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Childhood Outdoors: Toward a Social Ecology of the Landscape

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INTRODUCTION

In the urban environment, the creation of childhood places cannot be left to chance or the vagaries of pressure groups; they must be deliberately fostered by planning, design, and management to satisfy basic human needs. Our purpose therefore is to present existing empirical findings, within a behavior-environment ecological framework, to support more rational decision-making.

Under investigation is the environment actually used and experienced by children, referred to by Hart (1977) as the "phenomenal landscape" (p. 2). We present a highly simplified model of factors that control the development of the phenomenal landscape in Figure 1, which shows that a person lives simultaneously in three interdependent realms of experience: the physiological-psychological environment of body/mind; the sociological environment of interpersonal re-

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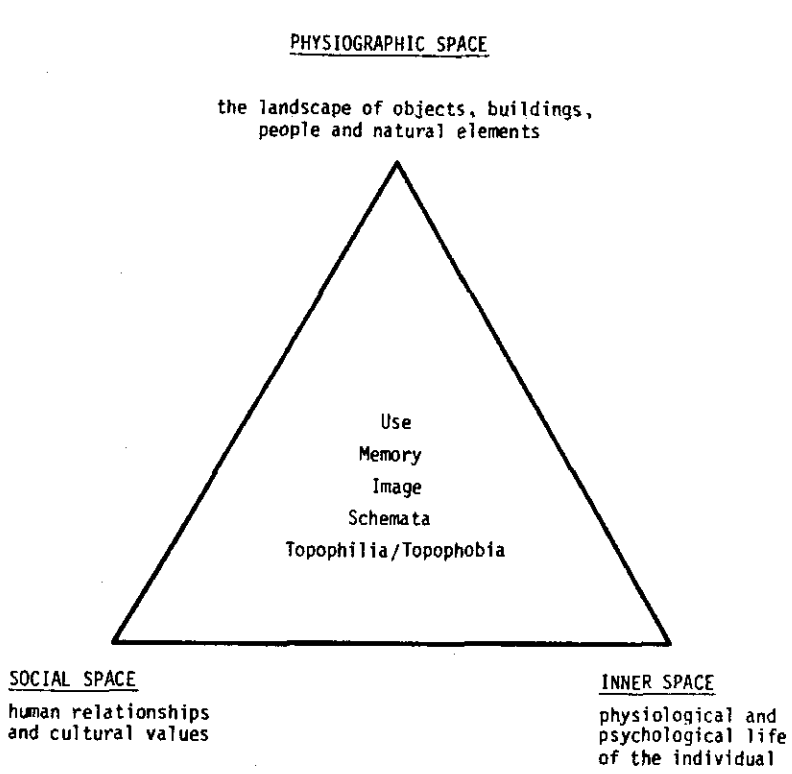


Figure 1. Realms of environmental experience.

lations and cultural values; and the physiographic landscape of spaces, objects, persons, and natural and built elements.

The interchange between these three realms controls use and results in what has been variously termed "image" (Boulding, 1956; Lynch, 1960); "topophilia" (Tuan 1974, emphasizing the affective domain); "cognitive map" (Downs & Stea, 1973); "mental map" (Gould & White, 1974); "schema" (defined by Bartlett, 1932, and applied by many, particularly Lee, 1968, and Abercrombie, 1969). We will use the last term to signify the cumulative content of experience. Refer to G. T. Moore and Golledge.(1976) for a comprehensive review of the environmental cognition field.

Building on an earlier broad review (Cooper Marcus & Moore, 1976), we have focused upon the outdoor urban-suburban-rural environment of early-middle childhood (ages 5-12, approximately). We have focused on these years because it is the age when girls and boys are reaching out most actively to grasp and understand the natural world (Cobb, 1969).

Sources

Of the more than 50 items reviewed, 34 contained useful empirical data relating to nonsupervised outdoor settings. To summarize biases, items were classified according to spatial scale and behavioral realm (Table 1). Nearly half the studies were at residential district scale, whereas a third were at neighborhood scale and less than a sixth at play-area scale. All studies included physiographic factors (the basis of selection); of these, 24 also included physiological-psychological factors (mostly age and sex) and 17 considered social-cultural factors.

Twenty-five case study items were selected as a working collection, of which about a dozen were used as primary sources. A third of these were British works, which precede more recent American contributions by nearly a decade, reflecting early governmental research involvement in British public housing—regrettably not expanded to other children-environment contexts.

Neighborhood studies were defined as encompassing the complete territorial range of children's year-round volitional behavior. Barker and Wright's (1955) well-known study of the behavioral ecology of all 707 inhabitants of "Midwest" was a pioneering contribution, followed by Hart's (1977) study of all 86 children in the Vermont town of Inavale. A third source was Moore's unpublished Childhood Use of the Urban(izing) Landscape (CUULS) Project, with samples in Britain (BR) and America (US). CUULS:US looked at the environmental relation-

Table 1
Spatial Scale and Behavioral Realms of 34 Empirical Studies of Children's Relationships with the Outdoors

Spatial scale	Behavioral realm		
	Physiographic factors (location, element type, etc.) All 34 studies	Physiological/ psychological factors (age, sex, etc.) 24 studies	Social/cultural factors (family life style, peer relations, parental attitudes, ethnic background, etc.) 17 studies
Neighborhood	12	9	9
Residential district	16	10	6
Play area	6	5	2

ships of 8- to 12-year-olds in six San Francisco Bay Area communities, across an urban-suburban-rural spectrum ($N = 265$). CUULS:BR covered three further samples ($N = 96$) from London, Stevenage New Town, and Tunstall (an older industrial town). A further significant source was Anderson and Tindall's (1972) comparison of the home range behavior of 100 urban and 100 suburban children.

Several other studies provided valuable back-up findings at neighborhood scale (Aiello, Gordon & Farrell, 1974; Auslander, Juhasz, & Carrusco, 1977; Coates & Bussard, 1974; Maurer & Baxter, 1972; Payne & Jones, 1976; Southworth, 1970). Several recent studies also served as useful methodological sources (Andrews, 1973; Ladd, 1970, 1972; Mark, 1972).

Residential-district studies included those where arbitrary study-site boundaries were drawn around a "housing project," "development" or, in Britain, an "estate." Several contributions have been made to this research area (Brower & Williamson, 1974; Cooper Marcus, 1974; Department of the Environment, 1973; Dresel, 1972; Hole, 1966; Hole & Miller, 1966). A disadvantage at this scale is that the elimination of "off-site" activity produces an inevitable bias toward what we shall later define as "habitual" range behavior. The low significance of official play areas, relative to other places used for play around the home, has been specifically indicated (Baltimore Department of Planning, 1972; Hole, 1966; Martensson, 1972; Maurer & Baxter, 1972; Sanoff & Dickerson, 1971).

Play-area studies focused specifically on playgrounds and/or other designated play areas. In this category ecologically viable research material was as sparse as the availability of ecologically viable study environments. Rare exceptions were Hayward, Rothenberg, and Beasley (1974), comparing three different types of playgrounds in New York City, and Mason, Forrester, and Hermann (1975), comparing the use of eight neighborhood parks in Berkeley. A few other studies have focused on the use of individual spaces, using interview and observation techniques (Bangs & Mahler, 1970; Byrom, 1972; Moore, 1974; Moore & Wochiler, 1974). The collected body is too small to merit extended review.

Methods

Behavior-mapping and other systematic observation methods are the only means of recording concrete data about environmental use. Hole (1966), Coates and Sanoff (1972), Cooper Marcus (1974), and Auslander *et al.* (1977) provide typical examples. The unit of measure is an

"observation," i.e., a categorized activity in space, within a given time frame. In "tracking" procedures, individual children are followed (Hayward *et al.*, 1974) to record the space-time pattern of behavior. Time-lapse photography has also been used as a recording device (G. R. Wade 1968; M. G. Wade 1977).

Simulation procedures have been used to overcome the practical difficulties of field work while still offering the subject a bridge to external reality. Compared to conventional interviewing, simulation has the advantage of introducing an artifact to stimulate the subjects' more prolonged involvement. LeVine and Taylor (1974) used "Q sort photographs"; Hart (1977) had subjects make "geographic diary" trip records on overlays on aerial photographs at the end of each day. Others have used two- or three-dimensional models (Mark, 1972; Rivlin, Rothenberg, & Justa 1974) as a response-eliciting vehicle. Brower, Gray, & Stough (1977) used a combined model-doll-play technique, involving subjects in dramatizing incidents of neighborhood life. In CUULS, subjects completed a "graphic simulation" to elicit significant elements of individual settings. Similar "mental map" methods have been used by Ladd (1970) and Maurer and Baxter (1972).

Child-guided field trips are similar to tracking, but instead of the investigator trying to maintain an unobtrusive relationship with the subject, they enter into close collusion with each other (CUULS; Gray & Brower, 1977; Hart, 1977).[1]

Assessment of factors such as age and sex are usually covered automatically in observational and simulation methods. To focus explicitly on individual differences, experimental psychological testing and physiological monitoring procedures can be used, e.g., heart-rate monitoring, as the child negotiates varied settings (M. G. Wade, 1977).

The effects of social-cultural factors such as family life-style, parental attitudes, peer relations, and school settings can be elicited to a degree by formal interviewing. Since the unit of study is the appropriate social organization, group, or institution, longer-term ethnographic "living-in" procedures allow many subtle nuances of day-to-day interaction to be recorded. Hart's (1977) "family studies" are a good example of this approach, so far rarely attempted in *urban* anthropology because of practical difficulties and the time they require.

[1] Barker and Wright (1966) assembled complete, highly detailed behavioral Day Records of one boy for one day. The overwhelming amount of data produced demonstrates the need for "methodological filters" to reduce information to levels of discrimination appropriate to range behavior analysis. Geographic diaries, graphic interview, and to some extent guided field-trips each have the effect of introducing a necessary psychic distance between actual behavior and its recollection.

COMPARATIVE SIGNIFICANCE OF INDOORS AND OUTDOORS

It seems clear that children and adults lead very different indoor/outdoor life-styles. For children "indoors" is a private domain, the source of physical shelter, social security, and psychic support—and also the locus of adult dominance and the limiting effects of "family" and "school." "Outdoors" is a necessary counterbalance, an explorable public domain providing engagement with living systems and the prevailing culture—the locus of volitional learning.

Wright's (1956) data indicate the dominance of home life for Midwest's population as a whole. Of 2,030 behavior settings surveyed in 1952, 1,445 occurred in homes and 585 in more public areas (p. 267), with occupancies of 5.1 million hours and 1.0 million hours, respectively. The proportional split for school children alone was quite different, however; Barker and Wright (1955) state that 43% of children's waking hours were spent in community settings—competing on almost equal terms with home life, rising to a peak in adolescence (Wright, 1956, p. 269, Figure 1).

Hole (1966) includes a rare source of temporal data from Himmelweit, Oppenheim, and Vince (1958) of week-long diary records kept by 77 10-to 11-year-olds in London and four other English towns in 1955. Following is an aggregated summary:

Average hours spent outside during survey week (7 days):	% 10-11 year olds[a]
Up to 8 hours, or 1 hour/day approximately	28
6-14 hours, or 1-2 hours/day approximately	58
over 14 hours, or more than 2 hours/day	14
Total	100

[a] All percentages are rounded out to nearest whole integer throughout the chapter.

Temporal averages are misleading because they level out individual behavior; for example, larger blocks of time may be spent outdoors on weekends rather than smaller blocks each day of the week. Also, without knowing the time of year, it is hard to get a sense of how much total discretionary time was available to the subjects. Nonetheless, the figures give a useful sense of the "temporal scale" of behavior and lead us to urge further investigation in this direction.

