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Patterns and predictors of childcare subsidies for children with and without special needs

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Abstract

One goal of childcare subsidies is to increase access to quality childcare for families of low-income, thus supporting child and family wellbeing, but subsidies may not equally benefit children with and without special needs. This study examined patterns and predictors of subsidy use among children with disabilities or delays relative to children without special needs. A nationally representative sample of approximately 4,050 young children from families of low-income was drawn from the Early Childhood Longitudinal Study–Birth Cohort. We examined subsidized care receipt at ages nine months, two years, and four years using descriptive analyses and multivariate logistic regression. Results suggest young children with special needs utilize childcare subsidies at significantly lower rates than their peers without disabilities. Mothers' marital status, work status, education, and age, along with child's race and number of siblings were significant predictors of subsidy use. We discuss implications for policy implementation and multisector collaboration to support the early care and education of young children with special needs.

Keywords

childcare; special needs; developmental delay; subsidy

1. Introduction

Quality childcare promotes the academic, social, and developmental competencies necessary for success in school (Magnuson, Ruhm, & Waldfogel, 2007; Phillips & Lowenstein, 2011; Skibbe, Connor, Morrison, & Jewkes, 2011). Yet families of low-income—and especially those with young children with special needs—have limited access to high quality care (Barnett & Yarosz, 2007; Torquati, Raikes, Huddleston-Casas, Bovaird, & Harris, 2011; Wall, Kisker, Peterson, Carta, & Jeon, 2006). Childcare subsidies offered via the federal Child Care Development Fund (CCDF) are intended to increase these families' access to

quality childcare as a means to boost families' self-sufficiency and improve children's outcomes. Subsidies may be particularly critical for children with special needs who come from low-income households because both poverty and special needs increase risk for poor educational outcomes (Zhang, Katsiyannis, & Kortering, 2007). Few researchers have examined subsidy use among young children with special needs, however, so their usage and any resultant benefits are largely unknown. Given policy and practice efforts to support children with special needs and increasing emphasis on collaboration across systems (e.g., health, education, social services; Administration for Children and Families [ACF], 2014), knowledge of subsidy use for young children with special needs can inform policy refinement and implementation, as well as collaborative processes to support child and family wellbeing. As such, this study investigated patterns and predictors of subsidy use among young children with special needs from low-income households compared to their peers who did not have special needs.

1.1 Early Childhood Special Needs

Individuals with disabilities and developmental delays, herein referred to as special needs, represent approximately 13% to 15% of the population of infants, toddlers, and school-age children and youth (Boyle et al., 2008; Rosenberg, Zhang, & Robinson, 2005). Developmental delays—that is, below average acquisition of cognitive, physical, language, motor, or social skills—and other childhood medical or psychiatric conditions are common among children under the age of two but are often unrelated to receipt of early intervention (Rosenberg et al., 2005). The prevalence of special needs among children from low-income households is even greater (e.g., Emerson, 2004; Fujiura & Yamaki, 2000). Children with special needs are significantly more likely to live in households below the poverty line than are children without special needs (Simon, Pastor, Avila, & Blumberg, 2013); likewise, poverty increases risk for disabilities and delays as children age (Rosenberg et al., 2005). As such, young children with special needs in low-income families face cumulative risks for poor outcomes, making it even more critical that they receive early care and education conducive to developmental gains (Parish, Cloud, Huh, & Henning, 2005).

Over 1.1 million children with special needs who are under age five receive early intervention and early childhood special education under the Individuals with Disabilities Education Act Part C (IDEA; U.S. Department of Education, 2018). However, the proportion of young children served under IDEA represents only 2.8% to 5.9% of children in this age group. This is well below the 13% to 15% estimated to have eligible disabilities and delays, signaling that many children in need of services do not receive them under this federal program (Boyle et al., 2011; Grant & Isakson, 2013; Hebbeler, Spiker, & Kahn, 2012; Rosenberg et al., 2008). There has long been concern that children with special needs are under-identified, but even among those children with identified needs, approximately one-third receive no services (Peterson et al., 2011). As such, young children with special needs may benefit from other federal and state programs that provide access to early childhood education and care. The federal childcare subsidy program is one such program that may facilitate access to beneficial child and family supports for low-income families of children with special needs.

1.2 Childcare and Subsidy Utilization

Quality childcare can provide benefits to both children and their families in low-income contexts, fostering development of more positive home environments and improved school readiness (McCartney, Dearing, Taylor, & Bub 2007; Vandell, Belsky, Burchinal, Steinberg, & Vandergrift, 2010; Yoshikawa & Weiland, 2013). Subsidy recipients demonstrate improved parental education, employment, and earnings because of increased access to non-parental care options (Ha & Miller, 2015; Tekin, 2005). Center-based care in particular has been linked to positive outcomes, such as reduced risk of later special education needs (e.g., Reynolds, Temple, White, Oh, & Robertson, 2011), decreased child abuse and neglect (Green et al., 2014; Mersky, Topitzes, & Reynolds, 2011), and improved functioning during adolescence (Vandell, Burchinal, Peirce, 2016). Differences in outcomes are likely related to the quality of care received in centers (Bassok, Fitzpatrick, Greenberg, & Loeb, 2016; Vandell et al., 2016). Unfortunately for families with low-income, securing and paying for consistent, high-quality childcare is an ongoing challenge. This is especially true for families of children with special needs who experience difficulty securing appropriate or adequate care for their children due to providers' limited availability, willingness, and competence to provide services for children with special needs (Forry, Daneri, & Howarth, 2013; Grisham-Brown, Cox, Gravil, & Missall, 2010; see Parish et al., 2005 for discussion of earlier studies).

