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Childcare Type and Quality among Subsidy Recipients with and without Special Needs

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Abstract

Low-income children, particularly those with special needs, may have limited access to high quality early care experiences. Child care subsidies are intended to increase families' access to quality care, but little is known about subsidy use by children with special needs. Using a nationally representative sample of 4,000 young children who participated in the Early Childhood Longitudinal Study – Birth Cohort, we examined the types and quality of childcare received by children with and without special needs who came from subsidy eligible families. We also investigated the extent to which subsidy use and child and family sociodemographic characteristics predicted care type and quality among young children with special needs who used childcare subsidies at nine months, two years, and four years. Findings indicated that subsidies increased the use of non-parental care, mainly center-based care, as well as home-based care to a lesser extent among children with special needs relative to peers without special needs and relative to peers with special needs who did not use subsidies. However, use of subsidy did not consistently result in families with children with special needs accessing higher quality care. Sociodemographic characteristics of children, families and their context were differentially predictive of type and quality care. We discuss implications for practice and policy to foster quality early care and education of young children with special needs who are receiving subsidies.

Keywords

childcare; special needs; developmental delay; subsidy; low-income families; economic assistance

Quality care is important for all children (Burchinal, Peisner-Feinberg, Bryant, & Clifford, 2000), but particularly for children with risks associated with poverty and early special needs (Fuller, Kagan, Loeb, & Chang, 2004; McCartney, Dearing, Taylor, & Bub, 2007). High quality childcare promotes children's cognitive, linguistic, and social outcomes (Burchinal et al., 2000), and can reduce risk of later special education needs (Barnett, Jung,

Youn, & Frede, 2013; Reynolds, Temple, White, Oh, & Robertson, 2011). Many low-income families whose children have developmental delays or disabilities and consequent complex needs for care have limited access to quality childcare (e.g., Booth-LaForce & Kelly, 2004; Grisham-Brown, Cox, Gravil, & Missall, 2010). Childcare subsidies provided under the federal Child Care Development Fund (CCDF) are intended to facilitate parents' employment by enhancing low-income families' access to high quality care through provision of grants and vouchers, and include specific provisions to benefit children with special needs. Studies suggest subsidies facilitate receipt of quality care among low-income families (e.g., Ryan, Johnston, Rigby & Brooks-Gunn, 2011), yet there has been little attention to the experiences of families of children with special needs despite evidence to suggest they face unique barriers to care (Chaudry et al., 2011; Grisham-Brown et al., 2010). In order to address this gap in research, the present study investigated the types and quality of childcare accessed by subsidy-recipient families of children with special needs relative to children who were typically developing, as well as predictors of the types and quality of care received by children with special needs.

Childcare Choices

Families' selection of childcare providers is related to a variety of logistic constraints (e.g., cost, hours of operation, location), sociodemographic characteristics, personal beliefs, and preferences (Huston, Chang, & Gennetian, 2002; Peyton, Jacobs, O'Brien, & Roy, 2001; Tang, Coley, & Votubra-Drzal, 2012). Conceptual models of care emphasize the relations of families' care choices to child characteristics, maternal sociodemographic characteristics, and families' contexts, such as work schedules, income, and informal care arrangements (Tang et al., 2012). For many families, home-based care is more affordable and flexible than center-based options, thus being more accessible for low-income families (Tang et al., 2012).

Enhancing parent choice and access to high-quality childcare is at the center of federal subsidy policy (Office of Child Care [OCC], 2017). Subsidies have been found to be associated with earlier use of center-based care and later use of publicly-funded preschool programs (Johnson, Martin, & Ryan, 2014). In addition, subsidy use seems to be related to a variety of child and family characteristics including mother's English-proficiency, mother's education, parental marital/partnership status, child support arrangements, parental employment status, income-to-needs ratio, number of siblings in the home, food security, urbanicity, child age, and childcare cost and proximity (Herbst, 2008; Johnson, Martin, & Brooks-Gunn, 2011; Shlay, Weinraub, Harmon, & Tran, 2004).

Families of children with special needs report greater challenges and stressors related to securing acceptable care (Knoche, Peterson, Edwards, & Jeon, 2006; National Association of Child Care Resource and Referral Agencies, 2008). These challenges may help explain why they appear to access childcare later, for fewer hours per week, change providers more often, and rely on relative care to a greater extent than home-based or center-based care when compared to families of children without special needs (Booth-LaForce & Kelly, 2004; Knoche et al., 2006). Families of children with special needs often also perceive home-based care as better meeting the child and family needs (Booth-LaForce & Kelly, 2004). A notable percentage of these parents (almost 30%) perceive their childcare choices as constrained

(Glenn-Applegate, Pentimonti, & Justice, 2011). This may be because parents encounter providers who lack the willingness or competence to provide appropriate services or physical environment (Forry, Daneri, & Howarth, 2013; Grisham-Brown et al., 2010). Whether the use of subsidies can positively impact the care choices of families of children with special needs has not been explored. Thus, the present study considered whether use of subsidies by families of children with special needs resulted in different care choices regarding use of parental, home-based, and center-based care relative to subsidy-eligible families of children with special needs who did not use subsidies, as well as compared to families of children without special needs, adjusting for other child and family characteristics related to subsidy use (e.g., Herbst, 2008; Johnson et al., 2011; Shlay et al., 2004).

