

Children's Rights and the Physical Environment:

– a Review of Current Knowledge

Sheridan Bartlett



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- a world where all children have hope and opportunity

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Background

In the coming years, children's rights to a healthy physical environment will have high priority at Save the Children Sweden. A new programme focusing on the role of the physical environment is going to be developed.

As part of the preparation of the programme, seven reports have been produced. This is one of them. The objective is that these reports serve as a "package" of basic information. Central concepts are defined, problems analysed and actors described. Possible activities at different levels are identified and related to the UN Convention on the Rights of the Child and other international agreements, such as the Agenda 21 and Habitat Agenda action plans.

The reports are:

- *Children's Right to a Good Physical Environment. Central Concepts and Problem Definition.* Code no 2002-2747 (Also available in Swedish: *Barns rätt till god fysisk miljö – centrala begrepp och problemdefinition.* Code no 2002-2748)
- *Children's Rights and the Physical Environment. A Review of Current Knowledge.* Code no 2002-2749. SEK 100.
- *The Rights of the Child and the Physical Environment. The UN Convention on the Rights of the Child and other Relevant International Agreements.* Code no 2002-2750
- *The UN Convention on the Rights of the Child Reporting System and the Physical Environment.* Code no 2002-2751
- *Children's Rights from an Environmental Perspective. Implications for Action.* Code no 2002-2752
- *Children and the Environment. Actors on the International Arena.* Code no 2002-2753
- *Barn och miljö. Aktörer i Sverige* (Children and the Environment. Swedish actors – the document is only available in Swedish). Code no 2002-2754

All of these documents may be ordered from Save the Children Sweden, 107 88 Stockholm, Sweden. Telephone number +46 8 698 90 20, fax +46 8 698 90 25. Or visit our on-line bookshop: www.rb.se/bookshop. Postage and handling will be charged.

Introduction

There is an intimate link between the physical world children occupy and the quality of their lives. Their housing, the water they drink, the air they breathe, the traffic on their streets, and the quality of their schools and neighbourhoods all have impacts on their health, happiness and long term development. In many ways, and for a number of reasons, these effects are more pronounced or different for children than they are for adults.

This relationship is often overlooked or underplayed in the work of child-focused agencies and organizations, many of which concentrate primarily on social interventions. When these groups do tackle environmental problems, they are seldom equipped to do so on a significant scale. On the other hand, agencies and organizations more routinely involved in the protection of the natural environment, or the planning, provision or upgrading of housing, infrastructure and common space generally have little awareness of the special needs of children.

This paper reviews current knowledge and understandings of the relationship between children and their physical environments, drawing on research in a number of fields and on practical experience from various parts of the world. The programming implications of this relationship are not discussed here. Rather, this is an attempt to provide the necessary background for such discussions. The UN Convention on the Rights of the Child, so widely used as a point of departure for addressing children's issues, serves here as an organizing framework in reviewing the relationship between children and their environments.

The UN Convention on the Rights of the Child and the physical environment

The UN Convention on the Rights of the Child defines children's rights to survival, development, protection and participation, and describes measures to be taken in securing these rights. Presumably, it should have something to say about the material world that children occupy. Interestingly, however, there is little in this document that makes specific reference to the physical environment. The Convention briefly mentions housing, clean drinking water and environmental pollution; it recognizes the importance of basic knowledge about environmental sanitation; and it calls for the development in children of respect for the natural environment (Articles 24, 27, 29). But it defines no explicit right to a supportive physical environment. In this sense it is consistent with other human rights instruments – a number of legal experts have questioned the existence of any substantive human right with regard to the physical environment, and this remains a somewhat controversial area in international law (Fijalkowski and Fitzmaurice 2000).

One school of thought, the one that will be embraced here, argues that this right must exist by implication. In other words, if certain human rights are dependent for their realization on particular conditions, it follows that there must be a right to these conditions (Ksentini 1994).

From this perspective, the rather limited references to the physical environment in the Convention may be less significant than its broader environmental implications. These can be most succinctly derived from the four basic principles expressed in Articles 2, 3, 6 and 12.

In Article 6, children are recognized as having the right to *survival and development*. Common sense tells us that this right cannot be realized in the absence of certain basic living conditions. Much of the Convention elaborates on this most fundamental principle, spelling out in greater detail children's right to the highest attainable standard of health, to a standard of living adequate for full development, to play and recreation, to conditions that ensure dignity and self-reliance for disabled children, to an education that ensures the development of the child's mental and physical abilities. These rights and others can only be realized in the context of a reasonably healthy supportive physical environment.

Article 2, another fundamental principle, rejects *discrimination*. All children, regardless of age, gender, ability, religion, ethnic background or place of residence, have the same rights, including the right to a physical environment that supports survival and healthy development. Children in squatter settlements, in institutions, in refugee camps, deserve the same protections and opportunities as those in more affluent neighbourhoods.

Article 3 requires that the *best interests* of children be a primary consideration in all actions that concern them, whether undertaken in the public or private sphere. According to this principle, all physical planning decisions, whether regarding land use, housing design, transport, the location of schools and parks, or the provision of basic services, must be undertaken with children's interests in mind.

Finally, Article 12 recognizes children's *right to have a voice* in the decisions that concern them. This, like the other basic principles, must reasonably extend to the physical world that they occupy and especially to the environments that they find important.

If the Convention provides relatively limited guidance on children's rights with regard to the physical environment, there are other international declarations that take this further; most significantly, perhaps, Agenda 21 from the Rio Conference (1992) and the Habitat Agenda (1996). Both documents contain practical prescriptions for promoting physical environments that are ecologically sustainable and supportive of human rights. Agenda 21 gives particular attention to the role that children and young people can play with regard to environmental protection and improvement, and stresses the importance of establishing procedures that incorporate children's concerns into relevant policies for development at local and higher levels. The Habitat Agenda specifies not only the right to decent, liveable neighbourhoods and settlements, but to the continuous improvement of living conditions (Chapter I, para.11).

These declarations, however, are primarily plans of action, and as such are more relevant when the programming implications of children's relationship with the physical environment are addressed. The task here is to draw on research from various fields and on relevant practical experience to arrive at a greater understanding of the impacts of the physical environment for children. This

will allow us to spell out more fully the environmental implications of the Convention – an essential step in working towards children’s immediate well-being and promoting their long term prospects.

Some conceptual clarifications

Some clarification of various terms, concepts and theoretical frameworks is in order here.

1. The physical environments of childhood are understood here to include both *material* and *spatial* aspects – not only the “what” but the “where” of things. From this perspective, the location and arrangement of housing is considered as well as its condition, the placement of water sources as well as the quality of the water, the accessibility of play space as well as its capacity to stimulate. In addition to these material and spatial aspects, there are also such ambient features of the environment as noise and temperature to consider.
2. The physical environment is approached here not simply as a *setting* for human interaction (which is how it is often viewed within the social sciences), but rather as a contributing factor to that interaction – something that both structures and mediates behaviour, and that is itself an object of involvement. The learning behaviour of children in a classroom with desks in straight rows facing a teacher and blackboard, for instance, is quite different from the more active learning that takes place in a classroom arranged to allow for hands-on interaction with a variety of materials.
3. This review approaches children’s development from an *ecological* perspective, which starts from the premise that it is not possible to understand children – or any other life form – outside the context of the larger world in which they are embedded. A familiar presentation of this ecological approach is Bronfenbrenner’s view of a nested hierarchy of systems (Bronfenbrenner 1979). According to this framework, children’s development is affected by a wide range of interrelated variables, from the most immediate (the people and surroundings they are in contact with each day) to the most distant and overarching (such as the global political and economic realities that end up affecting everyone). This review will focus primarily on children’s physical “micro-system”, but with reference to the larger cultural, social and economic factors that shape this everyday world.
4. The approach here will be *transactional*, stressing the reciprocal nature of the relationship between children and their environments, whether social or physical. Children are not simply passive recipients of outside forces. From the beginning of life, they are active participants in their own development – curious, alert, responsive beings who shape their world as well as being shaped by it. This understanding is fundamental to the Convention, which stresses not only children’s rights to protection, but their right to take an active role in their own lives, something they are innately inclined to want from their earliest days. A transactional approach encourages us to think not only about the impacts that physical environments have on children, but about the oppor-

tunities that children have to interact with their environments in developmentally constructive ways.

5. Another way to think about the factors that affect children's development is in terms of *vulnerability* and *resilience*. This is particularly useful in considering children who routinely face challenges and hardships. Features of their daily lives can either be seen as *risk factors*, which pose threats to their optimal development, or as *protective factors*, which buffer them from adverse circumstances. The number of risk factors in any child's life has been found to be more significant than the presence of any particular risk, and the likelihood of poor developmental outcomes increases cumulatively with the number of threats that are faced (Rutter 1983; Evans and Saegert 2000). This credit/debit approach to development can be very useful, but it is important also to bear in mind that both risk factors and protective factors can be mediated to some degree by the meaning that they hold for children and those around them, and that it is a mistake to take too mechanical an approach to the relationship between children and their physical environments.

The organization of this review

A number of provisions within the Convention depend on the quality of the physical environment for their realization. The most fundamental is the child's right to survival (Article 6); closely related is the right to the highest attainable standard of health (Article 24). The first section of this review looks at the impact of everyday living conditions on children's health through infectious and parasitic disease, malnutrition, toxic exposure, injury and stress; it will also consider how the quality of care that children receive is affected by their living conditions.

Next, children's right to a standard of living adequate for their full development (Article 27) is considered. A number of dimensions of the daily living environment, at the level of both home and neighbourhood, will be discussed for their effects on children's identity and emotional well being, their socialization, and their opportunities for gaining competence in various domains.

Most aspects of the child-environment relationship could reasonably be considered within a discussion of the living conditions that affect development. However, children's rights to play and recreation (Article 31), to education (Articles 28 and 29) and to participation (Article 12 and others) provide an opportunity to consider in more detail the environmental implications of these important concerns.

The review will conclude with a brief consideration of the wide range of factors that shape children's environments, from family and community decision-making to the policies and practices of local government; from economic and political realities at the national level to the global forces that have an impact on every household.

Children's right to health and survival

Children's right to survival and to the highest attainable standard of health depends at least as much on safe, healthy environments as it does on the provision of health services. Significant progress has been made over recent decades in reducing the rate of death for children worldwide, but one child in twelve still dies before the age of five, largely from preventable and environment-related disease. In the poorest communities, where physical conditions are most threatening, as many as one child in four dies in the first year after birth. Hundreds of millions more are compromised by illness and disabilities. Inadequate sanitation and drainage, a lack of clean water, uncollected waste, inadequate housing, polluted air, toxic wastes and threats to safety all contribute to these high levels of child mortality and morbidity.

Various methods have been employed in recent years to assess the actual contribution of the physical environment to death and disease. Although some studies are simply descriptive, others have established tight causal links between environment and health even when socioeconomic variables are held constant (for instance, Victoria 1988; Woldemicael 2000). In places with poor housing, water, sanitation and other basic services, there are unquestionably far greater health problems (Harpham and Stephens 1991; Bradley, Stephens et al. 1992). In the poorest countries, environmental conditions probably account for at least half the total health burden (Satterthwaite, Hart et al. 1996).

This connection between environment and health is also a function of age. The heaviest health burdens worldwide are imposed by acute respiratory infections and diarrhoeal diseases. Both conditions are closely related to environmental quality, and both primarily affect young children. It has been estimated that two-thirds of all the illness caused by environmental conditions occurs among young children (cited in Jansen 1998).

Biological pathogens

Although this is gradually changing, biological pathogens are still responsible for a high percentage of the world's total health burden and for the great majority of death and illness in children under five in low-income and middle-income countries. A number of environmental factors contribute to infectious, parasitic and vector-borne diseases.

Water and sanitation

Over three million children die each year from water- and sanitation-related diseases, and many more are debilitated by illness, pain and discomfort – primarily from diarrhoeal diseases, but also from other waterborne diseases such as cholera and enteric fevers, from schistosomiasis and guinea worm, from intestinal worms, and from various eye and skin diseases related to insufficient water for washing. Although inadequate water supplies and sanitation affect people of all

ages, children's health and well-being is particularly compromised. Approximately 84 percent of the burden of diarrhoeal disease worldwide is experienced by children under 5 (WHO, 1999), and 74 percent of the health burden from helminth (worm) infections affects children between 5 and 14 (Murray and Lopez 1996).

According to current figures, over two thirds of the world's population has access to safe water (UNICEF 2000). This does not mean that all these people are supplied in ways that ensure children's health, or that take into account the realities of life for those who care for young children. Safe supplies of uncontaminated water are vital, but there is a general consensus that water *quantity* is even more important than *quality* for maintaining children's health. Contaminated water contributes to outbreaks of disease, but too little water makes it difficult to maintain the sanitary conditions that are essential for preventing endemic disease that contributes so heavily to the death and repeated illness of many children (Cairncross 1990).

Too little attention is generally given to this important aspect. Distance to water points, regularity of supply, and time spent waiting are serious concerns – especially for caregivers dealing with young children. It has been estimated that 30 to 40 litres a day are needed per person for drinking, cooking, laundry and basic hygiene (Godin 1987). When water is at a distance and needs to be carried (or when it is bought by the bottle), this is a prohibitive quantity, and many households with young children which have access to safe water actually make do on much less than they really need. Children, food, utensils, floors, cooking surfaces are all less likely to be kept clean when water must be carried any distance. In Malawi it was found that water supply had to be brought within a few yards of the house in order for the amounts of water used by a household to be significantly increased (Lindskog and Lundqvist 1998).

The effects for child health can be dramatic. In Burkino Faso, mothers with access to a tap in their yard were three times as likely to use safe hygiene practices as those fetching water from wells outside their compound (Curtis, Kanki et al. 1995). In urban Brazil, infants were five times as likely to die in households using public standpipes as in those with water piped to the house (Victoria 1988). No matter how close the source, when water is not piped directly into a house or yard, it needs to be stored in containers. This is a problem in households with young children, who may dip dirty hands into the bucket, or leave water scoops on the floor, contributing to contamination and disease (Lindskog and Lundqvist 1998; Roberts, Chartier et al. 2001).

Problems posed by inadequate water supplies are further complicated by poor sanitation, which can cause contamination of water, and which greatly heightens the need for hygiene. Sanitation-related illnesses affect young children most heavily, in part because of their lower immunity to pathogens, but also because of their behavior. Small children have a drive to play and explore, they are in closer contact with the ground and they have less appreciation of hygiene. This means that they are more likely to come into contact with excreta, the primary source of diarrhoeal disease as well as other pathogens. Where children are concerned, the only safe sanitation methods are those that eliminate the possibility

for contact with excreta. Safe stool disposal is far more effective as a safeguard against disease than any amount of hand washing (Curtis, Cairncross et al. 2000). Yet almost 60 percent of the world's households lack a sanitary means for disposing of human waste.

