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Chapter 4

Child Care Quality, Compliance With Regulations, and Children's Development: The Pennsylvania Study

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THE ONLY PUBLIC POLICY designed to maintain quality control in child care consists of each state's licensing regulations. It is assumed that when child care programs comply with licensing regulations, they meet a level of quality that will, at the very least, not be harmful to the development of young children (e.g., Fiene & Nixon, 1981).

Many early childhood educators take issue with crediting the typical state child care regulatory system with anything closely related to quality. However, Morgan (1985) suggests that "Licensing establishes a basic floor of quality. A ceiling is represented by the goals of the profession" (p. 15). It is precisely this discrepancy between the floor and ceiling of quality that feeds the concern of skeptics who believe child care may be harmful for children and sparks the interest of researchers concerned about the impact of public policy on children and families.

Variation in regulatable characteristics of child care is related to differences in children's intellectual, language, and social development or experiences. Little research has been done to determine how regulatable aspects of child care (those aspects of quality that enter into licensing criteria) relate to measures of quality determined by standards of the child care profession. Although a portion of the Bermuda Study addressed this issue (McCartney, 1984; Phillips, Scarr, & McCartney, this volume), data also are needed from American settings if specific public policy implications are to be drawn. Specific information is needed regarding how much children's development is influenced by differences in regulatable characteristics of child care after all other relevant variables (e.g., age, SES, child care history) have been taken into account. Information of this nature will help determine which regulatable characteristics of centers are most critical to quality as it is defined by professional criteria and observed in child development outcomes.

A unique opportunity to obtain these data arose in the state of Pennsylvania, where the Office of Children, Youth and Families (OCYF) was wrestling with several related licensing issues. The first issue was one with which every state would like to deal: Pennsylvania had recently implemented an instrument-based program monitoring system to determine the level of center compliance to licensing regulations. The average center in the state was in compliance with 97% of the regulations (Fiene, 1980). Most centers, therefore, met the basic floor of quality.

Second, child care centers in Pennsylvania are required to apply to and be accepted by the state as licensed vendors of subsidized child care slots. Consistent with its goal of promoting child development, OCYF wanted to know that vendors selected to provide subsidized care are providing high quality care as defined by standards in the profession and by positive child development outcomes. Because most programs complied with the licensing regulations, however, the state had no way to objectively discriminate among the quality of services provided by centers. Thus, OCYF sought data to help pinpoint key quality indicators from individual regulatable center characteristics by determining how well these characteristics predict child development outcomes, licensing compliance scores, and an environmental quality score as defined by early childhood professionals. OCYF planned to translate the knowledge obtained from these data into public policy concerning child care regulation and funding. The study described here was conducted in collaboration with OCYF.

Conducting the study

Centers

The 10 centers that participated in the study were randomly selected from a sample of 25 centers that volunteered. Those 25 were part of a sample of 40 centers selected as representative of the 350 centers in the northeast region of Pennsylvania (i.e., half urban, half with enrollment more than 30, half nonprofit). The random sample of 10 participating centers was stratified to approximate the proportion of urban/rural and profit/nonprofit centers in that region of the state. Thus, of the 10 centers, five were urban/nonprofit, three were urban/profit, and one each was rural/nonprofit and rural/profit.

Children and parents

Child care directors provided a list of all 3-, 4-, and 5-year-old children who had attended the center full-time (more than 20 hours per week) for at least 6 months. Of these, 100 randomly selected children participated. These 100 children were divided by gender (53 males and 47 females), were predominantly White, and were from all socioeconomic levels. Children's mean age was 53 months. Their average age of entry into out of home care was 24.98 months, and the average time spent in child care was 4,084 hours. Mean annual family income was $26,512 with a range of no income to $100,000. Mothers whose children participated agreed to be interviewed by the researcher by telephone. See Table 4-1 for further descriptions of the sample.

Table 4-1. Means, Standard Deviations, and Ranges for Each Variable

Variable	X	SD	Range
Age of child (months)	52.80	8.66	36–70
Family background			
Mother's education (years)	13.07	2.74	4–21
Value for prosocial (score)	10.28	2.24	5–14
Child care experience			
Age at child care entry (months)	24.98	14.64	1–60
Time in care (hours)	4084.43	2097.14	270–9360
Center quality			
ECERS	139.62	21.59	111–176
CDPE-IC (%)	88.94	7.03	80–100
CDPE	34.00	39.48	−51–100
COFAS	67.97	10.54	54–87
Center characteristics			
Turnover (%)	27.88	19.99	0–70
Capacity	66.16	33.33	20–127
Group size	22.85	6.67	15–39
Ratio	9.81	2.06	6–15
Director's experience (years)	8.09	3.88	2–14
Average staff experience (years)	6.51	3.88	24–145
4-year degree (%)	49.00	56.00	0–100
Child development outcomes			
Slosson	112.47	16.84	71–150
CBI-Int	52.83	18.34	−5–91
TELD	101.72	13.07	67–130
ALI	60.29	11.41	33–90
PBQ	15.91	9.60	0–38
CBI-Soc	31.89	14.48	2–67