The CCDF subsidy program is intended to increase low-income families' access to high quality childcare so as to facilitate employment or participation in education or job training and foster improved management of parenting, and, by extension, enhance children's development (for discussion, see Healy & Dunifon, 2014). Originally enacted as part of 1996 welfare reform, CCDF aims to encourage parents with low-income to seek employment outside the home by providing vouchers and grants for non-parental childcare via the Child Care and Development Block Grant (CCDBG; Vesely & Anderson, 2009). Although earlier federal subsidy policy recognized the increased care needs of children with special needs by exempting their families from employment requirements, current federal policy does not require special allowances; instead states may choose to do so (Forry, et al., 2013; Parish et al., 2005) and eligibility requirements vary across states (ACF, 2017; Schulman & Blank, 2004). Use of childcare subsidies lags substantially behind estimated need (U.S. Department of Health and Human Services [USDHHS], 2012) as CCDF is not an entitlement program but rather a "demand-side subsidies, as parents must decide to apply for the subsidy, and if found eligible, parents choose the care provider" (Grobe, Davis, Scott, & Weber, 2017, p. 147). Generally, eligibility is related to family size, children's ages, family income, and parental employment or education status, as well as children's special needs and involvement in protective services. Some states have different eligibility requirements for families with and without children with special needs (ACF, 2017). In addition, childcare centers receiving any federal funding cannot deny children with special needs services under the Americans with Disabilities Act of 2008 and Section 504 of the Rehabilitation Act of 1973 (Booth & Kelly, 2004), but there is some evidence that children with special needs may not benefit from equal access to federally-funded subsidies (Herbst & Tekin, 2010).

In recognizing children with special needs as a priority population, the 2014 CCDBG reauthorization included additional requirements for reporting on children's disability status, increasing the supply of quality care, and coordinating across different programs, including early intervention and early childhood special education provided under IDEA, Head Start, and child care resource and referral providers (Office of Child Care, 2014). Recent data indicated that over 30 states give priority to families of children with special needs, as well as other groups such as families who participate in TANF, and children under child protective services or in foster care, but only six states guarantee subsidy for children with special needs (Stevens, Blatt, & Minton, 2017). Federal policy permits states flexibility in how they provide priority to children with special needs and incentivize providers' care for children with special needs (e.g., higher payment rates for providers, waiver of family co-payment). As such, some states fund special prekindergarten programs, such as Head Start, to provide wraparound services where providers are subject to additional requirements pertinent to the care and education of children with disabilities (Child Care and Development Fund Program, 2016). The reauthorization also requires states to provide information on developmental screenings and other assistance programs, including IDEA. This requirement may support states' responsibility to identify all eligible children with disabilities given the dependency of IDEA's child find process on referral from various agencies and providers that engage families of young children (Macy, Marks, & Towle, 2014). In addition, these requirements may increase the share of children with special needs served in other programs because of the additional information provided to families.

Presently, it is unclear whether low-income families who have children with special needs access subsidies at rates similar to other low-income families. By most recent estimates, more than 1.45 million children—the majority of whom were under age 4—in 874,200 families received childcare assistance via CCDF (Office of Child Care, 2014). Federal reporting does not yet allow for estimation of participation by families with children who have special needs. Obtaining estimates of subgroups' subsidy use is important because studies show that families who access subsidies are more likely to report having good choices for quality care and to use higher quality care than low-income families who do not use subsidies (Johnson, Ryan, & Brooks-Gunn, 2012; Marshall, Robeson, Tracy, Frye, & Roberts, 2013; Ryan, Johnson, Rigby, & Brooks-Gunn, 2011). Previous research indicated parents' utilization of subsidized care is related to a variety of family factors, 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). Whether those predictors of subsidy use are applicable to subsidy use in families with children who have special needs warrants further exploration, particularly in light of the new emphasis on ensuring access among this group.

1.3 Present Study

Families with children who have special needs may experience difficulty securing appropriate childcare and having low-income may exacerbate this difficulty. Childcare subsidies can facilitate access to high-quality care if programs afford appropriate access and

participation for families affected by special needs. Understanding the patterns of utilization among this population can inform efforts of policymakers and providers to support the sufficiency of childcare and the wellbeing of young children with special needs and their families (Forry et al., 2013). Further, because only a small subset of subsidy-eligible families receives services (USDHHS, 2012), there is value in identifying whether children with special needs have equal access and participation should efforts to ensure equity be needed. Accordingly, the purpose of this study was to compare rates of subsidy usage and related predictors among families with children who have special needs relative to their typically-developing peers within the population of low-income families at multiple points throughout early childhood. We addressed the following research questions:

1. Do low-income children with and without special needs have different rates of subsidized care throughout early childhood?
2. What child and family characteristics predict subsidized care among low-income children with special needs as infants, toddlers, and preschoolers?

2. Method

2.1 Data Source

Data were drawn from the Early Childhood Longitudinal Study–Birth Cohort (ECLS-B), a nationally-representative study of 10,700 children born in the United States in 2001 (Najarian, Snow, Lennon, & Kinsey, 2010). The ECLS-B was commissioned under the federal Early Childhood and Household Studies Program and sponsored by the National Center for Education Statistics (NCES), a division of the Institute of Education Sciences (IES) of the United States Department of Education. The study was administered and implemented in collaboration with eleven federal agencies involved in early care, education, and health services using a multi-method, multi-informant approach (Najarian et al., 2010). The present study was approved by the researchers' university institutional review board and adhered to the requirements for licensed ECLS-B data users (e.g., per IES requirements, any unweighted n is rounded to the nearest 50 and results are reported for the weighted analyses only).