In rural areas, people commonly use fields and wooded areas for defecation. The distances involved are often unrealistic for young children, who tend to eliminate instead on pathways near home, increasing the risk of contamination. In urban areas, many low-income settlements are served, at best, by communal latrines that may be filthy, foul smelling, crowded, and distant from many of the dwellings they serve, causing many people to defecate in the open. Such arrangements are particularly challenging for young children and their caregivers. Taking a young child any distance for toileting is impractical, especially when there is more than one child to be tended, and when there is likely to be a line at the latrine. Young children cannot wait to eliminate, especially if they have diarrhoea. The darkness, smelliness and large openings of many latrines make their use unpleasant and even frightening for young children. Reports from Malawi and Nepal point out that children rarely use latrines before they are six or seven because of their fear of falling into the pit (UBS ; Lindskog and Lundqvist 1998). Research in a Peruvian shanty town found that latrines were considered unrealistic for children under four. Diaper use was discontinued as early as possible because of the high water and time costs of laundering them; potties were the preferred solution for young children, but dealing with soiled potties hygienically also presented problems. In consequence, defecation on the ground was quite common (Yeager, Huttly et al. 1999). A survey conducted by UNICEF's India office found that 1 percent of children under six used latrines, that the stools of an additional 5 percent were thrown into latrines, and that the remainder ended up in drains, streets or yards (UNICEF MICS 2000). Considering the numbers of young children in any poor settlement, it is no wonder that the surroundings quickly become fouled.

The quality of provision within schools, child care centers and other institutions is also important. Possibilities for disease transmission are always higher when a number of children are together. Inadequate toilets or hand washing facilities may allow parasites or disease to spread quickly from child to child, and from there through the community. Conditions for working children and children on the street are also a consideration.

Drainage and waste collection

Problems with sanitation are intensified by inadequate drainage and waste removal. Where sanitation is poor, excreta collect in various places, or are dumped in garbage piles and drainage ditches. Uncollected garbage is also frequently dumped in drainage ways, which can quickly become clogged. When wastewater and storm water cannot be easily drained, flooding spreads any waste or excreta widely through the surrounding area. Standing water can also be contaminated by blocked sewers and overflowing septic tanks, and pathogens are then spread quickly to everything else.

Drainage is an especially serious concern for communities on steep or swampy land – the case for many illegal settlements in urban areas, where better land is unavailable or unaffordable, and where major flooding once or twice a year is not uncommon. In many cities people have to build on stilts and to construct elevated walkways between buildings; the lack of drainage becomes not only a threat to health, but also a safety hazard. Many children die from drowning or suffocation in mud as a result of falling from such walkways (Cairncross and Ouano 1990).

Pooled water and piles of organic waste provide places where disease vectors such as mosquitoes, house flies and rodents can breed and feed. One significant effect is the contribution to malaria, which killed over one million children under 14 in 1998 (WHO, 1999). Schistosomiasis, or bilharzia, another serious risk, can be easily spread when snail-infested standing water is contaminated by the feces of an infected person. Other diseases spread by vectors or water-based agents include yellow fever, dengue fever, guinea worm and filaria (Satterthwaite, Hart et al. 1996).

Inadequate drainage and waste collection pose particular problems for children, who tend to play wherever there is open land, and who may be particularly drawn to wade or play in standing water, or to scavenge in piles of garbage. In many communities, it is impossible for children to play outdoors and to avoid these hazards. Children between 5 and 14, for instance, are disproportionately affected by such water-based diseases as bilharzia (Satterthwaite, Hart et al. 1996).

Indoor air quality

Many households rely on open fires and inefficient stoves, often with no ventilation. Although the links between respiratory disease and indoor air quality remain poorly understood, there is little doubt that they exist. Smoke and fumes cause the respiratory tract to become inflamed, which in turn appears to reduce resistance to respiratory infection (WHO 1992).

Acute respiratory infections are the number one killer of young children, causing almost 20 percent of all under-five deaths (Murray and Lopez 1997). A review of research linking indoor air pollution with acute respiratory infections finds a significant increase in risk for exposed children, even in studies adjusting for confounding factors (Smith, Samet et al. 2000). The risk of serious respiratory infections for young children is from two to six times higher in smoke-filled homes (cited in Jansen 1998). Although rates are slightly higher for boys than for girls in the under-five age group, girls in the 5–14 group are 20 percent more affected than boys (WHO 1999), almost certainly a reflection of the longer hours that they spend indoors. Some studies have found a direct relationship between the hours per day that young children spend indoors and the number of life-threatening episodes of acute respiratory infection (Pandey and al. 1987). Infants and toddlers, kept inside and close to the fire while caregivers cook, often on the backs of those cooking, are especially vulnerable. Chronic exposure to smoky interiors can also contribute to eye problems.

Overcrowding and other housing-related conditions

Acute respiratory infections, along with other airborne diseases such as tuberculosis, influenza and meningitis, are also associated with overcrowded living conditions especially when they are combined with poor ventilation and unsanitary conditions (Ballard and Neumann 1995; Hardoy, Mitlin et al. 2001). Residential density increases proximity and hence the risk of infection; it increases the risk of prolonged exposure and hence more serious disease; and it increases the risk of multiple infections, since the number of potential transmitters is increased (Clauson-Kaas, Surjadi et al. 1997).

The physical construction and condition of housing also contributes to the spread of disease, especially vector-borne disease. A lack of screening exposes children to flies and mosquitoes; porous materials like roofing thatch can harbour rodents or insect pests; cracked walls and floors provide refuge for ticks, fleas, cockroaches and other insects. Hard-to-clean floors and surfaces increase contact with pathogens, especially for babies and young children who put everything in their mouths (Davey and Lightbody 1987; WHO 1992; Koram, Bennett et al. 1995). There is strong evidence for a close relationship between dampness, mold or mildew in housing and the development of asthma and other respiratory symptoms in children. Molds are also associated with fatigue, headaches and central nervous system symptoms (Mohamed, Ng'ang'a et al. 1995; Yang, Chiu et al. 1997; Etzel and Rylander 1999).

Relative vulnerability to pathogens

Children's vulnerability to pathogens is related to both their exposure and their level of immunity. The less effective immune systems of infants and younger children are somewhat compensated for by their relative protection from exposure to pathogens, especially for those children being breastfed. The greater mobility of children after infancy increases their exposure, but their acquired immunity provides some protection (Al-Eissa, Assuhaimi et al. 1995; Agha 2000; Wolde-micael 2000). Young infants and children who are being weaned tend to be at highest risk. The quality of care is a factor, most frequently with effects along gender lines. Pathogens do not discriminate; caregivers do, however unconsciously. Girls are more likely to be the victims of selective neglect; less food, less medical attention and less care can make them more vulnerable to disease and to poor outcomes as a consequence of disease (Caldwell 1996).

The living conditions of some groups put them at particular risk. Pavement dwellers in Mumbai, for instance, when asked about their problems, all mentioned access to a toilet; 90 percent noted difficulties with water. By contrast, only 50 percent considered their "house" to be a problem (Patel 1990).

Environmental factors contributing to malnutrition

Few child deaths, relatively speaking, are directly caused by malnutrition. However, malnutrition *contributes* to more than half of all child deaths, to chronic illness and to a slowing of development on all fronts. For many years, the

lack of food was considered to be the primary cause of malnutrition. More recently it has become clear that unsanitary environments and the quality of care are also critical factors (Engle 1996).

Links between disease and malnutrition

Malnutrition has especially strong links to diarrhoea and acute respiratory infection, and to the environmental conditions that promote these illnesses (Rice, Sacco et al. 2000). These links are complex and reciprocal: malnutrition weakens the body's defenses and causes children to be more vulnerable to disease. At the same time these diseases, along with the living conditions that promote them, contribute to malnutrition by causing decreased food intake, impaired nutrient absorption and direct nutrient losses through vomiting and diarrhoea (Stephenson 1999). Even a relatively mild infestation of intestinal parasites, for instance, can consume 10 percent of a child's total energy intake, as well as interfering with digestion and absorption (Satterthwaite, Hart et al. 1996). Unsanitary environments also contribute to malnutrition by challenging children's immune systems. As in the case of poultry raised in dirty conditions, nutrients that would otherwise support growth instead go towards supporting the immune response (Solomon, Mazariegos et al. 1993). Data from 84 countries indicate that the best predictor of nutritional status, next to financial access to food, is the level of access to water (Lechtig and Doyle 1996).

Spoilage and contamination

Unsanitary household conditions also contribute to malnutrition by increasing the likelihood of food spoilage and contamination. When food cannot be refrigerated and when flies and other disease vectors cannot be kept off food, utensils and surfaces, there is a high risk of contamination. If households rely on time-consuming methods for cooking, or if fuel is in short supply, it may be difficult to reheat food easily or to cook it thoroughly, and infectious agents are more likely to be transmitted. When cooking is difficult, many households make do with fewer meals a day. Small children, who need to eat more frequently, are more likely to be given leftovers that have not been reheated. A particularly vulnerable time is during the weaning period, when children are first exposed to foods and utensils that may be contaminated. A study of the preparation, feeding and storage of weaning foods in low-income families in India found high microbial counts as a result of poor hygiene, overnight storage of food at ambient temperatures and insufficient reheating (Sheth, Patel et al. 2000).

Bottle fed infants are at especially high risk; without clean water and hygienic conditions, bottles cannot be sterilized and formula cannot be safely mixed. A survey of the milk being fed to 149 6–24 month olds in a slum settlement in Varanasi, India found that 53.7 percent of the samples were contaminated by bacteria (Ray et al. 2000). Although HIV positive mothers are warned about the possibility of transmitting the disease to their infants through breastfeeding, the reality is that many of these infants, if bottle-fed in environments that do not

support adequate hygiene, are at even higher risk of death from diarrhoeal disease than from AIDS (UNICEF 1998).

Other factors

Environmental conditions contribute to malnutrition in other ways as well:

- Most importantly, household food security is undermined for many by environmental degradation and a lack of access to essential natural resources – to fertile soil and water for growing food, and to the fuel necessary for preparing food (Satterthwaite, Hart et al. 1996; Jansen 1998);
- Pressures for caregivers to work long hours, distance to the workplace, and inadequate public transport, can result in a lack of time for meal preparation, and make it difficult to provide sufficient nourishment for young children, whose small stomachs require frequent small meals, especially when the commonly available foods are low in protein and high in bulk (UNICEF 1998);
- Environmental factors affect the health of caregivers, and by extension, the nutritional level of children. A community-based study in an urban neighbourhood in Bangladesh found that illness or incapacitation on the part of wage earners was strongly associated with the prevalence of severe under-nutrition in under-five children (Pryer 1993).
- The cost of housing can cut into the financial resources available for food. In the United States, children from poor families living in unsubsidized housing were five times more likely to have low growth indicators resulting from poor nutrition than were those children whose families received housing assistance (Meyers and al 1995).
- Challenging living conditions contribute to heavy workloads for children, causing them to burn the calories they depend on for adequate nutrition. The energy expended by those carrying water twice a day from three kilometres away (not an unusual distance in rural Africa) is estimated to be equivalent to a third of usual dietary intake (Lechtig and Doyle 1996).

Street children

It is often assumed that street children are at highest risk for ill health and malnutrition. In fact, studies from several countries have found that children on the street may actually do better in terms of nutrition and growth than other poor children in the same cities – although not better than middle class children. Children on the street may be better placed to take advantage of opportunities and better able direct any earnings towards their own needs (Panter-Brick 2001). Many of these children demonstrate considerable adaptability and resourcefulness: nonetheless, it is clear that the physical challenges they face in meeting their basic needs are considerable (Patel 1990).

Toxics and pollutants

In countries where basic services are strong, diseases related to biological pathogens tend to be well controlled. Toxics and chemical pollutants, on the other hand, are a worldwide concern, a product of rapid development and unsustainable consumption. This relative distribution of environmental health problems has led to a perception in high-income countries that “environmental health” is primarily an issue of exposure to chemical hazards – despite the fact that infectious disease remains by far the greater health burden worldwide.

Some countries produce far greater quantities of toxics and pollutants; others are threatened by the absence of measures to control exposures to their more limited production. Insufficient knowledge about chemical hazards complicates the issue, making it difficult to determine which substances are dangerous, how dangerous they are, at what levels, and to whom. Numerous chemicals have yet to be evaluated for their potential to cause damage (Goldman and Koduru 2000). Of special concern is the relative lack of research on children’s exposure to various substances, and a lack of understanding about how exposure to multiple chemicals in low doses may influence child growth and development (Schneider and Freeman 2001).

A range of toxics and chemical pollutants found in water supplies, in foods, inside homes, in the air and in unprotected dumps are known to affect the health and functioning of those who are exposed. Among the sources involved are industrial wastes, emissions from internal combustion engines, indoor air pollution, fertilizers, pesticides and radiation. Effects include birth defects, various cancers, respiratory symptoms, skin problems and eye problems, as well as damage to the immune system, the central nervous system, the internal organs and the cardiovascular system (Schwela 2000; Hardoy, Mitlin et al. 2001). Children are particularly vulnerable. Their greater intake of food, water and air relative to their body weight increases their potential for excessive exposure, as does their closeness to the ground and their play behaviour. Their rapid growth and immaturity, both physiologically and metabolically, puts them in turn at greater risk of harm from their exposure (Chance and Harmsen 1998). Adolescence remains a high-risk time, since maturation of a number of organ systems occurs during this period (Golub 2000).

Air pollution

In houses with open fires or poorly vented stoves, concentrations of particulates have been estimated to be up to 100 times higher than health standards allow for, and to be many times higher than the outdoor urban concentrations (Hardoy, Mitlin et al. 2001). In terms of the overall global disease burden, this is probably the single most critical source of pollutants affecting children’s health (Satterthwaite, Hart et al. 1996). But outdoor air pollution also contributes to asthma, pneumonia, coughs and other respiratory ailments in many of the world’s urban areas; in Latin America, for instance, over 2 million children are estimated to suffer from chronic coughs as a result of urban air pollution (Romieu and al. 1990).

Lead

Lead ingestion is a particular concern for children. In the United States, in spite of public health efforts that have significantly reduced exposure, it remains the most common environmental health problem affecting children, aside from injury (Campbell and Osterhoudt 2000). At high levels it causes acute poisoning and can result in severe neurological damage and death. Even at relatively low concentrations once considered quite safe, it can affect behaviour and cognition, contributing to aggression and school failure (Needleman, Schell et al. 1991). Lead from vehicular exhaust is a serious threat for urban children in countries where leaded fuel is still used. Studies from Indonesia, Nigeria, Pakistan and other countries show blood lead levels well above acceptable limits (Manser, Lalani et al. 1990; Nriagu, Oleru et al. 1997; Heinze, Gross et al. 1998). In Karachi, children had significantly higher levels than adults, and 92 percent of them had levels above the USA action level (Nriagu, Oleru et al. 1997). Where leaded fuel is no longer sold, exposure occurs predominantly through the ingestion of dust in households containing lead-based paint, a problem particularly in low-income areas with deteriorating housing stock (Campbell and Osterhoudt 2000).