The Department of Environment (DoE) report provides indoor/outdoor spatial data of similar generality. From behavior-mapping records, it was found that the aggregate proportion of all resident children seen outdoors was 22%; and for 5- to 10-year-olds it was 30%.[2] Values were

[2] Figures of this kind should be treated with caution (as DoE themselves stress). For example, no compensation could be made for the deflationary effect of unrecorded "off-site" activity or the inflationary effect of "double-counting" in behavior mapping.

also higher for children living at or close to ground level with outdoor access. Again there is a problem of individual variances being obscured by aggregated values. Even so, the fact that one-fourth to one-third of the child population could be expected to be outdoors at any moment during the day gives a useful behavioral perspective.

Simulation and interview data present a more dramatic indoor/outdoor contrast. In the CUULS:US graphic simulations, only 16% of the drawings mentioned building interiors and only 2 out of 265 were devoted entirely to indoor settings (both from inner-city subjects). To counter any suspicion of a California climatic bias, the equivalent figures for the CUULS:BR sample were 4% and 1 out of 96.

CUULS interviews were less extreme. Children were asked two different questions about "favorite place to play": first, "after school"; and second, "at weekends." Responses were divided into three classes:

1. *Homesites* (of subject, relatives, babysitters, and friends);
2. *Community/commercial facilities* (library, church, stores, etc.);
3. *Open spaces/outdoor elements* (parks, playgrounds, streets, vacant land, including responses such as "at the creek," "in my tree," "around the block," etc.).

Average scores for combined after-school/weekend mention rates for the two populations are shown in Table 2.

It should be noted that an ambiguity exists in homesite and community-commercial facilities categories concerning the relative weight of their indoor and outdoor characteristics. At home a child may spend a good portion of time in the garden or yard; at a community facility, such as a recreation center, outdoor activities may be the main attraction. If we take the most conservative case and assume (unrealistically) that home-site and community-commercial facilities provide completely indoor experience, we still find that exactly half the Bay Area mentions and close to three-quarters of the British mentions refer exclusively to outdoor settings.

The significance of the outdoors is reinforced further by DoE, (1973) data. In its interview study, 237 children, living both on and off public housing estates, were asked what they liked about where they lived; 75% of estate children and 45% of the nonestate children answered in terms of "places to play outdoors" (p. 76).

Although our evidence is scattered and light, there is an apparent contradiction here between the overwhelming affective presence of the outdoors in children's minds and emotions, compared to its more modest actual use. The sharp contrast between children's sense of affiliation and physical involvement begs further investigation in a wider range of circumstances than we have been able to tap here.

TABLE 2
COMBINED AVERAGE MENTION RATES OF FAVORITE AFTERSCHOOL AND WEEKEND PLACES TO PLAY, GROUPED BY SPATIAL REALM, FOR FIVE BAY AREA SITES AND THREE BRITISH SITES[a]

	Mention rate[b]			
	Bay Area		British	
Spatial realm	N = 265 & 173[c]	%	N = 96	%
Homesite	.50	27	.34	23
Community-commercial facilities	.44	23	.11	7
Open spaces/ outdoor elements	.94	50	1.05	70
Total	1.88	100	1.50	100

[a] From CUULS Project interviews.
[b] Mention rate (m.r.) is the total number of times an element was mentioned, divided by the number in the sample, to give a clear indication of individual significance. It also allows for consistent aggregation of categories.
[c] Responses for "after school" were elicited from total sample; for "weekend" from 65% of sample.

OUTDOOR BEHAVIOR-ENVIRONMENT CONCEPTS

Three broad concepts are proposed (Figure 2), which together accommodate a full description of children's phenomenal landscapes:

- *Territorial range* defines the collective spatial realm of experiential breadth and diversity.
- *Place* defines the locus of experiential depth and involvement and the source of knowledge and affiliation.
- *Pathway* defines the conjoining network component, threading place and territory together, emphasizing mobility and experiential continuity.

In essence, place and pathway are the concrete, generic units of range; collectively they relate directly to Lynch's (1960) terminology and conceptual scheme. Pathways may function at different times for different people purely as channels of movement from A to B; or at other times they may become significant "linear places" in their own right.

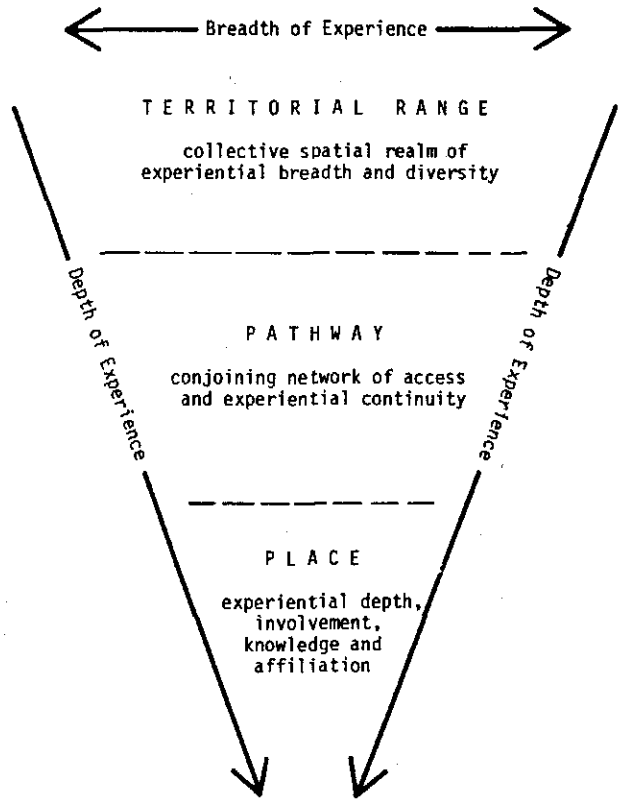


Figure 2. Components of the phenomenal landscape.

MEASURES OF TERRITORIAL RANGE

Territorial range indicates the spatial extent and experiential variety of outdoor places inhabited. It embraces the totality of a child's space-time domain—of familiar places close to home as well as a constantly expanding boundary condition, leading to unfamiliar, challenging encounters in new places.

Territorial range should not be thought of as a gross measure of area within which behavior takes place. Recognizing children's highly selective use of neighborhood space, measurement must take account of the number, variety, occupancy time, and spatial distribution of place-behavior. So far no one has attempted to develop an index or measure combining all these dimensions, though several partial attempts have been made (Moore, 1978).

Barker and Wright (1955) defined territorial range as "the number of community settings inhabited" (p. 99), but failed to take account of their spatial distribution—a crucial need when making physiographic comparisons (between city and suburb for example).

The measure of Mean Home Range (MHR)[3] used by Anderson and Tindall (1972) incorporated the number, variety, and distribution of places. Using data from "geographic diaries," Hart (1977) developed a similar measure, "maximum *daily* (our emphasis) distance traveled"; and a second measure, "maximum distance traveled to a range boundary" (from the homesite during a stated period, indicating the more geographic scale of behavior). Hart's approach, using the "trip" as a basic survey unit, allowed for the more overt, descriptive aspect of range experience to be assessed during a set time interval; e.g., weekday compared to weekend. Graphic simulation techniques have been used to assess territorial range as perceived by the child, with the option of subsequent transfer to a scaled map (CUULS; Ladd, 1970; Maurer & Baxter, 1972).

Range Evolution

Territorial range is a dynamic phenomenon, the outcome of complex interactions between organism and environment; it has two distinct aspects: one of "extension," the other of "development."

Range extension is easy to visualize as territorial entrepreneurship from birth onward, with the child constantly striving after new destinations (e.g., front step, friend's house, corner store, park, lake, etc.). Each extension introduces a new place, which then becomes the temporary landscape marker of the child's "range boundary."

[3] Defined as "total, nonredundant path length" (measured in feet) between "activity nodes," identified by subjects on neighborhood air photos. They suggest this is a less ambiguous and more easily derived measure than "area," because it more closely approximates the structure of behavior. Children do not move indiscriminately over the whole neighborhood domain. Their behavior is subject to a variety of constraints and opportunities. Nonredundant path length is a more satisfactory measure because it allows neighborhood space to be ranked behaviorally, according to how thickly or thinly it is *traversed*. Appleyard & Lintell [1972] provide an example of "street-traversability" as a function of traffic loadings. Other examples have a potential for study, e.g., block traversability as a function of alleyways, climbable fences, and resident tolerance toward children [as addressed by LeVine & Taylor, 1974]. Path-length measures of range are workable only above a certain spatial scale, where path and place can be behaviorally distinguished. At smaller scales where the density of behavior makes differentiation between "path" and "place" impossible, range concepts are no longer operational and analysis must focus on individual behaviors. All territorial range analyses we have come across relate to home range, where the subjects' home lies at the behavioral center. Several other range types have potential significance, e.g., "park range," extending from a family picnic site; "vacation home range," of rural cabin compared to city hotel; etc.

Range extension is a discontinuous process associated with primary social events, such as starting school or learning to ride a bicycle or using the buses alone. Or consider the new destinations made possible when permission is finally given to cross a busy street that had for years been the rigid boundary of the child's world. Extension is also subject to explicit "range-conditions," i.e., constraints or stimuli such as parental restrictions, mode of travel, accessibility, private-property rights, bureaucratic controls, physical dangers such as traffic, and the inherent but variable attractiveness of the landscape itself.

Range development is more consistently on-going, related to the exploration, manipulation, and transformation of newly acquired territory over time. Discovery is not limited to the first visit; each subsequent trip opens up new possibilities for continued involvement. These may stem directly from new perceptions of familiar places, or via the collective imagination of peer-groups (Moore, 1974); they may result from accompanying adult leadership (parents, teachers, older siblings, etc.); or they may happen because of inherent changes in the place itself. This last partly explains the significance of natural systems as a prime source of what might be called "sufficient unpredictability," fulfilling children's need for the simultaneous experience of continuity and change (Mead, 1966).

For each child there exists a repertoire of necessary range behaviors, extending from the strictly routine to exploratory involvements in a shifting spectrum of places—from familiar to unfamiliar, the known and the yet-to-be-discovered.

Both ends of this "involvement cycle" are important. The routine behavior of repeated trips to playground swings, for example, provides a confirmation of the predictability of social and natural phenomena. Nonroutine, "experimental" behavior, on the other hand, leads the child to discover new properties of the world, providing a necessary testing ground for emergent skills. Children's biological development must run parallel to range extensions, supplying new material for the continuing drama of a child's discovery of the world, without which the acquisition of competence and understanding would be impossible (Pearce, 1977).

Most studies have taken a rather static view of home range development. It seems important here to clarify the range evolution process to try to make it more amenable to analysis. The following outline model is offered, stemming from the CUULS study, with support from

other prime sources. It defines three levels of involvement: "habitual," "frequented," and "occasional."

Habitual range represents close-to-home behavior, incorporating friendship patterns clustered around each child's home, spilling out onto sidewalks, and extending into more accessible neighborhood spaces such as schoolyards, playgrounds, back alleys, lawns, vacant lots, small vegetated grassy areas, etc., where peers can play together. Habitual range analysis is particularly appropriate to the evaluation of residential districts, as we shall discuss later.

Habitual-range development begins during preschool years, initially incorporating the private spaces immediately around the home with later extensions into the contiguous public domain. New social alliances, acquired at elementary school, result in fairly dramatic range extensions to friends' houses and perhaps a corner store, together with sidewalk/street play, which maintains high significance over many years, especially in "dead-end," low-traffic conditions (Zerner, 1974).