2.1.1 Design—The purpose of the ECLS-B was to gather information on how young children's experiences influence their school readiness and various developmental outcomes (Najarian et al., 2010) and to inform public policy decisions (Nord, Edwards, Andreassen, Green, & Wallner-Alle, 2006), making it well-suited for the present analysis. The ECLS-B was based on an ecological framework to study child development. Data were collected from birth certificate records; questionnaires completed by caregivers, childcare providers, school administrators, and teachers; and direct child assessment (see Nord et al., 2006 for full description).

2.1.2 Sampling—The ECLS-B researchers used a multistage, stratified, clustered design, which accounted for census region, urbanicity, income, minority status, and region size in order to approximate the population of children born in the United States in 2001 (Nord et al., 2006). Approximately 14,000 children were sampled from the birth records recorded by

the National Center for Health Statistics, of whom 10,700 participated. The study excluded children born to mothers under 15 years of age and infants who were adopted or died prior to the age of nine months. Researchers also over-sampled American Indian and Asian children, twins, and infants with low birthweight to ensure sufficient participation for subgroup analyses. Although children with special needs could not be oversampled using birth certificate data, analyses for this group have been deemed valid by the study designers (Nord et al., 2006). Due to limited data collection regarding special needs and childcare in other large-scale datasets, the ECLS-B provides the most current and nuanced data source to answer our research questions. Use of sampling weights derived by the study designers allow for population estimates representative of children born in 2001 and who began kindergarten in 2006 or 2007. Weights were developed based on selection probabilities, survey nonresponse on specific instruments, and undercoverage of the target population (see Nord et al., 2006 for detailed discussion of the development process and interpretation). We report the unweighted n of ECLS-B participants for descriptive purposes only. All analyses were conducted using sampling weights per IES requirements, so the population N s are reported as well.

2.1.3 Procedures—Data collection occurred in five waves from 2001-2008 corresponding to birth (via birth certificates) and age nine months, age two years, age four years, and kindergarten (Najarian et al., 2010). As the present study focuses on subsidy use during early childhood, we utilized only data from the first three waves of data collection. Field investigators engaged in several days of rigorous training prior to collecting data (Najarian et al., 2010; Nord et al., 2006). Active and passive consent procedures, consistent with state law, were used to access birth certificate data, and informed consent was obtained from each participant's primary caregiver, usually the mother, to participate in other data collection procedures (Nord et al., 2006). Procedures included review of birth certificate data, interviews with both parents of each participant when possible, parent-child interaction observations, interviews with childcare providers and school staff, self-administered questionnaires, and direct child assessments.

2.2 Analytic Samples

This study utilized a subsample of ECLS-B participants from low-income families likely to be eligible for childcare subsidies. We weighed three primary considerations in delineating our analytic sample: variation in states' subsidy eligibility income criteria at the time of the ECLS-B data collection ranging from 113-295% federal poverty level (FPL; Schulman & Blank, 2004) with many states giving priority to very low income; the income equivalent of subsidy recipients (Office of Child Care, 2014); and reciprocal eligibility for recipients of other subsidies or welfare. Consequently, in order to capture the majority of eligible families who receive subsidies, our sample included families whose income was 130% of the federal poverty level following federal eligibility criteria, or who reported receiving welfare benefits, at the nine month, two-year, and four-year waves of data collection. Since families receiving or transitioning off welfare were also eligible for subsidy at the time of data collection, children for whom parents indicated receipt of welfare in the previous year were also included in the analytic sample (Herbst & Tekin, 2014). Because family income and resultant eligibility cannot be assumed to be static throughout childhood, eligibility was

determined for each wave, resulting in three different analytic samples for ages nine months, two years, and four years, with population *N*s ranging of 1,092,650 to 1,496,550 children (unweighted *n* ranging 2,350 to 4,050). Table 1 summarizes the descriptive statistics for the samples drawn from each wave of data collection by special needs status.

2.3 Measures

Most variables were taken from birth certificate or parent interview data. Parent interviews were conducted at each wave of data collection, with each child's primary caregiver, typically the child's mother, and lasted approximately 60 minutes. During these face-to-face sessions, the field investigator used a computer-assisted parent interview (CAPI) to gather information from parents (National Center for Education Statistics, 2016). The only variable that also included direct child assessment data was special needs status.

2.3.1 Special needs—For this study, we defined special needs to broadly encompass definitions of disabilities and developmental disability for U.S. children. Children were identified as having special needs if they met any of the following three criteria at ages nine months, two years, or four years: (1) parent reported that the child had an Individual Family Service Plan (IFSP) or an Individualized Education Program (IEP); (2) birth certificate data or parent report indicated the child had a medically diagnosed disability (e.g., Down syndrome, spina bifida, intellectual disability, autism, hearing impairment); or (3) child performed at least 1.5 standard deviations below the mean of the T-scores on direct assessments of cognitive, motor, or social-emotional skills completed by ECLS-B participants. Approximately 6.1%, 4.8%, and 43.8% of children met criteria 1, 2, and 3, respectively, and 5% met two or more criteria. Special needs was a dichotomous variable, such that any child meeting any of the three conditions above, whether formally identified or not, was identified as having a special need for the purposes of our study based on the following rationale.

