (37,38), an observational tool that yields a "play age," was used in this study to assess the developmental level of the child's play. This version was recently reported as exhibiting high interrater and retest reliability and as demonstrating content and concurrent validity (39).

Playfulness—the degree of freedom, energy, joy, and spontaneity a child exhibits (37)—was measured by a modified version of Lieberman's 12-item Playfulness Scale (37). One irrelevant item was deleted for this study, which resulted in a somewhat lower interrater reliability ($r = .59$) than that reported by Lieberman (37).

In addition, each tape was observed by an individual who recorded a detailed description of the child's behavior in order to supplement the statistical analysis with a qualitative comparison.

**Statistical Analysis.** A two-factor design was used to examine differences between the play behavior of hospitalized and nonhospitalized children and differences between children's play behavior in different environments. Playfulness scores and play age scores, the indicators of play behavior, were examined separately.

Statistical treatment for this type of design ordinarily assumes that subjects have been randomly selected from populations, a condition not present here. Kempthorne and Doerfler, objecting to the general use of such an assumption in experiments like this, contend that the best that can (and should be done is to consider the question "What does this experiment, on its own, tell us?" They argue that permutation (also called randomization) tests be used as an aid in forming opinions concerning the experimental results actually obtained (40). For these permutation tests, probability is introduced into the problem by considering all possible permutations of the data. The test statistic (in this case, $F$) is calculated for each possible permutation of the

| Table 2 |
| Playfulness and Play Age Scores for All Subjects |

<table>
<thead>
<tr>
<th>Subject</th>
<th>Familiar Environment</th>
<th>Standardized Environment I*</th>
<th>Standardized Environment II*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Playfulness Score</td>
<td>Play Age</td>
<td>Playfulness Score</td>
</tr>
<tr>
<td>Hospitalized Children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>19</td>
<td>2.67</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>2.04</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>2.94</td>
<td>11</td>
</tr>
<tr>
<td>Mean</td>
<td>14.33</td>
<td>2.55</td>
<td>11.00</td>
</tr>
<tr>
<td>SD</td>
<td>4.51</td>
<td>0.46</td>
<td>1.00</td>
</tr>
<tr>
<td>Nonhospitalized Children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>2.96</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>27</td>
<td>2.83</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>2.50</td>
<td>12</td>
</tr>
<tr>
<td>Mean</td>
<td>26.33</td>
<td>2.76</td>
<td>17.00</td>
</tr>
<tr>
<td>SD</td>
<td>1.15</td>
<td>0.24</td>
<td>9.54</td>
</tr>
</tbody>
</table>

*Standardized I = caretaker does not participate. 
†Standardized II = caretaker participates.
data, and the proportion of permutations yielding a value for the test statistic as extreme as that observed is determined. If this proportion is as small as an established significance level, the observed result is labeled significant. Thus, significance is determined from the data, rather than from significance tables (40). Each of the study hypotheses was tested with an appropriate F-statistic (denoted PF) using this permutation method to calculate significance levels.

Results
The playfulness and play age scores for each child in each of the environmental conditions appear in Table 2.

Hospitalized versus Nonhospitalized Children. The hospitalized and nonhospitalized children were compared, using the playfulness and the play age scores. With each set of scores a statistically significant difference was found—with playfulness scores (PF = 12.68, p = 0.05); with play age scores (PF = 18.58, p = 0.05). It should be noted that in both these cases 0.05 was the lowest p value that could be obtained, with this permutation method for the sample sizes used.

Play Across Environments. Analysis of the children's playfulness scores for three environments showed that there were no statistically significant differences (PF = 2.56, p = 0.17). For play age scores, however, there were differences among the three environments (PF = 6.55, p = 0.02). For both groups, play age scores were lowest in the first standardized environment, and were approximately the same in the second standardized environment and in the free play environment.

Analysis of the interaction between hospitalization status and type of environment yielded non-significant results both for play age scores (PF = 0.92, p = 0.44) and for playfulness scores (PF = 1.08, p = 0.46). Thus, there is no evidence that the patterns of scores across the three environments differed for the hospitalized and nonhospitalized children.

Qualitative Findings. The study's two quantitative findings that the hospitalized children demonstrated less playfulness (i.e., joy, freedom, energy and spontaneity) and engaged in less developmentally mature play than their nonhospitalized peers were supported by the qualitative data, namely, the detailed descriptions of behavior. In the case of playfulness, the hospitalized children uniformly demonstrated less smiling and less vocalization or facial gesturing associated with excitement or arousal; they moved about less vigorously and with less energy, and more often demonstrated anxiety by withdrawing from the playthings. They were less able to freely engage in play and achieve the arousal levels that their nonhospitalized peers exhibited. In short, they were less free and joyful.

In regard to developmental level of play, the hospitalized children often approached objects with little curiosity, primarily handling them in some simple fashion (i.e., pushing or back and forth). Sometimes they did not observe their own actions but stared off in another direction, seemingly uninterested in their effect on the toys. These children were less prone to use objects symbolically (i.e., putting a doll in a cradle and saying “night-night” or pretending to bake with a pan). They less frequently engaged in a sequence of activities that were connected—that is, creating a series of interactions between toy trucks. The hospitalized children were less likely to try out a variety of actions with each toy. They examined toys less carefully and inquisitively, and their play pace was slower—in other words, they did fewer things with the toys in a given period of time. The hospitalized children also exhibited less variation in motor behavior. They were less likely to change from fine motor to gross motor activities within a given observational period.