Childcare Quality and Dosage

Because childcare options among low-income families are often skewed towards low quality, subsidies endeavor to bolster the quality of care received by children from low-income households (OCC, 2017). Childcare quality is commonly conceptualized by its structural and process dimensions (Cassidy, Hestenes, Hansen, Hedge, Shim & Hestenes, 2005; Smolensky & Gootman, 2003). Structural quality is often readily measured and regulated as it refers to characteristics such as child-to-adult ratio, group size, setting features and resources, and caregiver training. Families of children with complex special needs may be particularly concerned with structural aspects related to caregivers' knowledge of special needs and equipment required by their children (Glenn-Applegate et al., 2011). Process quality refers to the interactions among children and caregivers as well as opportunities afforded for social and cognitive stimulation. Process features may be the mechanism by which structural features are experienced, as they are more proximal to the child and directly influence child outcomes. Adult-child interactions in particular are key to facilitating children's development (Hamre & Pianta, 2011). Dosage, or time spent in care, is often considered alongside quality, or as an indicator of exposure to structural quality (Pianta, Downer, & Hamre, 2016), because it is associated with enhanced benefits from quality care, though evidence for quality by dosage interactions is limited (Zaslow et al., 2016).

Both structural and process quality tend to vary by the age of children served and type of care setting. Infant and toddler care are often rated as low to moderate quality, contrasted with care of preschoolers which is moderate on average (e.g., Kreader, Ferguson, & Lawrence, 2005; Kryzer, Kovan, Phillips, Domagall & Gunnar, 2007; Phillips & Lowenstein, 2011). Moreover, quality of care received tends to be lower for children from low-income households (Ruzek, Burchinal, Farkas, & Duncan, 2014). Center-based care and home-based care also differ in overall quality and structural and process characteristics (e.g., Fuller et al., 2004; Layzer, Goodson, & Brown-Lyons, 2007; Li-Grining & Coley, 2006). Center-based programs are more likely to have higher child-to-adult ratios and larger groups, but also tend to have more highly educated staff and use formal curricula (Dowsett, Huston, Imes, & Gennetian, 2008). Home-based care is often of lower global quality than center-based care but may be rated higher on subcomponents of quality (e.g., Fuller et al., 2004). Overall, research suggests that high-quality care is rare in both centers and home-based settings.

Among subsidy-eligible families, subsidy use is associated with higher-quality care because it tends to facilitate selection of center-based care; however, those who select home-based care also benefit from access to greater quality (Ryan et al., 2011). Use of childcare subsidies is associated with greater use of licensed or other regulated care, particularly center-based providers (De Marco, Vernon-Feagans, & Family Life Project Key Investigators, 2015; Forry et al., 2013). Paradoxically, providers who primarily serve families who use subsidies tend to provide lower quality care (Antle, Frey, Barbee, Frey, Grishman-Brown, & Cox, 2008; Jones-Branch, Torquati, Raikes, & Edwards, 2004; Raikes, Raikes, & Wilcox, 2005). Other research suggests there is no difference in the quality of care between subsidized and unsubsidized settings (Weinraub, Shlay, Harmon, & Tran, 2005). Taken together, subsidies appear to increase access to quality care unless the chosen providers serve a high density of subsidy recipients. Subsidies' effects for children with special needs from subsidy-eligible families is unknown. Low-income children with disabilities tend to receive poor quality care (Wall, Kisker, Peterson, Carta, & Jeon, 2006), but if subsidies operate as intended, children with disabilities who receive subsidized care should benefit from higher quality care than they would without subsidy.

Present Study

Research indicates that subsidy use affects families' childcare choices and may improve access to high quality care; however, there is a dearth of research exploring subsidy use among families of children with special needs. The purpose of the present study was to identify differences among subsidy-eligible families in the type (parental-care only, home-based care, and center-based care) and quality of care accessed by children with and without special needs who used subsidies, and between children with special needs who did and did not use subsidies. Accordingly, we addressed the following research questions:

1. Among children from subsidy-eligible families, are there differences in use of home- and center-based care by children with and without special needs who used subsidies throughout early childhood?
2. Among children with special needs from subsidy-eligible families, are there differences in the (a) types and (b) quality of care received as measured by adequacy of global quality, child-to-caregiver ratio, and caregiver interactions, as well as by dosage, among those who did and did not use subsidies throughout early childhood?
3. How are subsidy use, child characteristics, and family characteristics related to the (a) types and (b) quality of care received, as measured by adequacy of care and caregiver interaction, among children with special needs from subsidy-eligible families?

We included in our analyses child demographics, mothers' sociodemographic characteristics, family configuration, and geographic factors shown to be related to subsidy use among low-income families (Herbst, 2008; Johnson et al., 2011; Shlay et al., 2004). Collectively, this study extends our understanding of the childcare experiences of young children with special needs who come from low-income families.

Method

Data Source

This study utilized data from the Early Childhood Longitudinal Study–Birth Cohort (ECLS-B), which featured a multi-method, multi-informant approach to collect data from a nationally representative sample of approximately 10,700 children born in the United States in 2001 (Najarian, Snow, Lennon, Kinsey, & Mulligan, 2010). Use of the ECLS-B for the current investigation was approved by the researchers' university's institutional review board and adheres to the requirements stipulated for the licensed users by the ECLS-B's sponsor, the Institute of Education Sciences. (Note: Per IES requirements, all reported frequency counts are rounded to the nearest 50.)

Design—The ECLS-B is an appropriate dataset for the current study because the aim of ECLS-B was to examine children's early home, care, and educational experiences and how these related to developmental outcomes (Najarian et al., 2010) in order to inform public policy and practice (Nord, Edwards, Andreasen, Green, & Wallner-Alle, 2006). Data were collected using multiple methods and sources within an ecological framework at birth and when participants were infants, toddlers, preschoolers, and kindergartners. When possible, both parents provided input regarding their child's development (Nord et al., 2006).