Under federal law, eligible infants and toddlers include children who demonstrate developmental delays or have a diagnosed condition likely to result in delays (IDEA, 2004, p. 60250). Federal disability regulations do not establish specific criteria for eligibility, instead providing examples of conditions with a high probability of developmental delays (e.g., chromosomal abnormalities, genetic and congenital disorders, sensory impairments) and leaving expanded definition up to states (U.S. Department of Education, 2011, p. A-6). As such, there is variability in how states have operationalized disability or delay, with quantitative criteria, namely, standard deviations (SD) below the mean or percentage of delay on norm referenced tests predominating (Danaher, 2011; Early Childhood Technical Assistance Center [ECTAC], 2015). States' SD criteria range from 1.0 to 3.0 below the mean with the most common being a combination of 1.5 and 2.0 below the mean in one or more developmental areas (i.e., physical, cognitive, communication, social/emotional, or adaptive functioning; Danaher, 2011). The SD approach has also been adopted in noteworthy epidemiological studies (e.g., Rosenberg et al., 2008). States' criteria also allow eligibility based professional judgment or team consensus, risk for later disability, or district established criteria. Some definitions used by states (Danaher, 2011; ECTAC, 2015) and researchers (e.g., Cheng, Palta, Kotelchuck, Poehlmann, & Witt, 2014; Hillemeier et al.,

2009) operationalized delay as performance below the 10th percentile, which is a more liberal definition than seen in the majority of states or adopted here. Given these considerations, we opted for the SD approach. Thus, we sought to capture children identified under the law via criterion 1 above, but being mindful of persistent under-identification of eligible children (e.g., Boyle et al., 2011; Grant & Isakson, 2013; Hebbeler, Spiker, & Kahn, 2012), we also sought to include those children likely to be eligible under federal and state laws, given the information available in the ECLS-B, via criteria 2 and 3.

Cognitive and motor skills were assessed using the Bayley Short Form–Research Edition (BSF-R), an abridged version of the Bayley Scales of Infant Development–2nd Edition. The BSF-R measured cognitive skills associated with object permanence, exploration, receptive and expressive language, and problem solving, as well as fine and gross motor performance (Berry, Bridges, & Zaslow, 2004). Social-emotional skills were measured using a researcher-created scale. During administration of the BSF-R, field administrators rated the children's social-emotional functioning on dimensions of positive affect, negative affect, interest in materials, attention to tasks, and social engagement. Ratings were assigned using a scale of 1 (low frequency) to 5 (high frequency). Using the field administrators' ratings on the five dimensions of functioning during the BSF-R, a composite of social-emotional functioning was derived. Exploratory factor analysis indicated the five ratings loaded sufficiently onto a unidimensional latent construct (.46 - .85) and had adequate reliability ($\alpha = .77$). Therefore, the present study operationalized social-emotional development as scores on the derived scale.

2.3.2 Subsidy use—Subsidy use was operationalized as parent report that social services paid for their childcare. CCDF is the largest source of subsidized childcare (Schmit & Matthews, 2013), and parent report has been shown to be a reliable indicator of subsidy receipt (Johnson & Herbst, 2013).

2.3.3 Child and family characteristics—As subsidy is not an entitlement, predictors of subsidy use may reflect systematic differences in policy implementation and state practices (Grisham-Brown et al., 2010). Research on service utilization in the general population of families eligible for public assistance indicates correlations to income, education, maternal age, race, and number of children in the home (Herbst & Tekin, 2014), so these factors are among those explored here. Child characteristics measured were sex (boy or girl) and race/ethnicity (White, Black, Hispanic, Asian/Pacific Islander, other/multiple races). Family characteristics included mother's age, education level (below high school, high school or equivalent, some college or degree), employment status (working full time, working part time, not currently working), and marital status (married or not currently married); home language (English or other); receipt of other public assistance (food subsidies and health subsidies); number of siblings in the home (none, one, two, three or more); census region (Northeast, Midwest, South, West); and urbanicity of the home (urban/suburban or rural).

2.4 Analyses

All analyses were completed using the complex sampling module of SPSS version 22 which uses the common Taylor Series adjustment method to estimate precise standard errors since

the ECLS-B employed a stratified random sampling. This adjustment accounts for the clustering, multistage selection, and differential sampling rates since statistical packages assume simple random sample data otherwise, and would, therefore, underestimate the standard errors here (IES, 2010). The Taylor Series adjustment, designed for analyzing complex samples, provides a linear approximation of the standard errors based on the strata and sampling unit identifiers (i.e., nesting variables) in the ECLS-B (Nord et al., 2006).

Three sets of analyses were conducted to address the research questions. First, we estimated the proportion of children with and without disabilities who received subsidized care in the population of children from low-income families at ages nine months, two years, and four years. Proportions were calculated using SPSS crosstab contingency tables of the variables for disability status by subsidy receipt at each time point. Second, *z*-tests of population proportions were completed to test for differences in these proportions of children with and without special needs who received subsidized care at nine months, two years, and four years. To reduce likelihood of Type 1 error, we applied the conservative Bonferroni correction when evaluating *p*-values to set the significance cut off at $0.05/3 = 0.017$.

Finally, multivariate logistic regression models were fitted to ascertain predictors of childcare subsidy use among children with special needs at age nine months, two years, and four years, resulting in the three models reported. We focused on the subset of children with special needs, because predictors of subsidy receipt using these data have been reported elsewhere (e.g., Johnson et al., 2011). In each model, the dependent variable was childcare subsidy use for that age; predictors were the child's sex, race, home language, and number of siblings; mother's marital status, work status, highest level of education, and age; receipt of food or healthcare subsidies; urbanicity; and region. Adjusted odds ratios are presented as measures of effect sizes for the predictors. In sum, we fitted a series of log-odds models where the outcome was a binary indicator of subsidy receipt, and included several theoretically motivated observational characteristics found to be significant in the general population in order to determine the relations in this unique subpopulation. In the results, we present the adjusted odds ratio, which provides the conditional odds of subsidy receipt for the variable, holding all other factors at their sample average.

3. Results

3.1 Patterns of Childcare Subsidy Use

At each age point, low-income families of children with special needs were significantly less likely to use childcare subsidies than families of children without special needs. At age nine months, 8.1% of low-income children with special needs received subsidized care, compared to 8.5% of children without special needs ($z = 4.34, p < .017$). At age two years, the rates of participation were 11.6% and 11.8%, respectively ($z = 3.18, p < .017$). The largest difference was seen at age four, when 6.7% of eligible children with special needs received subsidized care compared to 9.8% of children without special needs ($z = 48.84, p < .017$).

