Regulation, subsidy receipt and provider characteristics: What predicts quality in child care homes?

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Abstract

Far less is known about predictors of quality for family child care homes than for child care centers. The current study of 120 randomly-selected family child care providers in four Midwestern states examined distal, state policy-level variables (family child care regulations and the concentration of children cared for who received public child care subsidies, referred to as subsidy density), and proximal, provider-level variables (providers' level of education and reported annual training hours) as influences on global quality and caregiver sensitivity. More regulation, lower subsidy density, higher levels of provider education and more training hours were associated with higher global quality in family child care homes. Lower subsidy density and higher provider education were associated with more sensitive caregiving, but no effects on sensitivity were observed for regulation and training hours. An interaction effect indicated that regulation moderated the relation between education and sensitivity; education was especially important for sensitive caregiving among providers low in regulation. In addition, after including all predictor variables in the model, significant mean differences between states were noted. Findings demonstrate that both policy-level variables and provider characteristics influence quality in family child care homes, and further, that they may interact to affect observed child care quality. Implications for state child care policies are discussed with emphasis on implications for quality of care for low-income children whose tuition is paid by public child care subsidies.
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1. Introduction

There is considerable evidence that children receiving high quality child care demonstrate better developmental outcomes than children in low quality care (Burchinal, Roberts, Nabors, & Bryant, 1996;

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Cost, Quality and Child Outcomes Study Team, 1995; NICHD, 1999), and this is particularly the case for low-income children (Bryant, Burchinal, Lau & Sparling, 1994; Peisner-Feinberg & Burchinal, 1997; Phillips, Voran, Kisker, Howes & Whitebook, 1994; Vandell & Corasaniti, 1990).

Research suggests that a significant proportion of family child care is not good quality (Kontos, Howes, Shinn & Galinsky, 1995). In a multi-site random-selection sample of family home child care providers, Kontos et al. found that only 9% of the care provided in family child care homes reached widely-accepted standards of good quality. Many young children receive care in family child care homes, and further, a particularly high proportion of low-income children whose tuition is paid by government subsidies receive care in these settings (Coley, Chase-Landsdale & Li-Grining, 2001). To date, more studies have focused on predictors of quality in child care centers than in homes, but because of the number of children who receive care in family child care homes, it is important to learn more about predictors of quality in these settings as well.

1.1. What do we know about predictors of quality in family child care homes?

Relying on an ecological model that emphasizes the multiple layers of the child care environment that influence children's experience in child care (Phillips, Howes & Whitebook, 1992), previous work has demonstrated that child care quality in both family child care homes and centers is affected by provider characteristics, such as the amount of training and education the provider has received, as well as by the regulations and policies that govern child care in the region or state where the facility is located. While both sets of factors are important, research on child care quality in centers has maintained that proximal influences on quality such as providers' level of education and participation in training activities are more closely related to child care quality than distal influences such as the surrounding policy context, including regulations imposed by the state (Blau, 2001). In this study we examined the influence of proximal, provider-level variables (education and training) and more distal, policy-related variables (state regulation and subsidy receipt) on quality in family child care homes.

1.1.1. Provider-level variables

Provider education and training are two proximal influences on quality in family child care homes identified by previous research. Specifically, Kontos et al. (1995) found that providers with a higher level of formal education and more training provided higher quality care. Recent studies have confirmed that provider education and training are important for the delivery of high-quality care in child care homes (Burchinal, Howes, & Kontos, 2002; Clarke-Stewart, Vandell, Burchinal, O'Brien & McCartney, 2002); home providers with higher levels of education and training engaged in higher quality practices and displayed more positive interactions with children. Many of these relations, however, were reported without statistically controlling for other potential influences on child care quality in homes, such as the level of regulation experienced by the provider and whether the provider was reimbursed for children's tuition through child care subsidies.

1.1.2. Policy-related influences on family child care homes

In addition to provider characteristics, quality in family child care homes may be affected by distal factors such as state child care regulations or receipt of government child care subsidies for children attending care in their facilities. In centers, more stringent regulations have been associated with higher child care quality (Cost, Quality and Child Outcomes Study Team, 1995; Phillipsen, Burchinal, Howes

& Cryer, 1997). In family homes as well, providers who were more regulated (Kontos et al., 1995) and who were in compliance with group size cut-offs (Clarke-Stewart et al., 2002) delivered higher quality child care than less regulated providers.

The associations between regulations and observed quality are important because there is substantial variation in the extent to which family child care homes are regulated; differences exist *between* states (Phillips, Lande & Goldberg, 1990; Snow, Teleki, & Reguero-de-Atiles, 1996), and also *within* states. States differ in the stringency of standards, in the number of children who can be cared for in child care homes, training and education requirements, frequency of visits by licensing personnel, and in limitations placed on the number of very young children in a single home. Within-state variability is typically due to co-existence of regulated and license-exempt care; exempt care allows unregulated family child care providers to care for a small, specified number of children in their homes (often up to four, although the exact number varies by state). In most states, license exempt providers, sometimes referred to as family, friends and neighbors (Brandon & Martinez-Beck, in press), account for a significant portion of child care providers.

Within-state variation in regulations placed on family child care homes could also create an environment in which regulation is related to provider characteristics, because regulated and unregulated family child care providers may not share the same motivations for providing child care. For example, in the Kontos et al. sample (1995) regulated providers reported more frequently that child care was a chosen profession and that they received more training and formal education than unregulated and relative providers. Thus, it is important to determine whether regulation exerts an independent effect on quality, or whether regulation is related to higher child care quality in homes because of differences in provider characteristics. These differences may exist because some providers self-select into high levels of regulation (e.g., those who have more education, training or want to care for more children agree to more state regulation) or because regulation influences provider characteristics. For instance, providers who are more regulated may receive more training because the state regulations require them to. In the present study, we examine associations between provider characteristics and state regulation, and assess the impact of both on quality in family child care homes.