The rate of extension depends on local traffic conditions as well as many other controlling factors, including the negotiation of parental restrictions, sex of child, site layout, space availability, microclimate, etc. As children grow in age, an increasing number of range destinations become habituated. Beyond a certain limit, however, temporal constraints require some destinations to be dropped. The picture that emerges (though evidence is skimpy) is of progressive contiguous development up to preadolescence, for most children. In late childhood and adolescence, habitual "turf" remains significant but become fragmented as destinations more distant from home (e.g., friends' houses, soda bar, sports facilities, high school) are substituted for nearby early-middle childhood places.[4]

For all ages, behavior continues to be controlled by temporal constraints, especially during the school year, meaning that periods of play must be wedged between formal school schedules, family mealtimes, extracurricular activites such as music lessons, and (for nearly all urban children) nightfall. There is simply not enough time to wander far from home.

Frequented-range behavior reflects the temporal flexibility of weekend and vacation periods, opening up the possibility of weekly travel to more distant destinations, by children over about 8 years of age—

[4] We must stress that this is a highly generalized model and that individual behavior varies tremendously under the influence of social and physical factors [see Barker & Wright (1955); Chapters VIII and IX, for example]; and then there are effects such as residential mobility that have yet to be researched.

especially those on bikes. Typical destinations include preplanned trips to the local ball game, sports field, or swimming pool; excursions downtown; extended visits to parks or libraries; and journeys to special places such as "clubhouses" if not too far away.

In adult terms, most of these destinations are not far from home; but for the child, they lie at a necessary psychological distance, just beyond the habitual boundary, accommodating important qualitatively different, nonroutine experience.

Occasional-range behavior relates to exotic places beyond the frequented range that are the experiential privilege of few children. Trips may be made perhaps once or twice a month or even less frequently. Opportunities arise from a combination of phenomenal factors: the child's own qualities (e.g., independence); fortuitous circumstances presented by the social environment (e.g., tolerant parents); the landscape itself (e.g., a rare feature such as an old quarry or available public transit); and temporal conditions (long summer days, etc.). The variety of potential destinations is dependent upon, and expressive of, local regional characteristics. Mode of travel is obviously a contingent factor; foot, bike, horse, and public transit all embody inherent limitations and potentials. Horse-riding in rural terrain is a particularly potent source of occasional experience.

"Occasional trips" are usually undertaken by peer or sibling groups, as companionship is a necessary condition for journeys into the unknown. When children are chaperoned by an older, more knowledgeable child or adult, experiential quality depends a great deal on the maintenance of a shared understanding as to the role of leadership. In such cases, occasional ranges may include family trips by car to destinations such as vacation homes and large parks, in themselves the potential subject of further range analyses.

Controlling Factors on Range Development

We turn now to empirical sources to illuminate the foregoing conceptual scheme. Coates and Bussard (1974) used three semiequivalent concepts of home-range evolution: "home base," "territorial range," and "chaperoned travel." They looked at range behavior of 4- to 5-, 6- to 9-, and 10- to 12-year-olds in a moderate-density, suburban, planned unit development.[5] According to their results, the range of the youngest group was "bounded in a compact home-base bubble extending about

[5] Methods included open-ended and aerial photo–map interviews with children, activity checklists, Activity Day Narratives, and parental interviews ($N = 30$).

50' from the front doors . . . and between 90' and 140' laterally" (Coates & Bussard, 1974, Table 1, p. 138). For half the youngest age group "territorial range" extensions occurred along short paths to playgrounds.

Age and Sex

At elementary-school age, the authors note a dramatic change in range behavior, paralleling Payne and Jones' (1976) observation of less sidewalk and close-to-home play. Coates and Bussard discovered a tenfold increase in "home base area," and a five- to eightfold increase in "path length" (i.e., maximum distance traveled). In the 6-9 age range, all the boys and half the girls traveled to territorial range destinations beyond the home base. Ten- to twelve-year-olds' home base remained about the same, whereas territorial range and number of destinations increased, particularly for girls. Chaperoned travel in both age groups was related primarily to trips to the store.

The Anderson and Tindall study (1972) provides a good example of the simultaneous investigation of several factors controlling range development. Values for MHR of second- and fourth-grade, bike- and non-bike-owning girls and boys were compared for urban and suburban samples.[6] Highest distance scores related to fourth-grade bike-owning boys. Interestingly, urban and suburban MHR values were almost identical: 6,828 feet and 6,820 feet, respectively. A minimum value of 2,699 feet was related to second-grade non-bike-owning urban girls. In all cases MHR was lower for girls than boys and, with the exception of second-grade suburban girls, it was greater for bike owners than non-bike owners. Changes in MHR with age did not follow such an orderly upward progression.

In each age-sex category, MHR was greater for the suburban sample. On the other hand, the number of activity nodes (i.e., range destinations) elicited was greater for the urban sample. A further urban-suburban difference was that the number of "recreation nodes" increased regularly with age and sex in the urban sample, but remained at a constant level in the suburban sample. In other words, the suburban children traveled greater distances for less experience.

The authors suggest three possible explanations: First, suburban back yards (or space immediately around the home) is a more sufficient

[6] The study involved "turf-maps" derived from interviews with children using aerial photographs, with samples of black children in inner Baltimore and suburban New England (N = 100 in each case).

play space than the equivalent space around urban homes; second, suburban neighborhoods may provide sparser play "opportunity surfaces." Or, third, range behavior controls are exercised more severely by suburban parents. Our suspicion is that all three factors apply.

Rural, Suburban, and Urban Contexts

Hart's study provides further evidence regarding the effects of age, sex, parental control, and environmental context on range experience. The range distance measure used by Hart[7] was different from Anderson and Tindall's more comprehensive assessment. The mean distance for younger girls was 942 feet, and for boys 1248 feet. In the older group, values were 2,877 and 7,356 feet for girls and boys, respectively. Range Distance Sex Ratios (boys' score divided by girls' score) derived from these figures are 1.32 and 2.56, respectively. The implication is that younger children's range is a great deal more sex-equitable than older children's.

Table 3 includes these values together with equivalent ones from Anderson and Tindall.[8] Ratios for the younger age groups are remarkably close; indeed, the suburban and rural values are almost identical. The indication is of a constancy of sex-difference in the range distance of younger children, irrespective of site context. Ratios for older groups, however, present a different picture. The suburban ratio (1.58) indicates the highest level of equality, with the urban ratio (1.65) following close behind. The rural ratio of 2.56, by comparison, suggests conditions of severe inequality.

Comparison of the differences between sex-ratios indicates increasing sex-disparity between age groups as we move from urban (.19) to suburban (.27) to rural (1.24) situations. The massive difference in rural footage scores between the younger and older boys emphasizes the trend. One possible explanation is that undeveloped rural landscapes offer many more attractive opportunities for range extension, to greater distances, than the more compact homogeneous landscapes of suburbia, or the traffic-constrained, high-density landscapes of the city.

Differences in parental control are certainly also instrumental. Rural girls' range may be restricted more by parental fear and by

[7] From children's "geographic diary" records he was able to measure (with a planimeter) maximum daily distances traveled during the week-long survey period, for K-3rd grade and 4-6th grade girls and boys.

[8] Even though identical measures were not used, the comparison of *ratios* appears legitimate as we are interested in differences of scale, rather than kind.

TABLE 3
RANGE DISTANCE SEX RATIOS BY AGE GROUP AND SITE CONTEXT[a]

	Range distance (ft)		
	Younger[b]	Older[c]	Ratio difference
Urban			
Boys	4131	5816	
Girls	2833	3518	
Ratio	1.46	1.65	.19
Suburban			
Boys	5209	6165	
Girls	3962	3905	
Ratio	1.31	1.58	.27
Rural			
Boys	1248	7356	
Girls	942	2877	
Ratio	1.32	2.56	1.24

[a] From Anderson & Tindall (1972) (urban and suburban); Hart (1977) (rural).
[b] *Younger:* urban and suburban, 2nd grade; rural, K-3rd grade.
[c] *Older:* urban and suburban, 4th grade; rural, 4-6th grade.

requirements to do more chores around the home. Suburban girls are probably most free, because chores are more likely to be shared with brothers in middle-class families, and parents consider suburbs more "safe." Even though information on such matters is sparse, we should look at it more closely.

Parental Controls

By relating to parents as well as children, over a considerable period of time, Hart was able to identify subtle negotiations that took place beween them as range became extended step by step. The same was found in CUULS. In some households discussion of children's territorial rights was conducted in an open atmosphere of give-and-take, with very little apprehension overtly expressed by the parents. Both studies found that mothers were more flexible in their judgments, whereas fathers were more authoritarian and arbitrary, more so perhaps in their dealings with daughters than with sons.

Hart and the CUULS study both verify that territorial range rules laid down by parents were more frequently broken by boys, often with the knowledge of parents—and even with the child knowing that the

transgression was known. This led Hart to suggest the existence of a double standard of restriction, whereby boys's spatial privileges were accorded a more flexible margin of negotiation with more ambiguous rules, according to the maxim that "boys will be boys." Range rules for girls by comparison were more clear-cut, allowing for less maneuver as circumstances changed, although mothers generally did not seem aware of their preferential treatment toward their sons.

By undertaking long-term ethnographic studies, Hart was able to illuminate further influences of the social environment. He observed the constraining effect of "mothering" duties imposed on older girls and, conversely, the benefits on younger children, who were able to accomplish range extensions in the company of older sisters or occasionally with neighbors acting as surrogate parents.[9] Hart found that range restrictions were more relaxed when both parents were working; and he detected that restrictions of "first born" children are avoided further down the birth order, once older siblings could chaperone younger ones. He also noted that parents generally relax their hold on later children as their parenting skills and confidence mature.

In some cases Hart observed that mothers were unwilling to relinquish their children to the world (cf. Holt, 1975). This was especially true of single parents and last-born children. Most parents, however, transcend this problem and accept the fact that control must inevitably give way to disengagement.

In examining parent-child relations at close quarters, Hart identified three varieties of restrictive *range conditions*, modified by parents and children within a "negotiative" process, to suit prevailing circumstances. The conditions were defined as:

- *Free range*—places allowed to go alone, without asking permission.
- *Range with permission*—places allowed to go alone, but saying where and asking permission first.
- *Range with permission, with other children*—as above, but with other children.

In the CUULS study, a fourth condition was identified, namely:

- *Range with related adults*—accounting for range extensions made in the company of a family member or other adults (recreation leader, teacher, etc.).

From Hart's interviews with children, measures were made of

[9] Although the relationship is one of "following" rather than "leading" the trip.

range-boundary extensions under different permission conditions. Findings indicated that the farthest "free-range" distance traveled at first and second grade was about 300 feet, jumping to 786 feet at third grade, rising slightly to about 1,000 feet at fourth grade, jumping again to a maximum of 1,900 feet at fifth grade, and dropping to just over 1,500 feet at sixth grade.[10]

"Farthest distances with permission" followed considerably higher values but in the same relative sequence from just over 1,000 feet at first-second-grade levels to nearly 3,300 feet at fifth grade. Distances "with permission, with other children" still followed a regular progression by age, but again increased from a first-second-grade value of over 1,600 feet to more than 6,000 feet at fifth grade. Range extensions for girls in higher grades arose from domestic-role obligations. Older girls went on errands to stores almost twice as often as boys; but this type of range extension took place within quickly routinized channels, without resulting in an equivalent increase of experiential breadth that such a scale of extension would provide for boys, who were free to come and go as they pleased. Boys were found to mention many more "land-use places" in their diaries than girls, especially in trips alone. Girls became socially isolated in the summer and initiated relatively unimportant trips to the store in order to get away from the house and find contact with other children.