Working children

Working children are especially likely to be exposed to toxic substances – whether through pesticide use, work in dumps near burning garbage, fumes from various solvents, or exposure to hazardous by-products of various industrial processes (Lee-Wright 1990). Exposure to various chemicals can also result from small household-based industries. In the Philippines, for instance, the lead from automobile batteries is recovered in a home-smelting process, and small children are exposed to high levels of this potent poison (unpublished account, Nick Johnstone, IIED).

Unborn children

Fetuses are at particularly high risk from toxic chemicals, which may have marked effects on their development. Carbon monoxide, lead, methyl mercury from contaminated fish, various pesticides and other substances can all cross the placental barrier causing neurological damage, birth defects, spontaneous abortion or stillbirth. Research in the late 1980s found that over a quarter of Mexico City newborns had blood lead levels high enough to impair neurological and motor development (Rothenburg, Schnaas-Arrieta et al. 1989).

The case of Central Europe

Environmental pollution in Central Europe, and especially in Russia after the Chernobyl disaster, has attracted wide attention over recent years. A 1994 report describes the high level of childhood illness in Russia resulting from contami-

nation by the chemical industry and by radioactive releases (Cherkasova 1994). Official figures indicate that 50 percent of births had complications in 1990, and that high numbers of children were born with deformities and Down's syndrome. More than half of Russia's children were considered to be in poor health, and nearly all had allergies. In the city of Dserzhinsk, centre of the chemical industry, one child in ten was reported to be handicapped. In Salavat, an area of oil and chemical production, about 7 percent of children had abnormally small heads, and large numbers were born with serious liver disorders. Twenty percent of the country was considered to be ecologically dangerous, and in some areas children experienced high rates of cancer, glandular disorders, nose bleeds, joint pains, memory disorders and frequent illness, resulting not only from Chernobyl, but from hundreds of nuclear tests, dumps of radioactive materials and a number of "minor" nuclear disasters. According to the report, the situation was expected to worsen (Cherkasova 1994).

Safety hazards and child injuries

Hundreds of millions of children around the world are killed or disabled every year as a result of preventable injuries that occur within their homes and neighbourhoods. Heavy traffic, open fires and exposed kerosene heaters, unprotected stairways and heights, unfinished construction, poorly lit walkways, lack of safe storage for chemicals and poisons, piles of debris and a scarcity of safe play space all expose children to high levels of risk. In countries where disease is well controlled, unintentional injury ranks as the leading cause of death for children. In countries where disease and nutritional problems still kill many children, the percentage of injury-related deaths is lower, but the number of injuries per capita is considerably higher, especially in the poorest urban communities (Berger and Mohan 1996; Murray and Lopez 1996).

Causes of injury

Falls are the most common cause of injury, especially among younger children. Traffic-related accidents are responsible for the most serious injuries, and, along with drowning, for the highest number of injury-related deaths among children (Bartlett 2001). In many countries, road traffic accidents are the most common cause of injury requiring emergency attention; in South Africa they are the leading cause of death for children over one year (Kibel and Wagstaff 1995). The extraordinarily rapid growth of road traffic in most low and middle income countries, along with poorly maintained roads, multiple use of roadways and an absence of shoulders, sidewalks and safe crossings, has contributed to death and injury rates higher in many cases than any recorded in Europe and the USA (Manciaux and Romer 1986). Burns are most common for children under four, and in low-income countries are the result of floor-level cooking, open fires, unstable kerosene heaters, and crowded conditions. In high-income countries they are also related to poor housing conditions, but more often to faulty wiring, defective heating equipment and the absence of smoke alarms. Poisoning is also

especially common for young children, and results from a lack of safe storage for kerosene, household products, medicines and pesticides (Bartlett 2001).

Research in a suburban area in Jordan, where conditions were less challenging than was the case in nearby squatter areas and refugee camps, found that kerosene heaters were used in most households and that most of them were accessible to children. Many children were exposed to the risk of serious falls from roofs without fences, high windows without protection, stairways without rails. One third of the children depended on unsafe streets or roofs for play. Few families stored chemicals or poisons out of the reach of children. Only 8 percent of households were considered to be safe for young children. The researchers point out that large scale educational campaigns have made little impact on children's injury rates; the most effective interventions have been those involving environmental modifications (Janson, Aleco et al. 1994).

The relatively greater risks for children

A number of factors contribute to children's susceptibility to injury. In young children, curiosity and the drive to explore their surroundings are not matched by the capacity to understand or respond to danger (Matheny 1988; Jordán and Valdes-Lazo 1991). Even when children appear to understand the danger of a situation, this does not necessarily equip them to respond appropriately. The ability to interpret how fast a vehicle is moving, for instance, or to locate the sound of an approaching car, is limited before the age of six or seven regardless of training (Pfeffer and Barnecutt 1996). Children may be still older before they can absorb and analyze a lot of information at once in a complex environment (Ljungblom and Köhler 1991). Even when they are developmentally mature enough to understand and respond appropriately to danger, the drive to play can override the need for caution. Among older children and adolescents this can be complicated by a tendency for risk-taking. As children's capacity to deal with risk increases, their range of action and the number of risk factors that they face also increase. Injury rates, therefore, remain fairly constant throughout childhood, but the kinds of injuries tend to be different for children of different ages (Jordán and Valdes-Lazo 1991). A review of relevant studies has found that individual behaviour and personality traits such as impulsiveness make a minor contribution to injuries in comparison with environmental risk factors (Wazana 1997).

Boys are more likely than girls to be the victims of injury. In the 5 to 14 age group, they are more than twice as likely to drown, more than twice as likely to be injured in falls, and almost twice as likely to be killed or injured in road traffic accidents (Krug, Sharma et al. 2000). This gap has been attributed to behavioural differences, but it is more likely a function of the greater freedom afforded to boys, with the greater exposure to risk that this implies (Hart 1979; Ruangkanhasetr 1989; Berger and Mohan 1996). Girls have a far greater likelihood of being killed or injured as a result of burns, most likely a reflection of the extra time that girls are expected to spend indoors, often with responsibility for cooking. There is repeated evidence that children in poverty are more affect-

ed by injuries, in part because their physical environments more likely to be hazardous (Berger and Mohan 1996; Roberts and Power 1996; Reading, Langford et al. 1999; Butchart, Kruger et al. 2000; Laflamme and Diderichsen 2000).

Injuries are especially common for working children in low-income countries, who are often required to use tools and equipment designed for adults, or are exposed to unprotected machinery and or heavy loads that they are ill-equipped, developmentally, to deal with appropriately. This, combined with the loss of concentration resulting from fatigue, can mean high injury rates (Taket 1986; Blanc and contributors 1994; Boyden, Ling et al. 1998). An International Labour Organization (ILO) survey in the Philippines found that more than 60 percent of working children were exposed to hazards in their work, and that, of these, over 40 percent had suffered serious injury (ILO 1996). Even domestic work takes its toll; aside from burns, children can incur neck, head and spine injuries and deformities from regularly carrying heavy vessels of water (Nicol 1998).

Stress-related factors

Chronic illness and mental health problems, both stress-related, are among the most serious health issues in Europe and North America, and are becoming increasingly significant problems for people in the developing world, especially in urban areas. Poor living environments, and especially noise and crowding, have been recognized for years to contribute to stress and, through a heightened state of arousal, to deplete physiological resources and to affect hormonal and cardiovascular functioning, predisposing the body to illness and disease. Stress has also been found to undermine coping strategies and to interfere with social relationships (Cohen, Evans et al. 1986; Johnston-Brooks, Lewis et al. 1998; Evans 2001). Although these issues have been primarily associated with adults, they affect children too, both directly and indirectly through the effect that they have on those caring for them.

Stress is clearly a health issue, but in this review environmental stressors will be discussed in the following section as factors affecting children's overall development. There are certainly some physiological implications of stress for children, however, which can be briefly summarized here. Most of the health effects of residential crowding are related to the increased spread of infectious disease, but increased blood pressure and decreased growth have also been noted, primarily for boys. High noise levels from such sources as aircraft, road traffic, construction and industrial activity have been associated with temporary or permanent hearing loss as well as elevations in blood pressure and neuroendocrine functioning. There are, in addition, the less well-defined connections between stress and overall vulnerability to illness (Stansfield, Haines et al. 2000; Evans 2001).

Physical environments and the quality of care

The more challenging the physical environment is, the more critical the quality of care becomes for children's health and survival (Engle, Pelto et al. 2000). Many childcare practices are closely related to environmental risks to children's health; the practice in many countries of carrying infants and toddlers on the backs of caregivers, for instance, has been recognized as an effective means of protecting young children both from pathogens and safety hazards (LeVine, Dixon et al. 1996). At the same time, sadly, poor environments undermine the capacity to provide good care for children, since daily management in challenging living conditions tends to be extremely draining and time consuming. Overburdened and exhausted caregivers are far more likely to have to leave children unsupervised or to cut corners in the many procedures that are necessary for healthful living. Managing water supplies, keeping children clean and safe, dealing with waste and excreta in the absence of adequate services, finding fuel for cooking, and handling food appropriately can take more hours than there are in a day – and these challenges are often handled on top of other work. Difficult environmental conditions confront caregivers with impossible choices – if they fetch another load of water, they may not have time to cook a proper meal; if they feed children leftovers, they may risk another case of diarrhoea. The sheer drudgery resulting from inadequate housing and provision takes its toll on the capacity of families to function optimally, and the burden usually falls disproportionately on women, girls and young children.

The key to children's environmental health issues is often assumed to lie in the education of caregivers in hygiene and other protective measures. Education is certainly essential where there is misinformation – where diarrhoea is not related to dirty surroundings, for instance, or where parasitic infestation is thought to result from sugar intake. But a number of studies indicate that a reliance on health education is overly simplistic, and may have little impact in the absence of supportive living conditions. In a number of rural and urban communities, where the level of health, hygiene and safety knowledge was found to be high, this knowledge had little impact on daily practices (Arnold, Bartlett et al. 2000; McLennan 2000). In Burkino Faso, research into factors affecting hygiene behaviour found the location of water sources was more important than income, maternal education, health education or culture (Curtis, Kanki et al. 1995). In the Dominican Republic, interviews with caregivers revealed that in many cases they were simply "too tired to boil water" (McLennan 2000).

Researchers in Malawi point out that it is easy to forget the multitude of worries that confront poor families. On average, a child under five is sick for 40 days a year; families with a number of children may be coping with well over 100 sick days a year. When illnesses are not life threatening, it is understandable that caregivers might not bring all their time and knowledge to bear (Lindskog and Lundqvist 1998). In some cases, caregivers may respond less than aggressively to even life threatening illness. Scheper-Hughes's account of maternal responses to infant death in the Northeast of Brazil describes how mothers in a poor urban community keep an emotional distance from infants who appear weak, ailing and unlikely to flourish, thereby hastening their deaths (Scheper-Hughes 1992).

Physical conditions and the potential for hope can clearly affect the quality of emotional care. Adequate protection of children's health is not realistic in the absence of living conditions that support the health and functioning of all age groups.

Most research on care focuses on the capacity of adults to mediate between children and environmental risks of various kinds. But it is also worth considering the role that children play in protecting themselves from risks to health as they grow older. Caldwell points out that self-care is certainly a factor in the lower mortality of girls than boys in the 10–14 age group in India (Caldwell 1996). In many countries and communities, older children are also the caregivers for young children much of the time. Their capacity to deal with environmental health risks is as important as it is for adults, not only for themselves, but for their younger siblings.

Some final points on health and the physical environment

A few points are worth emphasizing. The first is the fact that children in poverty are so disproportionately subjected to environmental health risks – more likely to live in marginal areas that lack basic services; more likely to be undernourished and susceptible to disease; more often exposed to pollution and chemical contamination; more likely to face safety hazards as a result of overcrowded housing and inadequate space for safe play; less likely to receive the quality of care that might buffer them from these risk factors, largely because of the heavy time burdens faced by their caregivers.

Another critical consideration is the fact that children and caregivers seldom face these problems one at a time. Environmental risk factors often exist in clusters. It might be possible for caregivers to cope effectively with any one of them. But when inadequate water supplies are compounded by a lack of sanitation, by crowded and unfinished housing, by an absence of safe play space, by long distances to work and services, the difficulties can become overwhelming and unmanageable. It becomes far-fetched to assume in these complex situations that children can reasonably be protected in the absence of generally improved living conditions.

A final point is the fact that the connection between environmental factors and children's health is not linear and predictable, but is complicated by numerous social and behavioural realities. The Malawi example of improved water supplies is a case in point. It would be reasonable to assume that the closer a water source is brought, the greater the use that will be made of it. In fact, unless water supplies were brought to within a few yards of the house, water use did not increase (Lindskog and Lundqvist 1998). The complex relationship between environmental conditions and health cannot be easily understood or properly responded to without an appreciation of human behaviour and the larger context. As Caldwell points out, it is intriguing that as many as 70 or 80 percent of children actually manage to survive their vulnerable first year in the most challenging conditions (Caldwell 1996). Factors supporting resilience need to be better understood as well as threats to health.

Children's right to an adequate standard of living for full development

Article 27 of the UN Convention on the Rights of the Child establishes the right of every child to “a standard of living adequate for the child’s physical, mental, spiritual, moral and social development.” This section will look at the material and spatial dimensions of such a standard of living, particularly in housing and its neighbourhood surroundings. Although we will not discuss such alternative living environments such as refugee camps, prisons, shelters and various other institutional arrangements for children, it should be assumed that the factors defining supportive living environments for children and young people extend to these other settings also.

The links between children’s health and the physical environment are relatively well documented. This is less true of the connections between the environment and children’s general development. This relationship has generally been ignored in mainstream developmental psychology; even those psychologists who emphasize the importance of context have tended to overlook the contribution of the physical environment to children’s development and well-being. In spite of this mainstream neglect, a body of work in Europe and North America, especially in the fields of environmental psychology and geography, has established strong links between children’s physical worlds and their developmental outcomes. In the rest of the world, comparatively little research has been done in this area. What information there is tends to be observational and is often incidental to the objectives of the research in question.

Theory derived from research in Europe and North America frequently has broad relevance; nonetheless, it is a risky undertaking simply to extrapolate from Northern findings without considering local realities. Physical settings and conditions vary widely around the world, along with the meanings that are assigned to them. Even more to the point, local understandings of children’s development – and even the process of development itself – are shaped by cultural goals and constructions and by social and economic pressures, and may differ from a perspective on development that emphasises individuality, emotional independence and school-related cognitive competence (Valsiner 1987; Dawes 1999).

