The *Prevention in Human Services* series:

- *Evaluation & Prevention in Human Services,* edited by Jared Hermalin and Jonathan A. Morell
- *Helping People to Help Themselves: Self-Help and Prevention,* edited by Leonard D. Borman, Leslie Borck, Robert Hess, and Frank L. Pasquale
- *Early Intervention Programs for Infants,* edited by Howard A. Moss, Robert Hess, and Carolyn Swift
- *R_x Television: Enhancing the Preventive Impact of TV,* edited by Joyce Sprafkin, Carolyn Swift, and Robert Hess
- *Innovations in Prevention,* edited by Robert Hess and Jared Hermalin
- *Strategies for Needs Assessment in Prevention,* edited by Alex Zautra, Kenneth Bachrach, and Robert Hess
- *Aging and Prevention: New Approaches for Preventing Health and Mental Health Problems in Older Adults,* edited by Sharon Simson, Laura B. Wilson, Jared Hermalin, and Robert Hess
- *Studies in Empowerment: Steps Toward Understanding and Action,* edited by Julian Rappaport, Carolyn Swift, and Robert Hess
- *Prevention: The Michigan Experience,* edited by Betty Tableman and Robert Hess
- *Beyond the Individual: Environmental Approaches and Prevention,* edited by Abraham Wandersman and Robert Hess

Beyond the Individual: Environmental Approaches and Prevention

Edited by
Abraham Wandersman and Robert Hess

The Haworth Press
New York • London

The Methodological and Conceptual Basis of Environmental Policies for Children

Willem van Vliet—
The Pennsylvania State University

ABSTRACT. The literature on environmental effects on children is pervaded by value-laden statements. This article stresses careful examination of the factual basis of such statements. Selected research findings on children's health, play behavior, social interactions, and school behavior indicate a need for environmental policies for children. This need is further augmented by children's characteristics regarding their level of development, their decision-making authority, and their economic position. Four approaches to child-environment congruence are distinguished. A fable then underscores the importance of basing environmental policies for children on a certain and integral conception of how children's development over time relates to the environment. Space-time methodology is discussed as one such framework, elucidating contexual considerations that surround research and policies regarding children's environments.

Interview 1:

> Taking into account the wishes expressed by families? NO, I don't believe we can do that. We have to conceptualize, discern and supply; put the question to the right person . . . We have to build (the housing environment) and install the occupants, then Radiant City operates.
>
> Le Corbusier, architect of numerous high-rise buildings. (Chombart de Lauwe et al., 1959, p. 201.)

Reprints may be obtained from Willem van Vliet—, College of Human Development, Pennsylvania State University, University Park, PA 16802.

Interview 2:

> I hate living here. So does my husband. And the kids. Battery fowls, that's what we are . . . like chickens in a battery.
>
> Survey respondent, mother in an apartment building. (Stewart, 1970, p. 29.)

Le Corbusier was a renowned architect-planner. His *Unite d'Habitation,* an award-winning multifamily apartment complex in Marseille, France, became a mecca attracting design professionals from across the world. According to Le Corbusier, the ideal city was made up of gigantic skyscrapers, housing people at the fantastic density of 1,200 persons per acre while occupying a mere five percent of the land; the remainder was designated chiefly for large parks and superhighways.

The first quote above illustates Le Corbusier's view of the planning process, a view that was shared by many of his contemporaries and that is found still today: the experts who produce the environment know best what is good for the people who use it.

Now, consider Chandigarh, a new town in India. Here was a unique opportunity for Le Corbusier to implement his theories without interference, "unfettered by traditions of the past" in Nehru's words. Two decades after the new town's inception, Brolin (1972, p.56) observed:

> Cattle wander through shopping centers and lounge in the middle of the streets, even though it is illegal for most residents to own them. Sidewalk vending is outlawed, yet you can't walk on one without stumbling over peanut vendors, shoe repairmen and turban washers. There is an expansive park called Leisure Valley, yet hardly anyone takes his leisure there.

The case of Chandigarh does not stand in isolation. The mother's response to high-rise living, printed alongside the contrasting statement by Le Corbusier, is only one example of numerous well-documented instances where users' evaluations of the residential environment were found to differ from those of the so-called experts (e.g., Eichler & Kaplan, 1967; Lansing & Marans, 1969; Michelson, 1968; Raymond, Haumont, Raymond, & Haumont, 1966). Research indicates, not surprisingly, that such discrepant environmental perceptions also occur between adults and children, the user group on which this paper focuses (Hart, 1979; Lynch, 1977). Is suburbia a good place to raise children? Most planning officials and parents think so (Bell, 1968; Fischer, 1976). They cite reasons such as the relative safety from traffic, abundance of play space, proximity to good schools, and the lesser likelihood of association with undesirable peers. However, many children think quite differently about suburbia. *They* mention the lack of friends and lack of something to do (Van Vliet—, 1981b).

Are suburbs good child-rearing environments? Who is right: the architect, the planner, the developmental psychologist, the parents, the children? Consider apartments. Parents and housing officials worldwide claim adverse effects of such housing on children's physical and mental health and their social development (e.g., Gittus 1976; Gregoire, 1971; Hassan, 1978; Pearce, 1968; Pepler, 1977). There is however, very little research substantiating these ubiquitous concerns (Marmot, 1983; Van Vliet—, 1983). Clearly, one does not have to wait for mothers' footsteps on the walls to conclude that apartments may be unsuitable living environments for families with children. But some studies show that *under certain circumstances* apartments *are* satisfactory family housing (Ginsburg & Churchman, 1981; Michelson, 1979).

This article makes no attempt to conclude which environments are good for children and which ones are bad. These are value judgements which should be made, to be sure, but in another context. Here, the concern is with the *factual* evidence that should inform such value judgements. This article addresses the need on the part of decision makers for empirical data regarding the environments deemed desirable for and by children. It identifies methodological bases for statements about relationships between children and their environments; it also considers a conceptual framework for developing factual evidence for such statements. The first section reviews selected research findings to establish the salience of the physical environment in children's daily lives. It also focuses attention on a bias in research which for the most part has looked for adverse effects on children, giving insufficient consideration to possibilities of beneficial influences. Given the observed real impact of the environment on children, a need for environmental policies responsive to children's requirements is articulated. The methodological bases of such policies are then discussed. A fable precedes the concluding section which discusses a conceptual framework that in-

corporates both objective and subjective factors promoting and hindering the development of children's competence.