In all cases, under all range conditions, boys' "furthest distances" were greater than girls'. The extreme cases seemed to occur under free-range conditions, at third (Figure 3) and fifth grade, where boys' distances were 2.6 and 2.9 times greater than girls' distances, respectively. At second grade the ratio was still greater than 2.0, as was also the case with fifth graders under "with other children" conditions. At this age, boys experience a dramatic increase of freedom. By fifth or sixth grade, Hart reports, many boys were allowed to go anywhere they chose; and their resultant range-boundary was about as big as it was going to be until they reached driving age. He also discovered that the more advanced extensiveness of the boys' range was stimulated by their earlier bike use. Remaining always one year ahead, they were allowed to ride on sidewalks at third grade, whereas girls were not.

In summary, the Hart findings indicate that older boys especially move around more, further afield, to a greater variety of places. During the same period, girls begin to participate more in the routines of domestic life, with consequential constraints upon both the space and time of their range experience.

[10] Values converted from yards and interpolated from bar graphs (Hart, 1977, p. 42.)

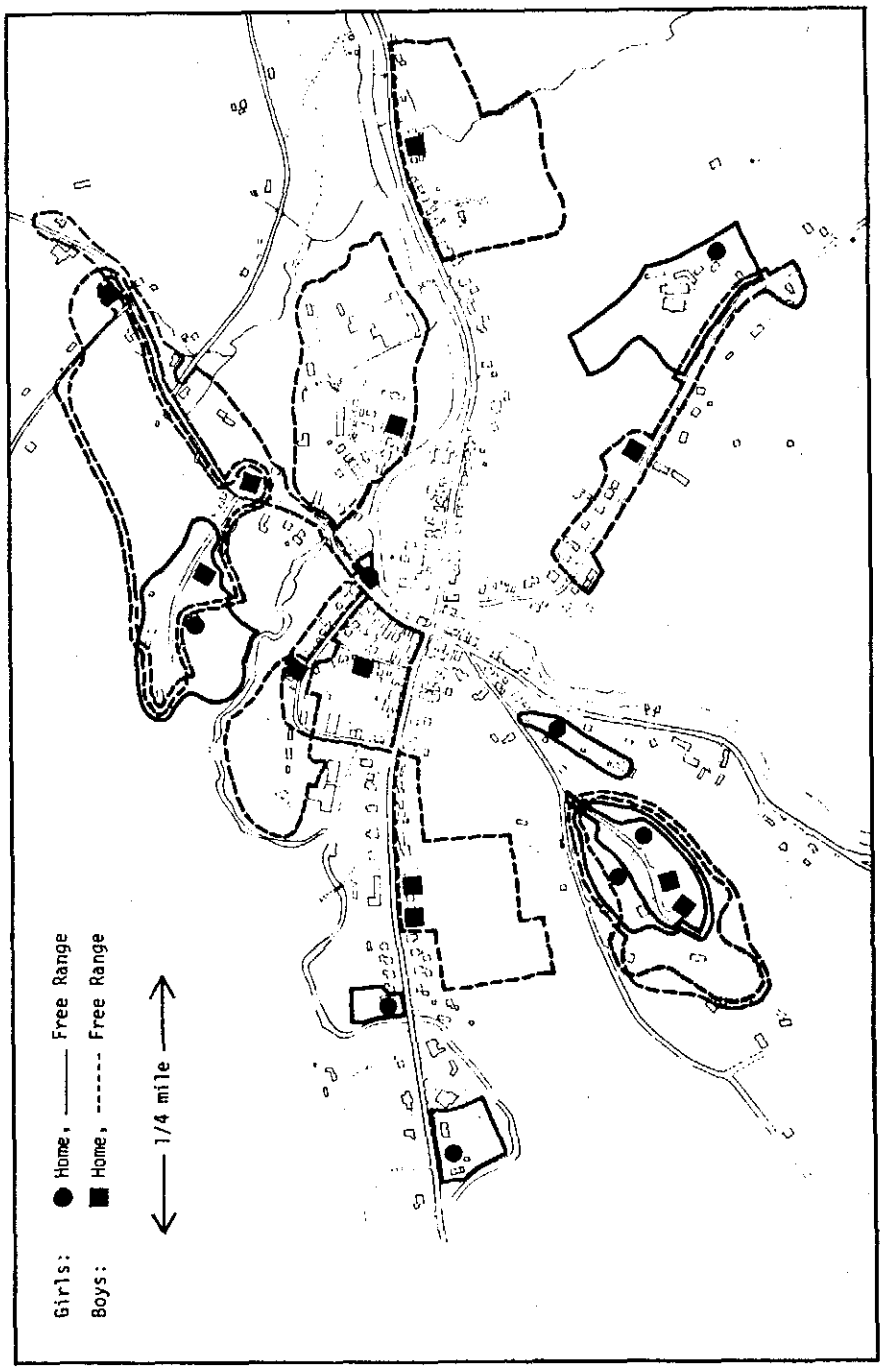


Figure 3. Free-range summer boundaries for 8-year-old girls and boys in Inavale, Vermont; showing dramatic sex differences in range development at this age. From Hart (1977, p. 40)

Environmental Fear

Both the Hart and CUULS studies identified several fear-based factors in parental control (which again seemed to affect girls more than boys). CUULS:US subjects were asked *why* use was not allowed of specific named places. Reasons given (as a percentage of total mentions) were: traffic danger, 27%; social apprehension/fear of attack (including not mixing with certain classes of kids, avoiding "winos," and fears of sexual molestation), 25%; "too far/get lost/not old enough" (i.e., a lack of spatial competency), 17%; physical dangers (excluding traffic; but including dogs, snakes, bodies of water, and high places), 17%.

In general the environmental fear of many parents seems out of proportion to statistical reality and gives rise to considerable sex-differentiation toward children, depending on the presupposition of parents. Fathers may think it is "manly" for sons to go out and "conquer" the world, and equally proper for daughters to stay home. Mothers may be far more fearful of sexual interference in respect to daughters, than to sons—and so on, always depending on secondary factors such as urban-rural context.[11]

Similar effects of sex-related spatial behavior were recorded by Payne and Jones (1977) in their study of a Calgary suburb, as well as by Coates and Bussard (1974). The latter again found an emphasis on stricter control, retarding the extension of girls' territorial range. The authors note how specific landscape elements (roads, fences, etc.) were used to mark the range boundaries for girls more precisely than for boys. Hole (1966, p. 24) includes data based on parents' response to a question that asked about maximum free range. For parents of 7- to 8-year olds, 52% said their child was not allowed off the estate; for 9- to 10-year olds the value was down, but was still 23%. In the CUULS:BR study, specific cases were documented regarding where interfaces between new high-rise buildings and old surrounding terraces were used by mothers as rigid, "nonextendable" boundaries, producing a situation of "low negotiative potential" between parent and child. According to Saegart and Hart (1978), such regressive inhibiting of self-determination is bound in the long run to result in reduced competence and a multitude of resulting handicaps in dealing with the world.

[11] A subtle example is taken from the CUULS:US rural sample: the whistling call of fathers was used as a signal for children to come home, who irrespective of sex were allowed to play within "whistling distance." The rural context allowed father and children to have more intimate contact during the day, resulting in more equitable treatment. The expanded point concerns the whistle itself, a common male skill, and the quiet rural surroundings that allowed it to be used by the father in undertaking an important domestic duty (getting children to the table on time).

Covert Equality

The foregoing conclusions are not mirrored in the more covert landscape relationships represented by CUULS graphic-simulation data. Average aggregate mention rates for outdoor place elements were 10.58 elements/drawing for girls and 10.08 elements/drawing for boys. Although there were many sex-differences related to individual classes of element, an aggregate picture of perceptual equality is clearly presented. Whatever differences may exist between girls and boys in their spatial behavior, they are not reflected in the breadth of their schemata.[12] The aggregated CUULS data strongly suggest a covert dimension of landscape affiliation, which seems to provide a countervailing influence upon girls' and boys' relationship with the outdoors. Although particular handicaps may result, as suggested by Saegart and Hart, it is also possible that compensating behavioral shifts occur whereby, for instance, girls gain greater depth of experience via extended involvement in fewer places, versus boys' more extensive but superficial range experience.

Temporal Factors

Temporal constraints on spatial behavior are rarely discussed and have been seldom investigated, yet they have an instrumental effect on children's range experience. CUULS provided mention rates of "after-school" compared to "weekend," "favorite places to play" (Table 4), giving an indication of weekend shifts, presumably from habitual to frequented realms.

A weekend shift away from home is immediately visible, numerically equivalent to the mention rate for weekend family trips, to which it is clearly related in the ecology of behavior. It is interesting to note that the aggregate rates for all nonhomesite destinations are almost identical for both after-school and weekend classes. Numerical equality makes interpretation a simple matter of examining the magnitude of behavioral shifts by destination.

Most scores show a drop in significance from weekday to weekend,

[12] This conclusion is further reinforced by Barker and Wright's (1955) finding that very little difference existed between the number and variety of behavior settings occupied by girls compared to boys; 90% of settings inhabited by children and adolescents were inhabited by both sexes (p. 100).

TABLE 4
COMPARISON OF AFTER-SCHOOL AND WEEKEND MENTION RATES OF FAVORITE PLACES TO PLAY, AGGREGATED BY DESTINATION TYPE[a]

	Mention rate			
	After school		Weekend	
Favorite places to play	N = 265	%	N = 173	%
Homesite	.63	29	.30	16
Open space	.40	18	.32	17
Community recreation facilities	.35	16	.24	13
Macroelements[b]	.18	8	.23	12
Microelements[c]	.17	8	.12	7
Commercial facilities	.11	5	.06	3
Sports facilities	.11	5	.10	5
Sidewalks/streets	.08	4	.03	2
Nonspecific[d]	.08	4	.12	6
Child-built places[e]	.07	3	.03	2
Weekend family trips	—		.32	17
Aggregate	2.18	100	1.87	100
Minus homesite	1.55	71	1.57	84

[a] From CUULS:US interviews.
[b] E.g., "hills, creeks, fields, railroad tracks."
[c] E.g., "rocks, frogs, crabs, trees, grass."
[d] E.g., "around the block, everywhere."
[e] Included "made" places such as "forts," as well as "found" places such as "hiding places."

indicating that most destination types (open space, community-recreation facilities, microelements, commercial facilities and sidewalks/streets) lie within the habitual range of most 8- to 12-year-olds, and that weekend use is overshadowed by family activity. The lower weekend score for child-built places is surprising and seems to contradict a hypothesis that such places are important destinations in the frequented-occasional realm.[13] On the other hand, the increase of macroelements and nonspecific destinations provides supporting evidence of open-ended weekend range extensions, focused on special landscape features. Collectively, these include a wide range of wild

[13] The "child-built" category included hiding and secret places, etc., that may well have been (by definition, almost) close to home and well within the habitual realm, hence accounting for the low weekend mention rate.

places, rough ground, natural resources, and abandoned artifacts of many kinds. In CUULS:US, weekend macroplaces included "the woods," "the hills," "the fishing pier," "train tracks," "the walnut orchard," "fields," "the creek," "the tunnel," and many others.

The "Pull" of the Landscape

Coates and Bussard's (1974) subjects mentioned "off-site range extensions" with name like "Snake Hill," the "Mountain," and "Closed Road"; in the 6-9 age group, mentions were exclusively by boys. In the 10-12 group, half the girls mentioned wild areas, but the boys still used them more and traveled to more distant ones.

Hart stated that rivers and lakes were the places children valued most and yet the river was forbidden to them until they were at least 8 years old, and the lakes lay well beyond the range of all but the oldest boys. At somewhat more modest scale, brooks and small "frog ponds" were highly valued and used for dabbling in as well as for watching and catching wildlife (micro-elements). Woods, sand piles, quarries, and a variety of "hiding places" and "look-out places" were also highly prized.