Sampling—To approximate the United States population of children born in 2001, a stratified complex sampling design was used to account for census region, urbanicity, income, minority status, and region size (Nord et al., 2006). Participants were identified from birth records cataloged at the National Center for Health Statistics, producing a nationally-representative sample of approximately 14,000 children born in the United States in the first year of the study. ECLS-B researchers excluded children who passed away or were adopted prior to 9-months of age or those who were born to mothers under the age of 15 years. To ensure enough participants to allow subgroup analyses, the ECLS-B researchers over-sampled infants with low-birth weights, twins, and children of American Indian and Asian descent. Children with special needs could not be over-sampled using birth records; however, Nord and colleagues (2006) stated that analyses for this subgroup yield reliable and valid results. A total of 10,700 children participated in the ECLS-B. Utilization of the ECLS-B sampling weights in analyses produces population estimates that are representative of children born in the United States in 2001 who attended kindergarten in either 2006 or 2007 (Nord et al., 2006).

Procedures—ECLS-B data were collected across five waves beginning in 2001 and ending in 2008 (Najarian et al., 2010). In addition to collecting data via birth certificate records, trained field investigators collected additional data when participants were infants (9 months), toddlers (2 years), preschoolers (4 years), and when participants entered kindergarten. Prior to collecting data, field investigators participated in several days of rigorous training (Najarian et al., 2010). Consistent with state laws, active and passive consent were obtained prior to accessing birth certificate records; moreover, parents/guardians provided informed consent before other data were collected (Nord et al., 2006). The data collection methods included birth record review; interviews with the child's parents

and care providers; observations in the home and a sub-sample of care settings; self-administered questionnaires for adult participants; and direct assessment of children's cognitive, motor, communication, and social-emotional child skills (Nord et al., 2006).

Measures

The variables used in this study were taken from several of the data sources in the ECLS-B dataset: birth certificate records, parent interview, direct child assessment, childcare provider interviews, and direct childcare observation data. Birth certificate data were utilized to obtain information about the children such as sex and conditions used to determine special needs (e.g., birth defects, Down's syndrome, spina bifida). Parent interview data from each wave of data collection included child, family, home, subsidy, and childcare characteristics as reported by the child's primary caregiver (typically the child's mother) during a 60-minute face-to-face interview using the computer-assisted CAPI instrument (National Center for Education Statistics, no date). Direct child assessments were also used in part to identify special needs. Finally, variables related to childcare type were taken from the parent interview, and variables related to quality originated from the childcare provider interviews and direct childcare setting observations.

Childcare type—During each wave of data collection, the child's parent reported the child's primary form of childcare in which the child spent the most hours of care. These data were used to operationalize childcare type as parental-care, home-based childcare, or center-based childcare.

Childcare quality and dosage—Childcare quality was measured via four variables representing both structural-level and process-level indicators for a subsample of approximately 100 children who received non-parental care at two-years and four-years of age, along with a measure of dosage. No quality data were collected at 9-months.

Child-to-caregiver ratio: Child-to-caregiver ratios were established using repeated counts of children and caregivers recorded by trained field investigators during direct observations of non-parental care arrangements for a subset of children in the ECLS-B (Najarian et al., 2010; Nord et al., 2006). This measure of structural quality was coded as a dichotomous variable (i.e., better than/recommended ratio and ratio exceeds recommendation) based on recommended child-to-caregiver ratios reported by the National Association for the Education of Young Children (2013) and in previous empirical literature (e.g., Burchinal et al., 2000). Of the total sample, 10% and 8% were in settings that exceeded the recommended ratio at ages two and four, respectively.

Quality of interactions: Field investigators conducted direct observations of a subset of children in the ECLS-B at 2-years and 4-years. The Caregiver Interaction Scale (CIS; Arnett, 1989) was used to measure the quality of the interactions and relationship between the child and care provider during these observations. The CIS includes 26 items that are rated on a 4-point scale, producing a composite score ranging from 0 to 104. Higher scores indicate more favorable social interactions and relationships (Arnett, 1989). CIS composite scores were

included as a continuous variable. Mean composite scores on the CIS were 58.41 at 2-years and 62.75 at 4-years for the present sample.

Quality of environment: To measure structural and process quality of center-based care providers, the Infant/Toddler Environment Rating Scale (ITERS; Harms, Clifford, & Cryer, 1998) was administered during the 2-year wave and the Early Childhood Environment Rating Scale-Revised Edition (ECERS-R; Harms et al., 1998) was administered during the 4-year wave. The Family Day Care Rating Scale (FDCRS; Harms & Clifford, 1989) was administered during the 2-year wave and 4-year wave for home-based care providers. The reliability and validity of scores produced using these standardized direct observation measures have been studied extensively (see Clifford, Reszka, & Rossbach, 2010), producing strong psychometric properties (e.g., internal reliability: Cronbach's $\alpha = 0.95$ for the ECERS, Najarian et al., 2010; $\alpha = 0.88$ for the FDCRS, and $\alpha = 0.86$ for the ITERS; Nord et al., 2006). Further, the field investigators who conducted the observations were highly trained, completing several test observations and achieving inter-rater reliability exceeding 85% agreement (Mulligan & Flanagan, 2006). Across all three standardized rating scales, a global quality rating score was produced using the same metric, which allowed for comparison of childcare quality across settings. Similar to past researchers (e.g., Burchinal et al., 2000; Johnson, Ryan, & Brooks-Gunn, 2012), childcare global quality ratings across settings were collapsed into a single quality variable. Due to the limited sample size and distribution of ratings, this variable was operationalized as either inadequate (scores less than 3) or adequate (scores of 3 to 7) quality care. Of the total sample, 45% and 16% experienced inadequate care at ages two and four, respectively.