Far less is known about relations between quality and another policy-related variable, subsidy receipt (Adams & Rohacek, 2000) in family child care homes. This is the case despite the fact that state and federal subsidy systems annually disperse several billion dollars ($9.4 billion in FY 2003) in child care payments for low-income children through the Child Care and Development Fund block grants, and in some states over 50% of subsidy-receiving children attend child care homes (Coley et al., 2001). Block grant funding means that states have considerable flexibility in reimbursing and regulating child care providers who receive subsidy payments, leading to notable differences in state subsidy systems affecting family child care homes (Meyers et al., 2002). Accordingly, the number of providers who care for children receiving child care subsidies, as well as the number they care for, could vary across states, because some states offer higher rates for providers who care for a majority of children receiving subsidies, while others have payment systems that may discourage participation among some providers.

Past research suggests family child care quality for low-income children is more variable than for middle-income children (Kontos et al., 1995) and is also more variable in homes than in child care in centers (NICHD, 1997). In centers, one study found high and low-income children received better quality center care than middle-income children (Phillips et al., 1994). Another study examined the specific relation between subsidy receipt and quality in centers and found that subsidy receipt was associated with lower quality (Jones-Branch, Torquati, Raikes, & Edwards, 2004). The current study is among

the first to specifically address the relation between subsidy receipt and quality in family child care homes.

As with regulation, subsidy receipt may also be related to provider characteristics. Little is presently known about the education and training backgrounds of home providers who care for children on subsidy. In the present study, we refer to the total number of subsidy-receiving children cared for by the provider, divided by the total number of children cared for, as "subsidy density." Subsidy density may reflect the ecological niches of child care providers, in that low-income parents may choose family child care providers who live in their neighborhoods or are family members or friends and share demographic characteristics. Further, subsidy receipt could be linked to level of regulation; for example, most states allow unregulated providers to care for children receiving child care subsidies and some states reimburse unregulated providers at the same rate they pay regulated providers.

1.2. Research questions

In sum, existing work on child care quality in family child care homes has delineated two possible sets of influences: first, provider characteristics, or proximal influences on family child care, such as the amount of training and level of education; and second, state policy variables, or distal influences on family child care, such as regulation and subsidy density. To date little work has examined the simultaneous influence of both sets of factors in family child care homes, despite the growing realization that research must examine the "relative, joint or compensatory effects of various dimensions of care" on observed child care quality (Phillips, Mekos, Scarr, McCartney, & Abbott-Shim, 2000, p. 493). This study identifies how subsidy density and regulation are related to provider characteristics, and how both are related to two aspects of child care quality: global quality and caregiver sensitivity. Global quality refers to several components of care delivered to children in family child care homes, such as the availability and variety of learning materials, the health and safety practices of the home, and the quality of interactions between children and caregivers. Caregiver sensitivity refers specifically to the warmth and responsiveness of providers in their interactions with children. Both global quality (Goelman & Pence, 1987; Kontos, 1994; Kontos et al., 1995) and caregiver sensitivity (Kontos, Howes, Shinn & Galinsky, 1997) have been linked to child outcomes and family child care provider characteristics in previous studies.

Specifically we pursued the following sets of questions. First, we asked whether there were bivariate relations between distal, policy-level variables (regulation and subsidy density) and proximal, provider characteristics (provider education and training). Second, because distal factors have been tested less often as predictors of quality in homes, we were interested in determining whether regulation and subsidy density were related to global quality and caregiver sensitivity. Third, we were interested in determining whether distal variables, subsidy density and regulation, had direct effects on child care quality, or whether the effects of distal variables disappeared when including proximal variables, provider education and training, in the models. Finally, we were interested in learning about interactions between policy-level and provider variables, specifically whether distal variables (regulation and subsidy density) moderate the relation between proximal provider characteristics (education and training) and quality. Said another way, we investigated the possibility that the relation between provider characteristics and quality varies according to regulation or subsidy density, because state policies create a context for family child care that could potentially affect the previously reported relations between provider characteristics and quality.

We made the following hypotheses. First, because more regulation is generally associated with higher training requirements, we hypothesized that providers who are more regulated would receive more training

and would have higher levels of education, as has been reported previously (Burchinal et al., 2002; Clarke-Stewart et al., 2002). Although no research to date has examined associations between subsidy density and provider education and training, we hypothesized that subsidy density would be associated with less education and training among providers because low-income parents might choose providers who are also living in low-income neighborhoods, where education and training levels are likely to be lower overall.

Second, in line with findings on regulation and quality from child care centers (Cost, Quality, and Child Outcomes Study Team, 1995; Phillipsen et al., 1997) and family child care studies (Kontos et al., 1995), we hypothesized that higher levels of regulation would be associated with higher levels of observed child care quality. We hypothesized that subsidy density would be negatively related to quality, given earlier findings showing lower quality in subsidy-receiving centers in the same region (Jones-Branch et al., 2004). Third, we hypothesized that distal variables (regulation, subsidy density) would have independent effects on quality, even after accounting for the influence of provider characteristics. Drawing upon previously reported findings, we anticipated that provider characteristics would influence quality, even with distal policy-level variables in the models (Burchinal et al., 2002; Clarke-Stewart et al., 2002). Thus, we expected independent effects of regulation, subsidy density, and provider characteristics on quality. Finally, we hypothesized that regulation and subsidy density could moderate relations between education and training and quality. As these relations have not been explored in the literature previously, this final question was exploratory.

We employed two of the most commonly-used indices of child care quality in existing research: global quality, which measures multiple aspects of quality within a child care home (the Family Day Care Rating Scale; Harms & Clifford, 1989), and caregiver sensitivity, which measures the attentiveness and responsiveness of caregivers (Caregiver Interaction Scale; Arnett, 1989), because global quality and sensitivity may reflect different aspects of provider environments. Accordingly, we explored the possibility that these two measures of quality are differentially affected by policy variables and provider characteristics.