In their suburban study, Payne and Jones (1977) note the occasional forays of 8- to 11-year-old boys up "Porcupine Valley"—an adjacent gully of trees and undergrowth, offering places for fort building and hideouts. Another "fringe area" in their study consisted of a large excavated dumping ground, used predominantly by boys to explore and build forts from discarded material.

The foregoing examples of wild and distant places provide a clear illustration of the effect of "place-quality" on range extension, whereby specific features in the landscape exert a "pull" over children, leading them ever further afield.

Investigation of these qualitative attributes of exotic place-elements was of particular concern in the CUULS study. The child-led field trips were especially informative in this respect, enabling the documentation of many subtle characteristics and secondary relationships. In the verbal questionnaire children were asked, "What's the furthest place you've been to on your own or with other kids, without adults going too?" The largest class of response (equal to mentions of commercial destinations) was of macroelements, e.g., "big trees place," "Indian Rock," "down San Carlos to big street," "other side of the mountain," "followed creek three miles to freeway," "followed railroad tracks to recyling plant," "Ellis Lake," with a scattering of "macrotime" responses, such as "all-day hike" (US data).

PLACE

Place is the smallest unit of range, representing the affective hotspots of a person's schema. The Perls, Hefferline, and Goodman (1951) thesis suggests that place accommodates transactive activity, facilitating learning toward an evolving sense of affiliation and meaning. Organism and environment adapt to each other over relatively long periods of time, coerced and supported by identifiable, measurable elements—space, time, fixed features, loose-parts, natural phenomena, and populations—together with the physical attributes or sensory characteristics of elements and their interactions.

Although "place" is a common term of everyday usage, few attempts, apart from Spivak (1973) and Moore (1977, 1978), have been made to sharpen its theoretical/empirical clarity. Place was used by Hart (1977) as a rubric for the social and geographic (range) factors affecting children's "place experience"; but the influence of the elements and attributes of places were not discussed in detail.

Significant Place Elements

The main source at our disposal is the CUULS graphic simulation data. Multiethnic, 8- to 12-year-old children were asked to make a map or drawing of "all your favorite places, where you go after school or at weekends—around your home and neighborhood, including the summer." From the drawings (Figure 4) 72 categories of place elements[14] were coded. Table 5 gives the complete list in rank order of mention rates.

An overview of the figures indicates that only three elements ("child's own house," "through streets," and "child's mention of self") had a mention rate greater than 0.50, and that a little over half had scores greater than 0.10. Because the sample was drawn from a wide range of settlement conditions, the list can to a degree be taken as a collectively ranked schema of San Francisco Bay region neighborhoods. Note the primary emphasis on the subject's own person and closest friends, together with their homes, the surrounding streets and immediately accessible places such as school, parks, playgrounds, stores, and community facilities. Interspersed within this functional realm are a set of elements of a different type: trees, fences, lawns, stoops, etc.,

[14] In coding, data were disaggregated to a maximum feasible degree, e.g., a park drawn with trees was coded both as "park" and as "single trees." The objective was to be able to code as many as possible of the elements at a scale appropriate to design science and planning policy. From another point of view, the coding procedure adopted was merely a way of showing methodological respect to the integrity of the data.

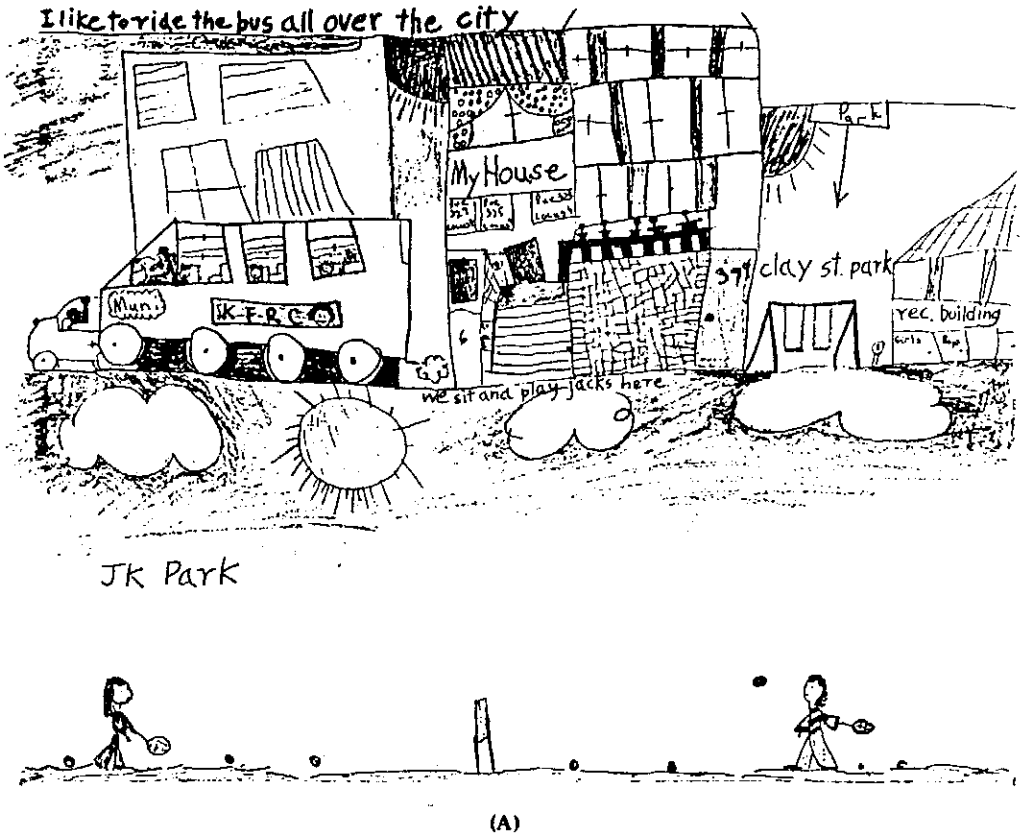
offering special place-affiliations. Four categories of pathway appear in the upper part of the list: (#2, "through streets," m.r. = 0.79; #20, "trails/shortcuts/paths/alleys," m.r. = 0.20; #21, "sidewalks," m.r. = 0.19; #26, "dead-ends/driveways," m.r. = 0.17). These categories attest to the importance of pathways. The street specifically, as a principal childhood place, is further reinforced by Barker and Wright (1955), who state that traffic ways had the highest occupancy index[15] (7.4) of all community settings for all children, apart from school classes (30.9). On the same scale, open spaces had an occupancy index of 4.3.

In theory, users' mention rates could be compared to actual "occurrence rates" in the environment, indicating the extent to which image and reality coincide. Although the necessary occurrence values are not numerically available, some differences are informally evident. Nonpathway asphalt, for example, has a very low mention rate (0.02) despite its dominant presence in the urban scene. It is apparently a phenomenol nonentity.

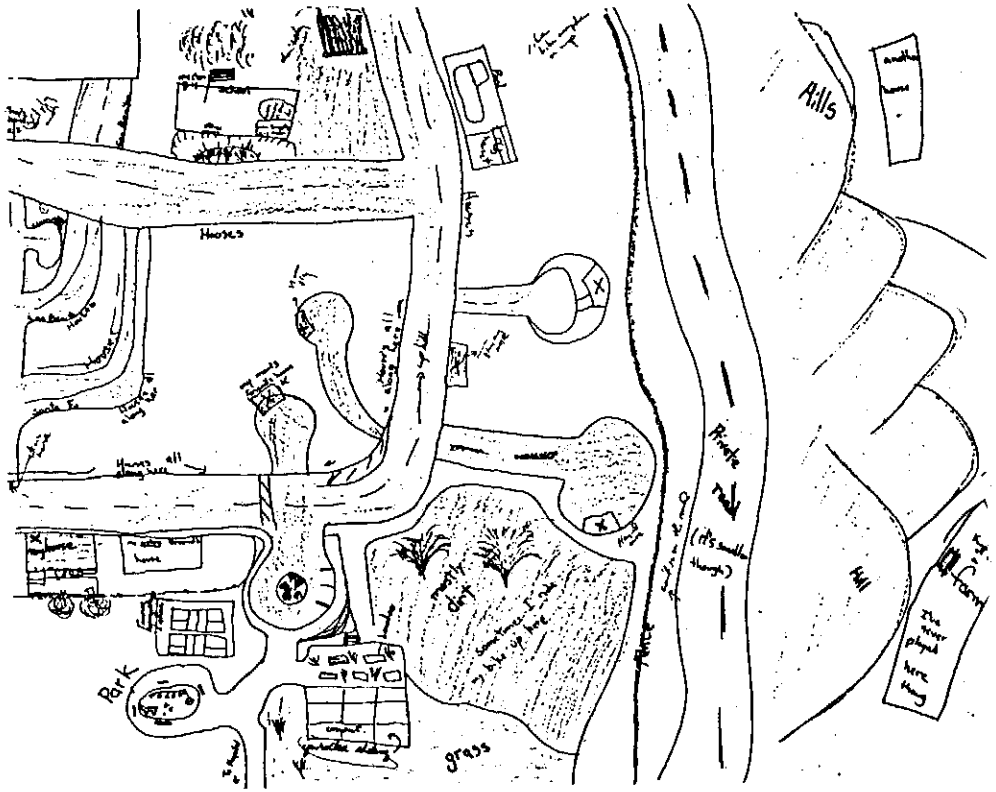
Taking an example from the opposite extreme, surely the moderate mention rate for creeks/streams (0.21) indicates a high degree of affiliation compared to their infrequent occurrence in the landscape (many have been culverted). For other elements, mention rates seem equivalent to their frequency of occurrence—trees, for example. Such judgments are based on the presumed *positive* affiliation between person and place. An example of negative "disaffiliation" is indicated by the low 0.26 m.r. given to "traffic" (compared to its ubiquitous presence), reinforced by negative reactions expressed in interviews.

Table 6 shows the 72 place-element categories aggregated into 16 broader place-element classes. The collective prominence of homesite elements comes across clearly with a mention rate of almost 2.00, followed by people (1.49) and vegetation (1.05), each with a value greater than 1.00. Pathways follow closely behind with a mention rate of 0.92. The sizable number of weighty categories mitigates against any kind of stereotypical impression of the child's world being confined to home, school, and playground. There is a diversity here that begs recognition (and further research). Perhaps the most impressive finding is the collective rank of natural systems, accounting for just over a quarter of the aggregate mention rate. Nature evidently has a powerful presence in the world of childhood.

[15] *Occupancy index* was defined as the percent of the total occupancy time which a subgroup spent in a setting or group of settings (or the percent of time a class of settings was inhabited). *Territorial index* is also a useful measure of place-significance, defined as the percentage of all community settings inhabited by a subgroup (or the percent of a subgroup inhabiting a class of settings); see Barker and Wright (1955, pp. 99-109).



(A)



(B)

Figure 4. Graphic simulations of 12-year-old girls in San Francisco (A) and a nearby suburb (B), in answer to the request, "make a map or drawing of all your favorite places, where you go after school or at weekends—around your home and neighborhood, including the summer." As well as providing useful aggregate data, as discussed in the text, a wealth of possibilities is opened up for the interpretation of individual differences. The city child's drawing is subdivided into four distinct environments: a detailed description of the older apartment building where she lives, including the stoop where she often plays with her friends; two neighborhood parks within walking distance of her home; and the "muni" used "to ride all over the city." There is an overall impression of richness in breadth and depth of experience. The suburban child's drawing clearly reflects a greater sense of environmental continuity, especially in the typical suburban "court" street pattern, which interconnects the homes of several friends and supports much bike-riding. Parks are indicated, but with much less prominence. The lack of detail gives a feeling of blandness (compared to the city image). The "hills" on the right of the drawing were visually prominent in the neighborhood, the "desired" destination of some of the children, but rarely visited because they were "private property." From CUULS Project (1976).