ENVIRONMENTAL EFFECTS ON CHILDREN

The purpose of this section is not to compile a comprehensive catalogue of environmental effects on children. Such reviews have been ably provided by others (e.g., Hart, 1979; Michelson & Roberts, 1979; Pollowy, 1977). The intention here is to highlight some of the research findings in order to indicate the scope and nature of environmental effects on children.[1] We will briefly identify selected research on, respectively, physical and mental health, play activities, social interactions, and school behavior and attainment.

To begin with, the environment may impact on children's physical health in both direct and indirect ways. Direct effects may occur from, for example, the ingestion of lead-containing paints (Lin-Fu, 1979); proximity to contagious diseases (Worth, 1963), pollutants (Kane 1976), or noise (Cohen, Evans, Krantz, & Stokols, 1980); exploration of new environments (Brink, 1982); and traffic accidents, either as passengers (Baker, 1979) or as active participants (Sandels, 1977)—the last being the leading cause of death among young people in North America. Indirect effects may express themselves in differential access to child-care facilities (Martensson, 1977) and neighborhood support systems (Garbarino & Sherman, 1980) and in the occurrence of accidents following a move to another environment (Knudsen-Cooper & Leuchtag, 1982).

In regard to mental health, the literature is more equivocal. Researchers lack a uniform conception of what constitutes mental well-being, and what does not, and they also do not agree on the appropriate operational definitions. Thus there are, for example, assertions galore regarding the negative effects of apartment living (e.g., Cappon, 1972; Gregoire, 1971; Gunn, 1968), but few fortifying data. One methodologically sound study did show, however, that elementary-school children in 14-story buildings scored higher on a number of behavioral disturbance measures than did comparable children in 3-story buildings (Saegert, 1980). Other environmental stimuli that have been associated with adverse effects on children's mental adjustment include household crowding (Murray, 1974), high neighborhood densities (Levy & Herzog, 1974), social isolation in suburbia (Larkin, 1979), television programs modeling

aggressive behaviors (Stein & Friedrich, 1975), and residential relocation (Northwood, 1975).

In comparison to research on environmental effects on children's mental health, studies concerning play activities are more conclusive. The following statement from a young girl's mother sums up the attitude of many parents in apartments regarding their children's play: "Of course, we limit her playing. We won't let her play with a ball for instance, or run around too much . . . " (Stewart, 1970, p. 29). Play space in and around the house ranks high among the reasons given by parents for preferring a single family dwelling (Bell, 1968). For much the same reason, suburbs are favored over inner cities (Holme & Massie, 1970). Clearly, different environments offer different opportunities for play, and children indeed engage in different play activities (Hole, 1966), although it is much less clear whether children consistently prefer one type of housing or neighborhood above another (Van Vliet—, 1981b). Further evidence on the role of the environment in play behavior comes from the extensive literature on children's playgrounds. Children do different things in, for example, traditional playgrounds with slides, swings, and the like, as compared to adventure playgrounds which are generally preferred by somewhat older children as places where they themselves can build and modify structures and assume responsibility for molding and managing their environment (Hayward, Rothenberg, & Beasley, 1974).

The significance of housing type, population density, and residential location for children's social interactions with peers and adults has been examined in detail elsewhere (Van Vliet—, 1981a; 1981b; 1984). With respect to housing type, the literature does indicate an effect on children's friendships, but the effects are not consistent. For example, while some studies have found that children in apartments have more friends than children in other housing types (Farley, 1977; Saegert, 1980), other studies have found the opposite (Davis, Bergin, & Mazin, 1974; Williamson, 1978). The reasons for these different findings have not been established, but are likely related to children's age and parents' child-rearing values. Regarding residential location and population density, the relatively large distances separating children in suburbia and low-density areas from opportunities for social interaction may result in fewer friends, fewer activities shared with friends, and a sense of isolation from peers and adults (Van Vliet—, 1981b). Growing up in these environments may diminish access to social support systems (Garbarino,

Burston, Raber, Russell, & Crouter, 1978) and impede the acquisition of skills required for gradual integration into the adult world (Van Vliet—, 1983b).

Finally, in regard to school behaviors and academic attainment (e.g., reading achievement, auditory discrimination), a number of studies have found impaired performance due to environmental conditions. Examples include effects of noise (Bronzaft & McCarthy, 1975; Evans, Krantz, & Stokols, 1980; Cohen, Glass, & Singer, 1973) and lack of functional privacy (Michelson, 1976, p. 158). Others have found effects of ambient conditions such as temperature (Lee, 1976), weather (Auliciems, 1972), and type of lighting (Mayron, Ott, Nations, & Mayron, 1977). Also noteworthy in this connection is a large British longitudinal investigation of a nationally representative sample of 16,000 children, born in one week of March 1958. After controlling for socioeconomic variables, the results at the ages of 7, 11, and 16 years showed that household crowding and lack of amenities were related to low scores on tests of reading and mathematics, and indicated a relationship between aspects of unsatisfactory housing and indicators of poor school performance (Essen, Fogelman, & Head, 1978). These results are in keeping with findings from a study of public housing in Baltimore (Wilner, Walkley, Pinderton, & Tayback, 1962) and a cost-benefit analysis of squatter housing in Malaysia (Wegelin, 1978), showing improvements in children's school performance after they moved out of substandard dwellings. Also school size and community size have been associated with student behavior and test scores (Baird, 1969; Barker & Gump, 1964) with marginal students being more susceptible to adverse effects of large size.

The foregoing discussion of environmental effects on children points to two conclusions. To begin with, it is apparent that the physical environment potentially affects children's physical and mental health, their play behavior, social interactions, and school behavior and attainment. There are two reasons why these environmental effects have not yet been asserted more forcefully. The first reason concerns aspects of research methodology. Research outcomes may vary and not be consistently convincing because of, for example, differences in sampling and confounding influences of extraneous variables such as age and social class. Also, the environmental variables are rarely measured in identical ways. A novel measure is the rule, replication the exception.[2] Hence, there are few instances of validation or refutation of reported findings.

