

THE NEED FOR SCALES OF THE PHYSICAL ENVIRONMENT

In much of the "environmental" and social science literature, even when the construct of "environment" is invoked, it is most often limited to the effects of aspects of the *social* environment (e.g., amount and quality of adult interaction with children) and not the physical and/or designed environment. Conversely, those working in the environmental professions tend to ignore the role of the social environment and often espouse, if unconsciously, an environmental deterministic position.

I was recently asked by my colleague and good friend, Roger Hart at the City University of New York, to look at and write a commentary in this regard on the *Infant/Toddler Environment Rating Scale* (ITERS).¹

The ITERS is a part of the family of child care rating scales developed by Thelma Harms, Richard Clifford, and their colleagues at the Frank Porter Graham Child Development Center at the University of North Carolina, Chapel Hill. Four scales -- the *Early Childhood Environment Rating Scale* for group-based child care centers, the *Family Day Care Rating Scale* for family day care homes, the ITERS, and most recently a scale for elementary school environments -- are a major contribution to the child care literature. They are all similar in structure and overall content. They are the best known and likely the most widely used scales to assess quality child care.

There are a number of scales available for describing and evaluating different aspects of child care programs and centers. Most of them focus almost exclusively on the programmatic or social environmental quality of child care; few pay any attention to the physical designed environment of child care centers. Among the various scales available are the following (despite their titles, they all contain checklists or some other form of rating device for child care programs and/or centers):²

¹ An earlier version of this paper was written to appear in S. Bartlett (Ed.), *Infant Environments*, special issue of *Children's Environments*, 1994, 10. Since writing that paper, I have learned that the U.S. National Institute of Child Health and Development is conducting a massive multi-site, multi-year study to assess whether child care is good/bad for children and more interestingly what features make it so. My colleague Gary Evans asked innocently of some the principals of that study if they were measuring the physical environment. Apparently they are, using the HOME scale adapted for preschool settings, though I've seen no reports or findings to date.

² In addition to these published scales and checklists, a number of investigators have recently become very interested in the question of assessing the quality of child care. Among them are Sarah Friedman at NICHD, Kathleen McCartney of the University of New Hampshire, Deborah Vandell of the University of Wisconsin-Madison, and Alison Clarke-Stewart at the University of California, Irvine.

- . *Assessment Profile for Early Childhood Programs*, by Martha Abbott-Shim and Annette Sibley, 1987, 1992.
- . *Assessment Profile for Homes with Young Children*, by Annette Sibley and Martha Abbott-Shim, 1993.
- . *The NICHD Study of Early Child Care*, by Martha Abbott-Shim, Annette Sibley, Bettye M. Caldwell, et al., 1991, 1992, 1993.
- . *The Complete Guide to Choosing Child Care*, by Judith Berezin, 1990.
- . *The Parent Guide to Quality Day Care Centers*, by Marilyn Bradbard and Richard Endsley, 1982.
- . *Physical Environment Assessment Checklist for Daycare Centers*, by Ruth S. Brent and Kathy Thornberg, 1985.
- . *HOME Observation for Measurement of the Environment*, by Bettye M. Caldwell and Robert H. Bradley, 1979, 1981, 1982.
- . *Rationale and Development of the HOME Inventories*, by Bettye M. Caldwell and Robert M. Bradley, 1984.
- . *Child Care Facility Schedule: World Health Organization--Manual*, by Bettye M. Caldwell and six others from around the world, n.d.
- . *The Family Child Care Program Quality Review Instrument*, by the California State Department of Education, 1988.
- . *The Infant and Toddler Program Quality Review Instrument*, by the California State Department of Education, 1988.
- . *The Board Self-Assessment Checklist*, by the Child Welfare League of America, 1992.
- . *Standards of Excellence for Child Care Services* (rev. ed.), by the Child Welfare League of America, 1992.
- . *Infant/Toddler Environment Rating Scale: Reliability and Validity Study--Final Report*, by Richard M. Clifford, Susan D. Fleming, Ellen S. Peisner, Thelma Harms, and Debby Cryer, 1989.
- . *The Quality Indicator Checklist*, by Randi Glass and Brenda Martin, n.d.