The only graphic interview data comparable to CUULS are in Maurer and Baxter (1972). They asked a multiethnic 7- to 14-year-old sample to "Draw me a map of how you see your neighborhood, of the place that you live." Their results clearly emphasize vegetative elements, viz.: grass (42%), trees (52%), and flowers (22%) were highly ranked, as were houses (90%) and homes (70%); "other built-structures," e.g., streets (69%), train tracks (25%), and fences (10%) were also significant. An obvious difference to CUULS was the low ranking of playgrounds (7%)—not commented on in the text.

The Berkeley Park Use Study (Mason *et al.*, 1975) presents clear evidence to show that children and adolescents are the predominant users of small neighborhood parks. In five out of six of the parks studied, the under-19s represented more than 75% of the user population. In half the parks 6- to 12-year-old use was particularly dominant.

The study by Lukashok and Lynch (1956) of adults' urban child-

TABLE 5
MENTION RATES OF PLACE ELEMENTS IN RANK ORDER[a]

Place elements	Number of mentions	Mention rate
1 Child's own house	210	.79
2 Through streets	209	.79
3 Child's mention of self	174	.66
4 Friends/relatives home	127	.48
5 Child's school	105	.40
6 Child's friend(s)	94	.35
7 Store(s)	93	.35
8 Community park	90	.34
9 Single trees	82	.31
10 Lawns	82	.31
11 Fences	70	.26
12 Playground/schoolyard/equipment	70	.26
13 Traffic	69	.26
14 Community buildings	69	.26
15 Dwellings/apartments	61	.23
16 Neighbors/sitter's house	57	.22
17 Yard for play/stoop	57	.22
18 Dirt/sand/gravel/tanbark	56	.21
19 Creek/stream	55	.21
20 Trails/shortcuts/paths/alley	53	.20
21 Sidewalks	51	.19
22 Child's parents	51	.19
23 Swimming pool	47	.18
24 Sports field	47	.18
25 Hill/mountains	46	.17
26 Dead-ends/driveways	45	.17
27 Child's siblings	44	.17
28 Building interiors	43	.16
29 Sports playing court	41	.15
30 Topography	38	.14
31 Shrubs	38	.14
32 Buses/BART/stops	37	.14
33 Tall grass/weeds/leaves	37	.14
34 Climbing trees	36	.14
35 Tree clusters	32	.12
36 Child's relatives/other adults	31	.12
37 Cats/dogs	30	.11
38 Climatic conditions	29	.11
39 Agricultural land	27	.10
40 Forts/clubhouses	25	.09
41 Water Play	25	.09
42 Fruiting trees/vines	25	.09
43 Rocks	25	.09
44 Regional park/fairground/campground	24	.09

TABLE 5 *continued*

Place elements	Number of mentions	Mention rate
45 Vacant lot/land under development	24	.09
46 Railroad	23	.09
47 Parking lot	23	.09
48 Misc. buildings/structures for playing	23	.09
49 Shopping/commercial strip	22	.08
50 Pond/lake/reservoir/ocean	22	.08
51 Gas station	19	.07
52 Fish/aquatic life	19	.07
53 Bridges/tunnels	18	.07
54 Dirt roads	18	.07
55 Flowers	18	.07
56 Treehouse	18	.07
57 Garden	16	.06
58 Skating rink/bowling alley	16	.06
59 Church	16	.06
60 Wild animals	16	.06
61 Shopping center/plaza	15	.06
62 Horses	14	.05
63 Abandoned buildings/structures	14	.05
64 Farm animals	13	.05
65 Wild birds/insects	13	.05
66 Movie theater/drive-in	10	.04
67 Tree-swing	10	.04
68 Other domestic animals	8	.03
69 Secret/hiding places	7	.03
70 Asphalt/concrete	6	.02
71 Woodland	5	.02
72 Culvert or stream	2	.01

[a] From CUULS:US graphic simulations. $N = 265$

hood memories underscores several of the preceding findings, particularly in relation to living elements. From 40 adults interviewed, the following elements were remembered frequently: lawns (27%), ground surface (25%), trees (21%), water (15%). It seems reasonable to conclude that experience of the natural environment is one of the crucial continuities in human life, giving adults a recollected "grounding" in their childhood years.

PLACE ELEMENTS IN THE HABITUAL RANGE

We shift attention now from the aggregate assessment of the place content of the inclusive home range to a closer look at the content of

TABLE 6
AGGREGATED MENTION RATES FOR 16 CLASSES OF PLACE ELEMENT[a]

Place-element class	Mention rate	%
Homesite	1.99	17
People	1.49	12
N—Vegetation[b]	1.05	9
Pathways[c]	.92	8
Community facilities	.91	8
Open space (official and ad hoc)	.87	7
Through streets	.78	7
N—Natural ground surfaces	.62	5
Sports facilities	.57	4
N—Macro-landscape elements[d]	.55	5
Commercial buildings	.49	4
N—Animals	.43	4
N—Aquatic features	.39	3
Fences	.26	2
Traffic	.26	2
Child-built places[e]	.24	2
Interiors	.16	1
Total	11.98	100

[a] From CUULS:US graphic simulations. $N = 265$
[b] N, natural system elements = 3.04, or 25.4% of total.
[c] Includes all pathway elements except "through streets," because they have a more ambiguous function.
[d] Includes large-scale or ubiquitous elements, such as hills/mountains, climatic conditions, and topography.
[e] Includes forts/clubhouses, miscellaneous structures used for play secret/hiding places.

places in the habitual realm only (remembering that we have now partitioned off one segment of the ecosystem). At this scale most studies introduce or rely heavily on systematic behavior mapping. An immediate problem with the several good sources available is their categorical mismatch. In an effort to reap the maximum comparative value, findings have been assembled together in two tables. Table 7 contains the results of one German and five American studies. Table 8 contains the more closely coordinated results of two British studies.

The six parts of Table 7 show some clear differences and similarities between the suburban, mixed, and urban contexts. The Aiello *et al.* low-density suburban figures (A), with the smallest number of location categories, indicate a massive 74% of activity actually occurring on the

house-site, with 18% occurring on the street (presumably including sidewalks).

The Sanoff and Dickerson figures (B), from a development of similar density, show a much stronger orientation toward the street, possibly reflecting a cultural attribute of the wholly black residents, compared to Aiello *et al.*'s white suburban population. In both cases, public space within or adjacent to the development was hardly used. The most viable explanation seems to indicate the social sufficiency of the house lot and street space.

The Coates and Sanoff figures (C) are from a higher-density, though still suburban, site. Now we see a dramatic shift of activity toward public and community open space (with interest in the street maintained), perhaps indicating the insufficiency of the much smaller attached house lots.

The Auslander *et al.* figures (D), taken from a mix of two urban and a rural site, present a confusing contradiction to the foregoing, with the majority (55%) of activity occurring on the private homesite, and a smaller amount (14%) occurring in public open space and playgrounds. Use of sidewalks (27%), however, remains impressively large.

The other two sets of figures (E and F) were recorded in similar-looking low-rise, "super-block" developments, although in Vogelstang (D) the buildings were more dispersed than at St. Francis Square (E and Figure 5). In these two sites behavior has shifted dramatically from private yards and streets to a variety of designated community spaces, although detailed examination shows considerable disparity between the distributions of activity.

In Vogelstang nearly three times as many children were drawn to play areas as in St. Francis Square, whereas the latters' grassed areas were much more popular. St. Francis Square figures also indicate that over half the outdoor activity occurred on paved areas and sidewalks, whereas the Vogelstang figures show only about a quarter of total activity in these categories.

The reasons for these differences could be many. Our hunch is that they lie more in the physiographic realm than in the social. The major significance of the data is simply to show that there are differences—from which all manner of implications can be drawn (which space does not allow here).

The Cooper Marcus study is unique in also supplying space provision figures, thus enabling Use Space Ratio (USR)[18] values to be

[18] Derived from Hole (1966), who used the term Ratio Space Usage (p. 6).

TABLE 7

LOCATION OF CHILDREN'S OUTDOOR ACTIVITIES IN SIX RESIDENTIAL BEHAVIOR-MAPPING STUDIES[a]

(A) Aiello *et al.* (1974)		(B) Sanoff and Dickerson (1971)		(C) Coates and Sanoff (1972)	
Frontyard	39%	Front step	6%	Front step and private sidewalk	4%
Backyard	33%	Driveway	5%	Backyard	4%
Street	18%	Frontyard	15%	Public sidewalk	10%
Carport	5%	Backyard	18%	Street	4%
Natural areas	5%	Street	23%	Parking lots	9%
	100%	Public sidewalk	15%	Woods	11%
		Cul-de-sac	8%	Public open space	25%
		Community center	5%	Community open space	33%
		Open field	3%		100%
		Central playground	2%		
			100%		

(D) Auslander et al. (1977)		(E) Dresel (1972)		(F) Cooper Marcus (1974)	% use	% provision	USR
Sidewalks	27%	Play areas	42%	Paved areas	44	20	2.2
Backyards	14%	Paths	21%	Grassed areas	19	44	.4
Frontyards	11.5%	Social center	17%	Play equipment areas	15	5	3.0
Front porches	10%	Green spaces	6%	Perimeter sidewalks	12	9	1.3
Public open space	7%	Entrances to buildings	5%	Parking lots	4	21	.2
Playgrounds	7%	Spaces not yet built on or landscaped	5%	Other (trees, fences, garbage sheds, meter boxes)	6	1	6.0
Side yards	6%	Streets	3%		100	100	
Aprons	5%	Garages	1%				
Private Sidewalk	4%		100%				
Street	4%						
Back porch	2.5%						
Alley	2%						
	100%						

[a] (A) Aiello *et al.* (1974, p. 192). Systematic observation was used to record activities with a total of 30 two-hour observations periods, in a New England suburban development, housing 305 4- to 14-year-olds. (B) Sanoff and Dickerson (1971, derived from Table 1, p. 99). A total of 1941 people were systematically observed in term-time, between 3:30 and 5:00 P.M. with 3- to 13-year-olds accounting for 88% of the total. The site was a 46-acre Turnkey housing project of 216 detached dwellings, housing 1129 total population. (C) Coates and Sanoff (1972, derived from Table 1, p. 13-2-5). A total of 519 people under 18 were systematically observed between 4:30 and 5:30 P.M., on six nonrainy days in March and April 1971, with 3- to 13-year-olds accounting for 71% of the total. The site was an 8-acre Turnkey housing project of attached single-family units, with a total population of 236. (D) Auslander *et al.* (1977, p. 6) recorded preestablished data categories directly into a tape recorder, for later transcription. The study covered a predominantly Chicano sample of 3- to 12-year-olds located in three sites: a barrio and a public housing project in Denver and a rural village in the mountains. A total of 4838 observations were made. (E) Dresel (1972, p. 81). Observations were made in a moderate-density development in Vogelstang, a suburb of Mannheim, Germany. (F) Cooper Marcus (1974, p. 202). Behavior-mapping techniques were used to record behavior of people under 18 years old, with 0- to 11-year-olds accounting for 87% of the total. The site was a 300-unit, low-rise moderate-density housing development (St. Francis Square), in San Francisco. Each of 25 subareas was observed 12 times in a period of 5 days, from 8:00 A.M. to 8:00 P.M., in June 1969.

calculated, to indicate the "social effectiveness" of each category of behavior/environment.