Some observers argue that different cultural norms, goals and developmental opportunities make it impossible to assume any universal principles regarding the process or outcomes of development (Burman 1994); others take the more moderate view that developing children share certain fundamental needs, capacities and aspirations, although these can be differently expressed depending on the ecology within which they unfold (Kagitçibasi 1996). Participatory work with children in a number of cultures and a variety of settings encourages a sense that the similarities in children’s preferences and in the ways that they use and understand their worlds may be even stronger than the differences (Lynch 1977;

Chawla 2001). Although attitudes and values may vary considerably, many of the behavioural responses of children to specific conditions do in fact remain relatively consistent across cultures, as the discussion of crowding (below) will demonstrate.

Rather than arguing here for a framework of developmental outcomes and goals that can stretch to fit all realities, we will take at face value whatever developmental impacts or implications for well-being are presented in the various sources that are drawn on here, recognizing that they may be more local or emic in some cases and less so in others. A comparatively large number of North American and European sources will be reviewed here; they raise questions and shed light on the realities within other settings, as well as providing invaluable information on their own milieus. There is also considerable discussion here of work from other parts of the world – but the repeated references to relatively few studies (especially from South Africa and Nepal) demonstrate the need for more research, both experimental and descriptive, into the material realities of children's lives in a greater diversity of settings.

The organizing framework for considering the connections between children's development and their living conditions will be the following set of categories and concerns that have emerged from the sources under consideration:

- the *security* inherent in the physical environment, or the features in the environment that promote or undermine a sense of belonging and identity in children;
- the *diversity* of the environment, or the stimulation and richness of experience that a child's surroundings can offer;
- the *accessibility* of the environment, or the range of developmentally supportive settings that are available to children;
- the *organization* of the environment, or the way that domestic and public space is structured and arranged to express and promote social and cultural norms;
- the *stress* imposed by the environment, or the ways that environmental chaos can threaten children's identity, competence, confidence and general well being.

These categories are not neatly packaged units, but overlap and relate in many ways, as is true in almost any attempt to organize a complex system into more manageable domains.

Security and identity

Secure physical environments have been found in many settings to contribute to children's emotional security and their sense of identity, providing a basis for optimal development on all fronts. The concept of *attachment*, which concerns the significance of the emotional bond between children and their caregivers, is helpful in understanding this connection. According to this basic tenet of deve-

developmental psychology, the young child seeks contact or proximity with her familiar caregiver, and the caregiver maintains a protective and responsive awareness of the child's whereabouts and well-being. In the context of the security that this behaviour fosters, the child becomes increasingly confident about moving outwards, both physically and emotionally, and the caregiver increasingly willing to allow and support this independence (Bowlby 1969). A child who has experienced secure attachment early in life is considered well equipped to develop into a trusting and confident person. When early attachment has been insecure, on the other hand – undermined by unpredictable care or extended separation – children are considered likely to become anxious and conflicted in ways that shape their social relationships and their sense of self (Thompson 1999).

Attachment behaviour and its outcomes are to some degree mediated by culture and circumstances. Where shared management of childcare is the norm, for instance, the attachment experience may develop and express itself differently. LeVine and Miller suggest that infants become attached not just to specific individuals, but to a specific set of conditions that they associate with comfort, and that cause anxiety when they are withdrawn (LeVine and Miller 1990). Observation of children's lives suggests that these specific conditions include the child's physical surroundings, and that familiar objects, places, sounds and smells contribute to a sense of security and comfort. Environmental psychologists have developed theories of "place attachment" to account for the emotional connectedness to home and familiar surroundings.

Place attachment

Chawla has reviewed a range of literature, most of it North American, on place attachment in children, pointing to the significance of a predictable, inviting, self-affirming physical world for the child's emotional development, and suggesting that "healthy place attachments balance the inward hold of an intimate familiar center with the outward attractions of an expanding world" (Chawla 1992, p. 66). Research from a number of other countries confirms the notion that children find security and affirmation in places – in homes, however humble, that provide a sense of refuge (Swart-Kruger 2001c), in surroundings that promote confidence through their very familiarity (Amar 1996), in "safe havens" that offer alternatives to chaotic, violent surroundings (Hill 1996), in supportive neighbourhoods that confer a sense of belonging and identity (Moore and Cosco 2001). A secure sense of self may be fundamentally dependent on predictable and responsive human relationships; but stable, comforting physical surroundings contribute to this sense, and may become especially important when human relationships are less than dependable (Searles 1960; Proshansky and Fabian 1987; Chawla 1992).

Homelessness, relocation and insecurity of tenure

Disruptions in a child's secure relationship to place can have unsettling consequences. Research, mostly from the United States, points to significant emotio-

nal problems in children of homeless families, including anxiety, sleep problems, aggression, withdrawal and regressive behaviour, in some cases as compared to low-income children whose families have secure housing (Bassuk and Rubin 1987; Rivlin 1992; Masten, Miliotis et al. 1993). It is possible that the distress of these children is related to the distress of their parents; or that their homelessness may even be a consequence of parental problems rather than a cause. Some indication of the relative contribution of the living situation is found in a British study comparing the mental health problems of homeless children and families before and after rehousing, as compared to low-income families with stable housing (Vostanis, Grattan et al. 1998). One year after rehousing, the majority of mental health problems within the original homeless group appeared to have been resolved by stable housing. The impacts of homelessness for children are a function not only of insecurity and lack of predictability, but of features of their current physical environment, be it a homeless shelter or the street. Shelter-living, for instance, tends to be characterized by a lack of privacy and high levels of overcrowding and ambient noise, the effects of which will be discussed further in the section on environmental chaos.

Research into relocation, also mostly from the United States, has yielded mixed findings. Some work has found that this disruption has no long-term adverse effects; other studies find that relocation, especially for children in poverty, who are more likely to experience frequent moves, is associated with poor school achievement, conduct problems and social isolation (Stroh and Brett 1990; Sluzki 1992; Bartlett 1997; Stoneman, Brody et al. 1999). Temperament may play a part: one study has found that residential instability is especially difficult for normally undemanding children, while children characterized as difficult or emotionally intense actually reduce their problematic behaviors during periods of instability (Stoneman, Brody et al. 1999).

A vast number of people in low-income countries live with chronically insecure tenure. Recent participatory work in eight countries has indicated the importance to children of secure tenure, and pointed to the anxiety of those who worry about keeping their homes (Chawla 2001). Generally speaking, however, the psychological impacts for children of this major issue have received little attention. Some of the practical implications deserve consideration; families living without security of tenure are subject not only to anxiety, inevitably transmitted to children, but also to a number of material consequences. Illegal settlements are less likely to be provided with the basic infrastructure that supports a manageable life. People are less likely to invest in their homes and communities, thereby failing to build their own asset base or contribute to local growth and stability. Secure tenure provides a foothold from which other problems of poverty can more easily be tackled; when it is absent, children are affected in all areas of their lives (Hardoy, Mitlin et al. 2001).

Forced eviction or displacement

A high percentage of poor families in illegal settlements in urban areas of Asia, Africa and Latin America live in constant fear of forced removal. Discussions with families who have been evicted have found that it is common for them to

experience evictions many times (ACHR 1989). Evictions often lead to homelessness and almost always to major economic upheaval. Possessions may be destroyed, livelihoods and schooling threatened, and social networks undermined. Case studies from Phnom Penh, Manila and Mumbai found that the impacts for family stability and children's well being were often devastating. Children described the violence, panic and confusion of the evictions, and the experience of sleeping without shelter afterwards and being separated from friends. They spoke of the difficulties in re-establishing a stable life, and frequent breakdowns in family relations as a consequence of stress and economic difficulties. Many children had recurring nightmares and anxiety, many became apathetic or withdrawn (Rahmatullah 1997). Swart-Kruger's account of a forced eviction in South Africa stresses the profoundly unsettling outcomes in spite of immediate relocation (Swart-Kruger 2001a).

Children's security can also be threatened by natural disasters. Residents of urban squatter settlements are, again, especially vulnerable. Housing on steep hillsides and in flood plains can be easily destroyed by heavy storms, and the flimsy materials used by the poor are unlikely to withstand high winds, earthquakes or fire (Hardoy, Mitlin et al. 2001). Even the anticipation of such events, which in some areas occur on a regular basis, can presumably be disturbing to children, although no research on this subject has been found.

Around the world, forced migration, resulting from armed conflict, political violence and other emergency situations, has resulted in displacement for millions of children, many of whom have become separated from family. Numerous studies, along with information from service agencies, have attempted to contribute to a better understanding of their predicament. The majority of this literature has focused on the impacts of separation from parents. A recent review points out that another major consequence of displacement to a new and alien environment is the loss of children's place-bound roles and daily responsibilities, which in many cases are essential components of their security and identity as part of a community. Mann suggests that the restoration of security and a sense of belonging for these children may have as much to do with the re-creation of certain daily life patterns (such as caring for younger children) as with reunification with family in an unfamiliar environment (Mann 2000). Relationship to place appears to be especially important in the identity development of refugee children. Interviews with children of refugees in Cyprus, born after their families' displacement, indicates the power of the "homeplace" in their construction of a secure sense of self (Hadjiyanni 2002).

Street-based children

It would seem reasonable that children living on the street might be the most threatened in terms of their emotional security, lacking as they do any dependable base, and often facing considerable risks and hardships. In fact, the large body of research on street children shows disagreement on this subject. Numerous studies from high and low-income countries point to serious emotional and social problems for children and adolescents on the street, describing depression,

low self-esteem, inappropriate behaviour, poor social skills, and an inability to accept responsibility (Hatting, Poggenpoel et al. 1998; Rohde, Ferreira et al. 1998; Ayerst 1999; Bao, Whitneck et al. 2000). But other studies point in a different direction. A review of the literature by Veale and colleagues, for instance, finds evidence that street children, rather than being psychologically vulnerable, show self esteem, positive identity and better mental health than poor children in the same cities living with their families (Veale and Taylor 2000). It can be difficult to assess research on street children, since many of those who conduct it appear to take rather extreme positions – either presenting these children as victims in desperate need of help, or else as robust protagonists who have taken control of their lives and found effective ways to cope with deep poverty and difficult home situations. Different ideological positions on the part of researchers may lead them to construct questions differently, or to interpret information differently. Some researchers have acknowledged that they may (however unwittingly) elicit desired responses from children, and that children may take surveys and questions less than seriously, enjoying the attention and elaborating with pleasure on the hardships of their lives (Dallape 1988; Baker, Panter-Brick et al. 1996). It appears likely that, while the threatening quality of life on the streets could seriously challenge a child's resilience, assertive and independent children are more likely to choose a life on the streets and may be relatively less likely to react adversely to challenging and insecure conditions – “security” for them, in fact, might lie in having the greater sense of control which life away from (an often abusive) family might offer them.

Access to play

Not all of the threats to emotional security posed by living conditions are as dramatic as homelessness or eviction. Research in Japan, Switzerland and the United States suggests that a lack of easy access to opportunities for safe play and exploration can result in more anxious attachment between parent and child, with implications for the child's emotional and social development (Oda, Taniguchi et al. 1989; Hüttenmoser 1995; Bartlett 1997). When the drive to play comes into conflict with the need for security and reassurance, it is not surprising that it might result in a level of anxiety and discomfort in young children. A Zurich study of over 900 five-year-olds compared those who could easily play outdoors with those living in areas where traffic made outdoor play unsafe. The children who were unable to play outside unaccompanied were less competent in their interactions with other children and more anxiously dependent on their mothers, who in turn were more nervous and overprotective with their children than the mothers in the other group (Hüttenmoser 1995). Studies in Britain and the USA have found that both young children and their caregivers are most comfortable when children can go off to play at will, but in situations where eye and voice contact can be easily maintained, or, in the case of slightly older children, where it is easy to go back and forth. Some settings, such as high-rise buildings or housing in hazardous surroundings, make such flexibility impossible (Cooper-Marcus and Sarkissian 1986). Whiting and Edwards, in a comparison

of socialization practices in 12 cultures, confirm that a gradual enlargement of children's range is most comfortable for both children and caregivers, and they draw on Mead's spatial terminology for characterizing different stages in this process: there are "lap children", "knee children", "yard children" and "community children" (Whiting and Edwards 1988).

Stigma and identity

A number of sources suggest that, far from taking their physical environments for granted, children are extremely sensitive to their surroundings both in practical and aesthetic terms, finding them a source of satisfaction but also a cause for humiliation and distress. Research from different countries around the world finds that children are quick to point to garbage, dilapidation, squalor and the absence of trees and basic services, and to see these physical conditions as a humiliating reflection of their own worth (Chawla 2001).

Swart-Kruger's participatory investigation into the lives of children in a squatter camp in Johannesburg reveals how powerful the sense of stigma is for these children as a consequence of their place of residence. The shack dwellers were resented for invading this patch of unused land and were blamed for the increase in local crime and the drop in property values. Children made it clear that they felt the disgust and anger directed at them by neighbours of all races. This affected their comfort in making use of neighbourhood resources. Those who attended local schools, for instance, were careful not to reveal where they lived, fearful of ridicule and rejection. Their identity as residents of this marginal community was, Swart-Kruger argues, an effective mechanism for social exclusion (Swart-Kruger 2001c). When this squatter community was evicted and relocated miles away from the city in a barren stretch of veld, water had to be trucked in, and they were often without supplies for days at a time. A film documenting the children's lives in this new site indicates how humiliating they found it not to be able to wash. One boy explains to the camera that when there is no water, he cannot attend school because it would be so shameful to arrive unclean (Cameron and Swart-Kruger 2001).

This sense of stigma is not unique to children in squatter settlements. A report on children's quality of life in British suburbs points to many of the same problems. Children were aware of mistrust and hostility from adults in their neighbourhoods and town center, in large part, it seems, because there were so few places available to them where their presence was seen as legitimate (Morrow 2001).

In some cases, even the name of a community or institution can cause children to feel ashamed. In informal settlements in Zimbabwe, children made it clear that they found it demeaning to be identified as residents of a squatter settlement. "A squatter is a person who lives in a prohibited place. The government brought us here, and so we do not live in a prohibited place. So why should I be called a squatter when I am a boy and have a name?" (Chinyenze-Daniel and McIvor 1999). Although adults in the settlements were indifferent to what they were called, 80 to 90 percent of the children interviewed objected to being iden-

tified this way. Children in an interim housing institution for homeless families in New York City also complained about the embarrassing name of their center (“Help One”) and said they would prefer to have it known as “the Condominiums” (Evaluation conducted by the Children’s Environments Research Group, The Graduate Centre of the City University of New York in 1995). Street children in Sri Lanka, similarly, when asked to come up with a name for their center, were determined that it be called a school rather than a center or a project, and they vehemently rejected “Poor Children’s School” or “School for Children who have no Home” (Gunsekera, Fernando et al. 1989).

Research on street children indicates that the contempt of others is intrinsic to their life on the street, and that the social stigma attached to their living situation is as trying as the physical hardships they face. Children in Montevideo spoke of the need to justify their presence in the street through an accepted and legitimate activity – otherwise they became the object of a “stigmatizing gaze”. The identity of these children is tied up with the street in complex ways. On the one hand, their presence there marks them as social outsiders who are therefore the target of discrimination. On the other hand, this discrimination strengthens their identity with the street. A researcher describes the physical attitude of a child who has made the street his own. In contrast to the awkwardness of other children sitting on the pavement working on a collage project, a boy who lives on the street immediately finds a position that appears natural and comfortable and that demonstrates his familiarity with the locale – this is also a defiant symbolic gesture that says “I have an experience you have no idea about and I am proud of it” (Lucchini 1996, p. 243).