2. Method

2.1. Participants

A total of 120 randomly selected family child care providers participated in this study. The randomization process proceeded in the following manner. First, the sample was selected using state child care division files from the four participating states. These files contained names of all providers who were licensed or registered and all providers who receive public subsidies from each of the states during a single month (October 2000 for three states; November 2000 for one state). Altogether, the files contained names of 39,473 child care center and home providers. State licensing and subsidy divisions sent letters or newsletters notifying providers of their partnership and support for the study. Next, the Gallup Organization drew at random five times the number of providers needed for the study survey with stratification by state, whether or not the provider was subsidy-receiving, type of care (center or home), and for the type of family child care home (i.e., license exempt, registered, or licensed) and participation in Early Head Start partnerships. From this potential sample of over 10,000 providers, and maintaining the randomized stratification plan following a seven-call call-back design, 2022 providers completed a telephone interview conducted by professional interviewers from the Gallup Organization and responded to questions about

Table 1
Population, survey and observation sample of child care providers

	Population	Survey	Observation
Family child care	21,938	1058	135
Total providers	39,473	2202	365

Note: 135 home providers were observed. Complete data were available on 120 providers, accordingly the sample for path models.

education, training, motivation and other potential indicators of quality and characteristics of providers. Of the respondents, 1058 were family home providers under varying degrees of regulation, including 502 licensed family child care home providers (from Kansas, Missouri and Nebraska), 292 registered home providers (from Iowa and Kansas), and 264 license exempt providers (from all four states). The overall response rate of eligible family child care providers was 73%. Nearly all potential respondents who were not interviewed did not have working telephone numbers; the overall hard and soft refusal rates were negligible (<2% of all persons contacted; 3% for family child care). Table 1 provides the sizes of the sample pool and sample at each stage of the study: total number of providers in the four states, randomly selected surveyed providers, and the observation sample.

Upon completing the interviews, the respondents were asked if they were willing to be contacted for a follow-up observation. The overall agreement to participate in the follow-up observations was 80% for family child care home providers. From this list of providers agreeing to follow-up visits, 135 were randomly selected and observed in their homes. This included 88 licensed home providers; 33 registered home providers and 14 license exempt providers; data were missing for 15 of the observations, leading to a sample of 120 used for regression analyses. Participants in the total survey sample were slightly less well-educated than those agreeing to be observed, averaging 13.0 years versus 13.1 years. For example, 39% of family providers in the survey sample had only a high school degree or less compared to 29% in the observation study. Additionally, there were more providers with a bachelor degree or higher in the observation sample (12% versus 9% for the survey sample). However, both samples provided the full range of education levels. Additionally, providers who agreed to be observed were more regulated. For example, providers who were registered or license-exempt constituted 34% of the observation sample versus 52% of the survey sample. Observed providers also cared for fewer children on subsidy (the proportion of children receiving subsidy for the observation sample was 0.27 versus 0.38 for the survey sample), and received more training hours (37.4 h on average for the observation sample versus 24.1 on average for the survey sample).[1] Table 2 shows characteristics of survey- and observation-sample providers by level of regulation, and demonstrates that data patterns from providers agreeing to be observed generally paralleled those from the survey sample.

For all analyses and consistent with the descriptive report of the observational sample (see Raikes et al., 2003, for more details), the data were weighted back to the population of providers identified in the original files provided by states, and multiplied by the number of children each provider was legally

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[1] All four states have substantial rural population with a few large urban areas. In the survey sample, 56% were from rural areas and 44% were from urban areas across the four states. Providers observed included a somewhat higher proportion from rural areas (64%) and fewer from urban areas (36%). None of the differences in policy or provider characteristics differed significantly by rural–urban locality. Subsequent analyses showed that quality variables also did not differ by rural–urban locality.

Table 2
Characteristics of providers by type in survey and observational sample, by regulatory level

	0	1	2	3	4	4.5
Education, in years	**12.4**	**12.6**	**13.4**	**13.8**	**13.1**	**12.9**
	12.6	*12.8*	*13.0*	*13.2*	*13.1*	*13.1*
Training, in hours	**17.0**	**22.1**	**21.2**	**40.1**	**44.7**	**51.2**
	13.5	*19.4*	*17.8*	*26.7*	*42.2*	*33.5*
Subsidy density	**0.86**	**0.28**	**0.29**	**0.18**	**0.21**	**0.23**
	0.74	*0.45*	*0.38*	*0.38*	*0.29*	*0.18*

Note: Values for observation sample appear in bold and values for survey sample appear in italics.

able to care for in her/his respective state. Procedures for weighting were developed by specialists in survey sample weighting at the Gallup Organization. We used this method because we had information about the number of children providers in the population could legally care for, as well as information about the number of children the provider actually cared for, which in turn allowed us to create weights that reflected the proportion of care provided by the individual respondents in our sample. We did not have information about the number of staff or about part-time and full-time staff for the population. The method of weighting selected was judged to provide a good approximation of relative contributions to the child care pool by different forms of care in the four states and the use of weights allows this sample to more accurately represent the proportion of different types of care provided across the four states. Weights were used for analyses reported here, in order to provide the most accurate picture of statewide policy influences on observed quality. Thus, analyses reflect the general distribution of providers in each regulatory category and the relative numbers of under-kindergarten age children in the care of these providers.

2.2. Measures

2.2.1. Survey data
As stated earlier, survey data were collected from providers through telephone interviews. The following variables were obtained from survey data and are used in the analyses.

2.2.2. Years of education
Providers were asked to report on their level of education. They were asked: "What is your highest level of education? Is it less than high school, did you complete high school or a GED, some training or education beyond high school, 1-year child development program, 2-year college degree, 4-year college degree, or graduate school courses and degree?" This information was then recoded as the number of years of formal education the provider had received at the time of the survey. Less than a high school degree was coded as 11 years, a high school diploma or completion of the GED was coded as 12 years, some college was coded as 13 years, completion of an associate's degree was coded as 14 years, and completion of a college degree was coded as 16 years. Graduate education was coded as 17 years. The resulting codes were used in analyses as a continuous variable. Among all types of home providers, as previously noted, the mean number of years of education was 13.1 (S.D. = 1.3). Five percent, or seven providers, had less than a high school education, while 12%, or 16 providers, had a college degree or more.

2.2.3. Training hours

Providers were also asked to report on the total number of training hours they had received in the past calendar year. They were asked, "From January through December of 2000, how many total hours of child care-related training would you say you received? In your total, include all sources of training. These range from videotapes, the Internet, and individual study materials to study groups, professional meetings, conferences, and course credits. Please answer in terms of actual clock hours spent, not in terms of any hours of credit you may have earned." Responses were open-ended and because some providers reported a number of training hours that seemed unusually large, providers were divided into two categories: those who also reported taking courses for credit, and those who did not, on the assumption that providers taking courses for credit might spend more time in training than other providers and thus report many more training hours. Among providers who did not report taking courses for credit (67% of the sample, or 102 providers), one case reporting more than 150 training hours during the past year was deleted, and all other cases were considered reasonable in light of available training options within the states. Among providers who did report taking courses for credit, no cases were deleted, because it was assumed that these providers could legitimately report high numbers of training hours. After deleting the provider cases *not* reporting coursework for credit but who had outlying values on training hours, the two groups of providers were then combined and all cases were recoded within three standard deviations of the mean. Actual responses ranged from no reported training hours to 188; the mean across all types of home providers was 38.5 (S.D. = 52.23).