Table 8 compares the percentage distributions of activity by location for the two British (public housing) studies. A tendency for play to occur on hard surfaces immediately surrounding residential units is clearly indicated. In low-rise situations considerable use (38%) was made of roads and pavements. In medium-rise situations a shift toward paved courtyard and intermediate areas occurred. In mixed-rise, denser layouts, a further shift occurred toward the buildings themselves, where a full 40% behavior was located in access areas (e.g., stairways and balconies), spaces that are immediately available and offer some degree of enclosure and a feeling of security. In nearly all classes, play on grassed areas was low. Provision of such areas is often low in high-density situations, and that which is provided is invariably "off limits" for children's use. Play in designated playgrounds was also low. The only exception was the 23% playground use in high-density estates, a score practically twice that of the nearest rival. The reason for this, as noted by Cooper Marcus (1974), is that in high-density situations there is frequently nowhere else for children to go, as the rest of the site is given over to buildings and heavily trafficked streets.

ENVIRONMENTALLY DEPENDENT AND INDEPENDENT ACTIVITY

So far we have looked at the significance of different elements in terms of gross amounts of activity supported. We need also to look at

Table 8
Comparison of Locations of Children's Activity in Two British Studies of Public Housing Open-Space Use (%)

Locations	Four low-rise estates[a,b]	Six medium-rise estates[a,b]	Five mixed-rise estates[a,b]	Old housing area[c]	Nine high-density estates[d]	Six low-density estates[d]
	18,102 observations			362 children	5251 children	4659 children
Access areas (i.e., balconies, stairways)	—	23	40	7	15	7
Paved areas (i.e., garage courts)	24	41	23	7	36	35
Roads and pavements (i.e., sidewalks)	39	11	9	54	7	34
Gardens (i.e., private yards)	18	2	1	9	2	—
Play areas	4	11	13	3	23	9
Grassed areas	10	7	8	—	12	13
Wild areas and waste land[e]	5	1	12	14	—	—
Unorthodox areas (garage roofs, etc.)	4	4	2	3	—	—
Planted and other areas	1	5	6	3	—	—

[a] Department of Environment Report (1973), p. 18; 0- to 15-year olds.
[b] Percentages adjusted to exclude the numbers of children observed on the estates which did not have locations in a particular category. Therefore, totals exceed 100%." (DoE 1973, p. 18).
[c] Department of Environment Report (1973), p. 61; 0- to 15-year-olds.
[d] Hole & Miller (1969), p. 1531; ages not given.
[e] "Waste land" applicable to "old housing area" only.

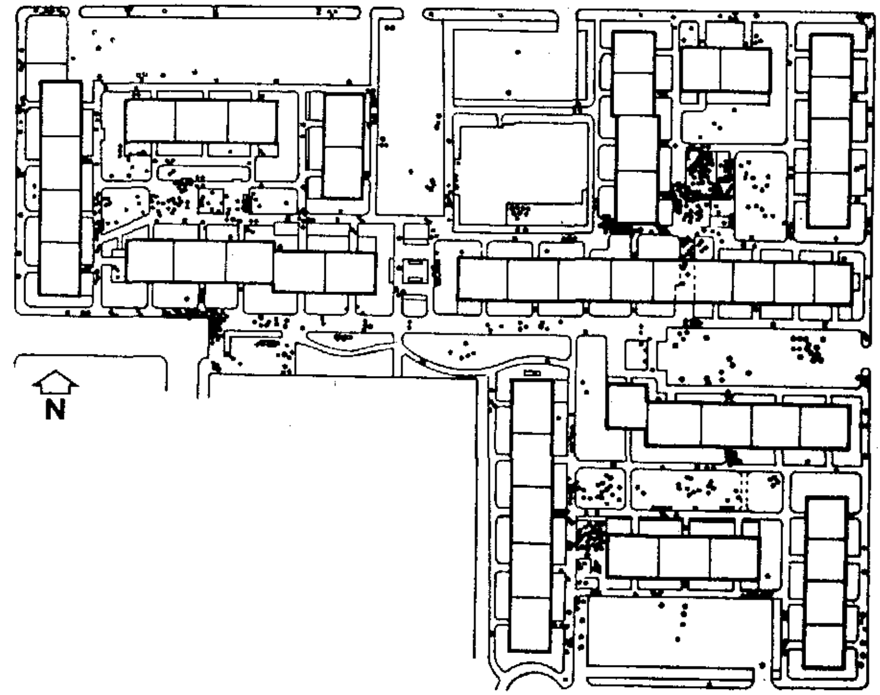


Figure 5. Behavior map of St. Francis Square (a low-rise, moderate-density housing development in San Francisco) representing a "composite day" (8 A.M.–8 P.M.) of behavior, recorded in June 1969. The overall proportion of children (solid dots) to adults (open dots) is almost exactly 7:3, rising to between 5:1 and 7:1 in the interior courtyards. From Cooper Marcus (unpublished source).

variations by types of activity, to give a clearer idea of instrumental significances.

Table 9 includes observational data, from those studies that can be reasonably compared, of activity types occurring mostly within (one may assume) the habitual realm, subdivided according to whether the activity was considered to occur dependently or independently of environmental support.

The figures are remarkably consistent, even though a fairly wide range of density, urban/suburban, and cultural contexts are covered. It is immediately apparent that between one-fourth and one-fifth of activity consists of the more or less immobile social pursuits of children: "hanging out," talking with each other, or playing sedentary games. On the other hand, between one-fourth and one-third of activity is mobile, i.e., children moving around from one place to another, en-

TABLE 9
ACTIVITIES RECORDED BY SYSTEMATIC OBSERVATION IN FOUR STUDIES OF OUTDOOR SPACE IN RESIDENTIAL AREAS (%)

Activity type	Department of Environment (1973) Low-rise	Medium-rise	Mixed-rise	Mean	Hole (1966) p. 8	Cooper Marcus (1974) p. 204	Aiello *et al.* (1974) p. 193
Environmentally independent							
Sit/stand/lie	19	28	30	27	23	20	15
Walking/running	40	31	30	33	24	37	15
Subtotal	59	59	60	60	47	57	30
Environmentally dependent							
Using playground equipment	3	6	8	7	12	6	8
Wheeled vehicles, roller skates	15	11	9	11	10	4	21
Ball games	6	8	8	8	2	9	7
Subtotal	24	25	25	26	24	19	36
Other	17	16	15	14	29	24	34
Total	100	100	100	100	100	100	100

gaged in chase games, or just wandering around looking for whatever might come their way. The use of wheeled vehicles is generally in the range of 10–15%, although with some larger fluctuations. Cooper Marcus found a low of 4% in a low-rise, moderate-density site, Aiello *et al.* found a high of 21%, in a suburban location. The latter can be explained in terms of generous suburban space provisions and higher levels of affluence, resulting in the possession of more wheeled vehicles (perhaps also reinforced by the example of an auto-dependent lifestyle).

Playground use and ball games occur at similar levels of frequency: between 3% and 12%. These activities, as well as larger-scale vehicle play, are more environmentally dependent than stationary and other mobile activity, which to a large degree can happen anywhere; whereas ball play depends on the provision of ball hoops, surrogate goal posts, sizable flat open areas, walls for bouncing games, and nonprohibitive management. Wheeled vehicle play is dependent on varied topography, circuitous pathway routes, smooth ground surface, etc. The environmental dependency of playground activity is self-evident.

Totals for the "dependent" and "independent" categories show a high consistency with each other. For the urban sites (first five cases), correlations are very high. The DoE figures indicate almost identical proportions of dependent to independent activity in each case. The proportions of independent activity vary only between 47% and 60%. Agreement between the two low-rise examples (DoE and Cooper Marcus) are particularly notable. Just a few percentage points separate the values taken from two different sites, thousands of miles apart, in two very different cultures and very disparate climatic conditions. A general predictability according to building type, independent of culture, is tentatively suggested by these figures. It is hoped that they may contribute toward further investigation of the degree to which children's play is culture specific or unspecific at different ages.

We turn now to the bottom half of Table 9, showing environmentally dependent activity. The figures indicate that 19–36% of the activity is related to playground equipment (fixed artifact) or wheeled toy and ball play (objects brought to the site, but dependent on specific site characteristics).

The category of "other" activity, which covers 14–34% of all activity, should not be overlooked. On the contrary, this is the area within which the finest grain and diversity of user-site relationships occur, where urban culture has its strongest expression, where personalized differentiations can give users a sense of possession—as exemplified by the use of specialized features in the Cooper Marcus study.

THE CO-ACTION OF RANGE, PLACE, AND PATHWAY

In essence, range development seems to involve children in a combined process of both finding and making places, connected by a network of pathways. Quality-enhancing elements and attributes are very unevenly distributed in the landscape and children are obliged to discover, assemble, and mold combinations to suit their purposes.

Place-making may result from small modifications to fixed resources, a "fort" for instance may exist as an almost inperceptible depression in long grass. The prolific fragments of natural systems can provide the loose-parts (Nicholson, 1971) or behavior objects (Barker & Wright, 1955) necessary to support more open styles of play. As children move through the environment, they may scratch the dirt, pick a couple of mottled stones from the edge of the highway, pluck a few flower heads to decorate their person, or discover some latent play-

function in the detritus of modern life: plastic cups, pull-tabs, abandoned domestic apparatus, etc.

Loose-parts are frequently too small to be discriminated in drawings or mentioned in interviews; and they are frequently used in combination with larger fixed features (as documented by both Hart, 1977, and in CUULS). Elements such as a discarded refrigerator case, a small space between buildings, a shady spot under a low-hanging tree provide initial cavelike spaces and are further elaborated and personalized by the addition of small objects and possessions, in much the same way that adults make a house into a home. The scale and symbol system are different, however. This gives rise to political difficulties between children and adults, because children's habitations cannot be given meaning in the conventional terminology used by adults to describe the world.

Data from both Hart (1977) and CUULS indicate the frequent occurrence of small modifications to the landscape. In Inavale they were usually situated within 100 feet of home. Hart recorded that Inavale children spent a large amount of time building places for themselves, and observed that many of the "houses" of children under eight were "found" places with scarcely any major physical modification. They nevertheless served the users well, who modified and differentiated their interiors via their imaginations, rather than by hand. He concluded that the primary factor required to allow building operations was the availability of areas close to home, not dominated verbally by adults or subject to the manicured announcement of adult ownership. A second requirement of building activity was a "flexible landscape" to ensure a ready supply of "loose parts" for construction, provided in Inavale by lush vegetation or snow, depending on the season. Marked girl/boy differences were observed in building places. Whereas boys concentrated on the building structure, girls devoted their attention to details of the interior, often with great imagination. More substantial physical changes such as building clubhouses and tree-forts occurred more rarely. Even in a rural area where opportunities are greatest, the limitations of time, space, availability of materials, and "technical know-how" make construction a haphazard, unpredictable affair. Although this latter scale of activity more readily fits adult stereotypes of a "free childhood," it seems clear that the place transformations most commonly bringing children feelings of proprietorship are quite modest. Hence the viability of the "adventure playground" concept (Cooper, 1970; Bengtsson, 1972; Moore, 1975), with the purpose of providing children with more substantial place-making opportunities close to home.

Only Hart (1977), Gray and Brower (1977), and CUULS looked at children's pathway systems. Two types are identifiable: pathways that traverse exclusive child domains and those that are shared with adults. In CUULS it was found that children frequently switched back and forth between one system and the other. Hart identified 10 child-only paths in his study site, and recorded how some were used to bypass traffic hazards or as places for daring exploits such as setting off firecrackers. They seemed to serve as ways of escape from adult domination.