Diversity and stimulation

Development is not something that just happens to children. Through their involvement in the world around them they are active participants in this reciprocal process. Provided they are reasonably healthy, well nourished and emotionally secure, children will engage with their surroundings, looking constantly for new opportunities and new experiences. Especially in their early years, given the opportunity, children spend much of their waking time exploring the world around them – watching, reaching, touching, tasting, imitating, manipulating, experimenting in various ways with what things are and what can be done with them. This is not just random activity; children are driven by a desire for competence and understanding. Through their exploration of their surroundings, they gain important information – about the properties of objects, about cause and effect, about their own capacity to make things happen. Through active play, they learn to use their bodies and to understand physical laws and spatial relationships. Through repetition, they gain a range of skills and a growing sense of competence and assurance. Through imitation of the activities of those around them, using objects in culturally sanctioned ways, they experiment with social roles and begin participating in the life of their households and communities. A stimulating, diverse physical environment is a basic support for this active learning, and has been recognized by many major theo-

rists as fundamental for development (for example, Piaget 1952; Montessori 1965; Wohlwill and Heft 1987).

The diversity of the environment can be functionally assessed in terms of its *affordances* – in other words, not just what is physically present, but the range of activities that the environment makes possible, depending on a child’s capacities (Gibson 1982; Heft 1983). A wooden bench, for instance, is not just a place to sit. It is also something to crawl under, to hold on to in learning to walk, to climb on or to jump off. Any setting for a child is as rich and stimulating as the number of affordances it contains. A description of children’s use of neighbourhood streets in Jordan describes the many affordances the street provides: children have the chance to observe tradespeople, maintenance workers and the daily life of the community; there are patches of dirt for building imaginary landscapes, piles of sand for digging in, hard surfaces for ball games and bicycles, building entrances to hide in, flights of stairs and retaining walls to climb. Children are observed jumping, climbing, skating, sliding, running, chasing, sitting and watching (Abu-Ghazze 1998).

Availability, variety, responsivity

A number of related studies in the USA has found that the *availability* of stimuli, the *variety* of stimuli and the *responsivity* of the environment are all positively related to children’s learning. For infants who are not yet mobile, the availability of objects is especially important; after that, variety and change become more critical than the actual number of objects available (Wachs 1987; Wachs 1992). When children reach about 9 months, they become capable of engaging in episodes of “joint attention” – in other words, being aware of what other people are doing with objects, learning from them, and directing the attention of these others to their own activity (Tomasello 1999). As children move into the pre-school years, social factors become more important, and cognitive development is considered to be best supported through the joint engagement (or *scaffolding*) of an adult or older child who guides the child through problem solving experiences, adjusting their involvement to what the child is developmentally ready to handle – or to what Vygotsky referred to as their *zone of proximal development* (Vygotsky 1978). The richness of the material environment remains significant as children grow older, but is arguably not sufficient in itself to guarantee optimal learning.

The child’s capacity to explore

A number of studies have tied the emergence of critical cognitive functions to a child’s capacity to explore. Rapid growth in understanding and learning at around six to nine months of age is related at least in part to increasing motor skills and mobility at this age, allowing for new forms of experience (Thelen 2000). Engle suggests that there is a complex relationship between environmental stimulation and nutritional deficiencies. Malnourished children, slower to develop and move around, have more limited contact with their physical sur-

roundings. This, together with their lower energy levels, can result in less exploration of the environment, and lower levels of the stimulation that promotes cognitive development (Engle 1996). Research in a poor urban community in Brazil has related early childhood diarrhoea and parasitic infections to both decreased fitness and impaired cognitive functioning four years later (Guerrant et al 1999). It is quite likely that the same mechanism that Engle describes is at work here.

Environmental diversity as a protective factor

Bradley and colleagues have looked at the implications of environmental diversity for young children at high-risk. They investigated the caregiving environments of premature, low birth weight infants in poverty from eight USA cities over their first three years, and identified six protective factors that contributed to the resilience of those few children who were not delayed in their development. Four of these six factors were related to children's physical environments: namely, the presence of toys and other play materials, the variety of stimulation and the availability of adequate space for exploration, along with low residential density (Bradley, Whiteside et al. 1994).

Child rearing goals

Physical restriction or support for exploration can also be a function of cultural beliefs and goals. Middle-class North American parents, for instance, emphasize cognitive development. Recent advances in brain science, pointing to the plasticity and dramatic rate of brain development during the early months, have contributed to this preoccupation and to an emphasis on the first few years of life as a particularly fertile time for learning (Shore 1997). Exposure to a rich social and physical environment during this window of time is considered to have potent effects for learning and long-term success. Child rearing and educational strategies in the context of this understanding emphasize the importance of stimulation for young children in order to maximize these gains – as attested to, for instance, by the plethora of carefully designed educational toys for even the youngest infants (Kagan 1998).

Child rearing goals and strategies can vary however. An account of child rearing among the Gusii in Kenya describes an approach concerned primarily with survival and compliance in children, and the economical use of limited resources, rather than with optimal cognitive gains (LeVine, Dixon et al. 1996). Mothers keep their new infants close at all times, breastfeeding frequently, responding immediately to distress, but avoiding the arousal that would result from eye contact or verbal interaction. These practices contribute to metabolic efficiency and protection from infection, and place a premium on survival during a highly vulnerable period. After the early months, infants are more often cared for by older sisters, who are expected to keep them quiet and calm, and to confine them to their backs or to a mat. Far from prizing stimulation, the attempt is to *avoid* arousal in young children and to maintain them in a quiet

state, free from both distress and excitement – a strategy that conserves caregiving energy and keeps infant expectations low. There is no explicit description of the engagement of young children with the material environment – but the suggestion is that a purposeful set of strategies limits exploration, scaffolded learning, and possibly cognitive gains, in the interest of promoting other goals.

It is quite possible that even children on the backs of caregivers are receiving greater opportunity for interaction with the material world than might seem to be the case. A description of a nine-month-old Nepali girl, tied to her mother's back, emphasizes the opportunities she seizes: she is loosely tied, and while her mother feeds the goats, she can pull herself to the side and watch what is happening. When her mother squats to scrub a pot, the child's legs reach the ground, and she flexes them up and down, reaches for stones, watches under her mother's arm, fully engaged in the experience. When she is briefly left sitting, she plays with a set of keys and her father is seen passing her some colored rags when she becomes bored (Arnold, Bartlett et al. 2000). But it is also possible that there may be alternative pathways to learning for children that rely more heavily on observation than on hands-on exploration. Rogoff and colleagues have described the different style of involvement of children in cultures where learning happens in informal participatory ways, with greater shared engagement and less emphasis on purposeful facilitation; these children tend to observe far more keenly, and to be capable of simultaneous attention to competing stimuli, as opposed to relying on focused feedback (Rogoff, Mejia-Arauz et al. 2001). It is at least possible that children in rich environments, but with relatively constrained opportunities for physical exploration, are able to complement their limited exploratory behaviour through closer attention to the actions of others. There is evidence, certainly, that even before infants are old enough to manipulate objects, they are able to acquire an understanding of some of the basic principles that govern the behaviour of objects simply through observation (Spelke, Breinlinger et al. 1992).

Observation may even be the preferred mode of engagement for children where social activities are rich and compelling. In rural Guatemala, research into daily activity patterns has found that young children, left for the most part to their own devices while older household members worked, spend less time playing than closely watching the activities of those around them. In this culture, where development is believed to unfold according to an internal timetable, unaffected by outside influences, caregivers see no reason to interrupt their busy work schedules to interact with young children and support their learning. Symbolic play with objects certainly exists, but is not actively encouraged, and children's competence develops along different lines, with skills in attention, social cognition and basic maintenance activities developing more rapidly than they would in Western children (Gaskins 1999).

Negative stimuli

Not all environmental stimuli are positive in their impacts. Ambient noise, overcrowding and household traffic have been negatively related to cognitive deve-

lopment, the theory being that these distractions inhibit attention, as well as interfering with caregivers' responsiveness. The availability of what Wachs refers to as a "stimulus shelter" – a quiet corner where a child can get away from the confusion of a chaotic household – has been found to be a protective factor and strongly predictive of more positive cognitive outcomes (Wachs 1987). These negative stimuli will be discussed in greater detail in the section on environmental chaos.

Accessibility and availability

Throughout childhood and adolescence the availability of novel experience continues to be a major factor in learning, social growth and sense of self. A supportive physical environment is one that makes a range of constructive experiences available. This section will continue the discussion of access to affordance-filled environments, but will focus on the *range* of settings that are available to children, especially as they grow older.

Behaviour settings

Whiting and Edwards, in their comparative analysis of children's social behaviour, argue that socialization has less to do with children's face-to-face interactions with adults than it does with the variety of physical settings that are made available to them as part of their daily lives (Whiting and Edwards 1988). Barker, a pioneer of ecological approaches, called these "behaviour settings", since a particular physical setting implies particular routines and activities (Barker 1968). A soccer field, a wooded park, a busy market place and a library, for instance, offer different affordances, make different opportunities available, have different rules for engagement and so contribute to development in different ways. An investigation of Brazilian children's commercial transactions offers an excellent example of the opportunities provided by access to a particular activity setting. Parents reported that they sent their children from a very early age to make small purchases at local stands – even 18 month olds were able to walk to a candy stand, be lifted up by some bystander, point to the item they wanted, and hand over the money. Opportunities for involvement were structured to match developmental needs. Younger children were generally given the exact amount needed for the transaction; older children were expected to take a greater or lesser role in checking their change or making the calculation themselves [Guberman, 1999 #847].

As children grow older, there is evidence that they move from wanting settings that allow for activity, to preferring places for the opportunity they offer to socialize with others, to establish their social independence, or to be alone (Malinowski and Thurber 1996; Woolley, Spencer et al. 1999). What adults may see as aimless "hanging around" appears to be experienced as an essential activity by young people in search of identity and belonging (Abu-Ghazzeh 1998). Participatory research in a number of cities around the world makes it clear that access to their surroundings and to reasonable opportunities in their neigh-

bourhoods is a major issue for children in worlds as different as Johannesburg and Trondheim, Bangalore and Melbourne (Chawla 2001.) A number of factors determine the availability of appropriate “behaviour settings” – among them, the location of housing, the quality of provision (including public transport, facilities for recreation, libraries, entertainment), the level of safety, and the constraints imposed by culture, gender, discrimination, disability and children’s work loads.

Some examples of the constraints children face

A recent report prepared for the city of Johannesburg confirms the importance of access to children in very concrete terms (Swart-Kruger 2001b). Researchers interviewed children aged 10 to 14 from four representative neighbourhoods for their assessment of factors that most affected their quality of life. Whether they lived in the inner city, in outlying industrial areas or in residential suburbs, children described a lack of access to opportunities. In none of these neighbourhoods were there demarcated, well-kept, safe places where they could play. Parks and open spaces had been taken over by drunk and abusive adults, or were filled with uncollected waste and overrun by rats. Swimming pools were too far away, or too expensive to use. Children’s mobility was limited by heavy traffic on streets difficult to negotiate because of inadequate pavements, broken traffic lights and a lack of safe crossing places; bus services were expensive and had insufficient routes and stops; streets were poorly lit, making it frightening to be sent out in the dark on errands. A number of children spoke of difficult access to clinics and police services. None of these problems were experienced in isolation – more often, they compounded one another: “It is not just that a traffic light is out of order but the fact that you have to stand for up to half an hour waiting to cross an arterial road carrying fast, heavy traffic – and that, while you are waiting, you are verbally abused by drunk adults, mugged by older street children, or terrified by large stray dogs” (p.36.) These conditions are repeated with variations in cities around the world.

Accessibility is not an issue only for urban children. Although rural children may have considerable spatial range, especially in the course of daily work, they can experience a lack of opportunity resulting from few behaviour settings. For girls especially, life can be limited to work at home and work in the fields, with little chance for companionship and recreation. The potential for even a common room for meeting with other children can make a significant difference (Rajbhandary, Hart et al. 1999).

Nor is accessibility a problem only for the poor. Middle class children may be even more confined in response to perceived risks – restricted to their homes, schools and a schedule of activities that may be interesting and educational, but that are no substitute for the benefits of unstructured play with peers, or for the sense of belonging that comes from involvement in a local community. In many cases, more affluent families live in buildings and neighbourhoods that are literally gated off from their surroundings. Research indicates that these measures may heighten the perception of safety, but that they show few benefits in terms

of actual crime reduction, and tend to undermine a sense of community (Wilson-Doenges 2000). Accessibility is an issue for children in all social categories, but it tends to have greater significance for children in poverty. They are more dependent on what their neighbourhoods have to offer since their homes are more likely to be overcrowded, dilapidated and lacking in space, and since there is less likelihood that they will have the resources to take advantage of opportunities further afield.

Certainly not all children in poverty live circumscribed lives however. Throughout Latin America, for example, there is a contrast between higher-income areas where children are isolated from others, and poor neighbourhoods where they run relatively free with their peers. A report from Buenos Aires describes the lives of children in the poor Boca Barracas neighbourhood, a physically and socially diverse area (Moore and Cosco 2001). In spite of poverty, litter, pollution and a general lack of maintenance and repair, community life is full and active for children. They are welcome in the public domain, and parents are comfortable allowing even young children to roam freely in the company of siblings, watching people at work, meeting friends, buying treats from local kiosks and taking part in local events. Small neighbourhood plazas and parks provide prized places for play and hanging out, and children have a strong sense of pride and ownership in their local world.

Provision

Local levels of provision make a marked difference both in the range of possible settings for children and in the means for reaching them: too many children and young people around the world live in barren suburbs, rundown inner cities or marginal squatter communities where their social, recreational and cultural needs are barely considered. The presence of such community institutions as churches, political organizations, cultural resources and civic clubs is in part a function of the level of social organization and commitment within a community – and this kind of neighbourhood resource base has been noted to be weak where there are high concentrations of poverty, joblessness and residential mobility (Wilson 1998). But levels of formal support from local government for such facilities as libraries and recreational centers are also critical. Transportation becomes particularly important when there are few opportunities available close to home. Even where the general level of formal provision is high, the extent to which children's particular needs are taken into account may be very poor. Participatory work with children makes it clear how often provision on various levels is designed in response to the requirements of adults. There have been a number of encouraging efforts around the world to take children's access into account in the planning and implementation of local government provision (Riggio and Kilbane 2000). However, there is little research documenting the developmental outcomes for children.