The previously described variables were measured using survey questions that were derived from other child care surveys. The survey was 12.5 min long on average; there were 38 content questions (and one question to determine if the provider was willing to be contacted again). Of these, eight questions were related to education and training the provider received, eight focused on characteristics of the child care facility, including number of children and their ages, six were about attitudes and experience of the provider, and 16 were demographic or other types of questions. The full methodology for the survey is reported elsewhere (Raikes et al., 2003). Overall, items in the survey were selected because they (1) predicted quality in other studies, (2) predicted child outcomes in other studies, (3) were conceptually related to quality or (4) were believed to associate with quality by child care administrators in the four states.

2.3. Observational data

Data describing both the global child care quality and the provider sensitivity levels were obtained through 2-h observations of each home provider.

2.3.1. Global child care quality

Global quality was the total score for each provider from observations obtained from the Family Day Care Rating Scale (FDCRS; Harms & Clifford, 1989) and following scoring procedures recommended by the authors. Observations were conducted over a 2-h time period during the morning of a typical day and captured multiple aspects of the family child care home (subscales include space and furnishings for care and learning, basic care, language and reasoning, learning activities, social development, adult needs, and provisions for exceptional children). The average FDCRS score within this sample was 4.15 (S.D. = 1.35). Scores ranged from 1.46 to 6.84; possible values range from 1 to 7, with higher scores indicating higher child care quality.

The FDCRS was selected for the present study for several reasons: (1) past studies demonstrate theoretically-predicted and reliable relations between child outcomes and observed quality using the FDCRS (Kontos, 1994; Kontos et al., 1995); (2) the FDCRS offers good comparability with other family child care studies; and (3) the FDCRS provides a measure of quality in family child care that enables assessment across all types of family child care and that corresponds to measures used in center-based care (Early Childhood Environment Rating Scale-Revised and Infant Toddler Environment Rating Scale). Such parallel measures are useful to states because they allow assessment across all types of care (Raikes, 1999), an important advantage given the interest in tracking the public investment of subsidy funds.

2.3.2. Caregiver sensitivity

Caregiver sensitivity was the total score from the observed Caregiver Interaction Scale (CIS; Arnett, 1989), a scale indexing a provider's sensitivity, punitiveness and responsiveness. Providers were observed for sensitive caretaking at the same time that global observations of child care quality were conducted. The Caregiver Interaction Scale contains 26 items, each rated on a scale from 1 to 4. One scale measuring sensitivity was created by summing and averaging items (after reverse coding negative items), consistent with recent findings showing a single factor most parsimoniously represents CIS data (ACF, 2004; Burchinal & Cryer, 2003). The average CIS score in this sample was 3.34 (S.D. = 0.54). Scores ranged from 1.62 to 3.96; possible values range from 1 to 4, with higher scores indicating more sensitive caregiving. The Caregiver Interaction Scale has been used previously to supplement the FDCRS across multiple levels of regulation in family child care (Kontos et al., 1995), and it frequently supplements other measures of child care quality in studies of center-based child care (Howes, Phillips & Whitebook, 1992; Peisner-Feinberg & Burchinal, 1997), providing a measure of caregiver-child interaction that can be used reliably across type of care and levels of regulation.

Observations were completed by trained observers who gained reliability using the FDCRS and the CIS. Eight "gold standard" observers (two from each state) attained reliability of 85% within one item, and within-state observers then attained reliability of 85% agreement with the "gold standard" observers, following procedures recommended by the one of the test authors (Harms, personal communication, December 2000). Reliability was reassessed, in approximately 10% of the cases, between field and "gold standard" observers during the study period. Observers were blind to the providers' survey responses and to their levels of regulation and subsidy receipt. Observers completed both the FDCRS and the Caregiver Interaction Scale on the same visit. The scales were correlated with one another ($r(131) = .75$, $p < .001$). Because sensitivity and global quality reflect different components of child care quality, we created separate regression models examining the predictors of both the FDCRS and caregiver sensitivity. Moreover, caregiver sensitivity and global quality were not used in the same analyses, eliminating the possibility of findings influenced by co-linearity between the variables.

2.4. State data on regulation and subsidy receipt

As noted above, information on home providers in each state was obtained in order to randomly select the sample of home providers. State child care divisions provided additional data that were used to determine the level of regulation of each home provider, as well as the amount of subsidy dollars received by the provider and the number of subsidy-receiving children he or she cared for.

2.4.1. Level of regulation

The variability of regulatory requirements for home providers across the four states suggested that a simple regulated/unregulated designation would not capture the range of regulatory requirements for family homes present in each of the states. State child care administrators noted that number of monitoring visits and training requirements were salient features that differentiated regulatory levels from one another. Thus, in order to determine the level of regulation of types of home providers, as defined by individual states' licensing policies, information regarding the number of visits required each year and the amount and type of training required of home providers was obtained from states.[2] Categories of providers within each state (such as family homes or unlicensed providers) were given one point for each type of regulation required. More points indicated that home providers were more regulated by the state. One point was given for each of the following categories: number of annual visits by the state (whether providers were visited once a year or more than once a year by state licensing officials), and training requirements (whether child abuse and neglect training was mandatory, whether there were additional requirements for training beyond child abuse and neglect, and whether there were training requirements specifically related to child development). The result was a scale from 0 to 5, with 0 indicating that providers were not regulated in any capacity, and a 5 indicating that the provider was regulated in every capacity outlined above. One group of home providers in Missouri is required to obtain training in child development, while the other group is not, and it was not possible to identify which providers experienced the more rigorous training requirement, so both groups were coded as 4.5 in order to assign a regulation value. It is important to note that unlicensed providers do experience some regulation in some states while other states exert no regulatory influences on this group, thus supporting the use of a continuous scale rather than a binary grouping of licensed and unlicensed, in analyses. A description of the items used in the regulation variable appears in Table 3, and the percentage of providers by level of regulation for each state appears in Table 4. The mean value on regulatory level was 2.60 (S.D. = 1.41).