A second reason why the significance of environmental effects on children is not always apparent stems from the mechanisms through which such effects are transmitted. Environmental factors typically exert their influence in conjunction with social, economic, and other factors that either intervene in or interact with the relationships between children and their environment. In comparison with these other factors, the physical environment does not often carry equal weight. However, in the drama of children's lives, the physical environment is a requisite stage providing children with access to different character casts and opportunities for different role repertoires.

The pertinent question, then, is not *whether* noise, density, housing, television, and so forth have an influence on children, but which *specific* noise levels, density conditions, housing designs, and program content affect particular child populations in given family and neighborhood contexts. This recognition of the environment as embedded in a constellation of relevant factors has implications for policy and research that will be discussed later.

A second conclusion emerging from the literature is that, by and large, researchers have looked for *negative* effects; the concern has been much more with ill health, social isolation, poor performance, and other negative implications than with ways in which the environment may promote well-being and friendship. This biased focus may fulfill a useful function; for policy makers, it is important to know "where the shoe pinches." Also, people's responses to negative conditions are less diffuse than to positive conditions, giving policy makers a more informative basis for decision making. However, the environment actually presents a broad spectrum of opportunities, positive as well as negative. The same city streets that have been excoriated for diverting youths into socially disapproved paths, for example, have also been hailed as indispensible places for learning social responsibility.

The observation that environments may potentially affect children in positive as well as negative ways has implications for preventive orientations. Preventive measures aimed at reducing or eliminating risk factors or improving coping responses following exposure to environmental stressors can be described as instances of *pro*scriptive planning, prohibiting environmental conditions which have adverse implications. In addition, we also need *pre*scriptive planning where recommendations for environmental planning and design are derived from children's developmental needs and formulated with

the express intent of enhancing their competence in exploring and exploiting environmental opportunities vis-à-vis a broad array of life chances. This orientation is one to which we will return.

ENVIRONMENTAL POLICIES FOR CHILDREN

The previous section established that the environment matters to children, a fact which in and of itself is sufficient basis for policy makers to consider children's needs. This basis is still augmented by qualitative differences between children and adults. Although once considered as such (Aries, 1962), children are not miniature adults. The differences manifest themselves in various life spheres; particularly relevant in the present context are level of physical and cognitive development, decision-making authority, and economic position.

Michelson and Roberts (1979, pp. 430-431), summarizing Kane's (1975) discussion, note how such physical characteristics of children as their smaller stature and the ratio of inhaled air to body weight, along with children's typical behavior patterns, make them more vulnerable to air pollution. The greater vulnerability of children to nefarious effects of toxic waste is also evident in Levine's (1982) detailed account of the Love Canal situation. Similarly, careful research has shown that young children lack the motor coordination, cognitive skills, and visibility to allow them to navigate independently and safely in urban traffic (Sandels, 1975). Furthermore, adults rarely entrust children with decision-making authority. Traditionally, adults' perspectives have favored "nurturance" over "self-determination" (Bohrnstedt, Freeman, & Smith, 1981). This attitude has been common not only in regard to potentially controversial issues such as birth control, educational placement, and custody, but has extended to such limited domains as playgrounds (Spivack, 1974). Finally, children are financially dependent on adults; if younger than 16 years, there are strict legal restrictions concerning paid employment; if older than that, they are among the first to be dismissed, provided they suceed in finding a job in the first place (Berlin, 1983). Also, children's conceptions of economic relations reflect their developmental stage (Berti, Bombi, & Lis, 1982; Burris, 1982), and their consumption preferences are largely shaped by adult influences (Mayer & Belk, 1982).

These special characteristics of children put their particular needs

further into relief. However, it is important to stress that environmental policy makers should be sensitive to these special needs, while at the same time considering their relation to the concerns of other population groups. This broadened focus is indicated by two factors. First, children often do not like or use patches of the environment designated specifically for them and they appreciate opportunities to mingle with adults (Lynch, 1977; Ward, 1978). Second, children's needs are but one consideration in environmental planning. Planning invariably evolves within a framework of bureaucratic management of scarce resources and political decisions molded by a plurality of stakeholders. For some of these groups (e.g., single-parent households, dual-earner families, the elderly, the handicapped), the propagated environmental scenario is quite similar to that proposed for children, including functionally integrated neighborhoods with easy access to jobs, shops, community services, and facilities. Therefore, more than any single-minded effort on behalf of children alone, the common interests with other population groups seem to hold a potential for ensuring the provision of opportunities for experiences contributing to the development of children's competence (Van Vliet—, 1983b).

Considering the just articulated need for environmental policies for children, it becomes relevant to examine the possible methodological bases of such policies. What follows next is a brief overview of approaches that have been adopted in efforts to attain congruence between children and their environments.

APPROACHES TO CHILD-ENVIRONMENT CONGRUENCE

Four general approaches to environmental planning for children can be distinguished by the varying degrees of input by children themselves. First, in the functionalist approach, design professionals make assumptions about behavioral needs and then create environments to accommodate those needs. This form-follows-function stance does not solicit children's opinions. The results may be bizarre: gorillas have been used to test the durability of playground equipment in which children express no particular interest (Dattner, 1969). However, the functionalist approach may be largely appropriate in, for example, specialized medical settings whose operation depends on a professional functioning that precludes children's input.

The second approach stresses flexibility. Here, design professionals provide an environment with some built-in capacity for change. Certain modular designs, for example, allow school children to adjust their space requirements by installing or removing partitions (although, in practice, this is probably usually done for them by adults). Similarly, in Europe some children's bedrooms have beds that can be folded against the wall to get extra play space. Also, toys are sometimes designed for multiple purposes (turning objects upside-down, for example, may give children another usage).