Family background is the most salient determinant of development in children attending child care centers whose quality varies from adequate to good.
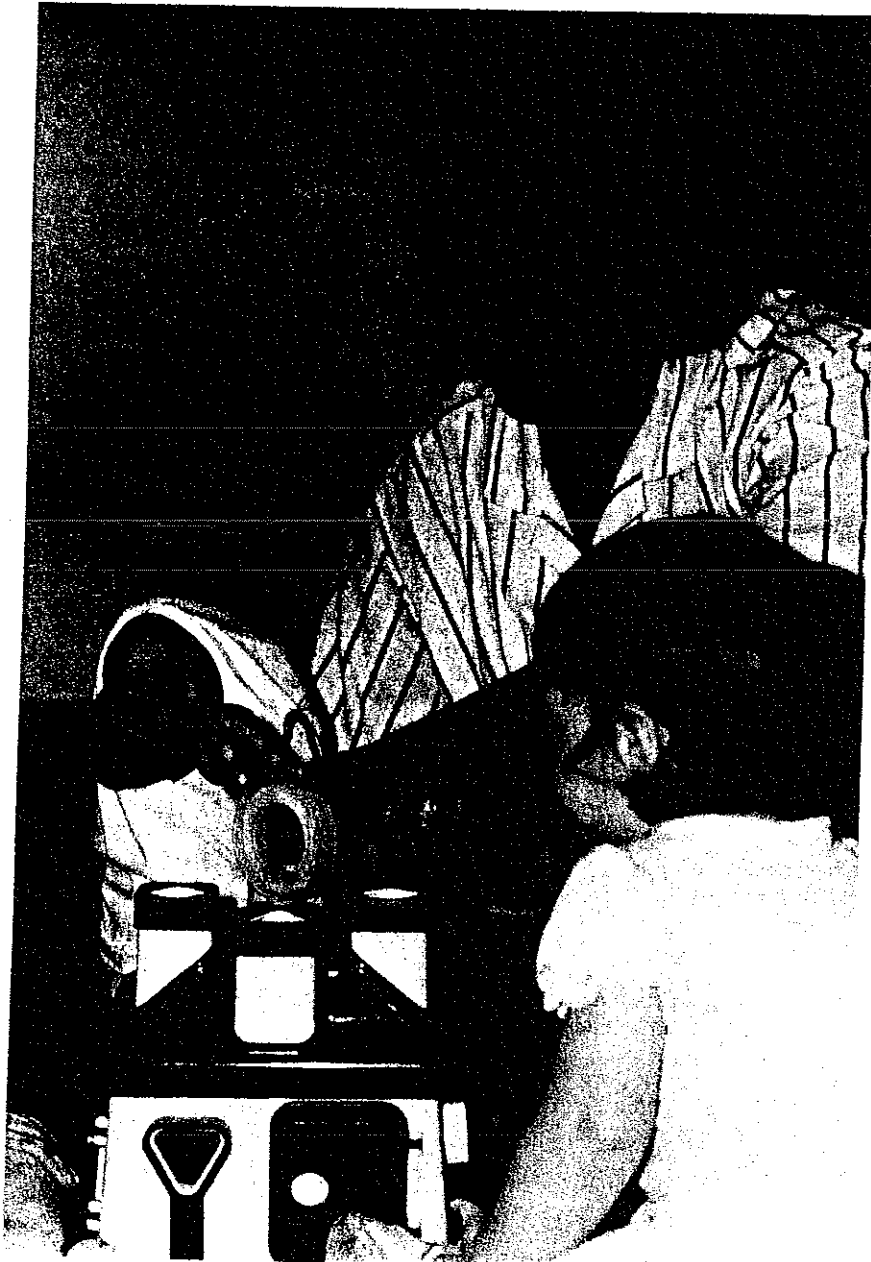
Measures of center quality

Four measures of center quality were administered for each center. Three of these measures were scales developed by the Pennsylvania Office of Children, Youth and Families in order to determine whether a center qualifies for fully or provisionally licensed status — the Child Development Program Evaluation Scale (CDPE) (Fiene, Douglas, & Kroh, 1978), the CDPE Indicator Checklist (CDPE-IC) (Fiene, 1984), and the Caregiver Observation Form and Scale (COFAS) (Fiene, 1984). These were the *floor of quality* measures. The fourth measure was a more comprehensive measure of overall environmental quality — the Early Childhood Environment Rating Scale (ECERS) (Harms & Clifford, 1980). This measure represents professional goals for quality. The CDPE and the CDPE-IC measure structural variables in child care. The COFAS and a significant portion of the ECERS measure process variables.

Compliance with licensing regulations in Pennsylvania is monitored through an instrument-based system. Each regulation has been translated into a dichotomous item with stated criteria that determine whether or not a center is in compliance with that regulation. Those items together form a 270-item instrument, known as the Child Development Program Evaluation (CDPE), that is administered annually by a regional licensing representative from the state during a lengthy site visit. The CDPE is comprised of the following seven subscales: program administration, environmental safety, child development program and curriculum, health, nutrition, parent involvement, and transportation.