2.4.2. Subsidy density (proportion of children in each home receiving child care subsidies)

To determine what proportion of children cared for by a provider were subsidy-receiving, the number of children receiving subsidies, as reported by the state,[3] was divided by the total number of children the provider reported she cared for during peak times of the day (including both subsidy-receiving and non-subsidy receiving). In 22% of the cases, due to part-time child care enrollees, there were more children receiving subsidies than were cared for during peak times of the day; in these cases, the proportion of subsidy-receiving children was top-coded at 100%. The same calculation was performed for each class of provider, so that the means of determining the proportion of subsidy-receiving children was consistent across type of home providers. In this report, the term subsidy density is referred to when reporting the variable but the term subsidy receipt is occasionally used when discussing subsidies more broadly. The

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[2] There is considerable variation in licensing requirements across the four study states, contributing to the more differentiated categorization of regulatory activities used in this study. Three states (Kansas, Missouri and Nebraska) license family child care home providers but vary in the number of inspections required. Two states (Iowa and Kansas) register family home providers but do not require inspections. Training requirements for registration are different between Iowa and Kansas. All four states (Iowa, Kansas, Missouri and Nebraska) allow license exempt care in family child care homes but there are some differences in requirements. For example, "license exempt" in one state resembles "registered" in another state.

[3] State lists included the number of dollars each provider received for subsidy during the target month and the number of children the payments applied to.

Table 3
Regulatory requirements used in construction of regulation level variable

	Visit 1/year	Visit 2 or more/year	Training—abuse/ neglect or health	Training—additional	Training—child development
IA—non reg family CC (2)	0	0	1	1	0
IA—reg family CC (2)	0	0	1	1	0
KS—rel care (0)	0	0	0	0	0
KS—reg family CC (1)	0	0	1	0	0
KS—licensed family CC (4)	1	0	1	1	1
KS—licensed group family CC (4)	1	0	1	1	1
MO—rel care (0)	0	0	0	0	0
MO—licensed family CC (4)	1	1	1	1	0
MO—Group Homes (5)	1	1	1	1	1
NE—approved (0)	0	0	0	0	0
NE—family CC I (3)	1	0	1	1	0
NE—family CC II (3)	1	0	1	1	0

Table 4
Percent of providers in regulatory levels, by state

	0	1	2	3	4	4.5
Iowa			100% ($n = 26$)			
Kansas	11% ($n = 1$)		23% ($n = 7$)		66% ($n = 34$)	
Missouri		52% ($n = 3$)				48% ($n = 30$)
Nebraska	13% ($n = 8$)			87% ($n = 24$)		

mean value on subsidy density was 0.24 (S.D. = 0.34). States varied somewhat in the type of family child care used by children on subsidies.[4]

3. Results

Two sets of analyses were used to address study hypotheses. First, we tested the bivariate associations between regulation, subsidy density, provider characteristics, and child care quality. Second, we used a series of hierarchical regression analyses to determine whether regulation and subsidy density were

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[4] States varied somewhat in distribution by type of care and participation in the subsidy program by type of care. Breakdowns were as follows. In Iowa ($n = 6443$ family home providers) subsidy-receiving registered providers constituted 36% of all family home providers; nonsubsidy-receiving registered providers, 55%; subsidy-receiving license exempt home providers, 9%. In Kansas ($n = 10,594$) subsidy-receiving licensed providers were 13% of all family child care providers; nonsubsidy-receiving licensed providers were 27%; subsidy-receiving registered providers were 3%; nonsubsidy-receiving registered providers, 23%; subsidy-receiving license exempt providers, 34%. In Missouri ($n = 9614$) subsidy-receiving licensed providers constituted 10% of all family child care providers; nonsubsidy-receiving licensed providers, 16%; subsidy-receiving license exempt providers, 74%. In Nebraska ($n = 4468$) subsidy-receiving licensed providers were 20% of all family providers; nonsubsidy receiving licensed providers, 46%; subsidy receiving license exempt providers, 33%.

related to quality, and specifically, to assess whether regulation and subsidy density exerted influences on quality after entering provider education and training into regression models. Interaction effects were calculated to assess whether subsidy density and regulation moderated the association between provider education, training and quality. We began by entering distal, state policy-level variables into the models, and then we entered provider characteristics, which are more proximal to the quality of care experienced by the child.

3.1. Descriptive statistics and bivariate relations

The first step in the analyses was to describe our sample and to examine relations between variables of interest. Within our sample of observed providers, 49% cared for no children receiving subsidy payments, and 13% cared only for children receiving subsidy payments. Regulatory levels were relatively well-distributed, with nineteen providers receiving no or very little regulation from the state, while 30 were regulated at the highest possible level (see Table 4). Most home providers also received some training, with 70% reporting more than 12 h of training during the past calendar year. Only 11% of the providers had received a 4-year college or advanced degree, with the majority having graduated from high school and reporting some training or college classes beyond high school but no 4-year degree (59.4%); 24% of providers had only a high school diploma and 5% had not graduated from high school.

The bivariate relations between level of regulation, subsidy density, provider characteristics and global quality were assessed using correlations. Consistent with hypotheses, provider characteristics, regulation, and subsidy receipt were related. Regulation was positively associated with education ($r(123) = .22$, $p < .01$) and training hours ($r(120) = .18$, $p < .05$). Subsidy density was negatively related to education ($r(133) = -.35$, $p < .001$) and training hours ($r(128) = -.17$, $p < .05$).[5] There was also a significant relation between subsidy density and level of regulation ($r(123) = -.35$, $p < .01$), such that higher levels of regulation were associated with lower levels of subsidy density.

There were also significant associations between both policy-level and provider-level variables, and quality variables. Providers who were more regulated were observed as having higher global quality ($r(123) = .41$, $p < .001$) and as being more sensitive ($r(131) = .37$, $p < .01$), and providers who cared for a higher proportion of children receiving subsidies were observed as having lower global quality ($r(134) = -.40$, $p < .001$) and as being less sensitive ($r(131) = -.52$, $p < .01$). Providers with higher levels of education and more training hours and were also observed as providing higher global quality and were more sensitive. Results appear in Table 5.