The third approach is more child-centered. Here, the basis for planning and design comes from social scientific research on children's needs. Such studies use a variety of data sources. Most common are observational studies which infer children's needs from their overt behaviors in playgrounds and residential areas (e.g., Coates & Sanoff, 1972). Others rely on questionnaires and other paper-and-pencil tests to obtain information on children's evaluation, knowledge, and use of the environment (e.g., Holme & Massie, 1970). A few authors have distilled planning and design recommendations from secondary analyses of available material (Cooper, Marcus, & Hogue, 1977; Pollowy, 1977). Finally, the most immediate insights have come from researchers who have interviewed children or have taken child-guided field trips (Gray & Brower, 1977; Hart, 1979; Lynch, 1977).

The fourth approach promotes direct participation by children in the planning and design process. A number of different methods have been attempted, including doll play (Brower, Gray, & Stough, 1977), modeling (Hart, 1979; Nagy & Baird, 1977), drawings and cognitive maps (Moore & Wochiler, 1974; Weiser, 1980), and broader community-based efforts (Regenbogen, 1981; Sanoff, Adams, Centeno, Wells & Fanjul, 1978). There is a growing interest in ways to prepare children for decision making involving their own welfare (e.g., Tapp & Melton, 1983; Weithorn, 1983), including participation in the planning, design, and management of the environment (e.g., Hanley, Houts, Ruzek, Krasner, 1981; Jacobs & Jacobs, 1979; Leman, 1982; Stiny, 1980; Van Wagenberg, Krasner & Krasner, 1983).[3]

The functionalist approach, the flexible approach, the social scientific approach, and the participatory approach all have their own merits and disadvantages. Each is appropriate under certain circumstances. Relevant factors in this regard are children's ages, skills,

parental attitudes, and available resources. Moreover, the approaches are not mutually exclusive; sometimes elements may be fruitfully combined. A commonality of the four approaches is, however, that by and large they are concerned with children's proximate evironments; that is, the concern is chiefly with (1) children's homes and their immediate residential environment; (2) playgrounds; and (3) institutional settings planned specifically for children (e.g., day-care centers, schools). Research has shown that children spend much time in other places in the community surrounding them—the so called "fourth environment" (Van Vliet—, 1983b). Consequently, it becomes important to understand the relationships between children's well-being and community infrastructure. Such an understanding is requisite for planning environments supportive of children's developmental needs. The following fable illustrates extant knowledge regarding appropriate environmental configurations of relevant developmental opportunities.

The Fabulous Master Planner[4]

Once upon a time there was a great Master Planner who had accomplished everything he wanted, with only one exception. In his long and distinguished career, he had never been able to plan a perfect environment for young people, no matter how hard he had tried, and his only wish left was to do just that. Shortly before the Master Planner died, a fairy appeared to him and told him about a distant place which was an ideal community for children. The only way to reach this place was through an underground tunnel. To enter the tunnel, one had to open one of two doors. If one opened the wrong door, there came out of it a voracious tiger, the fiercest and most cruel that could be procured, which would immediately tear the visitor to pieces, but if one opened the right door, there came forth from it a group of children; the happiest, healthiest, and brightest one could imagine.

So which door to open? Before the Master Planner could make up his mind, he was fatally struck by a heart attack. However, he had managed to leave some final instructions on his dictaphone. In these last words, he declared that a villa would be awarded to the one who opened the right door. Since there was a severe housing shortage, many applied. After rigorous selection, only three candidates remained; one, a psychologist, the second, a sociologist, and the third, a planner.

The psychologist had a change of heart. He refused to take a chance. He lived safely and died of old age.

The sociologist hired risk assessment consultants. He collected all the available data on children and tiger populations. He brought in sophisticated technology to listen for growling and to detect the faintest whiff of bubble gum. He completed checklists. He developed a utility function and assessed his risk aversiveness. Finally, sensing that in a few more years the children would be grown-ups, he opened the optimal door—and was eaten by a low probability tiger.

The planner took a course in tiger taming. He opened a door at random and was eaten by the children.

The moral. Readers may draw an infinite number of morals from the foregoing fable, but the one to consider here is that uncertainty is an inevitable element that cannot be eliminated from environmental planning for children. Of course, uncertainty is not always undesirable. It may be a positive feature, for example, insofar as it represents open-endedness of the planning process resulting from opportunities for participation by children (Nichelson, 1971). However, it is *un*desirable to lack a certain and integral conception of children's daily trajectory in the community environment. Planners and policy makers have to be curious about the availability of needed developmental opportunities and constraints on their accessibility. A clear understanding of how children cognize, use, and evaluate their community environment is a *sine qua non* for facilitation of positive experiences and enhancement of environmental competence, going *beyond* prevention of negative outcomes and improvement of coping responses.

The final part of this article discusses a conceptual framework with a biographic orientation that retains the integrity of children's experiences over time while linking together objective and subjective aspects of these experiences.

SPACE-TIME BIOGRAPHIES

The theme of this article concerns itself with ways in which to derive guidelines for environmental policies from children's developmental needs. Thus, the viewpoint taken is that of the child. This pedocentric criterion for defining "environmental fit" as well accommodated by a conceptual framework developed by Hagerstrand

(1970) to study the quality of life. In this framework, children's lives can be seen as made up of activity sequences that form a path in space and time. Inevitably, children's daily paths become captured in a net of constraints. Three main types can be distinguished:

1. *Capability constraints* limit children's activities because of their biological construction and the tools they can command. Some have a time orientation (e.g., hunger); others have a space orientation (e.g., walking range). In fact, this is not a homogeneous category: some constraints are fairly constant, for example, children's physiological requirements; other constraints are constantly undergoing change, for example, available technologies and the cognitive ability to negotiate traffic.
2. *Coupling constraints* govern children's life paths in that they define where, when, and for how long they have to join the paths of other people, tools, and materials. Coupling constraints refer to the synchronization in time and the synchronization in space of a plurality of life paths. Figure 1 provides a simplified illustration of the coupling process. It visualizes when and where a hypothetical preschool child interacts with whom. Clearly, the spatial and temporal arrangements of a community's infrastructure may facilitate or hinder such interactions. For example, a mixed land use pattern with relatively high population densities provides a greater number and variety of opportunities for children than do traditional suburban areas, in part, shaping children's activity patterns (Van Vliet—, 1981b). Likewise, the opening hours of banks, medical services, schools, daycare centers, and so forth, are like "pegs" around which the activities of children and their families get organized.
3. *Authority constraints* refer to a hierarchy of control areas which protect resources, varying from a school's student records to a child's tree hut. Small and more temporary domains like the latter are primarily controlled by customs, whereas larger and more permanent domains like the former commonly have a legal status. The eventual effect is again a restriction of activities. Examples include signs telling children to "keep off the grass" and official practices excluding families with children from one out of every four rental dwellings in the United States (Marans & Colten, forthcoming).