3.2 Predictors of Childcare Subsidy Use

Displayed in Table 2 are adjusted odds ratios (AOR) for the multivariate logistic regression models used to predict childcare subsidy use at nine months, two years, and four years. The pseudo R^2 for each model was near or above 0.20. Notably, the only predictor that significantly predicted childcare subsidy use among young children with special needs throughout early childhood was parents' marital status. As compared to children whose parents were currently married, children with unmarried parents were significantly more likely to use subsidies at nine months (AOR 11.64, 95% CI: 2.98-45.48), two years (AOR 4.08, 95% CI: 1.67-9.97), and four years (AOR 2.97, 95% CI: 1.24-7.12).

In addition to parental marital status, child race and mother's age were significant predictors of childcare subsidy use at nine months. When compared to White children, children who are Black (AOR 5.03, 95% CI: 1.46-17.35) and Asian/Pacific Islander (AOR 26.70, 95% CI: 2.52-282.86) were more likely to use subsidies. Mother's age was also a significant predictor of childcare subsidy use at nine months; for every year older a mother was at the child's birth, the child was 10% more likely to use childcare subsidies (AOR 1.10, 95% CI: 1.03-1.17).

At two years, number of siblings in the home, mother's work status, and mother's highest level of education were also significant predictors of subsidy utilization. Children who had either one (AOR 0.28, 95% CI: 0.13-0.58) or three or more (AOR 0.10, 95% CI: 0.03-0.27) siblings living at home had significantly lower odds of using childcare subsidies compared to children who did not have siblings in the home. Further, compared to children whose mothers worked full time, those with mothers who were not currently working were at significantly reduced odds of using childcare subsidies (AOR 0.31, 95% CI: 0.15-0.63). Finally, compared to children whose mothers had attended some college or held a post-secondary degree, those with mothers who did not graduate from high school (AOR 0.33, 95% CI: 0.13-0.89) or who had a high school diploma or equivalent (AOR 0.33, 95% CI: 0.14-0.74) had decreased odds of using childcare subsidies at two years of age. Finally, at four years of age, mother's work status was an additional significant predictor of subsidy use. When compared with children whose mothers who worked full time, children whose mothers were not currently working had lower likelihood of using childcare subsidies (AOR 0.20, 95% CI: 0.09-0.44).

4. Discussion

In this study, we aimed to provide much needed information on subsidy use by families of children with special needs as compared to their typically developing peers, a topic that has received little attention in research. In addition, using a nationally-representative sample of low-income children with special needs we examined the predictors of subsidy receipt for this subpopulation. The results have the potential to inform research on the early care and education experiences of children with special needs who come from low-income households and to improve policies and practices to support their needs and access to early education and intervention via use of childcare subsidies.

4.1 Rates of Subsidy Use

Children with special needs were significantly less likely than their same aged peers without disabilities to receive subsidized childcare throughout early childhood. Rates of subsidy usage decreased between ages two and four years, with children with special needs showing particularly depressed rates of usage. Although all of the analyses were statistically significant, differential subsidy usage at age four likely has the most practical significance since, at this age, children with special needs were more than 30% less likely than children with no special needs to receive subsidized childcare. Few studies have explored subsidy usage in this subpopulation, but our findings contrast with earlier findings that found no statistically significant relationship of diagnosed disability to receipt of subsidized care during infancy (Johnson et al., 2011). This distinction may be attributable to the differences in sampling (low-income here v. subsidy eligible elsewhere) and/or definition of disability (broad here v. served by IFSP/IEP elsewhere). A substantial portion of participants here were identified with special needs, particularly developmental delay, consistent with the longstanding finding that poverty increases risk for cognitive and social-emotional deficits (Evans, 2004; McLloyd, 1998) and increases risk for cognitive and developmental disabilities nearly double that of children from higher income households (Emerson, 2004; Fujiura & Yamaki, 2000; Simon et al., 2013) particularly as young children age (e.g., Rosenberg et al. 2008). Because young children with disabilities are so severely underserved in early intervention and special education, this study included children with special needs who have been identified for services and those who have diagnosed conditions or functional deficits indicative of delays. Previous researchers have considered the relations of diagnosed disabilities, special needs service receipt, or parent-reported developmental difficulties—each of which may substantially underrepresent the subpopulation—to subsidy receipt and did not find a relationship to subsidy receipt (e.g., Herbst, 2008; Herbst & Tekin, 2013; Johnson et al., 2013; Parish, Cloud, Huh, & Henning, 2005). A broader conceptualization of special needs here provides a different depiction of access to subsidies and potential disparities. Little previous research has considered such disparity; thus, causes of differential use of subsidies have yet to be identified. Furthermore, difference among subpopulations of children with special needs, or by differential operationalization of special needs, should be explored.

Several potential explanations for the observed disparities should be considered. Our findings may reflect the effects of children's special needs on parents' employment, because although some states exempt these parents from employment requirements for subsidy eligibility, many do not. This is noteworthy because children's special needs can hinder mothers' participation in employment or contribute to instability when parents are employed because of the added time demands and need for specialized care created by the child's disability (e.g., Shearn & Todd, 2000). Past research indicated that the added care burden of special needs contributed to mothers' choices not to work before their children entered elementary school (Porterfield, 2002), which may negate subsidy eligibility in many states during early childhood. Combined with the added out-of-pocket expenses and lost earnings shown to disproportionately affect families with low-income who have children with special needs (Lukemeyer, Meyers, & Smeeding, 2000), for these families, restrictive eligibility requirements combined with inadequate subsidy to fully pay for childcare may undermine

CCDF's overarching goal of fostering economic self-sufficiency because the elevated caregiving demands place steep obstacles for participation in employment and job training.