- . *The Family Day Care Rating Scale*, by Thelma Harms and Richard Clifford, 1989.
- . *The Infant/Toddler Day Care Rating Scale*, by Thelma Harms, Debby Cryer, and Richard Clifford, 1990.
- . *The Early Childhood Environment Rating Scale*, by Richard Clifford and Thelma Harms, 1983.
- . *The Medicine Hat Child Care Evaluation Instrument*, by Marlene Jubenvill, 1985.
- . *Evaluating Home-Based Day Care*, by Louise Child Care Centre, 1988.
- . *The Accreditation Procedures of the National Academy of Early Childhood Programs*, by the National Association for the Education of Young Children, 1985.
- . *The Physical Setting in Daycare*, by Elizabeth Prescott, 1984.
- . *The Day Care Environmental Inventory Assessment of Child-Rearing Environments*, by Elizabeth Prescott, Sibyl Kritchevsky, and Elizabeth Jones, 1972.
- . *Assessing Quality Day Care: A Checklist*, by Anne Soderman and Alice Shiren, 1980.
- . *Describing and Quantifying Open Education*, by R.E. Traub, J. Weiss, C.W. Fisher, and D. Musella, 1972.
- . *Purdue Home Stimulation Inventory: Training Manual*, by Theodore Wachs, 1990.
- . *Observational Manual for Day Care Study*, by Theodore Wachs, 1994.

But let us look at just one example, one of the family of instruments developed by Thelma Harms, Richard Clifford, and their colleagues. It is one of the two best known and most widely used instruments for assessing center-based or group child care settings (the other is the various *HOME Inventories* developed and tested quite rigorously by Bettye Caldwell, Robert Bradley, and their colleagues; a third less well known, but now part of the basis for the national NICHD Study of Early Child Care is the *Assessment Profile for Early Childhood Programs* by Martha Abbott-Shim and Annette Sibley).

The "Infant/Toddler Environment Rating Scale" (ITERS), developed by Thelma Harms, Debby Cryer, and Richard Clifford, consists of 35 items organized into seven sub-scales. It is intended for the assessment of the quality of center-based infant and toddler care for children up to 30 months of age. It is based on a broad definition of child care environments including not only what the authors call the organization of space but also interaction, activities, schedule, and provisions. It is as comprehensive as any scale available for the assessment of child care.

Many so-called scales are developed and promulgated in informal literature without adequate study of their reliability and validity. Not so the ITERS and other scales developed by this team. Several studies of the psychometric properties of the ITERS were conducted and reported in the period 1989-1992. In particular, Clifford and his colleagues (Clifford, Russell, Fleming, Peisner, Harms, & Cryer, 1989) found that interrater and test-retest reliability were in the range of $r = .58$ to $.89$, internal consistency was $\alpha = .83$, criterion validity was 83%, and content validity was between 75 to 86%. All of these figures are very respectable, enough so that Columbia University's Teachers College Press has published the scale (and others in the Harms and Clifford series).

So the scale is very reliable and very valid vis a vis other available scales and experts' opinions. But is it *physically environmental*?

To try to get a handle on this question, and first to be quantitative, I did a content analysis of the scale. Of the 35 items, 14 have some physical environmental content (*environmental* used here in the sense of the physical designed or planned environment of the infant or toddler center, not the social or organizational environment, i.e., that part of the total environment that can be manipulated architecturally). For example, the item "Furnishing for routine care" includes numbers of pieces of furniture, comfort and support, storage, and child-sized. On the other hand, items like "Nap" don't contain any reference to whether napping should be in separate nap rooms, in double-functioning nap/play rooms, or in partially partitioned napping spaces. The scale is silent on this important environmental issue.

Of the 396 detailed descriptors that make up and are used to score a center on the scale items (e.g., "diapering done near source of hot water," or "nap is scheduled appropriately for each child"), only 35 or 8.8% have any *physical environmental content* that could help one assess the physical environment -- the facility itself. Some of these descriptors are very good, like (undoubtedly based on the work of Elizabeth Prescott) requiring softness and cozy special areas for high scores on "Furnishings for relaxation and comfort" and (perhaps based on the work of Fred Osmon) correlating the separation of activity areas from circulation with quality child care.

But in other places the environmental characteristics of a test item are confounded with the behavioral use patterns. "Furnishings permit appropriate independence for toddlers

(Ex. toddlers use small chairs...)" Which is being assessed? The environmental characteristic (the character of the furnishings themselves)? Or the behavioral use pattern (that toddlers do or do not use small chairs, which could be influenced not only by the characteristics of the furniture but also by staff, whether games are spread out on the floor or on tables, and so forth)?