Before conducting the regression analyses, we also computed means on each variable by state using analysis of variance, in order to determine if it was necessary to control for state effects when conducting the regression analyses. Results appear in Table 6. ANOVA results revealed statistically significant differences between states on education, training hours, and overall quality; providers in Iowa and Nebraska had significantly higher rates of education and providers in Missouri had more training hours. Homes observed in Nebraska and Missouri had higher overall quality than homes observed in Kansas and Iowa.

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[5] We also examined bivariate associations in the full survey sample of 1058 family providers. In the survey sample, more providers had lower levels of education, and the relationship between regulation and years of education was .11[**]; the relation between education and subsidy density was −.18[**]. The association between training hours and level of regulation was 0.29[**] and between training hours and subsidy density −.17[**]. The association between regulation and subsidy density was −.37[***].

Table 5
Bivariate relations between policy and provider variables, global child care quality, and caregiver sensitivity

	Subsidy density	Education	Training hours	Global quality	Sensitivity
Level of regulation	−.35[**]	.22[**]	.18[*]	.41[***]	.37[***]
Subsidy density		−.35[***]	−.17[*]	−.40[***]	−.52[***]
Education			−.01	.40[***]	.40[***]
Training hours				.33[***]	.19[*]

[*] $p < .05$.
[**] $p < .01$.
[***] $p < .001$.

These findings demonstrated the importance of including a state control variable in the regression models, and so dummy codes were created to control for state differences. Missouri was chosen as the referent state, because Missouri had one of the two highest observed quality means as well as a higher mean level of regulation across homes. State dummy codes were included in all steps of the model to provide some control for state differences in relations between variables.

To determine whether the influences of regulation and subsidy density on quality were moderated by provider characteristics, interaction terms were created for level of regulation and subsidy receipt by each of the provider characteristics. In keeping with procedures outlined by Holmbeck (1997), interaction terms were created by mean-centering variables and multiplying them together, and these new variables were then entered in the regression models.

3.2. Regression models

Two sets of regression models, one with global quality as the outcome and the other with caregiver sensitivity as the outcome, were created. Both models contained the same set of predictor variables in the first two steps of the models. Because the analyses reported below were conducted using weighted data, we used SUDAAN in order to obtain accurate estimates of the influence of each variable. SU-DAAN accounts for design complexities (e.g., stratification) and corrects for potential false positive effects that can be obtained using standard statistics software (e.g., SPSS or SAS without proper specifications) that underestimate the sampling variance. All regression analyses reported below contained state dummy variables, which controlled for state differences observed in bivariate analyses, as described above.

Table 6
Means on policy and provider variables, by state

	Iowa (a)	Kansas (b)	Missouri (c)	Nebraska (d)
Level of regulation	3.00	3.74	3.12	3.46
Subsidy proportion	0.12	0.23	0.30	0.22
Education	13.4[*] (b, c)	12.8	12.6	13.7[**] (b, c)
Training hours	20.2	31.8	58.0[*] (a, b)	42.1
Quality	3.51	3.96	4.46[**] (a, b)	4.46[**] (a, b)

[*] $p < .05$.
[**] $p < .01$.

Table 7
Summary of hierarchical regressions for global quality (FDCRS) ($n = 120$)

	Step 1 B	Step 1 SEB	Step 1 ß	Step 2 B	Step 2 SEB	Step 2 ß
Iowa compared to Missouri	−0.71	0.04	−0.06	−0.81	0.03	−0.07*
Kansas compared to Missouri	−0.66	0.08	−0.13+	−0.54	0.05	−0.11*
Nebraska compared to Missouri	−0.20	0.07	−0.03	−0.45	0.06	−0.07
Regulatory level	0.27	0.11	0.29**	0.21	0.08	0.23**
Subsidy density	−1.27	0.08	−0.27*	−0.69	0.07	−0.15*
Education				0.33	0.09	0.31**
Training hours				0.01	0.13	0.25*

Step 1: $R^2 = .29$, $F(6, 120) = 12.87$, $p < .001$. Step 2: $R^2 = .38$, $F(8, 120) = 14.74$, $p < .001$. *Note:* *** $p \leq .001$.
 + $p \leq .10$.
  * $p \leq .05$.
  ** $p \leq .01$.

3.3. Global quality

In the first step of the model, level of regulation, subsidy density and the state dummy codes were used to predict global quality. Results indicated that both regulation and subsidy receipt were associated with global quality, after controlling for state differences. More regulation was associated with higher quality, while higher subsidy density was associated with lower quality. The first step of the model accounted for 29% of the variance in global quality ($R^2 = .29$; $F(6, 120) = 12.87$; $p < .001$). In the next step of the model, provider education and training hours were entered into the model. Results indicated that the model accounted for more variance in global quality after including provider characteristics ($R^2 = .38$; $F(8, 120) = 14.74$; $p < .001$). Specifically, providers with more education and those who had received more training hours had higher quality. Both regulation and subsidy receipt remained significant predictors of quality after accounting for provider characteristics and significant differences between two states and the referent state were obtained, after accounting for both policy and provider differences. In the third step of the model, interaction terms were included in the model. None of the interactions were significant predictors of global quality, so they were removed from the final model. A complete description of the results obtained from each step of the model appears in Table 7.

3.4. Caregiver sensitivity

In the first step of the model, only subsidy density predicted caregiver sensitivity. Providers who cared for more children on subsidy were observed as being less sensitive, but regulation had no effect on caregiver sensitivity, nor were significant differences between states apparent. The first step of the model accounted for 34% of the variance in caregiver sensitivity ($R^2 = .34$; $F(6, 120) = 3.77$; $p < .01$). Including provider characteristics in the second step of the model increased the amount of variance in caregiver sensitivity accounted for ($R^2 = .39$; $F(8, 120) = 3.63$; $p < .01$). In the second step of the model, provider education was associated with sensitivity, in that providers with more education were also more sensitive caregivers, but there was no effect of training hours on sensitivity. Subsidy density remained a significant predictor of sensitivity after accounting for provider characteristics, but there was still no effect of level of regulation on caregiver sensitivity.