Dosage: Dosage was operationalized as the average number of hours of care received per week for children in non-parental care was reported during the parent interview, ranging from 1 to 140 hours, and was coded into quartiles (≤ 16 hours/week, 17-32 hours/week, 33-40 hours/week, and >40 hours/week). At age two, 16% of the sample used care for ≤ 16 hours/week, 26.9% used 17-32 hours/week, 36.3% used 33-40 hours/week, and 21.8% used more than 40 hours/week. At age four, 28.9% of the sample used care for ≤ 16 hours/week, 27.5% used 17-32 hours/week, 21% used 33-40 hours/week, and 22.6% used more than 40 hours/week.

Special needs—For the current study, special needs was operationalized as a dichotomous variable (special needs or no special needs). At the 9-month, 2-year, and 4-year waves of data collection, children were identified as having a special need if the child (a) had an Individual Family Service Plan (IFSP) or an Individual Education Program (IEP) per parent report, (b) had a medically diagnosed disability per birth certificate records or parent report; and/or (c) performed on direct assessments of social-emotional, motor, or cognitive skills at least 1.5 standard deviations below the mean of the T-scores.

Direct child assessments included the Bayley Short Form – Research Edition (BSF-R), an abridged version of the Bayley Scales of Infant Development – 2nd Edition for cognitive and motor skills, and a researcher-derived scale for social-emotional development. The BSF-R measured fine and gross motor skills as well as object permanence, exploration, receptive and expressive language, and problem solving (Barry, Bridges, & Zaslow, 2004). Field

administrators also rated the children's social-emotional functioning on dimensions of positive affect, negative affect, interest in materials, attention to tasks, and social engagement, using a scale of 1 (low frequency) to 5 (high frequency) throughout the BSF-R. These ratings were used to derive a composite of social-emotional functioning via exploratory factor analysis which suggested the ratings loaded sufficiently onto a unidimensional latent construct (.46 - .85) and had adequate reliability ($\alpha = .77$).

Subsidy eligibility—Children were determined to be eligible for childcare subsidies and were included in our analytic sample if: (a) they were currently receiving or had used welfare benefits in the past year per parent report, or (b) their family income was 130% of the federal poverty level per parent report. Children were identified as subsidy-eligible at each wave of data collection (i.e., 9-months, 2-years, and 4-years) because it is well documented that eligibility is unstable overtime (for discussion, see Forry et al., 2013; Herbst & Tekin, 2014).

Subsidy use—Children were determined to have used childcare subsidies if their parent reported that social services paid for childcare. This was coded separately for each wave. Parental report of subsidy use have been shown to be reasonably accurate (Johnson & Herbst, 2013).

Ecological covariates—Past research suggested subsidy use and subsequent quality of care are associated with sociodemographic characteristics (e.g., income, maternal education, maternal age, maternal work status, race, and number of siblings in the home; Herbst & Tekin, 2014; Huston et al., 2002; Johnson et al., 2012; Peyton et al., 2001; Tang et al., 2012); therefore, these potential predictors of childcare type and quality for low-income children were included in our analysis. Covariates included: child sex (boy or girl), race/ethnicity (White, Black, other), mother's age, mother's education level (high school or below, some college or degree), mother's employment status (working full time, working part time, not currently working), parental marital status (married or not currently married), home language (English or other), use of other public assistance (health care subsidies or food subsidies), number of siblings living in the home (none, one or more), urbanicity (urban/suburban or rural), and census region (Northeast, Midwest, South, West).

Analytic Sample

Our base analytic sample included ECLS-B participants with and without special needs who were eligible to use childcare subsidies during early childhood. Our weighted analytic samples were 1,498,800 at 9-months, 1,387,700 at 2-years, and 1,404,300 at 4-years (3,100-4,100 unweighted cases across waves). Descriptive characteristics for the base analytic sample are shown in Table 1.

Analyses

Analyses were conducted in the complex sampling module of SPSS version 22 which applies Taylor Series adjustments to estimate standard errors. Due to the ECLS-B stratified random sampling, this approach was necessary as was the weighting of data with the sampling weights recommended in the ECLS-B training manual (Institute of Education

Sciences, 2010). Failure to account for the complex sampling would produce biased estimates. The weights corrected for design effects, attrition, and non-response. Data were also analyzed for missingness and was determined that use of the ECLS-B sampling weights sufficiently accounted for missing data without further manipulation to produce results that were nationally-representative of children born in 2001 in the United States.

To address the research questions, two sets of analyses were completed with subsamples of the analytic sample described above. This first set of analyses included descriptive statistics of the type of childcare (i.e., parental-care, home-based care, or center-based care) used by subsidy recipients with and without special needs during early childhood in order to answer the first research question. To assess whether or not there were significant differences in the type and quality of childcare used by these groups of subsidy recipients, z-tests of population proportions were produced. Only children who used childcare subsidies at 9-months, 2-years, and 4-years were included in this first set of analyses (n 300-450 in each wave).

The second set of analyses included only cases where children were subsidy-eligible and had special needs ranging from 450 cases at nine-months and 1,250 cases by age four years. For the second research question, z-tests were used to compare rates of the type and quality measures among children who did and did not use subsidies for child care. For the third research question, to examine predictors of the type of childcare used by subsidy-eligible children with special needs, multivariate logistic regression analyses were fitted and adjusted odds ratios were produced. The ECLS-B collected quality data for only a random subset of cases (n = 100 at two-years, 400 at four-years). Multivariate logistic regression was used to investigate predictors of adequacy of global quality while general linear models were fitted to examine the ecological predictors of the quality of child-caregiver interactions. Given lack of model convergence for the other quality measures, they are not reported.

Results

Results are organized by research question (RQ). Findings comparing care type of subsidy recipients with and without special needs among subsidy-eligible families are described first and presented Figure 1. This is followed by the results comparing care type and quality, as measured by adequacy of global ratings, interaction quality, child-to-caregiver ratios, and dosage, among children with special needs who used subsidized and unsubsidized care. This section concludes with description of results for the regression models for care type (Table 2), adequacy of global quality ratings (Table 3), and interaction quality (Table 4) accessed by subsidy-eligible children with special needs. Statistics are reported in text if not presented in tables.