Children's work

Levels of provision can also affect children's opportunities through their effect on local workloads. Children's work, and that of girls in particular, has been noted to increase with declining environmental conditions (UNDP 1995). Improved water provision or the installation of grain milling machines, for instance, can dramatically decrease the hours of work that children put in every day, leaving them time for other activities (Johnson, Hill et al. 1995; Nicol 1998). Adequate and affordable public transportation can make a difference to the possibility of returning home at the end of a day, rather than sleeping in a marketplace or on the street.

In some cases, work may be an enriching experience for children, providing a chance to move beyond the confines of home, and meeting the developmental need to acquire competence in new areas. But too often, it is a repetition of the same familiar routines and can become numbingly boring, providing little in the way of stimulation, but preventing the chance for alternative activities. In Nepal, where children begin to take on domestic chores by the time they are five or six, work is at first an exciting adventure – a chance to accompany older siblings beyond home, to learn new skills, and to prove themselves worthy of responsibility. By the time they are 10 or 12, however, there is little new to learn, and work becomes a burden that limits rather than expands life (Arnold, Bartlett et al. 2000).

Discrimination and exclusion

Children can be excluded from active participation in public space for a variety of reasons. Perhaps the most basic reason is the very fact that they are children. British research, in particular, has revealed the extent to which access and control over public space is limited for children and young people (Woolley, Spencer et al. 1999; O'Brien, Jones et al. 2000; Spencer and Woolley 2000; Morrow 2001). By contrast, the automatic social integration of children into community life in some countries makes a major difference to their quality of life.

Gender is another reason for limited access. Around the world, girls' freedom is generally less than that of boys, a response to cultural norms, perceived risks to safety, and the expectation that girls will help with household work (Whiting and Edwards 1988). In many cases this restriction begins with puberty. In rural Sudan, for instance, younger girls are able to wander freely around the village and range as widely as boys in the course of their daily work, collecting wood and assisting in the fields. But when they reach puberty, their movement through public space is considerably restricted (Katz 1993). In Jordan, adolescent girls seek out doorsteps and other recessed areas just outside the public right-of-way, while their male peers wander along the sidewalks, and younger girls play on the street (Abu-Ghazze 1998). In the USA, Hart mapped children's movements outside of home; boys ranged widely over the village, while girls went back and forth to the local store, running errands for their parents (Hart 1979). More recent work reveals that these gender differences are probably not universal (Cotterell 1993). Valentine notes, for instance, that girls in Britain may

be perceived by parents as more competent than boys at negotiating public space safely (Valentine 1997). But there is no question that for many girls around the world, especially after puberty, access to the public domain is limited.

Children with disabilities are frequently denied access to a range of possibilities; rarely are environments designed to be maximally accessible. Where resources are available, they are generally used to bring play and learning opportunities to these children rather than to establish ways of facilitating their access to a wider range of possibilities, and allowing them the chance to explore and select from a rich environment in the company of other children in their communities. This isolation is harmful to their development on all fronts.

Children who belong to minorities are often the victims of exclusion that can mean reduced access to community life. In rural Nepal, children belonging to lower caste groups are denied access to temples and local events, and know that they should not enter the homes and yards of higher caste households, or even make use of the same water sources (Arnold, Bartlett et al. 2000).

Safety issues

Risks to safety can have dramatic effects on the use children make of their surroundings. Household dangers, along with a high level of pathogens, cause caregivers to restrict mobility and exploration for very young children in many communities (Whiting and Edwards 1988; LeVine, Dixon et al. 1996). Outside the home, traffic is an especially common and serious problem, and research in Britain, the USA and Scandinavia has indicated the extent to which children's lives and opportunities have become constrained in response to increases in road traffic (Gaster 1991; Bjorklid 1994; Hillman 1995). In many low-income countries, where children and adolescents are even more dependent on local streets for play and socialization, traffic levels can have a critical impact on their activities (Abu-Ghazze 1998). Research has demonstrated that efforts to slow and restrict traffic result in a marked improvement in the quality of children's lives (Eubank-Ahrens 1985).

The relationship between safety and children's access is mediated by caregivers' perceptions of risk and their beliefs about children's capacities. Observers in the USA and Europe have argued that heightened perceptions of risk on the part of parents, combined with fear of litigation in the public domain, result in serious restrictions on children's freedom to explore and take chances (Environment and Design Research Association symposium, 1996). On the other hand, parents who are extremely pressured in their own lives, and forced to depend on children to care for themselves and for younger siblings, may perceive children as developmentally more capable of taking on challenging environments (Whiting and Edwards 1988; Goodnow and Collins 1990). Very generally speaking, middle class Western parents are inclined to avoid risk for their children by modifying the environment, for instance by "baby-proofing" kitchens or introducing rigorous safety measures in playgrounds. In many communities around the world, however, it is considered more appropriate for children to accommodate to the realities, inconveniences or dangers in the environment, either by

learning the skills necessary to cope at an earlier age, or by accepting constraints in access (Whiting and Edwards 1988).

Perhaps the most significant safety issue with regard to children's access to their neighbourhood worlds is the threat of violence, and the fears that accompany this threat. This issue will be taken up in a later section.

Sociocultural organization of the environment

Spatial restrictions and opportunities have a considerable impact on the diversity and accessibility of experience for children of all ages; they also communicate important cultural norms and expectations. The physical environment of any household or neighbourhood is structured to support the patterns and routines of a certain way of life. The way that different spaces are used, and by whom, the activities that are endorsed or prohibited, the value given to various objects, the understandings about territory and privacy, are all expressions of local values and social structures. In this sense one might say that the culture of a group is encoded in its physical surroundings. Through their daily interactions in this coded space, children acquire the cultural norms of family and community (Valsiner 1987).

Sebba describes the organization of Bedouin homes: there is a minimum of spatial division and no such thing as private territory. At night bedding is spread out for the whole household; children have no fixed place to sleep, but settle down with siblings or adults. Meals are taken from a shared plate. No object or place is identified as belonging to a particular child, nor does any experience (with the exception of school) separate children from other family members. In spite of a transition from tents and nomadism to permanent residences, and in spite of the introduction of such technologies as running water and television, the basic organization of Bedouin homes has not changed, reflecting an unchanging commitment to family as the all important unit (Sebba 1991).

Swart-Kruger's account of children's home life in the Johannesburg squatter settlement of Canaansland describes a very different set of values (Swart-Kruger 2001c). Even the small space contained within the shacks occupied by these marginalized people is carefully organized and divided by means of curtains or cardboard dividers to reflect hierarchical relationships within the household and to express traditional boundaries with regard to both gender and adult/child relationships. Both boys and girls in their allocated corners express their identity by decorating nearby walls and finding attractive pieces of material to cover their sleeping mats. In the words of one 13 year-old girl: "Children do not mix their things with adults and adults do not mix their things with children. We live close together but we children are on our own and the adults too." Although culture changes with changing needs and realities, the stability of certain core values, often expressed in material, spatial terms, can be a protective factor in times of rapid social change, and an important support to children's developing identity.

Social relations are affected by spatial organization at the neighbourhood level as well. The layout of dwelling units relative to one another, the placement of various facilities, understandings about the use of common outdoor space can

all influence the quality of contact between neighbours. Research in China, for instance, indicated higher frequency of social exchange among inhabitants of traditional houses around courtyards, as opposed to high rise dwellers, and greater willingness to offer help to neighbours (Ekblad 1991).

Control of the environment

If the organization of the material world is a medium through which socio-cultural values are communicated, then the degree of control that caregivers have over the spaces their children occupy is extremely pertinent. Where control is minimal, caregiving strategies may be more reactive than proactive. For many families – refugees, for instance, or migrants to urban areas – it may be difficult to express and communicate a familiar set of values in environments that bear little relationship to what has been left behind. For families in poverty, housing conditions may present constraints that seriously reduce control or choice. When caregivers are limited in their capacity to construct an environment that reflects their own norms and values and those of their society, it is difficult to communicate these values to their children, or sometimes even to hold on to them themselves (Bartlett 1997). The following section explores the implications of a lack of structure and control in more detail.

Stress

In the section on health, environmental stressors such as noise and crowding were related to particular physiological outcomes for both children and adults. Here, they will be considered for their effects on children's overall development. In addition, we will consider the impacts of violence for children; although violence is a social phenomenon, it has been related also to factors in the physical environment.

Environmental chaos

“Environmental chaos” is a term that embraces high levels of noise and crowding, many people coming and going, and a lack of physical and temporal structure in daily life (Matheny, Wachs et al. 1995). As a summary measure, it has been found to have negative impacts on children's development.

A number of studies have related chronic exposure to noise to learned helplessness, memory problems, speech perception and deficits in complex task performance and reading comprehension in children (Cohen, Glass et al. 1973; Evans, Hygge et al. 1995; Stansfield, Haines et al. 2000). In several countries, including India and the USA, overcrowding has been related to poor cognitive development, behavioural problems, lower motivation or learned helplessness, delayed psychomotor development, and difficulties with parents (Maxwell 1996; Evans, Lepore et al. 1998; Evans 2001). Many of the outcomes associated with overcrowding and noise have been related more generally to poor housing quality (Evans, Saltzman et al. 2001).

The negative outcomes of environmental chaos are considered to be mediated by two processes; the distracting effects on children's attention and the impacts on the quality of interaction between children and caregivers (Wachs and Corapci 2001). Temperament may also play a part; some children have a lower threshold for chaotic conditions and a greater tendency either to withdraw socially or to engage in disruptive behavior (Matheny, Wilson et al. 1987).

Environmental chaos appears to be linked in complex and reciprocal ways to child/caregiver interactions. A review of the literature, mostly North American, finds that caregivers in chaotic conditions are less responsive, less involved, less vocally stimulating and more likely to interfere with exploration; also more restrictive, controlling and punitive in their dealings with children (Wachs and Corapci 2001). Some observational studies from other countries support these findings. In households where extended families share space, for instance, mothers were found to be less responsive and stricter with their children, a reality moderated to some degree by the greater number of people engaged in childcare (Whiting and Whiting 1975). A Nigerian study found adults to be less tolerant of children's behaviour in urban areas, possibly because of lesser space in urban households (Akinware and Ojomo 1993).

While most studies, qualitative and otherwise, find that the level of discipline increases with environmental chaos, some non-western studies point to greater permissiveness in chaotic households. The following explanation is offered for this apparent contradiction: "High levels of ambient chaos act to reduce the ability of caregivers to support or monitor their children's activities. Thus, in chaotic homes in both western and non-western cultures, caregivers will be uninvolved, as long as children's actions do not disturb ongoing family activities and thus increase the level of chaos. When children's actions do disrupt family functioning, the caregiver's response is more likely to involve overly punitive reactions and authoritarian discipline as a means of restoring order and reducing both chaos and the stress associated with increased chaos" (Wachs and Corapci 2001).

Culture has been widely considered to moderate the impacts of overcrowding. The assumption has been that members of different groups perceive and tolerate density differently, depending on whether they belong to "contact" or "non contact" groups (Hall 1966). Levels of residential density that are considered "crowded" or difficult to tolerate by middle-class citizens of the United States, for instance, have been claimed to be acceptable or even comforting for Mexican immigrants to the country (Pader 1994). However, what little research there is from high-contact cultures actually points to outcomes surprisingly similar to those in the middle-class USA. A comparative study in urban India, for instance, found that children in more crowded homes showed lower academic standing, more behavioural problems at school and more conflicted relationships with their parents, as has been found in the USA (Evans, Lepore et al. 1998). There are strong indications that residential crowding may be stressful for people in the same ways, regardless of cultural differences in the perception of whether a given situation is in fact "crowded" (Evans, Lepore et al. 2000).

Environmental chaos is not limited to home environments, but can also be a significant aspect of neighbourhood (and wider) life. Especially for those in

urban poverty, sub-standard housing conditions are likely to co-exist with heavy traffic, pollution, high noise levels, dilapidation and inadequate provision. Evans and Saegert argue that the synergistic and cumulative effects of such stressors, especially in combination with difficult social factors, should not be underestimated. They found that the effects of density on children in low-income families were amplified by family turmoil and by the range of stressors typically experienced by those living in inner city poverty, leading to substantially greater developmental dysfunction than was found in prior crowding studies (Evans and Saegert 2000). This can work both ways however; there is also evidence that the impacts of chaos in the larger world can be moderated by an organized and supportive home environment, and that chaotic home environments can be effectively supplemented by high quality and low chaos day care programmes (Wachs and Corapci 2001).

Most studies on this topic have pointed to the ways that poor housing and neighbourhood conditions contribute to stress. It is important, however, to recognize that this is not always a simple connection. Living in noisy, densely populated inner city neighbourhoods, for instance, may offer certain essential advantages such as lower rents, better location for work and access to better services, all of which may actually moderate levels of household stress (Hardoy, Mitlin et al. 2001). Forced relocation to less crowded areas, for instance, has not been found to relieve, but only to change, the pressures for poor families (Swart-Kruger 2001a). Solutions to environmental stressors are more likely to involve ways to make pleasant alternative spaces available within neighbourhoods rather than finding ways to reduce density.

Violence and insecurity

Violence has also been related to various dimensions of the physical environment. Chaotic conditions contribute to mental fatigue, which in turn heightens irritability, decreases control over impulses and adds to a propensity for outbursts of anger (Kaplan 1995; Kuo and Sullivan 2001). At the neighbourhood level, moreover, environmental factors that discourage the regular presence of people in shared space contribute to the likelihood of violence.

Environmental chaos has already been noted to contribute to more punitive parenting; along with overwork, fatigue and anxiety it can add to levels of frustration that escalate into violence (Moser 1993). Whether children are the victims or merely the witnesses of violence, the developmental consequences can be far reaching, and can include a tendency to see aggression as the solution to problems (Newell 1997). Violence, crime and tensions between groups in the community are also sources of fear and insecurity that can undermine children's faith in adults and the social order and leave them feeling powerless in a precarious world. Chronic exposure to violence can compromise children's capacity to face normal developmental challenges, and has been related to anxiety, depression, defiance, aggression and problems with self control (Jones, Ajitutu et al. 1996; Margolin and Gordis 2000; Buka, Stichick et al. 2001). Work from South Africa has found that, when the relative effects of community violence and

poverty are weighed, violence is significant in predicting adverse psychological outcomes in a way that poverty alone is not (Barbarin and Richter 2001). There seems to be little doubt, however, that poverty can feed frustration, and that the inadequate living conditions, insecure tenure and the marginalization of many poor communities create a fertile ground for unrest and aggression (Vanderschueren 1996).

Some physical environment factors related to community insecurity and the presence of violence are summed up in the classic theory of “defensible space” – which argues that the degree of control that local residents have over the space outside their dwellings has an influence on levels of informal surveillance and on the incidence of anti-social behaviour (Newman 1972). When streets and alleyways are well-lit, when windows face onto the street, when there are transitional common areas between people’s dwellings and the street, people are more likely to feel ownership over public space, to keep “eyes on the street”, and to interact with one another in constructive ways. When people extend their activities outdoors, contributing to an active community presence, this tends to discourage anti-social behaviour and to make neighbourhoods safer and pleasanter for children. When children have access to the outside, this brings adults out more often as well. An Irish study, for instance, found that children’s play space situated between hostile neighbourhoods promoted interaction among adults as well as children (Menary 1990).

