Validity and Reliability of the Index of Child Care Environment (ICCE)

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Abstract- **The purpose of this study was to validate the Index of Child Care Environment (ICCE) as an evidence-based practical assessment of children's home environments. Two hundred and eighty-six dyads of toddlers and their mothers participated in the study. Trained professionals evaluated participants with the ICCE and Home Observation for Measurement of the Environment (HOME) during home visits. We found a correlation of 0.76 between the ICCE and HOME, and a reproducibility coefficient of 0.91. Thus, the ICCE is able to measure the child care environment with high validity and reliability, making it a helpful tool for understanding whether a child's environment is conducive to healthy development. The limitation of ICCE is that it has the bias of questionnaire.**

Keywords- Home Environment; Child; Evaluation; Scale; Child Development

I. INTRODUCTION

The environment in which children grow up and the quality of parenting that they receive are essential to ensure their healthy development. One measure for assessing this environment is the Home Observation for Measurement of the Environment (HOME) [1]. This scale has been used worldwide and translated into more than 50 languages [2], and is used to evaluate the quality and quantity of stimulation and support available to children in their home environment. Conducted through home visit observations, the scale focuses on the child in their environment, as a recipient of inputs from objects, events, and transactions occurring in connection with the family surroundings [3]. HOME observation items include "Parent spontaneously vocalizes to child at least twice", and "Parent does not interfere with or restrict child more than three times during visit", etc. [2].

"Child care environment" is defined by the degree of organization of the children's surroundings in relation to the human and physical resources, particularly their parents, and the quality of close relationships in their environment [4]. In other words, it is determined by complex interactions between the individual, their home environments, peer relationships, and the larger sociocultural context [5].

Many researchers have shown the variations in parenting according to the results of the original and adapted versions of the HOME Inventory [6]. Most research has focused on three aspects of the family environment, where parenting and resource acquisition are thought to be operative and for which there is evidence of a considerable impact on child well-being: parental responsiveness, discipline practices, and exposure to stimulating materials and experiences [6], [7]. Research has revealed contents consistency in all three areas [8].

Furthermore, these studies revealed a tendency for researchers to modify the HOME according to local beliefs and practices concerning the needs of children and families, and the roles of parents in fostering particular aspects of development [9]. However, despite these differences in cultural models of parenting around the world, studies have shown rather consistent positive relations between exposure to stimulation and parental responsiveness and children's adaptive functioning [10-15]. In addition, longitudinal studies have found clear negative associations between adaptive functioning and physical punishment [16].

Given the increased number of children displaying impulsive behaviors and social maladjustment, appropriate environments to foster pro-social behaviors among these children are needed [17].

Thus, it is essential to develop easier methods for evaluating child care environment in order to promote healthy development. One such measure is the Index of Child Care Environment (ICCE), which was developed as a questionnaire version of the HOME [13]. This questionnaire evaluates child care environment by using self-report questions or reports by caregivers for children under the age of 6.

The purpose of this study was to clarify the construct validity and reliability of the ICCE as an evidence-based questionnaire for practically assessing child care environment.

II. METHODS

A. Participants

Participants were 286 dyads of toddlers and their mothers among middle class Japanese who lived in towns surrounding Tokyo; 153 were boys and 133 were girls, while 134 were one-year-old and 152 were two-year-old (Table 1).

TABLE 1 DEMOGRAPHIC INFORMATION

	Items	n	%
Gender	Boys	153	53.5
	Girls	133	46.5
Age	1yrs	134	46.9
	2yrs	152	53.1
	Total	286	100.0
Note. Mean months = 24.9,（SD = 6.5, Range = 12–34）			

All parents signed informed consent forms and were made aware that they had the right to withdraw from the experiment at any time, before the study began. A personal ID system was used to maintain confidentiality of personal information. Furthermore, all data were stored on a password-protected disk; only researchers who were granted permission had access to the data. It complied with international ethical standards of the Declaration of Helsinki.

B. Measures

The ICCE (Appendix1) and HOME were used to assess children's care environment during home visits. Trained professional public health nurses visited participants' houses for about one hour and evaluated the environment of that home according to the manual of the HOME and ICCE. They did the HOME first, and then interviewed main caregiver with the ICCE.

The ICCE measures child care environment through 13 questions in four subscales: "human stimulation" (5 items: e.g., "How often do you play with your child per week?"), "social stimulation" (3 items: e.g., "How often do you go shopping with your child?"), "avoidance of restriction" (2 items: e.g., "How many times did you hit or kick your child last week?"), and "social support" (3 items: e.g., "How often does your spouse, partner, or other caregiver help you with the child?"). It can be used as a self-report or interview, meaning that it does not necessarily need a home visit.

Each item is assessed using a multiple-choice format, and the answer is given a binary score according to the manual (1 = good, 0 = not good or not sure); the overall score is calculated by summing all items in the scale. A higher score indicates a better child care environment.

C. Analysis

To assess construct validity, we conducted a correlational analysis to assess the relation between the ICCE and the HOME. The reliability coefficient was calculated by correlational analysis using scores of two evaluators, who were both professional public health nurses visited together 12 houses. Statistical Analysis System software (SAS version 9.1) was used for data analysis.

III. RESULTS

Table 2 shows the results of the correlational analysis between the total score and each subscale of the ICCE and the HOME. The correlation coefficients for "total score," "human stimulation," "social stimulation," "avoidance of restriction," and "social support," were 0.76, 0.78, 0.82, 0.82, and 1.00, respectively.