RQ 1: Care Type among Subsidy Recipients with and without Special Needs

Figure 1 presents rates of home- and center-based care among subsidy recipients with and without special needs among subsidy-eligible families. There were significant differences in rates of home- and center-based care by children with special needs relative to children with no special needs at each time point. At age 9-months, children with special needs had higher rates of center-based care than children with no special needs ($z = 21.65$, $p < 0.05$), but at

ages two-years and four-years, rates of center-based care usage were lower among children with special needs compared to children with no special needs ($z = -38.79$ and -17.15 , respectively, $p < 0.05$).

RQ 2: Subsidized and Unsubsidized Care Type and Quality among Children with Special Needs

2a. Differences in care type and hours of care accessed—Without childcare subsidies, most subsidy-eligible families of children with special needs relied primarily on parental-care at ages 9-months (67.6%) and 2-years (63.2%), though less so by age four years (48.4%). In comparison, children with subsidies spent the majority of their time in either home or center based care. The majority of children with special needs who used subsidy were center-based care, with an increasing share in this setting as students aged.

2b. Differences in quality and dosage of care accessed—Quality was assessed for a subsample of children at ages two and four years using a measure of global quality, child-to-caregiver ratio, and a measure of the quality of caregiver-child interactions. In terms of global quality, at age two, subsidy use was associated with greater global quality than unsubsidized care among children with special needs with 72.4% of children in subsidized care rated as adequate compared to only 46.5% of children in unsubsidized care ($z = 47.16$, $p < 0.05$). At age four years, the opposite was found, with 70.3% of children in subsidized care receiving adequate ratings compared to 79.5% of children in unsubsidized care ($z = -23.04$, $p < 0.05$). Children in subsidized care were more likely to be in settings that exceeded recommended child-to-adult ratios (15.6%) than children in unsubsidized care (5.6%; $z = 31.72$, $p < .05$) at age two and four-years (19.7% versus 8.4%, respectively; $z = 37.68$, $p < .05$). There were no significant differences in the quality of child-caregiver interactions between young children with special needs who did and did not use childcare subsidies.

Dosage—Eligible families without subsidies also relied on home- or- center based care for fewer hours of service at each time point than families who used subsidies. Specifically, only 49.5% of families without subsidies used 33 hours or more of care per week compared to 88% of families with subsidies when children were 9-months old. Rates of full-time care usage were 51.2% and 67.6% at age two years, respectively, and 42.0% and 87.1% at age four years, respectively among families who did not use subsidies compared to those who did use subsidy.

RQ 3: Predictors of Care Type and Quality

3a. Predictors of care type accessed—Among subsidy recipients, care type was consistently predicted by the number of siblings in the home, parents' marital status, and mother's work status throughout early childhood (see Table 2). Children with one or more siblings were more likely to be in center-based care as infants but were less likely to be in center-based care at ages two and four years. Children of unmarried parents were consistently less likely to be placed in center-based care, whereas children of mothers working less than full time were also generally less likely to be in center-based care than

children whose mothers worked full time. There were regional differences in use of subsidized center-based care among infants with special needs but not as children aged.

3b. Predictors of global and interaction quality—Results of the regression analyses for adequacy of global quality and interaction quality are presented in Tables 3 and 4, respectively. When controlling for all ecological covariates, at age two years, children who received subsidized care were significantly more likely to receive inadequate care. At age two years, children who were Black, had siblings, and whose mothers worked less than full time also had elevated risk of inadequate care. At age four years, subsidy use was not a significant predictor of global quality (see Table 3). At this time point, inadequate care was elevated for children whose mothers did not work full time, had less than high school education, and did not use food subsidies. Subsidy use was not predictive of caregiver interaction quality. As shown in Table 4, race, sex, use of childcare subsidies, use of health care subsidies, and mother's age were significant predictors of child-caregiver interaction quality when participants were toddlers. At age four years, the final regression model was not significant, indicating that the child or home variables included in the model did not significantly account for the variation in the quality of child-caregiver interactions.

Discussion

Federal subsidy policy is designed to expand parents' choice and access to high quality care for children from low-income households. Recent iterations of the law identify children with special needs as a subpopulation warranting unique consideration (Administration for Children and Families [ACF], 2017). As little research has addressed the childcare experiences of these children and their families, the present study sought to ascertain the care type and quality of childcare accessed by children with special needs relative to their peers. The use of ECLS-B data conferred several advantages in terms of sample characteristics and variables related to quality and type of care. First, ECLS-B is one of the few data sets that is both nationally representative and inclusive of low-income children with special needs who are subsidy-eligible. Second, data permitted exploration of type and quality of childcare used over three time points in early childhood. Beyond the research questions of this study, use of ECLS-B allowed us to address some of the methodological challenges identified in past research on subsidy use and childcare choice (Johnson et al., 2012). Specifically, quality of care was directly observed, region could be included to control for variations in state subsidy policies and supply of care, and an appropriate comparison group of subsidy-eligible families with children with special needs could be drawn. Finally, variables included in ECLS-B data allowed for a broad inclusion of children with special needs in order to capture the greatest number of young children with special needs in the sample.

The present findings indicate that, as subsidy policy intended, use of subsidies for both children with special needs and those without special needs increased the use of non-parental care, both home- and center-based. Within these categories of non-parental care, subsidy recipients were more likely to choose center-based care at each age point. Whereas families without subsidies relied primarily on parental care for their children with special needs, followed by home-based care, subsidy recipients overwhelmingly relied on center-

based care; however, children without special needs were accessing center-based care at higher rates than children with special needs at ages two and four year of age.