Children and adolescents may be the victims of community violence – but they can also contribute to it. Vandalism, drug use and gang-related criminal behaviour by young people are the source of fear and insecurity in communities worldwide. In some cases and to some extent, this can be related to boredom and a lack of opportunity for young people. In many communities the provision of recreational facilities and opportunities for constructive involvement have resulted in dramatic reductions in crime and gang violence (Guerrero 1993; Trust for Public Land 1994; Vanderschueren 1998).

The restorative effects of nature

A growing body of research suggests that exposure to nature reduces stress and mental fatigue and provides a respite from the demands imposed by various environmental stressors. Particularly notable is a “natural experiment” in Chicago that has allowed for controlled study of the effects of vegetation for hundreds of poor residents of inner-city housing projects.

All of these otherwise identical buildings were originally landscaped with plantings, but over the years some flourished and some died out. Courtyards now range from shaded grassy plots to barren stretches of bare dirt or concrete. These differences are not attributable to differences in the residents, who are randomly assigned to buildings, similar in terms of education, income and life circumstances, and not involved in the maintenance of their outdoor space. A series of studies has shown that residents of the “green” buildings spend more time outdoors and know more of their neighbours (Kuo, Sullivan et al 1998). They report significantly less domestic violence and demonstrate a greater capacity to

cope with major life issues (Kuo 2001). Reported incidents of crime are less than half as high around the green buildings (Kuo and Sullivan 2001). Children make higher use of the green courtyards, engage in more creative play, interact more with adults and perform better on cognitive tests than children from the other buildings (Taylor, Wiley et al 1998; Taylor, Kuo et al 2001). A striking feature of this research is the relatively low level of vegetation that has been found capable of having measurable effects. Also surprising is the statistical robustness of the outcomes, even with relatively small samples.

This well-controlled research is complemented by numerous qualitative studies and observations from all over the world noting the marked preference and desire of children, and in particular poor urban children, for natural environments. The findings discussed here, along with those of numerous other studies, suggest that nature, far from being a luxury for urban children, should be considered an essential component of the human environment, potentially as critical to mental health as clean water and sanitation are to physical health.

Some final points on children's living conditions

Children's development is fundamentally connected to their everyday material reality and the possibilities that it contains. As with health, the connections between social and material aspects stands out. In most situations these factors cannot be untangled. Homelessness and overcrowding, for instance, have strong spatial or material dimensions, but cannot realistically be discussed outside the context of the social and cultural realities that accompany them. It can be impossible in many cases to prove tight cause-and-effect connections between the physical environment and developmental outcomes for children – especially given the rather limited situations in which controlled experimental work has been undertaken. This does not diminish the significance of the physical environment; it simply returns us once again to a recognition of the importance of context, and of the synergistic ways in which all aspects of a system operate. Material and spatial realities affect social relations and behaviour, which in turn give meaning to the physical environment, and affect how it is understood, organized and used.

This capacity to shape the physical environment, however, and to use it constructively in the interests of children's optimal development and socialization, is especially limited for families and communities in poverty, as is true in the case of health. Children's own capacity to become involved in their world, and to use it as a resource in their drive for competence and understanding, is similarly compromised when they are faced with barren, dangerous or chaotic surroundings. Children can be extraordinarily resourceful when it comes to making the most of limiting circumstances. But in circumstances of poverty, exclusion and marginalization, even the most resourceful require support.

As is the case with health, it is the accumulation of insults to optimal development that gives most cause for concern. Those children whose security is most apt to be threatened by disaster or eviction are also those who are likely to endure noise and overcrowding on a daily basis, and to lack access to a range of

enriching and supportive opportunities, and to the restorative effects of nature. While social responses – such as parenting programmes, training for children on the street, and so on – will always be important, children’s development will continue to be compromised as long as material conditions undermine positive social interaction and limit opportunity.

Children's right to education

The UN Convention on the Rights of the Child recognizes children's right to a free and accessible education that contributes to full development and to the capacity to be competent, caring and responsible members of society (Articles 28 and 29). These goals can be difficult to realize in the absence of supportive physical environments.

Attendance

The location of schools can have significant effects for attendance. In isolated rural areas, reaching the nearest school can require a lengthy walk. But even in more densely populated areas, the tendency is often to centralize, rather than establishing small neighbourhood schools. Location can be especially problematic for girls, who are more likely to be prevented from attending when school is at a distance. In Egypt, girls were found to be 18 percent more likely to attend when school was one kilometer away instead of two (UNICEF 1999).

Competing demands on time also make attendance unrealistic for many children. These demands are often related to the extra workload imposed by inadequate basic services (Doyle 1995). In the Sudan, attendance went up when a water pump was installed next to a primary school, since children no longer had to take extra time to fetch water (Nicol 1998). Local development can also have unexpectedly negative effects; a watershed development project in Tamil Nadu, India, for instance, successfully increased economic security by improving water supplies for farming; but the increased profitability of farming led many parents to remove their children from school and to send them to work (Iyer 2001).

Health

Without good provision for basic hygiene, schools can become the means by which disease is passed from child to child, and through the community. Too many schools lack adequate toilets, often because of lack of upkeep, and some have no toilets at all. Lack of provision can contribute to attendance problems. Girls may be unlikely to attend if there are no toilets and facilities for washing, particularly once they are menstruating.

Schools in prosperous countries also contain health threats. Products used in the construction and maintenance, including carpeting, glue, paints, roofing materials, pressed board products, disinfectants and waxes, along with supplies for printers, copy machines, crafts and laboratories, are considered to contribute to the so-called "sick school syndrome", resulting in increased allergies, asthma, skin problems and other health disorders in children, as well as hyperactivity and learning problems. (<http://www.head-gear.com/SafeSchools/>).

Physical conditions and learning

Certain minimal conditions are necessary within schools in order for children to be comfortable and attentive. Too many children around the world attend schools in dark, crowded, poorly ventilated rooms which make attention difficult. Elaborate facilities and educational materials are not essential – many effective schools, built from local materials, provide a fine education in quite minimally-equipped surroundings. Regardless of the level of investment, however, the layout of schools and classrooms and the availability of diverse, stimulating materials can make a significant difference to the learning that takes place (Moore 1987).

Schools frequently champion an ideology of learning that is formal and abstracted from children's everyday culture, environment and preoccupations, and they reflect this ideology in physical terms – in buildings isolated from the community and in bare concrete classrooms with little evidence of local life. There is broad agreement within the world of education that children learn best when they are actively involved in the learning process – able to acquire abstract concepts through concrete problem solving, to learn at their own pace and in collaboration with others, to build on the kinds of learning familiar within the culture. But classrooms that promote this kind of learning require a certain level of flexibility – materials for hands-on work, different areas for different kinds of work, movable seating, the capacity to display work and so on.

Successful schools in a number of communities demonstrate that the environment can be sensitively designed, even with few resources, to support children and their teachers in the enterprise of relevant learning. The GSS schools (Gonoshahajjo Sangstha) in the poorest neighbourhoods of Dhaka, Bangladesh, for instance, have highly differentiated classrooms with separate learning areas for different subjects, a quiet reading corner and an arts area. Even though the schools are built with cheap materials, they provide a range of different functions – floor areas covered with carpet scraps for sitting, tables for writing, hard floor areas for games and art work, the walls covered with written materials prepared by teachers and children. The “Escuelas Nuevas” of Colombia have similarly rich learning environments, responsive to the desires of parents and communities for learning that is relevant to local priorities and livelihoods. Many of these schools have a rich system of agricultural activities in the school yard, managed by committees of children. The best of these schools are not just a microcosm of local agricultural practices; they are also a demonstration of excellence in sustainable development of the environment. Children in these schools perform very highly on standardized tests of achievement (Hart 1997).

Even in less innovative schools, the school yard can be an important adjunct to learning. In California, when a schoolyard was transformed from an undifferentiated asphalted playground into a complex environment filled with plants and organized into distinct and diverse areas for play, children were found to engage in a much greater variety of exploration, social interaction, role playing and collaboration (Moore and Wong 1997).

Children's performance at school can also be affected by conditions at home. In numerous countries and communities children point out that their capacity

to perform well at school is undermined by conditions at home that do not permit study – either because of a lack of lighting or a lack of space and quiet for concentration (Arnold, Bartlett et al. 2000; Chawla 2001).

Children's right to play and recreation

The Convention recognizes children's right to engage in play and recreational activities appropriate to their age, to participate in cultural life and the arts, and to associate freely with others (articles 31, 15). Children's play, recreation and access to community life have been mentioned frequently in the preceding section on living conditions; almost everything that affects the quality of the local environment also affects these rights. This section is a brief synopsis of research findings already considered.

Children's play, when they are young, takes place primarily around the home. Factors that support their play include:

- *the absence of hazards* (or adequate protection from hazards) such as open fires, unprotected kerosene heaters, unfenced rooftops, flimsy construction, debris, access to the street, and the presence of sharp tools and implements, poisons, drugs, pesticides that are not securely stored. The age at which children become capable of handling various hazards is partly determined by developmental age and partly by cultural expectations which result in different levels of experience and training.
- *a stimulating, diverse home environment* that allows for engagement in a range of activities. This is generally considered to mean a rich and varied material environment (not necessarily specially designed toys and equipment), although it has been noted that "engagement" can also mean the opportunity to observe and interact with others involved in a range of activities;
- *sufficient space to play* without disturbing adult activities. Where homes are crowded and busy, the possibility of withdrawing from chaotic surroundings in a "stimulus shelter" can be beneficial, not only to children's capacity for attention, but for adult's willingness to allow play to occur. Uncomplicated access to protected outdoor space where children can be easily watched by caregivers is a valuable support for young children's play.

As children grow older, the neighbourhood becomes increasingly important to play. The same principles apply, but at another level:

- *attention to safety hazards* including uncollected waste, open drains, standing water and most importantly, traffic. Where resources and space are limited, streets are likely to be the most attractive places for play and, especially in urban areas, the only spaces close to home that are large enough for energetic games. Measures that slow down or restrict traffic are critical supports for children's right to play near home and to move around their communities;
- *easily accessible public spaces* such as parks, playgrounds, open spaces, that are responsive to cultural norms, and where children as well as adults are welcome, play is encouraged, and a range of activity supported;

- *play materials and environments* that are ideally process-oriented and flexible in their potential use, rather than rigid and outcome oriented;
- *access to nature* close to home to increase the use of outdoor space by adults and children, increase the level of informal surveillance and social safety, and enrich the quality of children's play.

When they are old enough to move further from home, and especially when they approach adolescence, mobility, opportunities for structured recreation and places to associate with peers become increasingly important. Supportive factors include:

- *affordable transportation*, well maintained sidewalks, crossing markers and traffic lights;
- *recreational facilities*, which have been observed in various communities around the world to reduce vandalism and gang crime;
- *public space* that provides opportunities for gathering informally – cafes, benches, plazas, adequate lighting at night;
- *adequate provision* to minimize the time spent fetching water and performing other household chores.

In a number of countries, access to the public domain is especially limited for girls, and their opportunities for play, recreation and association with one another is seriously limited as a result. The availability of safe spaces close to home, and of transitional space between home and the street can moderate the effects of culture and extend the opportunities for play and interaction. In the same way, access to the public domain, as well as within the home and its immediate surroundings, for children and young people with disabilities must be supported by physical means. A *facilitating environment* for children with disabilities is one that includes modifications that improve access and mobility, encourages the best use of their abilities, and allows them to function with as much dignity and self reliance as possible.

Children's right to participate

As repeatedly emphasized here, children are active agents in their own lives. From the young infant who decides when to accept eye contact and when to reject it, to the adolescent who makes strategic and responsible decisions about her life, children are part of a reciprocal process. They are shaped by their surroundings, but they also shape them. In a number of provisions, the Convention recognizes children's right to take an active role – most basically in their right to have a voice in decisions that concern them (Article 12).

Participation is often assumed to be relevant only to older children who are mature and confident enough to make formal claims on the adult world; it is frequently considered to involve primarily planned activities, or the opportunity to take part in formal events or decisions. But whenever children are actively involved in the concerns of their families and communities, however spontaneously or informally, they are participating. And whenever they make choices on their own behalf, they are expressing their views and their preferences. The small child's desire to climb a flight of stairs is as valid an expression as an older child's request for relevant education. Taking that child's views seriously does not mean allowing a one-year-old to climb to unprotected heights; it means acknowledging the drive for exploration and competence, and helping her find safe ways to act on her self-expressed needs. Eekelaar has argued that the most fundamental means of fulfilling the "best interests of the child" as called for by the UN Convention on the Rights of the Child is to create the conditions that enable children to select from a diversity of options in a safe environment. He uses the term "dynamic self-determinism" to describe this (Eekelaar 1994). Arguably, this is also the way to support the right to have a voice – although children's right to a voice is equally valid in constrained environments.

The physical environment becomes an important consideration for participation for two reasons: 1) the kinds of decisions and activities most likely to engage children and young people are often those that pertain to their physical surroundings; 2) the effective involvement of children in the lives of their communities is far more likely to occur in the context of a supportive physical environment.

Chawla and Heft, who have provided a thoughtful assessment of the relationship between the physical environment and children's participation, argue that an essential quality of a fully functioning individual is the propensity to engage in the environment in a "selective, self-directed, purposive manner" (Chawla and Heft 2002). This appears to be particularly true for children, who are generally more limited to their local surroundings than is the case for most adults; and whose preferred activities involve an active engagement with, and often transformation of, these surroundings. Participatory research around the world has indicated that children gravitate naturally to a purposeful engagement with their material world, and that they have strong feelings about the environments they use everyday (Hart 1997; Chawla 2001). In Guayaquil, Ecuador, for instance, urban children who played regularly in an overgrown vacant space

nearby their settlement made valiant attempts to save the plot from development (Espinosa 1997). This is nothing new: in New York City at the end of the 19th century, the asphaltting of streets resulted in vehicles taking control of territory that the children had felt was theirs for play. Children living in the Lower East Side of the city resisted by sprinkling glass on the streets (McShane 1994). It perhaps is no accident that some of the most interesting participatory projects involving children have focused on their physical surroundings (Chawla 2001). Even a description of a children's radio station in Nicaragua stresses the concern in their programming on physical environment issues: how to get water into their schools, how to improve sanitation, how to acquire more desks for school (Giertsen 2001). In Barra Mansa, Brazil, similarly, the children's participatory budget council, composed of 9 to 15 year olds who have control of a part of the municipal budget (about USD 125,000 a year) have focused primarily on physical environment improvements, such as repairs to schools, tree planting, lighting for a tunnel frequently used by children, and an all weather sports surface (Guerra 2002).