Regarding reliability, the reproducibility coefficient was 0.91 between two evaluators for a sample of 12 home visits.

TABLE 2 CORRELATIONS BETWEEN THE ICCE AND HOME

			coefficient
ICCE	Total	r_s	0.76
		ρ	<0.01
Subscale	Human stimulation	r_s	0.78
		ρ	<0.01
	Social stimulation	r_s	0.82
		ρ	<0.01
	Avoidance of restriction	r_s	0.82
		ρ	<0.01
	Social support	r_s	1.00
		ρ	<0.01

Note. r_s: Spearman's rank-order coefficient

IV. DISCUSSION

The results of this study indicate good continuity between assessments of environment using self-report and observation. Our analysis revealed a high correlation between the total and subscale ICCE and HOME scores, indicating good construct

validity. Our results suggest that the ICCE is a reliable and valid measure of child care environment in young children.

Effectively evaluating child care environment has expanded the field of interpersonal environmental measurement [19]. It is no longer acceptable to simply assert that "a child's home environment is important for his or her development," without providing a valid means of assessing this environment [20]. Measures such as the ICCE show that the "environment" side of that assertion is as open to scientific measurement as the "development" side.

Our results suggest three main strengths of the ICCE, described below.

First, ICCE supports the ease of using this measure in practice; the ICCE is highly adaptable because it takes less than 10 minutes for caregivers or children to complete.

Second, the ICCE can be used for comparative studies across international samples, given that the measure is based on the widely used HOME. Furthermore, the subscales are based on HOME categories, which have been widely used in research assessing child care environment worldwide [2-3].

Third, we have evidence that the ICCE has adequate predictive validity, given the positive correlations observed between the ICCE and the child future development by our previous studies [14-17].

However, we must note several limitations of this study. First, the ICCE subscales might not cover all the dimensions of child care environment, even though it was developed using the HOME inventory. It is substantially shorter than the HOME inventory. Second, it has the bias of questionnaire. Given the nature of some of the questions on ICCE, it might be that parents would be afraid of putting down truthful answers, such as for "how many times have you kicked or hit your child in the past week?". Third, the present study focused on observed and self-reported environment. Environments that would be most effective for child development are not necessarily ones that can be properly observed, as some may be invisible.

Future research should examine strategies for regulating children's environments, perhaps by challenging preconceived notions of what constitutes a good environment for development.

V. CONCLUSION

This study provides evidence that ICCE is able to validly and reliably assess children's care environment. Thus, the ICCE can be considered as an established, valid screening instrument that can accurately reflect the attributes of a child's environment. This measure helps provide further information that can be used to develop methods of encouraging more pro-social home environments, which enhances the practicality of the ICCE for practitioners and caregivers.

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APPENDIX1. INDEX OF CHILD CARE ENVIRONMENT (ICCE)

1. How often do you play with your child per week?

(1)rarely   (2)1–2/week   (3)3–4/week

(4)5–6/week   (5)almost every day   (6)other(   )

2. How often do you go shopping with your child?

(1)rarely   (2)1–2/month   (3)1–2/week

(4)3–4/week   (5)almost every day   (6)other(   )

3. How often do you read to your child?

(1)rarely   (2)1–2/month   (3)1–2/week

(4)3–4/week   (5)almost every day   (6)other(   )

4. How often do you sing songs with your child?

(1)rarely   (2)1–2/month   (3)1–2/week

(4)3–4/week   (5)almost every day   (6)other(   )

5. How often do you go to the park with your child?

(1)rarely   (2)1–2/month   (3)1–2/week

(4)3–4/week   (5)almost every day   (6)other(   )

6. How often do you and your child meet with friends or relatives with children of a similar age?

(1)rarely   (2)1–2/month   (3)1–2/week

(4)3–4/week   (5)almost every day   (6)other(   )

7. How often does your spouse, partner, or other caregiver help you with the child?

(1)rarely   (2)1~2/month   (3)1~2/week   (4)3~4/week   (5)almost every day   (6)other(   )

8. How often does your child eat meals together with both parents?

(1)rarely   (2)1–2/month   (3)1–2/week

(4)3–4/week   (5)almost every day   (6)other(   )

9. What do you do if your child spills milk on purpose?

(1)hit the child   (2)scold the child   (3)discipline in another way

(4)determine how to prevent it in the future   (5)other(   )

10. How many times did you hit or kick your child last week?

(1)never   (2)1–2times   (3)3–4times

(4)5–6times   (5)almost every day   (6)other(   )

11. How many times do you have a chance to talk with your partner about your child?

(1)very little   (2)1–2/month   (3)1–2/week

(4)3–4/week   (5)almost every day   (6)other(   )

12. Does someone help you take care of your child?

(1)yes   (2)no   (3)other(   )

If yes, circle all the following that apply:

(1)spouse   (2)grandparent   (3)friend   (4)relative   (5)neighbor

(6)child care professionals from the nursery   (7)director of nursery

(8)baby-sitter   (9)other staff at the nursery   (10)other(   )

13. Do you have someone to consult with about childcare?

(1)yes   (2)no   (3) other(   )

If yes, circle all the following that apply:

(1)spouse   (2)grandparent (3)friend   (4)relative   (5)neighbor

(6)child care professionals from the nursery   (7)director of nursery

(8)baby-sitter   (9)other staff at the nursery   (10)other(   )