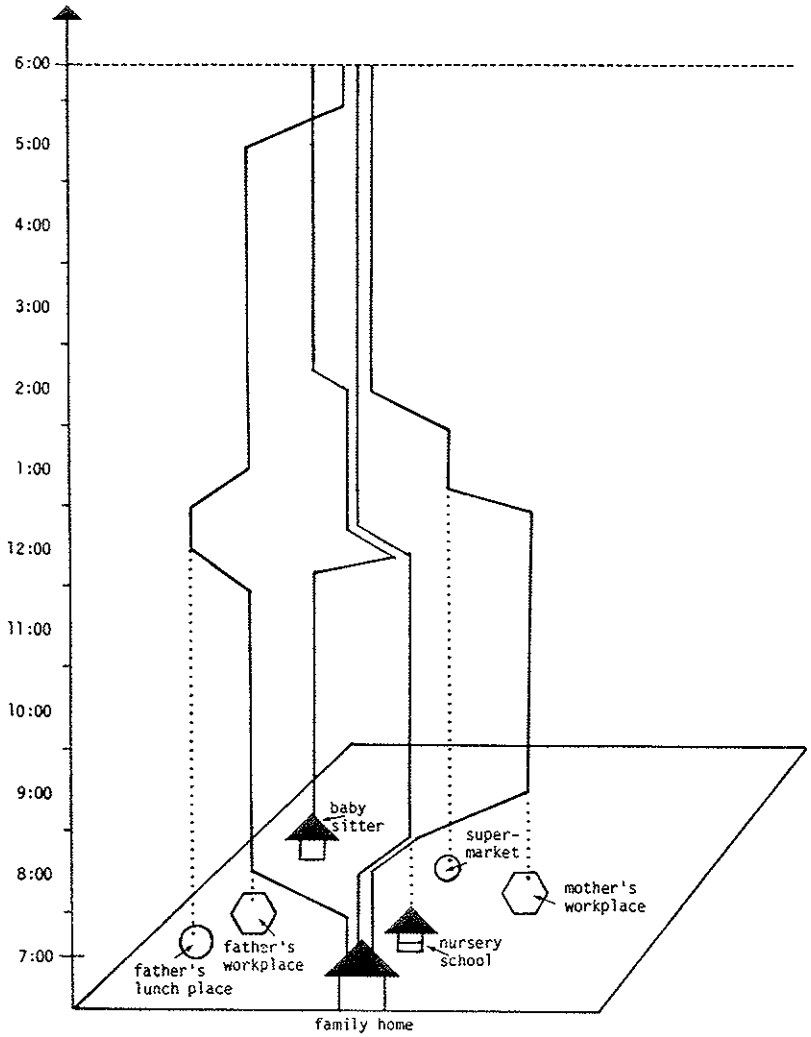

FIGURE 1. Simplified daily activity schedule of two-earner family with one preschool child and a sitter.

The so-called time-geographic approach examines how these constraints restrict behavior; put differently, it aims at identifying the range of alternative behaviors feasible in an environment under a given configuration of constraints. To this end, a particular methodology has been developed, characterized by its capability to yield a

comprehensive and continuous picture of activities at specific times, in and between specific places. This picture is, it must be stressed, an *objective* picture. The descriptors are neutral space-time coordinates; the behaviors are overt. Information of this sort is extremely valuable in outlining the behavioral potential of different environmental arrangements. It enables, for example, an examination of the possibilities for coordination of the activities of children and their parents and of the family as a social unit vis-à-vis the community facilities and services that support family functioning (e.g., daycare; see Martensson, 1977).

However, the time-geographic approach has traditionally not inquired about the *subjective* assessment of objective environmental conditions. Clearly, when we are interested in environmental policies that promote children's competence to explore social, economic, and other resources, we want to be concerned not only with constraints, but also with choices. And choice decisions are, by and large, informed by subjective assessments of objective constraints. There is a growing interest on the part of researchers to collect and analyze data in ways that integrate objective and subjective dimensions (e.g., Dale, 1980; Walter-Busch, 1983; Wasserman & Chua, 1980), although to date there has been only one application in regard to children (Michelson, 1984).

In addition to permitting the simultaneous consideration of objective and subjective data, the space-time framework operates seismographically, registering the impact of historic societal trends and policy decisions at the macrolevel on children's daily lives at the microlevel; with space-time budgets one can examine questions like to what extent a shorter working week would result in more adult-child interaction (the foremost wish in a national sample of 7 to 16 year old Norwegian children; see Raundalen & Raundalen, 1978). Finally, the framework also makes it possible to examine children's experiences in and of the physical environment in relation to their family and community context and their economic circumstances.

Although the conceptual framework expounded above appears to be potentially powerful, it is not the only perspective available. Alternatives have been proposed (e.g., Barker, 1968; Bronfenbrenner, 1979). The issue here is not how these different frameworks contradict or supplement each other. Rather, the point is to recognize the need to base environmental policies for children on an integral conception of how children's development over time relates to the environment. The foregoing brief sketch of the space-time

framework points out some relevant dimensions of one such conception which can be elaborated into more specific methods and techniques at lower levels of abstraction.

NOTES

1. Bibliographies may be found in Ahrentzen, 1982; Moore, Lane, & Lindberg, 1979; Sarkissian, 1973; U.S. Department of HUD, 1980; and Van Vliet—, 1982.