A challenging aspect of children's right to participate is the fact that they frequently have different environmental priorities from adults, and may identify and wish to act on different problems (Iyer and Goldenberg 1997) – streets, for instance, may be viewed primarily as spaces for play, rather than as arteries for moving traffic efficiently. At the same time, the issues that most concern children are apt to be in areas of strong adult control. Children are seldom given a voice in the design of schools, for instance, or in the municipal planning that affects their play space and mobility. It is also likely that in situations where they may most need to experience the sense of control that comes from decision-making about their own surroundings, it may be least feasible. Boyden points out, for example, that children's protagonism in refugee camps, where they may especially feel the need to shape their environment, may be resisted both by officials, apprehensive about any form of collective organization, and by parents, disturbed by the perceived threat to traditional inter-generational power structures (Boyden 2001).

Children's participation, in both formal and informal terms, is most likely to take place in supportive environments – in other words, in communities where they are welcome in the public domain, where their mobility is not constrained, and where there are spaces that are available for their specific use – issues that have been discussed more fully in the section on accessibility. Community attitudes towards children have a critical effect. In Nepal, for instance, six and seven-year-old boys were observed skillfully mending an above-ground water line that broke while all adults were away working in the fields – an event unlikely to have a counterpart in countries and communities where unaccompanied children are viewed with suspicion (personal observation, 1999).

In more formal efforts, descriptions of projects frequently draw attention to the critical contribution of a place that children and young people can call their own and use to meet and plan. An account of the National Congress of Neighbourhood women in the USA quotes a member of this network: "Groups that want to empower themselves must claim physical space to house the structure

they are trying to create” (Belenky, Bond et al. 1997, p. 213). In Nepal, again, the creation of child clubs, with spaces for children to meet and plan, has been a powerful catalyst in stimulating children and young people to work together on projects of their own devising and in ways that tend to cut across the caste and gender barriers in the rest of their communities (Rajbhandary, Hart et al. 1999).

Factors that shape children's physical environments

The environments that shape children's health and development are themselves shaped by a range of factors from the most local to the most global. These have to be taken into account in determining the most effective entry points for action.

Community governance

Within any community, understandings and decisions about land use, public space, communal responsibility and local priorities have a marked effect on the quality and impacts of the environments available to children, especially in settlements where little responsibility is taken by local authorities. Low-income households and communities working without the assistance of government have been responsible, after all, for most of the housing and public space in the world, and even for infrastructure and services (Hardoy and Satterthwaite 1989). Measures that cannot effectively be taken at household level are often feasible at the level of collective decision-making – through informal understandings or through the focused efforts of local organizations.

Much of what is possible for children is determined by local culture – an understanding, for instance, that girls should be restricted in their public access, or that young children are the shared responsibility of all. Levels of community support can be an essential resource or safety net for individual children or households, especially where living conditions and basic services are very poor. Concerted action on the part of community organizations can play a critical role in determining possibilities for children, either through direct action in improving the environment, or through efforts to monitor and document conditions and to press for action at higher levels (Hardoy, Mitlin et al. 2001). Local power structures are also critical. Communities can be complex entities, including people with a range of different, and sometimes conflicting, values and interests. The decisions of those with influence may have little to do with the needs of less powerful groups, including children.

Local government

Local government plays a major role in shaping children's environments – first of all through decisions regarding the allocation of resources and the provision of such basic services as piped water, sanitation, drainage, waste removal, public transportation, law enforcement and attention to public space. Through a number of measures, local governments can minimize the differences in the quality of the environment for rich and poor (Satterthwaite, Hart et al. 1996). The capacity of local government agencies is critical. A recent news report from

South Africa, where 18 million still lack adequate sanitation, announced that only 25 percent of the funds allocated for a 4 month period for the provision of water and sanitation had been spent because of a lack of capacity in local councils (Mamaila 2001).

The impact of local authorities is not limited to what they provide or fail to provide. Much of the disproportionate exposure of poor families and children to various stressors is related to regulation and enforcement – the level of protection from pollution and other environmental hazards, regulations regarding land use, the availability of legal tenure and so on. The absence of appropriate regulation or enforcement in areas occupied by the poor has been documented worldwide – especially with regard to hazardous waste exposure (Evans and Kantrowitz 2001).

The larger context

The capacity of local government to respond is determined by national prosperity, the distribution of resources and assets, and the political and administrative structure of a country, including its capacity to respond to democratic processes. In nations where democratic reforms and decentralization have improved the capacity and accountability of local governments, the assistance provided by external agencies can be far more effective (Hardoy, Mitlin et al. 2001).

In turn, the context provided by each nation is influenced by the global political situation and the workings of the international market. Much attention has been drawn, for instance, to the effects of structural adjustment and to the impact it has had on many households, affecting the earning capacity of adults, the availability of basic services, and the potential for children to attend school. In many cases structural adjustment, along with other global forces, has resulted in the over-exploitation of natural resources, whether because of support to privatization, or because of reductions in subsidies for such items as kerosene (Satterthwaite, Hart et al. 1996). Outcomes for children can be dramatic. In the Sudan, for instance, the introduction of a large scale agricultural development project transformed land from mixed use to intensive monoculture, contributing to severe environmental degradation over several years, and changing the local economy and patterns of labour. The implications for children were considerable and included far greater distances to cover in fetching wood and herding livestock, heavier workloads as young men left for work in market towns, and less chance to attend school (Katz 1993).

Implications for action

Improving children's physical environments, and at the same time the potential for realizing their rights, is an effort that has to be undertaken at all levels in order to be sustainable and far reaching. For child-focused agencies there are a number of practical entry points.

1. ***Legal and regulatory frameworks and reports:*** National and local governments need to reflect the provisions of the Convention in their laws and regulatory codes. Interpreting the environmental implications of the Convention for these frameworks is a task that could well be supported by child-focused agencies. Along the same lines, assistance could be provided to countries in the preparation of country reports to the Committee on the Rights of the Child to ensure that they pay adequate attention to environmental concerns and interventions.
2. ***Advocacy:*** Advocacy on a number of fronts is a critical role for child-focused agencies – both with regard to raising awareness of children's rights, but also in addressing more general biases that inhibit or constrain action for children. Governments and international agencies, for instance, frequently make the assumption that urban children (and urban populations generally) are too privileged in comparison to rural children to deserve attention; or that the children of the urban poor living in illegal settlements have no right to basic services; or that interventions that serve communities at large will automatically serve children too. There is a strong need for advocacy to ensure more inclusive, effective, participatory measures by government bodies at all levels and by international agencies. The awareness of the general public also needs to be addressed, and here too child-focused agencies can play a critical role, pointing out the rights violations inherent in the status quo, and questioning some basic assumptions.
3. ***Research and data collection:*** This effort requires a fuller understanding of the often complex ways that children are affected by their surroundings. In order to be useful for this purpose, population-based data needs to be disaggregated by age and gender, but also by location. Averages for entire cities, for instance, are of little help in understanding the sometimes extreme disparities between one neighbourhood and another, or the disproportionate ways in which children are often affected by conditions. Community-based studies on local realities can be critical in determining the ways in which various factors interact within a specific location. We also need qualitative and culturally grounded research into the daily lives of children and their caregivers in a range of settings, and especially on the impacts of various housing and neighbourhood conditions, in order to clarify the dynamics underlying connections revealed by more quantitative approaches. Child-focused agencies can take the lead in developing and supporting data collection processes that can genuinely inform practice.

4. ***Good practices:*** We need a better understanding of the interventions that have actually delivered for children. It is important to identify and document projects and policies that have successfully addressed children's requirements with regard to their living conditions – and to look for lessons in those that have failed in this regard. There is a real dearth of informative case studies examining the challenges and difficulties to be overcome in taking a child-focused approach, and the strategies that have been useful. Here again, child-focused groups could productively collect examples of good practice, demonstrating the ways in which children have been affected, and working towards generating helpful guidelines for action.
5. ***Mainstreaming responses for children:*** Systematic and far-reaching changes in children's environments cannot realistically be undertaken in a piecemeal fashion, except as demonstrations of what is possible. In order to be taken to scale, effective interventions have to be incorporated into the routine work of those institutions with the most significant capacity to affect the living conditions of the poor, be they local authorities, district or national governments, the private sector or non-governmental organizations. Rather than involving just special projects for children, this would entail adapting more general measures to make them responsive to children. In many cases, this would require changes in standards for provision – since most of the policies and interventions that actually affect the quality of life for children are not specifically undertaken with children in mind. Water provision, for instance, would have to meet standards that actually reflect the quantities needed to keep children healthy, and the effort it takes to carry water any distance. Upgrading of streets would have to take into account the implications for children's play of faster traffic flows. At the same time, care must be taken that standards not be rigid and overly prescriptive, failing to take local realities into account. Child-focused agencies can contribute by working with policy makers and practitioners who are not accustomed to thinking in terms of children's needs, and by assisting in the development of processes that take these needs into account – for instance in the development of child-impact assessments as a part of both planning and evaluation.
6. ***Involving children:*** A genuine understanding means greater attention at every level to the concerns of caregivers and the priorities of children. Although increasing attention is given to participatory approaches, support is still needed at all levels to encourage its acceptance, and to ensure that it is carried out in ways that truly enable children and their caregivers to assess and articulate their priorities as a routine part of local planning and decision making. Those experienced in working with children and young people can make a practical contribution on this front.

Creating the environments that promote children's rights is a significant undertaking, one involving action on every level and within many sectors. It is unrealistic to think of child-focused agencies as the primary vehicle by which these objectives can be reached. It is not at all unrealistic, however, to see these agencies and organizations as catalysts for promoting the necessary efforts – helping

by means of research, advocacy, training and technical assistance to increase health, stability, productivity and opportunity not only for children but for entire communities.

Summary of facts

Environmental feature	Outcomes and effects	Who is affected
Provision of basic services		
<i>Water</i> Water quality	Outbreaks of water-borne disease, e.g. cholera, diarrhoeal diseases	All, esp. young children
Regular supplies, water quantity,	Health problems associated with too little water – basic hygiene, outbreaks of disease and endemic disease including diarrhoeal diseases, skin and eye infections etc.	Young children, caregivers, including child water carriers
Distance to source, number of users	Time, quantities used, hygiene and health	All
Cost (for those reliant on vendors)	Less water used, less to spend on food	
<i>Sanitation</i> Absence of latrines	Contact w/ excreta, disease transmission, parasites	Esp. young children, school age children esp. girls
Type of latrine provided	safety issues in community latrines (harassment, rape)	All, esp. caregivers, young children
Level of maintenance	Level of use, community contamination and disease transmission	
Distance, # of users, cost		
<i>Drainage and waste removal</i>	Blocked drains, flooding, fecal contamination, breeding, feeding for disease vectors, unsafe play	Young children, boys and girls playing in n'hood
<i>Electricity</i> Lack of provision	Increases reliance on unsafe lighting methods, shortens productive hours. Decreases community safety.	All, esp older girls and boys Esp. for girls
Cost	Less to spend on basics	All, esp. nutrition for young children
Housing <i>Access and tenure</i> Access to land and/or housing	Family stability, food security, malnutrition,	All
Housing costs	Emotional security, economic security	Marginal groups
Security of tenure/evictions		
Discrimination, spatial segregation	Access to a range of opportunities	

Environmental feature	Outcomes and effects	Who is affected
<i>Housing quality</i> Open fires, unvented stoves	Respiratory infections	Caregivers, older girls, esp. young children
Poor ventilation	Eye problems, greater transmission of contagious disease	
Dampness	Molds, mildew – asthma, headaches	All
Unsafe building materials	Exposure to toxics, outgassing etc	Especially very young children
Lack of screening, porous building materials	Vector borne disease e.g. malaria, dengue	
Hard to clean floors, surfaces	Contact w/ pathogens	
Lack of hygiene, covered storage, refrigeration, inadequate cooking facilities	Food contamination Increased risk of contamination, Malnutrition	All, esp. children being weaned
Overcrowding	Increased disease transmission, higher injury risks	All, esp. young children
along with noise, increased household traffic	Heightened stress, household tensions, attention deficits, cognitive effects, punitive parenting	All ages
Adequate lighting, quiet space	Ability to do homework	School children
<i>Household safety</i> Open fires, unstable heaters, crowded conditions, bad wiring, leaky gaslines and equipment	Children's safety, caregiver's time Burns, scalds, fires	All, esp. children under three or four, young girls doing domestic work
Lack of safe storage	Poisoning from medications, pesticides, kerosene etc; access to sharp tools	Young children
Lack of protective barriers	Falls from rooftops, stairways, windows	
<i>Play at home</i> Adequate safe space; diverse, stimulating surroundings; access to outdoors, access to other children	Motor development, cognitive development, social growth, autonomy, easing of burden for caregivers	Young children, caregivers
Shared space outdoors	Cooperative child care	

Environmental feature	Outcomes and effects	Who is affected
<i>Layout, potential to modify, organize household space</i>	Cultural identity, socialization of children through transmission of cultural norms Moderates or increases effects of crowding	All, esp. migrants, refugees, slum dwellers
Neighbourhood and beyond		
<i>Traffic levels</i> Sidewalks, bike paths, traffic lights, speed bumps and other traffic calming devices, rerouting of traffic	Outdoor air quality, lead levels contributing to health problems Noise, contributing to stress levels Use of public space Safety of street play, involvement in community life, access to opportunities away from home Safety while working on street Lessen the effects of traffic	All, esp. young children All Children Esp. adolescents Working children All
<i>Neighbourhood common space</i> Sidewalks, courtyards, plazas, squares, benches, lighting, cafes etc Parks and green space Play space for young children	Greater presence of residents in public space, more cooperative behavior, "eyes on the street", more opportunities and oversight for children Restorative effects of nature, improved cognitive functioning, less violence, improved play for children, relieves effects of overcrowding Improves safety, quality of life, developmental opportunities for children, also increases adult presence in public space	All, and especially children, children with disabilities

Environmental feature	Outcomes and effects	Who is affected
<p><i>Facilities</i> Recreational facilities, child clubs, youth centers, special facilities for girls, libraries etc</p> <p>Shops and markets</p>	<p>Greater range of social and developmental opportunity, higher quality of life, potential for reduced violence and gang activity, relief from overcrowding and insecurity, place to do homework</p> <p>Convenience, less travel needed, brings people out into common space</p>	<p>All, esp. older children, adolescents, girls</p>
<p><i>Public transport</i> Costs and access</p> <p>Frequency and regularity</p> <p>Waiting facilities</p>	<p>Access to employment, caregivers' time; access to school, to recreation, access for working children to home life, children's participation in community life</p> <p>Safety, comfort</p>	<p>Households, young children, school children, working children</p>
<p><i>Schools</i> Distance from home</p> <p>Water, sanitation facilities</p> <p>Ventilation, crowding, seating</p> <p>Layout, flexibility, materials</p>	<p>Enrolment and attendance, especially for girls, parent involvement</p> <p>Children's health, community health, attendance especially for girls</p> <p>Children's health, attention, performance</p> <p>Quality of learning</p>	<p>All school age children</p>

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