In addition, our findings may be attributable to the difficulty faced by families of children with special needs in finding childcare providers willing and equipped to appropriately provide care, education, and intervention to their children (Knoche, Peterson, Edwards, & Jeon, 2006). Providers who do and do not accept subsidies may not differ in this regard. Alternatively, interested providers may be unable to secure needed supports to facilitate care for these children because of logistic or bureaucratic constraints. These dynamics may be exacerbated by state policies that do not allocate sufficient subsidies to account for the added costs of providing care to children with multiple or intensive needs. In addition, families' awareness or valuation of services in across various sectors supporting childcare and education may be limited by ineffective coordination between state agencies administering Part C services and those involved in facilitating childcare (OCC Fact Sheet, 2015). In these ways, families who are low-income and have children with special needs may be doubly disadvantaged when seeking high quality care. Future research should explore how these contextual factors—state policies and procedures for families and providers—are related to differential rates of subsidized care and whether the new federal rules improve access and participation.

An alternative explanation for our findings may be found in parents' childcare preferences as opposed to access to subsidies. Previous research suggested that parents of very young children prefer parental care and other informal care arrangements (Susman-Stillman & Banghart, 2011); this preference may be especially pronounced among families with children with special needs. Although subsidies can be used with unregulated informal care providers, state requirements for these care providers vary significantly (e.g., background checks, registration stipulations, health and safety training and requirements, in-home observation requirements, etc.; Minton, Stevens, Blatt, & Durham, 2015; Raikes, Raikes, & Wilcox, 2005) and may disincentivize subsidy receipt among these providers (Rachidi, 2016). In addition, parents of young children with disabilities may rely on parental care longer or more frequently than parents of children without special needs (for a summary see DeRigne & Porterfield, 2010). Among families of children with special needs, families of children with profound needs and two-parent families are more likely to rely on parental care than single mothers (DeRigne & Porterfield, 2010; Leiter, Krauss, Anderson, & Wells, 2004; Porterfield, 2002). Research suggests that parents' valuation of out-of-home care and maternal employment may distinguish families who do and do not utilize non-parental care. Families who rely on parental care may perceive more costs and fewer benefits for maternal employment than families who use childcare, but they are otherwise similar to families without children with special needs on demographic characteristics, child characteristics, childrearing attitudes, or caregiving (Booth & Kelly, 2002). Whether these patterns apply to low-income families should be explored.

Variations in subsidy use across early childhood should also be explored further. The drop in subsidy usage among preschool-age children may be due to participation in other public programs, including early childhood education and special education, or it may be due to families cycling in and out of the program due to changing family resources, needs, or

difficulties in securing ongoing support due to policy and procedural barriers that hinder maintenance of eligibility (Ha & Meyer, 2010). Researchers should consider whether such policies and services reduce families' access to and needs for childcare, particularly for children with special needs.

Families of children with special needs might also rely primarily on services provided through other systems such as respite and early intervention/special education, decreasing the need for childcare subsidy or making them ineligible for subsidy. Finally, families of children with severe special needs may have less need for childcare because state policies for welfare receipt may exempt these parents from eligibility requirements for employment or educational activities, freeing time for them to directly care for their children (Minton et al., 2015). Thus, future research might also explore the eligibility and participation in various programs (e.g., TANF, IDEA, Head Start and Early Head Start, Title V family support services, social services block grants, and state prekindergarten programs) and systems (e.g., child welfare, social security) that may subsidize or otherwise support early care and education and thus affect families' use of childcare subsidy. Furthermore, in light of the priority subgroups in the recent CCDF reauthorization and emphasis on referral and coordination in multiple federal programs serving these groups (e.g., CCDF, IDEA; Child Abuse Prevention and Treatment Act), future studies can explore the effects of these regulations on the need for, and access to, various supports and services for children's early care and education. Qualitative follow up studies can help to elucidate barriers and facilitators to subsidy use as they relate to family and children's unique experiences, perceptions, preferences, and needs as a basis for informing refinement of policies and procedures to bolster family and child outcomes. In addition, researchers should explore whether the nature of a child's special needs, both in types and severity of disability or delay, affect the families' attitudes about childcare and their experiences with various configurations of care on a variety of dimensions (e.g., timing, type, dosage, accommodations, quality). Because quality childcare can bolster school readiness and long-term outcomes and help ameliorate the risks associated with early childhood special needs (Phillips & Lowenstein, 2011), we must consider trends in access, participation, and outcomes of early care and education for young children with special needs who live in low-income households.

4.2 Predictors of Subsidy Use among Children with Special Needs

Several child and family characteristics were significant predictors of subsidy use among eligible children with special needs. Throughout early childhood, children with special needs whose parents were not married were significantly more likely to utilize childcare subsidies. This is not an unexpected finding, as single-parent headed households tend to have lower incomes than dual-parent households (Child Trends Data Bank, 2015), and the subsidy program is targeted at the lowest-income families. Further, because single parents with children with special needs are more likely to choose non-parental care than their married counterparts (DeRinge & Porterfield, 2010), low-income families headed by single parents may be more likely to obtain subsidies to defray the costs of non-parental care. Other predictors of subsidy use included the child's race, maternal age, number of siblings in the home, maternal employment status, and maternal level of education. However, these

characteristics did not consistently predict subsidy usage throughout early childhood, but rather, were only predictive at single time period.