Discussion
The findings from this study indicate that the hospitalized children demonstrated less playfulness and played in a less developmentally mature fashion than their nonhospitalized peers. Further, the variation of environments was shown to have an effect on the development level of the children's play. These findings and their significance must be considered in light of a number of limitations and ramifications of the study.

Limitations. The low retest reliability coefficient for the playfulness scale warrants a conservative interpretation of the statistical significance of differences in playfulness across children and environments. On the other hand, the corroborating evidence from qualitative observations strongly suggests that real differences in playfulness did exist where statistical differences were found.

The goal of this study, to isolate the effects of long-term hospitalization on the play behavior of children, was only partly accomplished. The hospitalized children did not demonstrate any significant long-term illness or developmental delay. However, two of the hospitalized subjects were born prematurely and one of the nonhospitalized had also been premature. The hospitalized subjects were older by an average of 2 months so that the gestational age...
of the hospitalized children was an average of one month older than the nonhospitalized children. However this does not control for any subtle neurological or other organic insults that the premature children might have incurred. None were clinically noted in the children's records, but subtle problems might have gone undetected.

The handicapped speech production that results from a tracheostomy might have had some impact on the play of the hospitalized children. Sound production and language are tools of play. These children could produce sounds and speech through blocking the tracheostomy manually, but their speech was less spontaneous during play than the nonhandicapped children's speech.

Also, differences in the way parents play with their children might have affected differences in the children's play. When told to act "normally," the parents or caretakers of the hospitalized children tended to remain fairly passive or make verbal suggestions only, such as "get the doll." The parents of the nonhospitalized children were more likely to attempt to interest their children in a particular game, or to carry it out jointly with them.

The different play behavior of these children cannot be conclusively attributed to the hospital environment; it is likely that several variables, including hospitalization, contributed to the suppressed playfulness and delays in play maturation. The fact that complexity of play in both groups of children was affected by experimentally manipulated environmental changes lends support to the notion that environments—of which the hospital is a special kind—are an important factor in modulating play.

Environmental Effects. It is important to ask which environmental variables were likely to have affected the children's play. Although much was done in the hospital ward to accommodate the children's need for play, the play space was more limited than it was in the case of the nonhospitalized children. Further, the time and space for play was restricted to certain areas at certain times despite a play room and program run by volunteers. At home children tend to have extended and uninterrupted periods of play. The hospitalized children were periodically interrupted for a variety of diagnostic, monitoring, and therapeutic activities. Thus, the normal cadence, timing, and duration of play in the child's day was affected.

The amount and quality of adult interaction also differed for the two groups of children. One of the hospitalized children, because of the geographic distance from his home, had little contact with his parents. The older two children were visited regularly by their parents (often daily and for long periods). Observations of these parents, however, suggested that they were not comfortable in the hospital setting, that they were uneasy about exercising their parent role outside the privacy and security of the home, and that they were less spontaneous and playful with their children than parents of the nonhospitalized children. In addition, the performance of many routine activities by ward personnel were observed to be done in a perfunctory and nonplayful manner. Occasions such as mealtimes and getting dressed, which might be used by a parent as an occasion of playful interaction, were performed in the hospital context as routine tasks to be dispatched with ease and efficiency.

A final constraint on play was the physical layout of the hospital ward. Hallways could be played in only when ward activities would not be interrupted. The children's rooms were arranged for the purpose of hospital care and were not inviting play spaces. These children could not cultivate private spaces and pathways for play as other children do, and thus had only limited opportunities to expand the range of their play settings.

Implications of the Findings. These features of the hospital environment are important variables to consider in any attempts to remediate play. The implication is that the hospital environment, especially for those children who will spend significant amounts of time in the hospital, should be scrutinized and organized to facilitate the continuation and development of normal play. The occupational therapist can fulfill an important and needed role as consultant to staff in planning and designing physical space that is conducive to play in hospitals, and by conducting remedial play programs.

The issue of hospitalization's effects on childhood play leads one to consider the ultimate effects of suppressed playfulness and delayed play maturation on the child. Although this question was beyond the scope of this study, one observation from the qualitative analysis of the data bears mentioning.

In the first standardized environment parents or caretakers were present but instructed to be passive. The atypical passivity of the adult was apparently interpreted by the children as a sign that something was wrong. The nonhospitalized children vocalized their discomfort and actively sought to get their parents to remove them from the room. In contrast, the hospitalized children, although they also seemed
very uncomfortable, made no effort to seek escape from the room, but sought instead to sit on their mother or caretaker’s lap, withdrew into a corner, or otherwise passively acquiesced to what was obviously for them a less than comfortable situation. Their submissiveness to environmental conditions (even uncomfortable ones) may be a reflection of a generalized feeling that they lack control. In play, children learn to master the environment and exploit its resources. When play is suppressed, children may become pawns of the environment.

Further research into the effects of the hospital and other institutions on the play of children is needed. The question of long-term effects is complex but one that bears investigation. This study suggests that hospitalization may have detrimental effects and should stimulate further studies.

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