Each item on the CDPE was empirically given a weight (translated into points) based on ratings of the level of risk to children's health and safety if the center is out of compliance (see Fiene & Nixon, 1981, for method of determining weights). Centers begin with a perfect total score of 100, and points are then subtracted when a center is out of compliance on a particular item. For this study, the CDPE total score on file for each center from the last site visit was one of three measures of quality related to compliance to licensing regulations.

The second measure of quality involving compliance to licensing regulations was the percent of items passed on the CDPE Indicator Checklist (CDPE-IC). The CDPE-IC is a 15-item scale comprised of the best predictors of the total score from the full scale (Fiene & Nixon, 1985). Items focus on staff ratios and qualifications, environmental safety, supervision, presence of health appraisals on children and staff, emergency contacts for children, food preparation, use of safety carriers during transportation, and social service agreement forms. An additional item

based on an observation of caregiver behavior comprised a separate scale (COFAS) in the present study and is described below. The CDPE-IC was administered at each center by a regional licensing representative and a child care center director (from a different center) shortly after the children's data were obtained. Both people administered both the CDPE-IC and the COFAS simultaneously but independently and reached a consensus on any items about which there was disagreement.

The observation of caregiver behavior (COFAS) is designed to determine if adult behavior in the child care setting promotes development of skills, self-esteem, and positive self-identity and provides for a choice of activities. The COFAS (Fiene, 1984) is a list of 29 caregiver behaviors that are coded during a 20-minute classroom observation, assigned their designated weight, and summed for a total score. A score of 30 or above is required for the caregiver to be in compliance with the observation item on the Indicator Checklist. Items comprising the COFAS were selected following extensive field testing (see Fiene & Nixon, 1981).

The Early Childhood Environment Rating Scale (ECERS) (Harms & Clifford, 1980) was administered at each center by one of the three-member research team. This scale consists of 37 items judged by early childhood professionals to be extremely important components of quality programs for children and has been shown to have high interrater reliability (McCartney, 1984; Harms & Clifford, 1980). The items focus on seven areas of quality (personal care routines, furnishings and display, language and reasoning experiences, creative activities, fine and gross motor activities, social development, adult needs).

Center characteristics

Seven center characteristics — one process variable and six structural variables — were individually measured: staff turnover, center capacity, staff-child ratio, group size, director's experience, average staff experience, and proportion of staff with 4-year degrees. Of these variables, only turnover was not regulatable. Staff turnover rate, the process variable, was measured by determining the proportion of staff positions that had been replaced in the previous year (or 2 years if the proportion was more representative). Only one staff member with a 4-year degree held it in a non-child-related major — psychology; the remainder of the degrees were in elementary education, early childhood education, or special education.

Children's development

Two measures each of intellectual, language, and social development were obtained for each child. Intellectual development was measured by

the Slosson Intelligence Test (Slosson, 1983) and the intellectual functioning subtest of the Classroom Behavior Inventory — Preschool Form (Schaefer & Edgerton, 1978). The Slosson Intelligence Test is an individually administered test of mental ability adapted from the Stanford-Binet (Form L-M). The Classroom Behavior Inventory — Preschool Form is a 60-item rating scale of which 30 items comprise the intellectual functioning subtest. This includes five subscales with items concerning task orientation versus distractibility, creativity/curiosity versus apathy, and verbal intelligence. See Schaefer and Edgerton (1978) for details.

Language development was measured by the Test of Early Language Development (TELD) (Hresko, Reid, & Hammill, 1981) and the Adaptive Language Inventory (Feagans & Farran, 1979). The TELD, an individually administered standardized test of language development, is designed to measure two dimensions of language — form and content — in both the receptive and expressive mode. For this study, the dependent measure was the language quotient. The Adaptive Language Inventory is an 18-item teacher rating scale of children's verbal ability in a classroom setting (see D. Farran, personal communication, 1984). Items focus on comprehension, production, rephrasing, spontaneity, listening, and fluency. All Adaptive Language Inventory item scores were summed for a total score.

Social development was measured by the Preschool Behavior Questionnaire (a 30-item behavior problem checklist that assesses social deviance) (Behar & Stringfield, 1974) and the sociability subtest of the Classroom Behavior Inventory. The Preschool Behavior Questionnaire is a modification of Rutter's Children's Behavior Questionnaire (Rutter, 1967). The items describe behaviors ranging from "squirmy and fidgety" to "unusual sexual behaviors." The questionnaire was designed to help identify children with symptoms of emotional disturbance. The second measure of social development was the 30 items relating to sociability remaining on the Classroom Behavior Inventory — Preschool Form (Schaefer & Edgerton, 1978). These items form six subscales related to extroversion/introversion, considerateness/hostility, and independence/dependence.