And in still other places, the scale is surprisingly silent on important issues about the physical environment of infant and toddler centers. Space only allows me to give a few examples to make the point. Under "Room arrangement," the scale seems to uncritically assume one overall organizational pattern for infant/toddler centers -- the box-car arrangement of a double-loaded corridor with self-contained classrooms. How about other organizations, like what we have been calling for many years "modified open space"? The scale is silent on the pros and cons of different organizational patterns, despite the existence of research literature documenting the relative advantages and disadvantages of different spatial layouts. It may be that the procedure of calculating validity by comparison with other scales and a small panel of experts is an inherently conservative process.

"Areas for quiet and active play separated (Ex. by low shelves)" is an indicator of good room arrangement. A more sophisticated notion would be "zoning," a standard operating procedure of any architect. Also related to the goodness of room arrangement is the item that "Young infants given space and materials to explore while protected from more mobile children." No one would disagree about the necessity for safety, but the scale is silent on age-mixing, so much a part of many progressive approaches to child care (cf. the book by Lilian Katz on the case for mixed-age grouping in early education), and ways in which the environment might aid and abet age-mixing without creating safety problems.

Under "Greeting/departing," the scale is silent about the characteristics of the environment that might aid greeting and departing like our concept of "cubby clusters." Similarly, under "Meals/snacks," the scale doesn't discuss the pros and cons of centralized industrialized kitchens (a major expense for any child care center) versus what we have been calling since 1979 "children in the kitchen."

The scale is very good about the necessity for a variety of play areas for infants and toddler (art, music and movement, blocks, pretend play, even sand and water play for toddlers), but again is silent on the environmental characteristics of infant/toddler center that will facilitate these types of developmentally appropriate play activities.

On the items measuring "Peer interaction," not one descriptor relates to the designed environment. However, we have found child-child interaction to be a function of plan type (reported in Carol Weinstein and Tom David's 1987 *Spaces for Children*). All other things equal, modified open plan centers evidence almost twice the degree of social interaction among children than do open plan centers. Similarly, regarding "Caregiver-

child interaction," where again no descriptor relates to the physical setting, we have found significantly more caregiver involvement with children in spatially well-defined activity settings than in moderately defined or poorly defined ones (reported in the 1986 *Journal of Environmental Psychology*). It would seem valuable to add to the ITERS scale items reflecting these findings about the role of the physical environment in quality child care.

The ITERS scale is also strangely silent on a number of other environmental issues that architects and other designers are confronted by each time they move a pencil in designing a child care center, and center directors are confronted with each time they consider the facility program for a new or renovated center. Among these are location, size, scale, image, circulation, character of the outdoor activity areas, and so on.

Finally, to not only give a critical review, but to suggest how we might develop a more environmental scale, let's look at one example of how such a scale might be revised and modified to incorporate more environmental content. For instance, would it not be possible to not only requiring a variety of activity areas, but also to specify something about their supportive physical environmental characteristics? The environmental notion of "resource rich activity areas," on which we have published scientific research, was transformed a number of years before the ITERS into a one of the preliminary scale contained herein for the definition of behavior or activity settings. And on a larger scale, the organization of the space of the center as a whole, on which we have also conducted hard research, was made into another preliminary scale for spatial organization. The two were labelled the "Early Childhood Physical Environment Scales" and are included later in this report. Each is comprised of 10 items which, like the ITERS, are measured on a Likert-type scale, in our case a 5-point scale from descriptors like "visual connections to other activity spaces" to "lack of connections" or "degree of connection between indoor and outdoor activity spaces" to "lack of connection."

Together with two of my students, Nancy Genich and Shan Sivakumaran, we are currently working to develop a new set of scales for the evaluation of child care centers which could be used for self-assessment, for monitoring, maybe for parents concerned about quality child care, for formal post-occupancy evaluation, and as an aid in the redesign of exiting centers or the design of new centers.

As the first part of that effort, we will be conducting a comparative evaluation of all other available child care center evaluation tools and scales. But beyond that, we will develop a number of new design criteria. Over the years, I have become rather convinced that somewhere around 18 patterns are absolutely critical for the success of any child care facility. I hope that our new "Early Childhood Physical Environment Scales" will include many or most of those 18 principles as scale items with appropriate descriptors.

Subsequently we will test the reliability and validity of the new scale (or scales) on existing child care centers (Shan and Nancy have already begun this work), and will revise it appropriately.

Part of Nancy's contribution, as an undergraduate independent study is to develop a very preliminary version of a new comprehensive scale for a POE of an existing child care center. And part of Shan's contribution, as part of an advanced doctoral methods course, is to rigorously pilot test part of a different preliminary version of the new scale.

We hope to report on progress on the development of the new scale(s) in *Children's Environments*, *Young Children*, and other appropriate journals.