2. An incomplete inventory of research revealed 51 different density measures (Van Vliet—, 1984).

3. A wealth of information on participatory programs and techniques is contained in the following issues of the *Childhood City Quarterly:* 1980 (22), 1981 (23), 1982-83 (9-10) 4/1. The Center for Human Environments, The Graduate Center, The City University of New York, 33 West 42nd Street, New York, NY 10036.

4. This is a modified adaptation of an old fable. I am indebted to Joachim F. Wohlwill for alerting me to its revival by William Clark of the Institute of Resource Ecology, University of British Columbia.

REFERENCES

Ahrentzen, S. *Children and the built environment: An annotated bibliography of representative research of children and housing, school of design and environmental stress.* (Architecture Series: Bibliography A-764). Monticello, IL: Vance Bibliographies, 1982.

Aries, P. *Centuries of childhood.* New York: Vintage Book, 1962.

Auliciems, A. Some observed relationships between atmospheric environments and mental work. *Environmental Research,* 1972 *5,* 217-240.

Baird, L.L., Big school, small school: Critical examination of the hypothesis. *Journal of Educational Psychology,* 1969, *60*(4), Part 1, 253-260.

Baker, S.P. Motor vehicle occupant deaths in young children. *Pediatrics,* 1979, *64,* 860-861.

Barker, R. *Ecological psychology: Concepts and methods for studying the environment of human behavior.* Stanford, CA: Stanford University Press, 1968.

Barker, R.G., & Gump, P.V. *Big school, small school.* Stanford, CA: Stanford University Press, 1964.

Bell, W. The city, the suburb and a theory of social choice. In S. Greer, D. McElrath, D. Minar, & P, Orleans (Eds.), *The new urbanization.* New York: St. Martin's Press, 1968.

Berlin, G. *Not working: Unskilled youth and displaced adults.* New York: Ford Foundation, 1983.

Berti, A.E., Bombi, A.S., & Lis, A. The child's conceptions about means of production and their owners. *European Journal of Social Psychology,* 1982, *12,* 221-239.

Borhrnstedt, G.W., Freeman, H.E., & Smith, T. Adult perspectives on children's autonomy. *Public Opinion Quarterly,* 1981, *45,* 443-462.

Brink, S. *Environmental safety and the prevention of childhood accidents.* Paper presented at the Ontario Psychological Association Conference, Ottawa, Canada, 1982.

Brolin, B.C. Chandigarh was planned by experts, but something has gone wrong. *Smithsonian,* 1972, *3*(3), 56-63.

Bronfenbrenner, U. *The ecology of human development.* Cambridge: Harvard University Press, 1979.

Bronzaft, A.L., & McCarthy, D.P. The effect of elevated train noise on reading ability. *Environment and Behavior,* 1975, *7,* 517-528.

Brower, S., Gray L., & Stough, R. *Doll-play as a tool for urban designers.* Department of Planning, Baltimore, MD, 1977.

Burris, V. The child's conception of economic relations: A study of cognitive socialization. *Sociological Focus,* 1982, *15*(4), 307-325.

Cappon, O. Mental health in the hi-rise. *Ekistics,* 1972, *196*(33), 192-195.

Chombart de Lauwe, P.H., et al. *Famille et habitation* (Vol. 1): *Sciences humaines et conceptions de l'habitation.* Paris: Centre National de la Recherche Scientifique, 1959.

Coates, G., & Sanoff, H. Behavioral mapping: The ecology of child behavior in a planned residential setting. In W.J. Mitchell (Ed.), *Environmental design: Research and practice* (Vol. 1). Los Angeles: University of California, 1972.

Cohen, S., Glass D., & Singer, J.E. Apartment noise, auditory discrimination and reading ability in children. *Journal of Experimental Social Psychology,* 1973, *91,* 407-422.

Cohen, S., Evans, S.W., Krantz, D.S., & Stokols, D. Physiological, motivational, and cognitive effects of aircraft noise on children. *American Psychologist,* 1980, *35*(3), 231-244.

Cooper Marcus, C., & Hogue, L. Design guidelines for high rise family housing. In D. Conway (Ed.), *Human response to tall buildings.* Stroudsburg, PA: Dowden, Hutchinson and Ross, 1977.

Dale, B. Subjective and objective social indicators in studies of regional well-being. *Regional Studies,* 1980, *14,* 503-515.

Dattner, R. *Design for play.* New York: Van Nostrand, 1969.

Davis, D.L., Bergin K., & Mazin, G. *When the neighbors get noisy we bang on the walls: A critical exploration of density and crowding.* Paper presented at the 69th annual American Sociological Association meetings, Montreal, 1974.

Eichler, E.P., & Kaplan, M. *The community builders.* Berkeley: University of California Press, 1967.

Essen, J., Fogelman, K., & Head, J. Childhood housing experiences and school attainment. *Child: Care, Health and Development,* 1978, *4,* 41-58.

Farley, J. *Effects of residential settings, parental lifestyes and demographic characteristics on children's activity patterns.* Doctoral dissertation, Dept. of Sociology, University of Michigan, 1977.

Fischer, C.S. *The urban experience.* New York: Harcourt, Brace, Jovanovich, 1976.

Garbarino, J., Burston, N., Raber, S., Russell, R., & Crouter, A. The social maps of children approaching adolescence: Studying the ecology of youth development. *Journal of Youth and Adolescence,* 1978, *7*(4), 417-428.

Garbarino, J., & Sherman, D. High-risk neighborhoods and high-risk families: The human ecology of child maltreatment. *Child Development,* 1980, *51,* 188-198.

Ginsberg, Y., & Churchman, A. *The future of housing quality: Satisfaction with living quality in multi-storey housing.* Paper presented at the European Meeting of Urban Researchers, Essen, Germany, Oct. 2-4, 1981.

Gittus, E. *Flats, families and the under-fives.* London: Routledge and Kegan Paul, 1976.

Gray, L.V., & Brower, S. *Activities of children in urban neighborhoods.* Baltimore, Dept. of City Planning, 1977.

Gregoire, M. The child in the high rise. *Ekistics,* 1971, *186,* 331-333.

Gunn, A.D.G. The medical-social problems of multi-story living. *Nursing Times,* 1968, *64,* 468-469.