Four of the measures of children's development are identical to some used in the Bermuda Study: the Preschool Behavior Questionnaire, the Adaptive Language Inventory, and the Classroom Behavior Inventory, which are all teacher rating scales. The Slosson Intelligence Test and the TELD are standardized tests administered by the researchers.

Family background

A standardized telephone interview was used to obtain family background information from the mother (only one mother could not be

Floor of quality appears to be different from a professional standard of quality, and the floor of quality measures appear to be somewhat different from one another.

reached). The interview focused on demographic characteristics of the family (age, occupation, marital status, income, family size, and education), access to a Title XX child care subsidy, the child's supplemental care history, childrearing and education values for the child (from the Parent as Educator Interview, Schaefer & Edgerton, 1979), and variety of stimulation in the home (from the HOME Inventory, Caldwell & Bradley, 1978).

In order to determine mothers' childrearing and education values, interviewers asked them to rank three sets of five statements about varying priorities for childrearing and education (Schaefer & Edgerton, 1979). The ranks were summed to form three subscores that indicated relative value for conformity, prosocial behavior, and independent problem solving in children's behavior.

The "variety of stimulation" subtest of the HOME Inventory (Caldwell & Bradley, 1978) provided a measure of home environment stimulation. Nine items concerning children's excursions away from home, participation in grocery shopping, inclusion at mealtime, the types of toys, and the display of children's artwork were scored as pass or fail. The total items passed comprised the home environment stimulation score.

Procedure

A team of three researchers visited each center for one day to obtain the ECERS scores and administer to children the Slosson Intelligence Test and the TELD. Children's primary caregivers were given instructions for completing the rating scales. They were asked to complete the rating scales item by item for all children so that they were using comparable scoring criteria. Researchers interviewed directors at the center to obtain information concerning the center characteristics. They conducted telephone interviews with children's mothers after the center visit.

Results of the study

Quality variables

Table 4-1 presents means, standard deviations, and ranges for each variable included in the analyses. All centers were qualified for a license based on the CDPE-IC and the COFAS. According to scores on the full CDPE, only six centers qualified to be fully licensed, three could be provisionally licensed, and one would be denied a license.

The mean ECERS total score indicated that the average item score on this measure for all centers was slightly above *adequate*, but less than

good. The average ECERS item score for the lowest scoring center was *adequate*. For the highest scoring center, the average ECERS item score was slightly below *good*.

These data suggest that the centers participating in the study represented a range of quality, both in terms of licensing criteria and in terms of professional standards. Several centers received *perfect* quality scores on the licensing measures; none of the centers scored at either extreme of quality as measured by the ECERS.

The intercorrelations among the quality variables reveal an interesting pattern (see Table 4-2). Correlations were consistently low to moderate. Predictably, the highest correlation was between the full CDPE and the CDPE-IC. In fact, because those two scores ostensibly measure the same thing, an even higher relationship was expected.

The most important of the correlations among quality variables were those between the ECERS (the professional standard for quality) and the three licensing variables (the floor of quality). Interestingly, the ECERS was most strongly related to the COFAS, the measure of caregiver behaviors. The relationship between the ECERS and the total CDPE was only slightly weaker. What is notable about these correlations is that their small to moderate strength suggests that these measures of quality overlap very little with one another. In other words, the floor of quality appears to be different from a professional standard of quality, and floor of quality measures appear to be somewhat different from one another. Another possibility is that the two aspects of quality do not have a linear relationship and thus a correlation coefficient may not be an accurate index of the relationship.

Relationships between quality measures and center characteristics

One purpose of our study was to determine how well individual characteristics of centers (most of them regulatable) predicted measures of quality, and vice versa, as defined by licensing criteria and by professional standards. Of the seven individual center characteristics, four predicted caregiver behavior (COFAS), two the total CDPE, and three ECERS. For this sample, the individual center characteristics were most strongly related to caregiver behavior both in number and strength of correlations. Capacity, group size, and ratio were the structural characteristics most consistently related to any aspect of quality. Larger center capacity and more children per caregiver predicted lower quality as measured by the ECERS (for both variables) and the CDPE-IC (for capac-

Table 4-2. Correlations Between Center Characteristics and Center Quality Measures (N = 10)

	Center characteristics							Quality measures			
Characteristics	Turnover	Capacity	Group size	Ratio	Director's experience	Average staff experience	4-year degree	ECERS	CDPE-IC	CDPE	COFAS
Turnover	—	.04	.47	.35	-.44	-.34	.34	.10	.01	-.02	-.66
Capacity		—	-.39	.48	-.36	-.34	.39	-.41	-.56	-.04	-.15
Group size			—	-.27	.08	-.04	-.14	.46	.44	-.23	-.18
Ratio				—	-.51	-.41	.33	-.47	-.21	-.26	-.61
Director's experience					—	.75	-.50	.32	.15	-.15	.73
Average staff experience						—	-.29	.29	.22	.002	.57
4-year degree							—	-.12	-.28	.10	-.33
Quality											
ECERS								—	.36	.28	.38
CDPE-IC									—	.44	.19
CDPE										—	.31
COFAS											—

Note: Due to sample size, no significance levels are reported.

ity) or COFAS (for ratio). Interestingly, and contrary to findings in other studies, group size was positively related to quality. The strong negative relationship between staff turnover and COFAS and the strong relationship between director's experience and COFAS are noteworthy. These data suggest that structural and process components of staff characteristics are related to caregiver behavior.