This overall finding is consistent with the general findings about parental choice of type of subsidized care favoring center-based care over home-based care (Ertas & Shields, 2012; Forry et al., 2013; Marshall, Robeson, Tracy, Frye, & Roberts, 2013). In this way, subsidy-eligible parents who have children with special needs appear to make similar choices regarding type of care as subsidy-eligible parents with children who do not have special needs. Yet, they may make their decisions about type of care for different reasons. For parents of children with special needs, stability of care, consistent access to resources, and the ability to care for the special need may especially critical considerations (Glenn-Applegate et al., 2011). However, past research suggested parents of children with disabilities are more likely to choose home-based care (Booth-LaForce & Kelly, 2004). Additional research is needed to elucidate the potential reasons for parents' preference for center-based care.

Use of subsidies resulted in increased use of non-parental care, especially center-based care, and more hours of care; however, it did not result in consistent access to high-quality care. To the contrary, there was little evidence of higher quality care across ages two and four. Child-to-caregiver ratios were higher in subsidized settings at both ages. While at age 2, more children with special needs accessed subsidized care of adequate global quality, by age 4, the unsubsidized care for children with special needs increased use of higher quality care to rates greater than those of subsidized children. There were no differences in the quality of caregiver-child interactions between subsidized and unsubsidized children with special needs. Thus, for families with children with special needs, accessing subsidized center-based care did not provide an advantage over families without a subsidy in regards to higher quality childcare from age 2 to age 4. This pattern stands in contrast to what is known about the quality of care for subsidized children, as center-based prekindergarten programs received the highest rating of quality (Johnson et al., 2012). Other factors may affect the impact of subsidy use in families with children with special needs. In the present study, variation in the quality of the interactions experienced by subsidy-eligible children with special needs in childcare settings was accounted for in part by child and family characteristics. Further research is necessary to better understand the mechanisms that may account for access to high-quality care when families who have children with special needs do and do not use subsidy. The use of higher hours of subsidized care with limited indicators of quality may help to at least partially explain recent findings that subsidy recipients with special needs do not show better school readiness outcomes than comparable peers who did not use subsidies (Sullivan, Susman-Stillman, & Farnsworth, 2017). Accordingly, future research should explore the relations of dosage and quality of care to these children's outcomes.

Our findings align with other studies showing that use of subsidized care does not necessarily lead to access of higher quality childcare (Antle et al., 2008; Weinraub et al., 2005). Studies have yielded mixed findings when comparing the quality of care received by children from eligible families who do and do not use subsidies (e.g., Johnson, Rigby, & Brooks-Gunn, 2011; Weinraub et al., 2005). Although previous research suggested that

preschoolers, but not toddlers, in subsidized care had higher child-to-caregiver ratios than children in unsubsidized care (Maher, Frestedt, & Grace, 2008), our study suggests that among children with disabilities, subsidy use is associated with higher ratios for both toddlers and preschool-age children.

Thus, the findings in this study call into question whether the intended goal of the subsidy program to consistently increase use of quality care for low-income families is being accomplished. This is particularly concerning for low-income children with special needs who experience greater developmental risks and who stand to make the greatest gain from receipt of quality care (Peisner-Feinberg & Burchinal, 1997). Furthermore, even when accessing subsidized care, there were disparities in quality for children with special needs who were Black, had siblings, and whose mothers worked less than full-time or had less than a high school education.

Why are parents with children with special needs who use subsidies less likely to access quality childcare especially if they are accessing center-based care? Johnson and colleagues (2012) found that relative to non-recipients, subsidy recipients chose childcare that was lower in quality than other public programs (e.g., Head Start, public prekindergarten). While that finding may be due in part to practical considerations, as Head Start and public prekindergarten programs offer fewer hours of care than childcare centers, there may be additional considerations when families of children with special needs are choosing care. Quality of inclusive preschool classrooms, compared to non-inclusive classrooms, is mixed and varies by age of child (Grisham-Brown et al., 2010; Knoche et al., 2006; Wall et al., 2006). Quality of care for children with special needs is likely affected by whether caregivers are competent and interested in caring for children with special needs (Grisham-Brown et al., 2010). Furthermore, high quality care is expensive and caring for children with special needs can confer additional costs. Subsidies may not provide sufficient funds to allow parents of children with special needs to afford the highest quality care.

Even with a childcare subsidy, there may be little advantage to subsidy use if the quality care choices are constrained (Johnson et al., 2012). Parents of children with special needs report challenges in finding childcare with which they are comfortable and may compromise on childcare choices more than parents of children who do not have special needs (National Association of Child Care Resource and Referral Agencies, 2008). Parents of children with special needs are also more likely to prioritize structural aspects of care than parents without children with special needs (Buysse, Skinner & Grant, 2001; Glenn-Applegate, Justice, & Kadaravek, 2016). For example, parents who are aware of the time-intensive needs of their children's disability may be particularly concerned about higher child-to-caregiver ratios, but unable to find a childcare center with a lower ratio.