Hagerstrand, T. What about people in regional science? *Paper and Proceedings of the Reg. Science Association,* 1970, *24,* 7-24.

Hanley, G.L., Houts, A.C., Ruzek, J., Krasner L., & Krasner, M. Children as community planners. *Education,* 1981, *102*(2), 189-193.

Hart, R. *Children's experience of place.* New York: Irvington Press, 1979.

Hassan, R. Singapore children in high-rise flats. *Ekistics,* 1978, *45*(272), 374-375.

Hayward, D.G., Rothenberg M., & Beasley, R.R. Children's play and urban playground environments: A comparison of traditional, contemporary and adventure playground types. *Environment and Behavior,* 1974, *6*(2), 131-168.

Hole, V. *Children's play on housing estates.* Ministry of Technology, National Building Series Research Paper 39. London: Her Majesty's Stationery Office, 1966.
Holme, A., & Massie, P. *Children's play: A study of needs and opportunities.* London: Michael Joseph, 1960.
Jacobs, E., & Jacobs, P. Children as managers of urban space: From unique to reproducible process. *Managing urban space in the interest of children.* Report of a symposium. Ottawa: CMHC, Children's Environments Advisory Service, 1979.
Kane, D.N. Bad air for children. *Environment,* 1976. *18*(9), 26-34.
Knudson-Cooper, M.S., & Leuchtag, A.K. The stress of a family move as a precipitating factor in children's burn accidents. *Journal of Human Stress.* June 1982, 32-38.
Lansing, J.B., & Marans, R.W. Evaluation of neighborhood quality. *Journal of the American Institute of Planners,* 1969, *35,* 195-199.
Larkin, R.W. *Suburban youth in cultural crisis.* New York: Oxford University Press, 1979.
Lee, T. *Psychology and the environment.* New York: Methuen, 1976.
Leman, A.B. The child's role in human settlements. *Ekistics,* 1982, *296,* 383-392.
Levine, A.G. *Love Canal: Science, politics, and people,* Lexington, MA: D.C. Heath, 1982.
Levy, L., & Herzog, A.N. Effects of population density and crowding on health and social adaptation in the Netherlands. *Journal of Health and Social Behavior,* 1976, *15,* 228-240.
Lin-Fu, J.S. Lead poisoning in children—what price shall we pay? *Children Today.* Jan/Feb. 1979, 9-13.
Lynch, K. (Ed.). *Growing up in cities.* Cambridge, MA: MIT Press, 1977.
Lynch, K. (Ed.). *Growing up in cities: Studies of the spatial environment of adolescence in Cracow, Melbourne, Mexico City, Saltra, Toluca and Warsawa.* Cambridge, MA: MIT Press, 1977.
Marans, R.W., & Colten, M.E. U.S. rental housing policies affecting families with children: hard times for youth. In W. van Vliet—, E. Huttman, & S. Fava (Eds.), *Housing needs and policy approaches: Trends in six continents.* Durham, NC: Duke University Press, forthcoming.
Maratensson, S. Childhood interaction and temporal organization. *Economic Geography,* 1977, *53,* 99-125.
Marmot, A.F. Flats fit for families. *Design Studies,* 1983, *4*(2), 92-99.
Mayer, R., & Belk, R. Acquisition of consumption stereotypes by children. *The Journal of Consumer Affairs,* 1982, *16,* 307-321.
Mayron, L.W., Ott, J., Nations, R., & Mayron, E. Light, radiation and academic behavior. *Academic Therapy,* 1974, *10,* 33-47.
Michelson, W. Most people don't want what architects want. *Trans-Action,* 1968, *5,* 37-43.
Michelson, W. *Man and his urban environment* (Rev. 1970 ed.). Reading, MA: Addison-Wesley, 1976.
Michelson, W., & Roberts, E. Children and the urban physical environment. In W. Michelson, S. Levine, & A. Spina (Eds.). *The child in the city: Changes and challenges.* Toronto: University of Toronto Press, 1979.
Michelson, W. *From sun to sun: Contextual dimensions and personal implications of maternal employment.* Totowa, NJ: Rowman and Allenheld, 1984.
Moore, G.T., Lane, C., & Lindberg, L. *Bibliography on children and the physical environment: Child care centers, outdoor play environments, and other children's environments.* Unversity of Wisconsin-Milwaukee, School of Architecture and Urban Planning, 1979.
Moore, R.C., & Wochiler, A. An assessment of a redeveloped school yard based on drawings made by child-users. In D. Carson (Ed.), *Man-environment interactions: Evaluations and applications* (Part II). Stroudsburg, PA: Dowden, Hutchinson & Ross, 1976.
Murray, R. The influence of crowding on children's behavior. In D. Canter & T. Lee (Eds.), *Psychology and the built environment.* London: The Architectural Press, 1974.
Nagy, J.N. & Baird, J.C. Children as environmental planners. In I. Altman & J. Wohlwill (Eds.), *Children and the environment.* New York: Plenum Press, 1978.
Nichelson, S. How not to cheat children: The theory of loose parts. *Landscape Architecture,* October 1971, 30-34.