Relationships with children's development

The contribution of variations in center quality and center characteristics to children's development was measured in two ways. Initially, we correlated the child development measures with the measures of center quality and of individual center characteristics using Pearson Product-Moment correlations. The results of these analyses can be seen in Table 4-3. In general, the correlations were small, but a number of them reach significance because of the sample size. Three of the correlations stand out because of their strength. Higher quality, as measured by the CDPE-IC, and smaller center capacity were related to lower social deviance scores on the Preschool Behavior Questionnaire. Less director experience in child care was related to higher TELD scores.

In general, center characteristics and quality measures most consistently predicted language development as measured by the TELD. These correlations were all negative, however, and difficult to explain. Most probably, the reason is related to a confounding of center quality with family background: The lower quality programs tended to be in profit centers where more middle-class children, who performed better on the developmental assessments, were enrolled.

Needless to say these correlations were confounded with children's ages, family background, and child care experience. The subsequent set of analyses attempted to control for the effects of these variables in order to obtain a clearer picture of how children's development is affected by individual center characteristics and center quality.

Regression analyses

Design. We used a hierarchical multiple regression model to control for the influence of children's age, family background, and child care history prior to examining the extent to which children's cognitive, language, and social development was affected by variation in individual center characteristics and center quality. A four-step process was implemented to determine predictors of children's development and to examine the influence of center characteristics. At each step, we calculated the

amount of variance in children's cognitive, language, and social development accounted for by the set of predictor variables. The analysis indicated how much *additional* variance was accounted for by subsequent predictors added to the model.
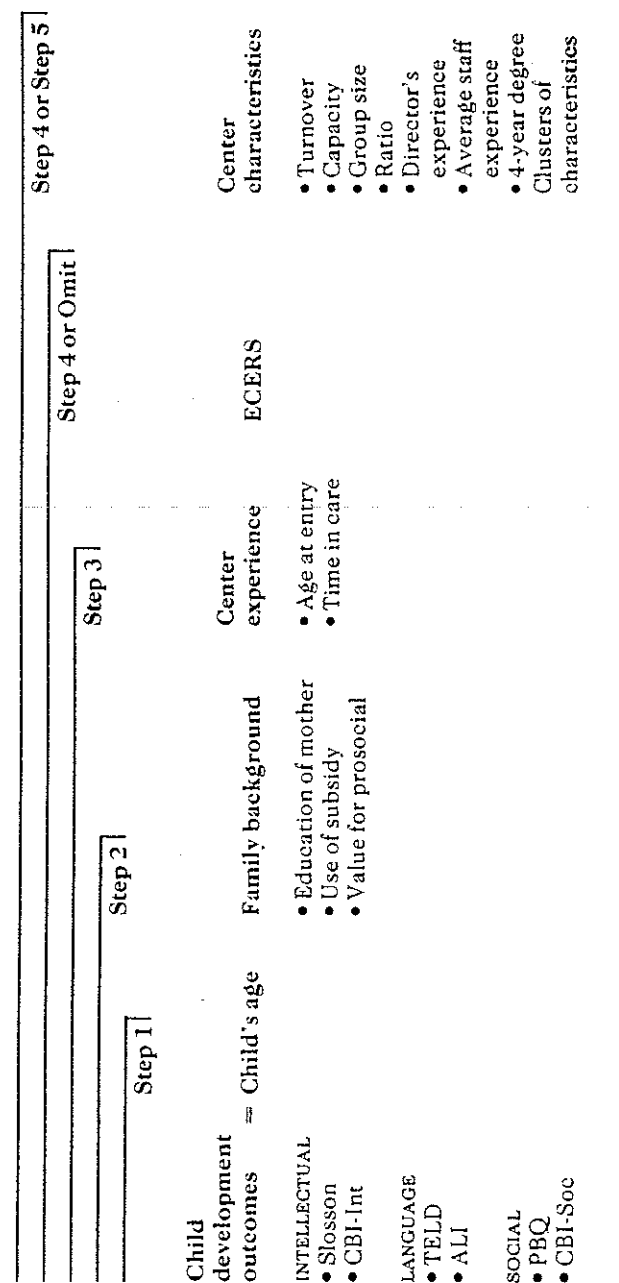
A diagram of the model is presented in Figure 4-1. For the first step, children's age was the only predictor of the developmental measures. Then the three family background variables found to influence center selection were added simultaneously to form step 2. It was important to know whether centers with certain quality scores were selected by families of a