Table 8
Summary of hierarchical regressions for caregiver sensitivity ($n = 120$)

	Step 1 B	Step 1 SEB	Step 1 ß	Step 2 B	Step 2 SEB	Step 2 ß	Step 3 B	Step 3 SEB	Step 3 ß
Iowa compared to Missouri	−0.08	0.03	−0.01	−0.17	0.03	−0.03	−0.32	0.02	−0.05
Kansas compared to Missouri	−0.20	0.08	−0.09	−0.21	0.07	−0.09	−0.20	0.05	−0.08
Nebraska compared to Missouri	−0.04	0.04	−0.01	−0.13	0.04	−0.04	−0.16	0.04	−0.05
Regulatory level	0.08	0.12	0.18	0.07	0.11	0.15	0.02	0.09	0.02
Subsidy density	−0.72	0.10	−0.32**	−0.60	0.10	−0.27**	−0.34	0.07	−0.15*
Education				0.09	0.06	0.18**	0.10	0.06	0.18**
Training hours							0.01	0.11	−0.01
Education × subsidy							0.10	0.10	0.18+
Education × regulatory level							−0.15	0.10	−0.30**

Step 1: $R^2 = .34$, $F(6, 120) = 3.77$, $p < .01$. Step 2: $R^2 = .39$, $F(8, 120) = 3.63$, $p < .001$. Step 3: $R^2 = .48$, $F(11, 120) = 5.00$, $p < .001$. ***$p \leq .001$.
+ $p < .10$.
* $p \leq .05$.
** $p \leq .01$.
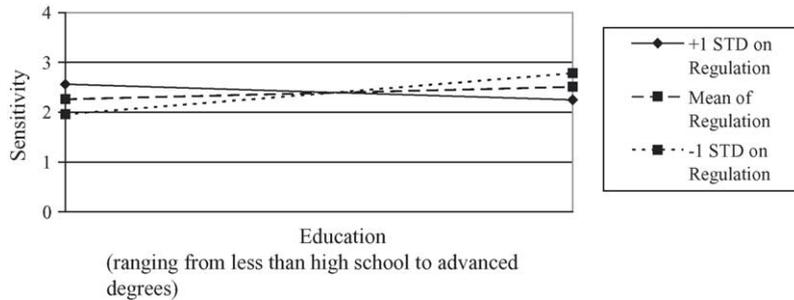
Fig. 1. Relationship between education and caregiver sensitivity, by level of regulation.

To test for interactions between provider characteristics, regulation and subsidy density, the same model was regressed again upon caregiver sensitivity, this time including interaction terms. The interaction term between level of regulation and education was statistically significant, and the model again accounted for additional variance when including the interaction terms ($R^2 = .48$; $F(10, 120) = 5.00$; $p < .001$). Post hoc analyses of the interaction indicated that education was more strongly related to caregiver sensitivity for providers who were less regulated. A plot of the interaction appears in Fig. 1. In addition, the interaction between subsidy density and education was marginally significant ($p = .06$); education showed a more positive association with quality for providers high in subsidy density. State differences in caregiver sensitivity were apparent after including the interaction terms in the model; caregivers in Iowa were significantly less sensitive than providers in Missouri. A complete description of the results obtained from each step of the model appears in Table 8.

4. Discussion

The primary purpose of this study was to determine the role that distal, state policy-level factors play in affecting quality in family child care, and to determine if these factors relate to and interact with the proximal, provider characteristics more frequently studied as predictors of quality. Consistent with our hypotheses, regulation and subsidy density were predictors of global quality; providers' education and training predicted global quality as well. Caregiver sensitivity was predicted by subsidy density and education, but not by regulation or training. Results also indicated that policy factors may alter associations between provider characteristics and quality. For providers who were less regulated, education was more strongly associated with sensitivity, and for providers high in subsidy density, education was more strongly related to sensitivity (a statistical trend in the latter case). However, no interactions between policy-level factors and provider characteristics were observed in relation to global quality. Together, education, training hours, regulation and subsidy density accounted for 38% and 48% of the variance for global quality and provider sensitivity, respectively, although some of the variance explained was also due to statistically significant mean differences in quality between states.

Our first hypothesis, that provider characteristics would be associated with regulation and subsidy receipt, was confirmed. More regulated providers, and those caring for fewer children receiving subsidies, had more education and received more training. Regulation and subsidy density were also negatively associated with each other. These findings suggest that family home child care providers caring for high concentrations of children receiving subsidies have less education, less training and are less likely

to be regulated than family providers caring for non-subsidy-receiving children. The mechanisms that link provider characteristics, subsidy density, and regulation have yet to be identified, but could include providers' ecological niches as well as their comfort with state regulatory systems. For instance, providers who care for high concentrations of children receiving subsidies could have less education because they are located in neighborhoods where low-income children live, and where education levels are lower on average. Providers with more education could view the child care regulation system as less daunting or restrictive than those with less education. Independent of the causes, the current regulatory and child care subsidy environments in the four states studied may be contributing to a two-tier family child care system, with one tier less educated, receiving less training and regulation, and serving greater concentrations of low-income subsidy-eligible children, while the other tier is more educated, receives more training and regulation, and serves lower concentrations of low-income children.

Our next hypotheses, that regulation and subsidy density would be related to global quality and caregiver sensitivity, were confirmed in three out of four cases. Regulation was a significant predictor of global quality. Regulation—and things that go with it such as specialized training requirements and visits by state licensing personnel—may help providers achieve higher global quality. While regulation of home providers would require additional state/federal resources, the findings of this study could be interpreted to suggest that increasing regulation—such as requiring home providers to meet higher standards or increasing the number of visits by state licensing personnel—may enhance the global quality of care they provide, and ultimately, affect child outcomes. Conversely, global quality may be higher among more regulated providers due to provider characteristics or beliefs that were not measured in the present study, but affect their decisions about whether to become regulated. A contribution of the present study is that it presents a method for quantifying the effects of regulation along a continuum of regulatory functions, which can be used in future studies to more thoroughly assess associations between regulation and provider characteristics.