Some predictors of subsidy use for low-income children with special needs were consistent with those identified by previous researchers for the general population of subsidy-eligible children. Johnson and colleagues (2011) found that infants who received childcare subsidies had older mothers and fewer siblings living at home than subsidy-eligible non-recipients. Similarly, Herbst and Tekin (2010) reported that, in their sample of children from subsidy-eligible families, children whose mothers were more highly educated were more likely to receive subsidies. Three other studies found that families who used childcare subsidies were more likely to be headed by single mothers who were employed or African American (Herbst, 2008; Marshall et al., 2013; Shlay, Weinraub & Harmon, 2010).

Other predictors of subsidy use for children with special needs were not consistent with findings for the general population of subsidy-eligible children, suggesting that some patterns here may be unique to families of children with special needs. Unlike previous research (Herbst & Tekin, 2010; Johnson et al., 2011), language status and use of food subsidies (e.g., WIC or food stamps) did not predict subsidy utilization for children with special needs. Mothers' work status was a significant predictor when children were ages two and four, suggesting that employment requirements preclude subsidy use among mothers of children with special needs as discussed above. These findings may also be attributable to our differences in sampling or may suggest efforts to facilitate subsidy use by targeting groups based on these characteristics may not be influential for families of children with special needs at least in part because of the caregiving and employment challenges faced by families of children with special needs.

Qualitative studies may complement this large-scale research to explore the intersections of socioeconomic conditions and cultural characteristics with parents' perceptions of special needs, family needs, and childcare options and choices. Researchers may also consider the ways in which culture and family needs intersect to influence families' childcare attitudes and choices when children have special needs, given the likely role of parents' perceptions of disability in how they engage with their children and early intervention and care (e.g., Diken, 2006). In light of the parameters of the subsidy program, qualitative studies should also explore how children's disability influences the employment and education experiences and choices of parents with low-income. Such research might help to elucidate complex issues related to differential need, access, and opportunity among low-income families of children with special needs.

4.3 Limitations & Future Directions

While the current study adds to our understanding of childcare subsidy use by families with young children with special needs, it is not without limitations. A common limitation in this line of research is difficulty capturing variation in states' implementation of the subsidy program. Federal law only requires that subsidy recipients' have children under 13 years of age and have incomes under 85% of the state's median income (Vesely & Anderson, 2009), but many state laws change the eligibility criteria. State requirements also vary in employment requirements, use of waiting lists, requirements for parent co-payments for

childcare, and childcare provider reimbursement rates that may influence rates of subsidy use (Minton et al., 2015; Schulman & Blank, 2011; Vesely & Anderson, 2009). Using nationally representative data has the effect of averaging across all states, so the effects of interstate policy variations are unknown. Since the Office of Child Care (2014) reported that approximately 78% of families who access CCDF subsidies have incomes at or below 130% of the federal poverty level, we used this to approximate low-income families who may be subsidy-eligible in the United States. However, the results may not generalize well to states with substantially different eligibility criteria. Further, our sampling was complicated by the varied eligibility requirements for families with children with and without special needs; we opted not to include an employment criterion in our sampling strategy, but this hinders direct comparisons to studies of children from subsidy-eligible families in the general population.

Federal reports indicated that at the time of the ECLS-B data collection, fewer than one-third of subsidy-eligible families participated in the CCDF program, but reasons for these low rates, and the declining rates observed here, are unknown (U. S. Government Accountability Office, 2010). In addition, research suggested that using self-report data to identify subsidy-recipients may result in overestimates of participants compared to using administrative data (Krafft, Davis, & Tout, 2015), though this is contradicted elsewhere (Johnson & Herbst, 2013). This suggests that future studies should be conducted using samples drawn from CCDF administrative records. Future research should also account for both variations in states' CCDF implementation, children's special needs, and other family characteristics to help elucidate the trends identified here and elsewhere. Additionally, due to constraints of using extant data, the predictors of subsidy use were limited to those child, family, home, and geographic variables available in the dataset. It is possible that other factors not included in this study contribute to subsidy use for families with young children with special needs.

Finally, while the ECLS-B measures allow for broad estimation of special needs, we relied in part on parent report and lacked more precise information about whether and how children were identified with disabilities. The trends identified here may be confirmed in future research using administrative records. Researchers may also consider the extent to which residential and labor market conditions may differentially affect families' participation in the subsidy program, particularly in light of other barriers to labor market involvement of parents of children with special needs (e.g., Wall et al., 2006), as well as how states' and localities' differences in regulations and support affect families' use of subsidies. Furthermore, policy analysts should consider that benefits of CCDF may be realized in other ways not reflected in subsidy use among children of families with low-income because the support flows directly to early childhood programs to increase the supply and quality of care. The recent reauthorization may allow for consideration of the ways in which the CCDF supports children with special needs more broadly given the changes in reporting requirements.

Nonetheless, this study is significant because we provide nationally representative estimates of subsidy use and correlates among families of children with special needs, an often-understudied subgroup of children from low-income households. Finally, the ECLS-B allows for estimates of participation that predate the most recent policy changes, but more current data are not available because of limited collection of data pertaining to special

needs and childcare in other studies. Thus, the present study offers the most current and comprehensive estimates of subsidy use among families with children who have special needs. The present study can be used as a baseline for measuring the effects of recent federal rules intended to facilitate access among families of children with special needs.