Table 4-3. Correlations of Center Characteristics and Quality Measures with Child Development Outcome Measures

| | Child development outcomes (n = 100) | | | | | |
| | Intellectual | | Language | | Social | |
	Slosson	CBI-Int	TELD	ALI	PBQ	CBI-Soc
Characteristics						
Turnover	−.12	.04	−.06	.10	.16	.13
Capacity	.02	−.17	.11	−.05	.25*	−.06
Group size	−.21*	−.02	−.22*	.02	−.06	.07
Ratio	−.005	−.08	.06	−.02	.12	.12
Director's experience	−.23*	.02	−.33*	−.06	−.003	−.20*
Average staff experience	−.09	.10	−.20*	.05	−.09	.006
4-year degree	.16	.06	.18	.09	.14	.14
Quality						
ECERS	−.20*	.03	−.21*	.07	.02	−.04
CDPE-IC	−.003	.01	−.02	.03	−.39*	.21*
CDPE	.16	.03	.20*	.08	−.18	.10
COFAS	.14	−.05	−.22*	−.03	−.02	−.22*

*p < .05

Figure 4-1. Diagram of Multiple Regression Model

Child development outcomes = Child's age

INTELLECTUAL
• Slosson
• CBI-Int

LANGUAGE
• TELD
• ALI

SOCIAL
• PBQ
• CBI-Soc

Step 1

Step 2
Family background
• Education of mother
• Use of subsidy
• Value for prosocial

Step 3
Center experience
• Age at entry
• Time in care

Step 4 or Omit
ECERS

Step 4 or Step 5
Center characteristics
• Turnover
• Capacity
• Group size
• Ratio
• Director's experience
• Average staff experience
• 4-year degree
Clusters of characteristics

particular background. Three family variables—mother's education, use of a child care subsidy, and maternal value for prosocial behavior—predicted center quality and became control variables in the final regression analysis.

Step 3 involved adding two variables concerned with the child's supplemental care history (age at entry into group care and length of time in group care). This step estimated the effects of exposure to child care environments, regardless of their quality.

Finally, each of the seven measures of center characteristics was added to the model individually and in a cluster as step 4 to estimate the influence of center characteristics (alone and in combination) with the influence of all other variables removed. In order to minimize the confounding among the clusters of regulatable center characteristics, Pearson Product-Moment correlation coefficients were calculated among all seven characteristics. Only combinations of characteristics whose intercorrelations were below .30 were included in a cluster.

A five-step process was implemented to examine the same relationships, but with the inclusion of center quality as a predictor of children's development. Of the five steps, the first three remained the same as in the four-step process. Step four, however, involved adding one center quality variable, ECERS. This step estimated the effects of child care quality (as defined by professional standards) on children's development with the influence of all other variables removed. The fifth step involved once more adding each center characteristic individually and in clusters to the equation. The purpose of step 5 was to determine if the amount of influence accounted for by the center characteristics changed when the effects for center quality were removed first. This approach, modeled after that used in the National Day Care Study, was designed to estimate an upper and lower range for the amount of variance in child development outcomes accounted for by center characteristics with and without the variance due to center quality removed first.

Findings. Table 4-4 presents the beta weights for each variable, the R, and the proportion of variance added by each of the four steps for each of the six child development variables. Age was a significant predictor of development only for two nonstandardized measures, the intellectual functioning subtest of the Classroom Behavior Inventory—Preschool and the Adaptive Language Inventory. For three of the six child development measures, family background was the prime and/or only significant predictor: Slosson Intelligence (intellectual development), the TELD, and the Adaptive Language Inventory (language development). Neither mea-

Table 4-4. Results of Hierarchical Multiple Regression Analyses (Beta Weights and R^2)

| Measure | Step | Family Background | | | | Center Experience | | Quality | | |
		Age	Mother's education	Subsidy	Value for prosocial	When entered care	Time in care	ECERS	R^2	R^2
Slosson	1	.075							.001	
	2	.144	1.29*	5.54	1.37				.13*	.129*
	3	.418	1.15	4.17	1.43*	-.384*	-.0009		.185*	.055
	4	.40	1.26*	1.76	1.31	-.394*	-.001	.085	.193*	.008
CBI-Int	1	-.55*							.067	
	2	.63*	1.46	-2.7	.62				.145	.078
	3	.72*	1.41	-3.12	.64	-.12	-.0003		.149*	.004
	4	.72*	1.41*	-3.08	.64	-.12	-.0003	.0015	.150*	.001
TELD	1	-.04							.0007	
	2	.05	.73	4.81	1.52*				.155*	.15*
	3	.20	.66	4.26	1.55*	-.198	-.0008		.176*	.02
	4	.19	.72	2.86	1.48*	-.204	-.0008	-.049	.179*	.003
ALI	1	.37*							.08	
	2	.39*	.84*	-4.34*	.97*				.188*	.111*
	3	.44*	.82*	-4.43*	.98*	-.06	-.0004		.19*	.002
	4	.44*	.82*	-4.61	.97*	-.06	-.0003	-.006	.19*	.00
PBQ	1	-.07							.004	
	2	-.09	.89*	-1.24	.33				.09	.086
	3	.03	.94	-1.57	-.03	-.15	-.0007		.1119	.02
	4	.02	.88	-2.92	-.37	-.15	-.0008	-.047	.1119	.00
CBI-Soc	1	.23							.02	
	2	.29	1.03*	.86	.78				.08	.06
	3	.21	1.07*	1.10	.76	.10	.0005		.08	.008
	4	.21	1.04	1.77	.80	.10	.0004	.02	.09	.002

*p < .05

sure of social development was affected by variation in family background. Child care history failed to account for a significant portion of the variance for any of the six child development variables. Of the control variables included in steps 1 through 3, family background proved to be an important factor.