Limitations

To explore questions of type and quality of care accessed by low-income families with children with special needs, we chose to conduct secondary analyses using the ECLS-B, a nationally representative data set. There are few other data sets that permit these kinds of analyses, particularly because data on subsidy use by families of children with special needs is extremely limited and most are bound to a geographic region (e.g., Ha, Magnuson, &

Ybarra, 2012; Shlay, Weinraub & Harmon, 2010). However, there are limitations to this data set that are important to acknowledge. Since the children in the ECLS-B were born in 2001, there have been significant changes in early childhood policies and practices as well as subsidy policies and practices that may affect, positively and negatively, practices with children with special needs and subsidy eligibility. In terms of measuring care, the study design did not include collection of quality data during infancy leaving open the question about quality of care accessed in infancy. Furthermore, the quality variables included in the ECLS-B gauge structural and process aspects of care may not fully represent the construct of quality. Glenn-Applegate and colleagues (2011; 2016) described the familial aspect of quality as a third dimension distinct from typical structural and process quality dimensions. Likewise, several sociodemographic characteristics represented in the literature were unable to be included in analyses because of extensive nonresponse by providers (e.g., licensing/accreditation). Finally, use of secondary data precluded our ability to explore factors that contributed to parents' use of subsidy and which may be linked to their preferences for type or quality of care (Johnson et al., 2012). Nonetheless, the ECLS-B offers some of the best available data for exploration of child care experiences of children with special needs who are subsidy eligible since federal reporting only recently required collection of special needs status in winter 2016 (ACF, 2012). As such, these analyses may be regarded as baselines for emerging trends as subsidy policy now prioritizes children with disabilities (ACF, 2017).

Implications for Practice and Policy and Future Directions

The findings in this study document that while subsidized children with special needs are more likely to access non-parental care than unsubsidized children with special needs, they are not consistently accessing high-quality care. Future research should focus on clarifying parental preferences and motivation for choosing the type and quality of care as there appear to be differences in the care chosen by families whose children do and do not have special needs and who do or do not access subsidies. For example, do families with children with special needs who are subsidy-eligible choose lower quality care because the preferences they have for quality childcare are not available or because the cost of caring for their children is not adequately accounted for by the subsidy? If the aspects of childcare quality prioritized by parents of children with special needs were incorporated into childcare programs (e.g., lower child-to-caregiver ratios), would there be increased use of higher quality childcare? Subsidy policies may not sufficiently accommodate the unique needs of families who have children with special needs; however, with the historic reauthorization of the Child Care Development Block Grant in 2014, and the inclusion of children with special needs as a priority audience, there may be opportunities to further enhance these families' ability to access and pay for quality childcare.

The findings of this study also indicate that improving childcare quality for young children throughout early childhood should be a priority. Improving quality will have beneficial effects for all children, including children with special needs. Improvements can be targeted towards both structural and process aspects of quality (e.g., decreasing child-to-caregiver ratio, adjusting the physical environment, enhancing providers' sense of competence about caring for children with special needs). States can use their quality rating and improvement systems and their professional development systems to provide improvement supports to

increase program quality with specific attention to children with special needs. For example, providing more robust training on caring for children with special needs and specific information on certain kinds of disabilities can improve not only childcare providers' knowledge and skills, but also expand the pool of providers interested in caring for children with special needs. States can also work to remove barriers for childcare providers who are motivated to care for children with special needs. For example, many states offer special rates for providers who care for children with special needs, but providers may need additional supports to qualify and apply for increased reimbursement rates. By supporting childcare providers throughout the process of acquiring special rates, state governments increase childcare access for families with children with special needs. Finally, states may want to target consumer education towards families who have children with special needs to most effectively educate them about quality childcare. As noted by Johnson et al. (2012), simultaneous efforts to improve both quality and supply are necessary to address the complicated issue of accessing child care for subsidy-eligible children with special needs.

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Figure 1.

Rates of Home- and Center-based Childcare among Subsidy Recipients by Age and Special Needs Status. SN = special needs.

Table 1

Characteristics of Subsidy-Eligible Children during Early Childhood (as proportions)

	9-months (N = 1,498,800)	2-years (N = 1,387,700)	4-years (N = 1,404,300)
Unweighted <i>n</i>	4,000	3,150	3,100
Male	0.49	0.51	0.51
Race			
White	0.32	0.31	0.33
Black	0.23	0.24	0.24
Other	0.45	0.45	0.43
English	0.71	0.72	0.72
One or more siblings	0.63	0.72	0.83
Married	0.46	0.47	0.49
Mother's age (mean)	25.62	25.57	25.82
Mother's education			
High school or less	0.77	0.78	0.78
Some college/degree	0.23	0.22	0.22
Mother's work status			
Not working	0.61	0.59	0.54
Part time	0.16	0.16	0.17
Full time	0.23	0.25	0.29
Received food subsidies	0.91	0.85	0.84
Received healthcare subsidies	0.85	0.74	0.88
Urban	0.84	0.84	0.84
Region			
Northeast	0.14	0.15	0.14
West	0.27	0.26	0.24
Midwest	0.19	0.18	0.21
South	0.40	0.41	0.41
Has special needs	0.06	0.20	0.47

Table 2
Predictors of Use of Center-based Childcare for Subsidy-eligible Children with Special Needs