In many instances pathways existed as literal shortcuts through small openings, inpenetrable to adults; or they ran across private property where outsiders would not dare to follow, but where children's presence was either tolerated or remained undetected. Hart and CUULS both also discovered examples of so-called shortcuts that geographically were in fact round about routes between stated destinations. But they gave access to a stimulating private landscape, where the normal space-time relations of the functional adult world were suspended. Child-only routes seem to be used as ends in themselves, as places to "dilly-dally on the way"—not so much as movement channels as endless sequences of exploration-for-its-own-sake in *ad hoc* "side-trips." In the most benign examples, there seemed to be no "final destination."

On the other hand, to quote Hart, "considerable value is placed by children in knowing how to get to places. Paths are 'discovered' by them and special pride is exhibited in the finding of 'shortcuts.' This knowledge is shown off to friends with that aura of great excitement which surrounds the sharing of any 'secret.'" Routes are "ritualized" by groups of friends, he suggests, "to cope with the uncertainty of too much complexity . . . [making] landmark differentiations highly significant . . . especially for younger children's range-extensions."

A game strategy seems to operate here, echoing Mead's (1966) insistence that both familiarity and challenge be accommodated by the neighborhood landscape. For example, a CUULS expedition led to a description of Golden Gate Park's landscape as a place where, "me and my friends try to get lost . . . running all over without looking where we're going . . . then we find where we are, but we know we got there differently." In this way young explorers extend their schemata of the park, by playing risk-taking "range games," in a landscape ideally suited to the purpose (though probably not designed as such).

Inevitably, the most significant places occur at the intersections of many behavior settings, where the inherent potential of elements and attributes coincide with behavioral competencies of the majority of users. In complex landscapes, pathways and places are so thickly spread

on the ground that they form a pyramid of overlapping schemata and interdependent behaviors. Such *multipurposeness* (the capacity of a place to accommodate a variety of activities simultaneously or in sequence) is usually the result of deliberate design, although it may sometimes arise from serendipitous combinations of natural and cultural forces, as in an old rural cemetery (the favorite place of a CUULS boy) containing a mixture of fortresslike monuments, patches of lawn and large mature exotic trees. This kind of juxtaposition provides a powerful stimulus for children, drawing them beyond their habitual domain, into a perceptually more boundless "as if" world where mind, body, and landscape can be in more fluid contact.[17]

CONCLUSIONS AND FUTURE DIRECTIONS

A conclusion that stands out is the evident cultural dependency of children's outdoor relationships. This is not given by any single study so much as by a scattering of indications throughout the body of literature. The impression is strong enough to suggest that every subculture has a significant ethos in childhood environmental experience (Young, 1975). If this is so, two implications immediately follow. The first is that the promotion of environmental awareness, as well as the development of more explicit environmental values in society, must be more firmly recognized as an important responsibility of parents and early-middle childhood public school education. The second implication is the need for more cross-cultural and comparative work at all scales, from interneighborhood studies in the same city to international studies following the directions set by the UNESCO report (Lynch, 1977).

Interrelated with cultural dependencies there also exist, theoretically, more universal species-specific developmental functions, facilitated or constrained as a result of children's outdoor experience. Such functions have so far proved difficult to isolate. Certainly to an extent they can be derived inductively from developmental theory—from Piaget in particular. But the applicative leap required is of immense proportions. Our own suspicion is that once the empirical literature

[17] A problem of New Town and suburban environments is that the significance of multipurpose qualities has not been appreciated by those who control the landscape. Complex, naturally formed differentiations are often unavoidably bulldozed during construction, but are not deliberately replaced. The child is faced with an oversimplified lookalike landscape that extends the stereotyped, adult-controlled habitual range instead of providing a contrast to it.

has reached a sufficient magnitude, commonly occurring factors and correlations will begin to be identified. Methodologically, this takes the phenomenological approach to its logical conclusion, i.e., under appropriate ecological conditions children themselves will reveal environmental dependencies that lie beyond the conditioning effects of the particular culture they were born into.

It consequently follows that children must be more directly involved in research and decision-making as co-workers. From our own work, and drawing on that of others (especially Coles, 1964), we are convinced that in essence children are the experts most qualified to make judgments about the categories of behavior and meaning to be applied to their own settings.

The universal needs of children must be clearly articulated and integrated into public decision-making. Empirical pursuit is important as deeper needs may often be overshadowed by more visible cultural attributes, which are not necessarily supportive of physical health and psychic well-being. Both Hart (1977) and Payne and Jones (1976), for example, looked at suburban environments[18] and concluded that they have a detrimental effect on the development of postkindergarten children, providing less and less opportunity for the enhancement of competence. In Chapter 5 of her study of Easter Hill Village, Cooper (1975) presents clear evidence showing how social conflicts between children and adults in housing areas can be exacerbated by a lack of adequate provision to meet children's outdoor play needs. These studies are valuable because they identify a set of physical and social characteristics that define unsatisfactory ecological conditions, thus paving the way for further research focused on the more effective management of residential settings to promote child-development more adequately.

Age and range extension are clearly correlated, but because of the variety of secondary factors involved it is difficult and probably futile to try to specify detailed norms of range extent by age. More appropriate is the clarification of general stages of range development within broad age limits that should be expected (e.g., in "early," "middle," and "late" childhood), in relation to specific controlling factors in particular contexts.

Sex differentiation emerges very clearly as a major issue for further research. We have quoted findings that clearly indicate that at most age levels boys' territorial ranges are more extensive than girls' ranges, in some contexts by a large amount. Yet on the other hand, according

[18] Hart's study area included a new hilltop suburban subdivision, providing an ideal opportunity for comparison with the old town.

to two sources (CUULS and Barker and Wright, 1955) covert environmental relationships appear to be more or less equitable. Thus, overt use is not a sufficient indicator of landscape significance. Indeed, evaluations based solely on direct observation of behavior (especially in ecologically partitioned, "official" settings), will more likely result in only minor improvements to the status quo, rather than broaden the spectrum of needed solutions.

The problem for individual investigators is to recognize their own personal values, as developed from field experience, combined with sources of introspection and apply them explicitly to interpretation and future research design. In this way the values of "others" will be more clearly identifiable. It cannot be directly proved, for example, that children's involvement with natural systems is absolutely essential to their well-being, yet one can be led toward this conclusion by working closely with children in ecologically viable settings. This in turn will affect future research design, resulting inevitably in the reinforcement of previously tentative conclusions. The outcomes of such an evolving epistemology will be very different from those predetermined by theoretical suppositions.

Cross-cultural, comparative study, identification of universal dependencies, closer scrutiny of environmental sex differentiation and the pursuit of in-depth, co-working relationships with children in education, and research seem to be, in summary, general directions to be followed. We conclude with a list of specific research questions and tasks within this perspective, appearing to us as priorities under the broad areas of range, place, and pathway analyses.

Range Analysis

1. In the assessment of a greater variety of contexts, special attention should be paid to (a) *urban-suburban landscape variables:* density, land-use pattern, pathway networks, traffic distributions, age of landscape and buildings, presence of natural systems; (b) *climatic differences:* (studies so far are biased toward warm, summer months); (c) *temporal factors* of seasonal daylight hours, weekday/weekend, school time/vacation, etc., and how they effect indoor/outdoor investment of discretionary time; (d) *influence of television,* role of parents as monitoring agents.[19]

[19] Although many children watch a lot of television, it is not so far all children. A wide range of TV-watching behavior was recorded in CUULS, reflecting differing parental values.

2. Investigations of range conditions that tend to foster outdoor experiential equality between girls and boys.

3. Extended exploration of the roots of parental fears compared to factual reality. More adequate data are required concerning actual (as opposed to imagined) physical and social dangers faced by children, to help reduce parental apprehension in some cases and to focus political awareness in other cases.[20]

4. Methodologically, the development of diary methods and graphic-simulation techniques show considerable promise as efficient data-gathering tools.

Place Analysis

1. Much more work is required in order to understand the relationships between *involvement* and *affiliation,* i.e., how does physical engagement contribute toward a lasting image of place or, indeed, does involvement necessarily need to come first? This is a particularly pertinent question vis-á-vis girl/boy differences.

2. Following from the above, extended studies of outdoor activity are required, leading eventually, we hope, to a set of agreed-on topologies. At the moment this is lacking in the literature and greatly limits opportunities for interstudy comparison. Sharper attention must also be paid to the different biases inherent in activity classification, according to the sex of the investigator, her/his disciplinary background, the overall scale of study, and interpretations of predominant molar categories versus weighty categories of miscellaneous "other" activity. An attempt to standardize activity topologies will require formal meeting and negotiation between experienced field workers. There is a similar need to standardize age groupings and temporal units of analysis.

3. Deeper analyses need to be made of place experience, conducted over a relatively long period of time, so that the two measures of involvement, "frequency of visit" and "duration of stay," can be recorded in sufficient volume to guarantee statistical relevance when correlated with physical and social variables. With sufficient records, places and their constituent place elements should be able to be ranked

[20] There is an overwhelming issue of liability insurance and its detrimental effect on the quality of children's environments, which in turn is related to insurance companies' profit motives on the one hand and the public's propensity to sue on the other. Empirical data would contribute a great deal toward public education in this area.

according to an index of involvement. This will make possible the projection of range "opportunity surfaces" in new residential development, at a greater level of specificity.

4. At a deeper level still, assessment of specific dependencies between particular activities and particular place elements and attributes will be of great benefit to decision-makers. Involvement and affiliation do not develop without some degree of dependency on elements and attributes. However, some activities are supported by a wide range of circumstances, others are place and time specific. This distinction needs greater clarification in terms of specific elements and activities to help define the most potent components of multipurpose environments.

5. Related to paragraph 4, above, is the need for further comparative studies of nontraditional, unofficial, or esoteric play environments. These include adventure playgrounds[21] children's use of wild areas in parks and elsewhere; miscellaneous uncontrolled areas such as waterfronts, renewal sites, waste-land, construction areas, etc. A specific subarea includes the places children find and make for themselves, including forts, hideaways, secret places, and tree houses.[22]

6. Homesite architecture, i.e., spaces inside and immediately around, above, and below the child's residence, beg further research (although the same ethical caveat applies). A considerable contribution has been made by the cited work. Pollowy (1977) has published a useful introductory text. So far, the majority of studies have focused on a fairly narrow band of moderate- to high-density housing types. This may be a priority place to start, but extensions need to be made into a much broader range of housing while also paying greater attention to the effects of family and peer relationships. Barbey (1974) has presented a highly suggestive direction, based on children's graphic conceptions of house design. Ladd (1972) also demonstrated the possibilities of co-working relationships by asking black adolescents to contrast present housing conditions with imagined future hopes.

7. Generally speaking, we favor a deliberate bias toward the comparative case study of "success" environments (chosen on the basis of user-consensus), rather than "problem" environments; seemingly the latter attract a disproportionate amount of attention.

[21] Considering how long adventure playgrounds have been in existence, especially in Europe, there is a mystifying paucity of empirical literature.

[22] Such studies, conducted in the field, raise serious ethical questions concerning children's rights of privacy and proprietorship, however.

Pathway Analysis

1. Elements and attributes that provide good pedestrian pathway networks need documentation, especially in high-density/high-traffic conditions. Appleyard and Lintell (1972) have already documented the dramatic negative effect of traffic on the general quality of street life. Further studies are needed to show the especially severe effects of traffic on children's use of sidewalks and streets.

2. Much more information is required concerning how children move around their block, neighborhood and city. Durlack, Duncan, and Emby (1976) have made a beginning contribution, vis-à-vis 10- to 16-year-olds in suburban Toronto. But key controlling factors need more precise identification and analysis, in a broader range of contexts.

3. Research and development work is required in relation to bikeway and horse-trail networks. Successful examples need study, to isolate transferrable principles and attributes. Cycle-range studies need to be conducted in parallel with pedestrian studies, using the same techniques and measures.

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