Of crucial importance to the purpose of the study was the effect of center quality on children's development after the effects of the control variables were removed. It is particularly significant, then, that when ECERS was entered as step 4, it accounted for none or next to none of the variance in children's development on *any* of the measures. In this study, center quality as defined by professional standards did not predict children's development when age, family background, and child care history were taken into account.

Of equal importance to the purpose of the study was the effect of center characteristics, alone and in combination, on children's development. Table 4-5 reports the proportion of variance accounted for by each center characteristic entered alone at step 4, without ECERS, and alone at step 5, after ECERS, on children's development. The proportions of variance in children's development accounted for by individual center characteristics ranged from 0 to .07 and were similar at step 4 and step 5 due to the lack of effects for ECERS. Center capacity contributed 6.8 to 7% and staff turnover contributed 2.7 to 4.2% of the variance for social deviance. Group size contributed 3.6 to 3.8% of the variance for language development (TELD) and 2.3 to 3% of the variance for intellectual development (Slosson). Staff turnover contributed 2.9 to 3.5% of the variance for intellectual development (Slosson).

The remaining proportions of variance accounted for by center characteristics were smaller. In nearly every instance, the effects of center characteristics were greater than the effects of quality on children's development. The fact remains that the effects of all the individual center characteristics on children's development were statistically nonsignificant.

Table 4-6 reports the proportion of variance accounted for by clusters of center characteristics entered at step 4, without ECERS, and at step 5, after ECERS. These results revealed two statistically significant effects, both of them involving the sociability subtest of the Classroom Behavior Inventory—Preschool. Two statistically significant effects would be expected solely due to chance. Director experience and average staff experience together contributed 16.2 to 16.4% of the variance for sociability. Those two variables combined with group size contributed 18.8 to

Table 4-5. Proportion of Variance Accounting for Child Development Outcomes by Each Center Characteristic

	Slosson		CBI-Int		TELD		ALI		PBQ		CBI-Soc	
	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5
Turnover	.035	.029	.001	0	.024	.021	.007	.008	.027	.042	.011	.011
Capacity	.0009	.037	.021	.027	.01	.008	.002	.002	.068	.07	.0002	.001
Group size	.03	.023	.019	0	.038	.036	0	0	.008	.01	.007	.007
Ratio	.021	.037	.021	.025	.004	.011	.005	.006	.046	.046	.002	.005
Director's experience	.001	0	.01	.009	.019	.018	0	0	.015	.018	.018	.021
Average staff experience	.009	.019	0	.08	.003	0	.004	.04	.005	.057	0	.025
4-year degree	.003	.025	.001	.009	.001	.027	0	.011	.003	.02	.004	.029

Table 4-6. Proportion of Variance Accounting for Child Development Outcomes by Clusters of Center Characteristics

	Slosson		CBI-Int		TELD		ALI		PBQ		CBI-Soc	
	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5	Step 4	Step 5
Turnover-Capacity	.035	.027	.023	.028	.036	.034	.008	.011	.091	.091	.014	.014
Ratio-Group size	.065	.064	.024	.025	.051	.049	.005	.006	.047	.048	.013	.012
Group size-Director's experience	.031	.023	.01	.009	.054	.055	.002	.002	.023	.024	.025	.024
Group size-Average staff experience	.043	.035	.082	.083	.038	.037	.044	.045	.066	.066	.037	.038
Group size-4-year degree	.051	.043	.01	.009	.056	.056	.011	.011	.022	.023	.04	.039
Director's experience-Average staff experience	.047	.046	.109	.109	.039	.038	.109	.109	.057	.062	.162*	.164*
Average staff experience-4-year degree	.074	.069	.13	.129	.033	.031	.081	.081	.055	.058	.084	.087
Group size-Director's experience-Average staff experience	.066	.058	.111	.112	.068	.064	.112	.113	.073	.074	.188*	.189*
Group Size-Average staff experience-4-year degree	.085	.077	.136	.135	.057	.056	.085	.085	.066	.061	.112	.112

18.9% of the variance for sociability. Seven additional effects of greater than 10% approached significance. Four of these involved the intellectual functioning subtest of the Classroom Behavior Inventory — Preschool and two involved the Adaptive Language Inventory. Treating center characteristics as clusters produced noticeably stronger effects on measures of children's development than treating them singly.