	9-months				2-years				4-years			
	AOR	CI 95%	Wald F	AOR	CI 95%	Wald F	AOR	CI 95%	Wald F	CI 95%	AOR	Wald F
Female	0.88	0.39-2.01	0.79	1.28	0.59-2.78	0.25	0.75	0.43-1.31	1.17			
Race			2.35			2.40			0.30			
White [†]	-	-	-	-	-	-	-	-	-	-	-	-
Black	3.61	1.21-10.76		4.45	1.52-13.04		0.68	0.33-1.38				
Other	2.54	0.66-9.73		2.21	0.89-5.51		0.86	0.44-1.69				
Home Language not English	0.43	0.04-5.16	1.12	0.61	0.25-1.50	2.02	0.45	0.23-0.89	3.05			
One or more siblings (v. none)	3.72	1.12-12.41	12.62 [†]	0.40	0.20-0.80	3.61 [*]	0.26	0.12-0.61	6.77 ^{**}			
Unmarried parents	2.13	0.70-6.52	4.31 [*]	2.89	1.34-6.23	4.92 ^{**}	1.20	0.72-2.02	2.06			
Mother's work status			7.96 [†]			24.17 [†]			17.28 [†]			
Full time [†]	-	-	-	-	-	-	-	-	-	-	-	-
Part time	0.83	0.17-4.08		0.17	0.09-0.34		1.15	0.54-2.45				
Not working	0.18	0.05-0.63		0.04	0.02-0.09		0.28	0.15-0.52				
High school or less (v. >HS)	0.92	0.37-2.25	0.29	0.32	0.17-0.61	6.34 ^{**}	0.57	0.29-1.12	2.22			
Mother's age (1 year increments)	0.98	0.89-1.07	0.25	1.00	0.93-1.07	0.38	0.97	0.93-1.01	2.13			
No food subsidies	0.64	0.07-5.58	0.17	1.13	0.31-4.13	0.02	0.74	0.36-1.52	3.79			
No healthcare subsidies	1.36	0.28-6.67	0.43	0.32	0.12-0.80	3.67 [*]	1.63	0.74-3.61	1.28			
Rural residence (v. urban)	0.67	0.15-2.98	0.61	0.96	0.39-2.36	0.76	0.41	0.20-0.85	3.10			
Region			2.68 [*]			1.48			1.55			
Northeast [†]	-	-	-	-	-	-	-	-	-	-	-	-
Midwest	3.49	0.64-18.97		0.44	0.10-2.01		0.48	0.15-1.52				
South	5.63	1.58-20.06		1.39	0.29-6.54		0.69	0.23-2.04				
West	1.32	0.12-14.60		0.85	0.16-4.66		0.48	0.16-1.43				

Note:

[†] indicates the reference category.

^{*} $p < 0.05$.

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Table 3
Predictors of Inadequate Quality Child Care for Subsidy-Eligible Children with Special Needs

	2-years			4-years		
	AOR	CI 95%	Wald F	AOR	CI 95%	Wald F
Female	0.08	0.02-0.34	13.86**	1.07	0.29-3.93	0.01
Race			10.17**			0.02
White [†]	-	-	-	-	-	-
Black	2.65	0.51-13.65		1.12	0.30-4.22	
Other	0.04	0.002-0.71		1.08	0.19-6.23	
Home Language not English	0.01	0.001-0.05	34.39 [†]	0.19	0.02-2.06	2.01
One or more siblings (v. none)	16.78	3.40-82.89	14.17**	0.46	0.11-1.98	1.16
Unmarried parents	1.00	0.14-6.99	0.00	0.70	0.27-1.81	0.58
Mother's work status			3.98*			8.09 [†]
Full time [†]	-	-	-	-	-	-
Part time	6.68	0.91-48.78		0.56	0.80-3.87	
Not working	13.86	1.96-97.77		0.17	0.06-0.50	
High school or less (v. >HS)	0.79	0.07-8.36	0.05	25.85	2.69-248.56	8.51**
Mother's age (1 year increments)	0.94	0.82-1.07	1.04	1.02	0.92-1.12	0.12
No food subsidies	0.30	0.04-2.67	1.37	12.45	2.15-72.03	8.51**
No healthcare subsidies	0.63	0.11-3.63	0.32	0.72	0.07-7.56	0.08
No childcare subsidies	92.13	13.29-638.57	24.80 [†]	0.28	0.07-1.22	3.06
Rural residence (v. urban)	0.48	0.06-4.23	0.52	0.26	0.05-1.26	3.02

Note:

[†] indicates the reference category.

* $p < 0.05$,

** $p < 0.01$,

[†] $p < 0.001$

Predictors of Child-Caregiver Interaction Quality for Subsidy-eligible Children with Special Needs

Table 4

	2-years						4-years					
	Control Model			Final Model			Control Model			Final Model		
	B	SE	B	B	SE	B	B	SE	B	B	SE	B
Constant	74.34	5.25	71.92	5.27	68.53	7.42	67.26	6.94				
Race												
White	1.67	1.51	0.35	1.70	-3.03	3.91	-3.06	3.71				
Black	-10.43 [†]	1.94	-11.30 [†]	1.75	-4.36	2.77	-4.72	2.61				
Other [†]	-	-	-	-	-	-	-	-				
Female	3.19 [*]	1.24	3.89 ^{**}	1.23	-0.56	2.16	-0.58	2.06				
English	1.93	1.92	3.13	2.03	-0.93	2.43	-0.56	2.37				
No siblings	2.07	1.27	2.39	1.44	0.68	2.31	0.92	2.36				
Married	-4.58 [*]	1.97	-3.27	1.94	-1.56	1.95	-2.13	1.61				
High school or less	-6.12 [*]	2.41	-4.39	2.16	-2.37	2.59	-2.02	2.63				
Mom work status												
Not working [†]	-	-	-	-	-	-	-	-				
Part time	2.67	2.06	2.37	2.15	1.02	1.99	2.26	2.29				
Full time	-2.26	1.54	-1.09	1.48	-3.26	2.52	-2.37	2.13				
Mother's age	-0.40 ^{**}	0.12	-0.36 [*]	0.13	0.09	0.13	1.00	0.13				
Used healthcare subsidy	-5.58 [*]	2.28	-6.69 ^{**}	2.18	-3.84	3.31	-3.73	3.27				
Used food subsidy	3.96	2.96	2.29	2.43	4.87	3.98	5.66	3.83				
Urban	0.06	1.41	-0.44	1.61	-2.65	2.92	-2.49	2.76				
Used childcare subsidy			4.66 ^{**}	1.50			-4.44	4.38				
R ²	0.34		0.37 [*]		0.70		0.08					
Wald F	7.20		90.54		1.26		1.56					

Note:

[†] indicates the reference category.^{*} p 0.05,

The control model included all covariates; the final model added subsidy status.

p 0.001.

d 0.01.

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