Northwood, L.K. The impact of urban removal from a child's point of view. *Journal of Sociology & Social Welfare,* 1975, *3*(2), 224-241.
Pearse, J. Children in the sky. *Town and Country Planning,* October-November 1968, 479-481.
Pepler, D.J. How do high-rises affect our children. *Habitat,* 1977, *20*(1), 2-4
Pollowy, A.M. *The urban nest.* Stroudsburg, PA: Dowden, Hutchinson, and Ross, 1977.
Raundalen, M., & Raundalen, T.S. *Interviews with 4,000 Norwegian girls and boys about their daily life and future.* Paper presented at the International Congress of "The Child in the World of Tomorrow," Athens, Greece, July 2-7, 1970.
Raymond, H., Haumont, N., Raymond, M., & Haumont, A. (Eds.). *L'habitat pavillionaire.* Paris: Centre de Recherche d'Urbanisme, 1966.
Regenbogen, T. *A place to share. Neighborhood improvement: How your neighborhood may help itself, its children, young people, and families.* Ottawa: Children's Environments Advisory Service, CMHC, 1981.
Saegert, S. *The effect of residential density on low income children.* Paper presented to the Annual Meeting of the American Psychological Association, Montreal, 1980.
Sandels, S. (Ed.). *Children in traffic* (translation of Swedish 1968 edition by H. Maben and edited by J. Hartley). London: Elek Books, 1975.
Sanoff, H., Adams, S., Centeno, G., Wells R., & Fanjul, S. Programming environments for young children. In H. Sanoff (Ed.), *Designing with community participation.* Stroudsburg, PA: Dowden, Hutchinson and Ross, 1978.
Sarkissian, W. *Children will tell you.* South Australian Institute of Technology, South Planning Research Unit, School of Social Studies, Adelaide, Australia, 1973.
Spivack, M. The political collapse of a playground. In G. Coates (Ed.), *Alternative learning environments.* Stroudsburg, PA: Dowden, Hutchinson and Ross, 1974.
Stein, A.H., & Friedrich, L.K. The impact of television on children and youth. In E.M. Hetherington (Ed.), *Child development research* (Vol. 5). Chicago: University of Chicago Press, 1975.
Stewart, W.F. *Children in flats: A family study.* London: National Society for the Prevention of Cruelty to Children, 1970.
Stiny, G. Kindergarten grammars: Designing with Froebel's building gifts. *Environment and Planning,* 1980, *7,* 409-462.
Tapp, J.L., & Melton, G.B. Preparing children for decision making. In G.B. Melton, G.P. Koocher, & M.J. Saks (Eds.), *Children's competence to consent.* New York: Plenum, 1983.
U.S. Department of HUD. *Children in the built environment.* Washington DC: U.S. Government Printing Office, 1980.
VanVliet—, W. The environmental context of children's friendships: An empirical and conceptual examination of the role of child density. In R.A. Findlay, A.F. Osterberg, & C.P. Tiernan (Eds.), *Design research interactions: Exploring the future through the 1980's.* Washington, DC: Environmental Design Research Association, 1981. (a)
VanVliet—, W. Neighborhood evaluations by city and suburban children. *Journal of the American Planning Association,* 1981, *47*(4), 458-467. (b)
VanVliet—, W. *Young people's environments: Selected References.* Council of Planning Librarians, Bibliography No. 78, Chicago, Illinois, 1982.
VanVliet—, W. Families in apartment buildings: Sad storeys for children? *Environment and Behavior,* 1983, *15*(2), 211-234. (a)
VanVliet—, W. Exploring the fourth environment: An examination of the home range of city and suburban teenagers. *Environment and Behavior,* 1983, *15*(5), 567-588. (b)
VanVliet—, W. The role of housing type, household density, and neighborhood density in peer interaction and social adjustment. In J.F. Wohlwill & W. vanVliet—(Eds.), *Habitats for children: Impacts of density.* Hillsdale, NJ: Erlbaum, 1984.
Vanwagenberg, D., Krasner, M., & Krasner, L. Children planning and ideal classroom. *Environment and Behavior,* 1980, *13*(3), 349-360.
Walter-Busch, E. Subjective and objective indicators of regional quality of life in Switzerland. *Social Indicators Research,* 1983, *12,* 337-391.

Ward, C. *The child in the city.* London: Architectural Press, 1978.
Wasserman, I.M., & Chua, L.A. Objective and subjective indicators of the quality of life in American SMSAs. *Social Indicators Research,* 1980, *8,* 365-381.
Wegelin, E.A. *Urban low-income housing and development.* Leiden: Nijhoff, 1978.
Weiser, G. City streets: The child's image as a basis for design. In P.F. Wilkinson, (Ed.), *Innovation in play environments.* New York: St. Martin's Press, 1980.
Weithorn, L.A. Involving children in decisions affecting their own welfare. In G.B. Melton, G.P. Koocher, & M.J. Saks (Eds.), *Children's competence to consent.* New York: Plenum Press, 1983.
Williamson, R.C. Socialization in the high-rise: A cross-national comparison. *Ekistics,* 1978, *45*(268), 122-130.
Wilner, D.M., Walkley, R.P., Pinkerton, T., & Tayback, M. *The housing environment and family life: A longitudinal study of the effects of housing on morbidity and mental health.* Baltimore: Johns Hopkins Press, 1962.
Worth, R.M. Urbanization and squatter resettlement as related to child health in Hong Kong. *American Journal of Hygiene,* 1963, *78,* 338-348.

Urban Planning and Mental Health

William M. Rohe
University of North Carolina at Chapel Hill

ABSTRACT. Both the product and the process of city planning have been shown to have an influence on mental health. This paper presents a model of the process through which community design characteristics influence mental health. The model emphasizes the importance of local social interaction and physical stimulation, as well as adjustment mechanisms used to dampen stress resulting from undesirable levels of interaction and stimulation. The research on the relationship between four community design characteristics and social interaction, stimulation and mental health is then reviewed. An argument for the importance of citizen participation is also presented, stressing the influence of participation on both sense of control and the development of social support. Commonly employed participation techniques, however, differ in their ability to affect support and control. Neighborhood council programs are identified as having the greatest potential for influencing sense of control and social support. Finally the obstacles to improving community design and specific recommendations for the prevention of environmentally induced mental health problems are presented.

Historically, city planning and health concerns have been closely allied. In fact, much of the impetus for the adoption of planning regulations can be traced to concerns about the effect of high residential density, poor housing quality, and lack of recreation and sanitation facilities on the health of urban populations (Rohe, 1982; Scott, 1969). The boards of health established in the mid-to-late 1800s were the first to regulate building construction and provided support for a fledging planning profession.

Although the original emphasis was on controlling environmental factors which were believed to affect the development and spread of contagious diseases, this soon broadened to include factors associated with mental health and well-being. The work of early sociologists such as Durkheim, Simmel, Cooley, and Wirth sensitized

Reprints may be obtained from William Rohe, Department of City and Regional Planning, University of North Carolina at Chapel Hill, Chapel Hill, NC 27514.