The hypothesized relation between regulation and caregiver sensitivity, however, was not supported in multivariate analyses, despite discovering a positive bivariate association. Thus, the overall positive effects of regulation may extend only to global quality, and not to caregiver sensitivity, which could be more reflective of a provider's personal beliefs about young children's needs and their approach to interactions with children. Despite the failure to find a direct effect of regulation on sensitivity, however, results indicate that regulation is not inconsequential for caregiver sensitivity. Instead, regulation moderates the association between education and sensitivity. For less-regulated providers, education was more strongly related to sensitivity; providers' education may help provide a context for providing sensitive care when regulation is absent. In the present study, we are not able to provide a causal explanation of why education and caregiver sensitivity are more positively related when providers experience less regulation, but future work should attempt to identify the mechanisms by which regulation and provider characteristics interact to affect quality.

Subsidy density, a new policy variable introduced in this study, was negatively associated with both global quality and caregiver sensitivity. The study may be the first to demonstrate that family providers who care for high concentrations of children receiving child care subsidies are less likely to offer high global quality or sensitive care than providers caring for lower concentrations of subsidy-receiving children. Moreover, we identified a marginally significant statistical interaction, indicating that education and sensitivity show a more positive association among providers caring for many children whose tuition is paid by government subsidies. Similar to the interaction noted between regulation and education, this interaction suggests that there are aspects of high subsidy density that make education particularly critical for delivering high quality care.

In all four states in the study, subsidy-receiving children were in families with incomes below 200% of poverty and, in most cases, were children whose mothers qualified for cash assistance. Because states in our study had different subsidy-related policies, it was difficult to predict how subsidy density would relate to quality when other variables were controlled. One state paid a higher rate for providers who cared for more than 50% of children in families eligible for subsidies; another was known to reimburse providers several months after services were incurred; two paid differential rates based on regulation and two did not. Regardless of differential policies, all states devoted substantial funding to subsidized tuitions for children attending care in child care homes and, although some states' policies encouraged concentration more than others, in all states there were high concentrations of subsidy-receiving children in some family child care homes. The study suggests children in such homes are at risk for receiving lower quality and less sensitive care.

In addition to proposing that regulation and subsidy density would have direct effects on quality after accounting for provider characteristics, we hypothesized that provider characteristics, education and training, would affect both global quality and sensitivity after controlling for policy-level variables. Consistent with existing research on child care quality in homes (e.g., Kontos et al., 1995), providers' education was a significant predictor of both global quality and caregiver sensitivity. Most studies find that education is one of the largest contributors to child care quality and that was true in this study as well. However, this study further contributes to the literature by showing that education not only has an independent effect on quality, but also may also show stronger relations to quality depending on the policy context, as demonstrated by the interactions involving education, regulation and subsidy density. Although we are not able to draw causal links between variables, the findings suggest that promoting higher education levels among family child care providers could lead to improved quality in child care homes. The relatively low level of education among providers across all states, about 13 years, underscores the need to raise education levels among home providers.

In addition to education, the total number of training hours providers received in the past year is also an important indicator of global child care quality in homes, but not caregiver sensitivity. Our failure to find significant effects for training on caregiver sensitivity may be due to our measurement of training. Previous work has suggested that targeted training is more strongly related to child care quality than the total hours of training (Blau, 2001), and the present data reflect total number of training hours only. It is possible that certain types of training not measured in the present study promote caregiver sensitivity, and it may be more beneficial to address questions regarding the type of training received, rather than simply the number of training hours, when looking at predictors of caregiver sensitivity. Conversely, it may simply be that training is more related to global quality than to sensitivity, because sensitivity reflects provider characteristics that are less amenable to instruction.

Finally, significant mean differences between states were found in this study, even after regulation, subsidy density, training and education were controlled, and consistent with findings reported in other studies (Burchinal et al., 2002; Clarke-Stewart et al., 2002; Phillips et al., 2000). While states vary in their regulatory and subsidy-related policies, they also vary in the ways they carry out quality enhancement activities as supported by Child Care and Development Fund earmarks for quality. This variation has been largely unexplored in linkages to quality (Government Accounting Office, 2002). While the current study operationalized two new policy-related variables, continuous variables measuring regulation and subsidy density, there clearly are others that need to be identified and quantified. Our research suggests that there may be differences in quality across states above and beyond those accounted for by regulation and by subsidy density. States implement many policies affecting child care, including policies designed to

enhance quality. As our results suggest, some states' strategies are most likely more effective than others. Little research has addressed such variations in state-based child care quality improvement. In addition, states make different investments in quality improvement efforts and early childhood in general, and demographics may also create greater challenges to quality improvement in some states over others. For all these reasons, studies with larger samples may be needed to better characterize the unique contribution that state differences make in family child care quality variation.

In sum, consistent with previous research, our results delineated the importance of policy-level variables in child care quality, as well as confirming the importance of provider characteristics, but the interactions between them also demonstrated the value of viewing the impacts of provider characteristics on quality within the larger context of state regulatory and subsidy policies. Provider characteristics (such as education) may have their strongest effects on some aspects of child care quality in homes (in this study, provider sensitivity) when taken in the context of policy influences such as regulation and subsidy receipt. Future research should further investigate the role that policy-level variables play, the possibility that regulation and subsidy receipt may moderate other previously-reported associations between provider characteristics and quality. These recommendations are consistent with a new generation of child care studies that are beginning to explore the interactions among variables to create a more nuanced story of factors influencing quality (Phillips et al., 2000).

4.1. Implications for practice

Practical implications of this work include the finding that states may be able to improve quality in family child care by regulating more stringently and by monitoring concentration of children receiving subsidies. In addition, states may be able to improve quality by providing incentives for increased education, and this may be especially so for providers who experience very little governmental regulation or care for high concentrations of children receiving subsidies. Government policies could provide incentives for enhancing the education level of unregulated or high subsidy-density providers serving children in low-income neighborhoods through newer programs such as T.E.A.C.H. that provide support for increasing providers' education levels. More broadly, the work suggests low-income children in family child care are at risk for poor quality care when there are high concentrations of children receiving subsidies within family homes. Children in unregulated facilities, and those in the care of unregulated providers with lower levels of education, are also at risk for lower quality. Because our findings showed that subsidy density, lack of regulation, and low education often co-existed, a closer look should be given to policies that affect settings the government purchases for subsidy-eligible, low-income children, to prevent the harm to children's development that has been associated with low-quality care (Kontos et al., 1995). Future research should explore additional features of state child care policies that affect child care quality; a more expansive look at state context may reveal additional important ways that states can improve child care practices among home providers. Results reported here also suggest that policies should be formulated to specifically address quality in family child care homes.

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