Several combinations of center characteristics contributed substantially, though not significantly, to children's development. Director experience and average staff experience (10.9% of the variance); average staff experience and proportion of 4-year degrees (12.9 to 13% of the variance); group size combined with director experience and average staff experience (11.1 to 11.2% of the variance); and group size combined with average staff experience and proportion of 4-year degrees (13.5 to 13.6% of the variance) all contributed noticeably to the variance in children's intellectual development as measured by the Classroom Behavior Inventory — Preschool. Group size, director experience, and average staff experience contributed 11.2 to 11.3% of the variance in language development as measured by the Adaptive Language Inventory. Director experience and average staff experience contributed 10.9% of the variance to that measure of language development. Finally, group size, average staff experience, and proportion of 4-year degrees contributed 11.2% of the variance in sociability. In general, clusters of center characteristics had the strongest effects (>10% of the variance accounted for) on the intellectual functioning and sociability subtests of the Classroom Behavior Inventory — Preschool and on the Adaptive Language Inventory, all teacher rating scales.

Discussion

The results suggest that family background is the most salient determinant of development in children attending day care centers whose quality varies from adequate to good. The strength of family background as a predictor in and of itself ought not to come as a total surprise. These results are consistent with a major study of public school quality and children's cognitive development and educational attainment (Jencks, 1972). In that study family background explained half of the variance in children's educational attainment while school quality added little or nothing to predictions of cognitive development or educational attainment.

More recently, Clarke-Stewart (Clarke-Stewart, this volume; Clarke-Stewart & Gruber, 1984) found no significant correlations between forms and features of family day care homes and children's intellectual and social competence when variation due to family background variables was partialled out. To a lesser extent, this also occurred for center-based child care programs.

In the Bermuda Study, family background variables were as predictive of children's language development as child care quality (McCartney, 1984; Phillips, Scarr, & McCartney, this volume). Clearly the data regarding family background and child care quality gleaned from this study are partially consistent with other data.

Moreover, the range of quality represented must be taken into account as we draw conclusions. Center quality, as measured by the ECERS, was a significant predictor of development in the Bermuda Study, but not in this study. Why the difference? In examining the differences between the centers participating in the two studies, it is immediately clear that the Pennsylvania centers, while they varied in quality, were substantially different in the range of quality than the Bermuda centers. The lowest quality center in Pennsylvania had an average item score of adequate while in Bermuda the average item score for the low quality centers was much lower. The implication may be that when child care quality ranges from adequate to good the differential effects of quality are nonexistent. When the lower range of quality drops below adquate, the differential effects may become salient due to detrimental effects of low quality care on children's development.

This is not consistent with Vandell and Powers's (1983) data that showed medium quality centers were more like low quality than high quality centers. They were using floor of quality measures, however, not professional standards. Being at a moderate level with respect to the floor of quality may indeed have different implications for children's development than being moderate in quality using professional standards.

Looking at the individual center characteristics in isolation, we found that capacity, group size, and ratio were most frequently related to quality regardless of how it was measured. Contrary to the results of the National Day Care Study (Ruopp, 1979), however, group size was positively related to quality. On the other hand, the negative relationship between caregiver-child ratio and quality is consistent with the National Day Care Study findings. Consistent with the findings of Howes and Rubenstein (1985) and Vandell and Powers (1983), staff characteristics (turnover, ratio, director's experience, and average staff experience) predicted caregiver behavior (as

measured by the COFAS). Children's performances on the Slosson Intelligence Test and TELD were the child development outcome variables most frequently related to individual center characteristics, particularly group size and director's experience. Recall that earlier these negative correlations were explained by confounding between center quality, profit status, and children's performance on developmental measures.

The results clearly show that individual center characteristics were much more powerful as predictors of children's development when they were treated in clusters than alone. The clusters of characteristics explained more than 10% of the variance in several measures of development and in two instances explained between 15 to 20% of the variance. The latter two were statistically significant predictors.

The lack of statistically significant effects for individual center characteristics (alone or in clusters) on children's development is certainly not a sign that policymakers are free to deregulate child care without fear of harming children. These results are a function of the characteristics of a small sample of 10 centers. The *typical* range of regulated center characteristics in Pennsylvania or any other state is unknown. Another line of reasoning suggests that researchers have yet to determine at what point an effect can be said to have a substantive impact on development, even when it is statistically significant. A number of effects that approached significance suggest that this study warrants replication in order to draw firmer conclusions regarding how structural and process characteristics of child care centers affect children's development.

With the added perspective of previous research, one thing that these data tell us is how far we have to go in understanding how variations in child care environments affect children's development. Consistencies and inconsistencies between studies ought to remind us of the innumerable variables that may be acting as a smoke screen to, rather than shedding light on, the relationship between child care quality and children's development. For instance, state-to-state variations in licensing regulations and monitoring, demographic variables related to families and communities, when and in what country the study was conducted, size of the sample of centers, and type of child development outcome measures are factors that singly and together surely influence the results of research in this area. This study contributes to the knowledge base by showing how, within the confines of the measures used and the sample of families and centers, family background contributes more to variation in children's development than center quality or individual center characteristics.

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