4.4 Implications for Policy and Practice

These findings indicate that low-income families with children with special needs access subsidies at lower rates than low-income families whose children do not have special needs. Under the CCDBG reauthorization, states must make policy and practice adjustments, particularly through improved data collection, consumer information, provider supports, and system coordination to facilitate access among *all* families, with some targeted efforts towards families of children with special needs (Office of Child Care, 2015). Children's special needs may affect how, when, and where parents access childcare information and services; thus, improving knowledge and coordination among frontline subsidy workers, social and health service providers, and educators who engage with families with young children who have delays and disabilities (e.g., early interventionists, therapists, pediatricians, early childhood educators and other providers of IDEA Part B and C services) about CCDF could help improve subsidy awareness and use among this group. Efforts may also be tailored to increase those children shown here to have significantly reduced likelihood of subsidized care, particular those from smaller families headed by young mothers and mothers with lower educational attainment. Families' access may also be bolstered by adjusting income limits to account for inflation, using sliding scales for co-pays (Schulman & Blank, 2015), and providing program information and accepting applications in community-based locations (Schmit, Matthews, Smith, & Robbins, 2013). Recently, a state's increased subsidy 'generosity'—via higher income limited, increased reimbursement rates, and reduced copay—was found to improve families' subsidy access and increase use of center-based care (Weber, Grobe, & Davis, 2013).

In addition, state agencies may ease barriers for providers who serve or are interested in serving children with special needs. 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. Furthermore, the rates, which vary by state, need to be sufficient to cover the increased cost of caregiving for children with special needs since any costs not covered by the childcare subsidy may be passed on to families, thereby undermining the intention of the programming. States may also use contracts to increase the slots available for children with special needs (Schmit & Matthews, 2013). The advent of quality rating and improvement systems affords states the opportunity to provide additional resources and training for providers, which may increase availability and quality of subsidized care for children with special needs. For example, states can enhance providers' capacity to serve children's special needs by providing infant and toddler mental health consultants to support children with behavioral or social-emotional difficulties (Schmit & Matthews, 2013).

5. Conclusion

Findings from this study have the potential to bolster advocacy and dissemination efforts by providing nationally representative estimates on usage rates and predictors of childcare subsidy use among families of low-income children with special needs. The disparate subsidy usage rates signal the need for greater exploration of childcare needs and experiences of these families in order to ensure children with special needs are not disadvantaged within this system. Disparities in subsidy receipt may indicate that greater effort must be undertaken to ensure families with children who have special needs know about and access subsidies. In addition, it may indicate the need for more intentional collaboration between agencies overseeing subsidies, early childhood care and education, health care providers, and early intervention and special education to support children's developmental outcomes and school readiness.

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Table 1
 Characteristics of Low-Income Children at Three Age Points (As Proportions Unless Otherwise Indicated)

	9-months			2-years			4-years		
	Special Needs	None		Special Needs	None		Special Needs	None	
Unweighted <i>n</i>	450	3600		750	2250		1200	1200	
Child is male	0.57	0.49		0.57	0.49		0.59	0.45	
Child race									
White	0.33	0.31		0.31	0.32		0.30	0.35	
Black	0.22	0.23		0.23	0.24		0.24	0.29	
Hispanic	0.38	0.38		0.39	0.37		0.38	0.28	
Asian/Pacific Islander	0.01	0.02		0.02	0.02		0.02	0.02	
Multi/Other	0.06	0.05		0.05	0.05		0.06	0.05	
Household characteristics									
English is primary language	0.67	0.71		0.71	0.72		0.71	0.81	
Number of siblings									
None	0.34	0.37		0.29	0.29		0.16	0.18	
One	0.30	0.30		0.34	0.34		0.35	0.37	
Two	0.18	0.20		0.20	0.23		0.28	0.26	
Three or more	0.18	0.12		0.17	0.15		0.22	0.19	
Mother is married	0.43	0.47		0.45	0.47		0.50	0.45	
Mother's employment status									
Not working	0.68	0.60		0.64	0.59		0.60	0.47	
Part time	0.12	0.17		0.17	0.15		0.13	0.20	
Full time	0.20	0.23		0.19	0.26		0.27	0.33	
Mother's highest education									
Below high school	0.45	0.40		0.42	0.41		0.44	0.37	
High school or GED	0.39	0.37		0.38	0.36		0.38	0.39	
Some college or degree	0.16	0.23		0.20	0.23		0.18	0.24	
Mother's age (mean)	25.87	25.61		25.37	25.61		25.55	25.67	
Received food subsidies	0.91	0.91		0.85	0.85		0.88	0.83	
Received healthcare subsidies	0.90	0.85		0.73	0.75		0.90	0.87	

	9-months		2-years		4-years	
	Special Needs	None	Special Needs	None	Special Needs	None
Urban residence	0.84	0.83	0.84	0.84	0.82	0.84
Region of resident						
Northeast	0.18	0.14	0.12	0.16	0.09	0.17
Midwest	0.18	0.20	0.21	0.18	0.18	0.23
South	0.38	0.40	0.47	0.39	0.46	0.40
West	0.26	0.27	0.20	0.27	0.28	0.20

Note: All frequencies were rounded to the nearest 50 per IES requirements. Analyses were weighted by the replicate weights W1C0 for the 9-month estimates ($N = 1,496,550$), W2C0 for the 2-year estimates ($N = 1,329,550$), and W31C0 for the 4-year estimates ($N = 1,092,650$).

Table 2
Predictors of Subsidized Care among Low-Income Children with Special Needs during Early Childhood

	Age 9-months				Age 2-years				Age 4-years			
	AOR	CI 95%	Wald F	AOR	CI 95%	Wald F	AOR	CI 95%	Wald F	CI 95%	Wald F	
Female	0.57	0.21-1.55	1.22	0.60	0.29-1.20	2.17	1.16	0.54-2.50	0.15			
Race			3.49 *			3.25 *						1.00
White [†]	–	–		–	–		–	–				
Black	5.03	1.46-17.35		2.10	0.79-5.58		1.50	0.60-3.79				
Hispanic	1.74	0.37-8.28		0.56	0.21-1.55		1.14	0.32-4.05				
Asian/PI	26.70	2.52-282.86		0.27	0.06-1.23		3.01	0.25-36.99				
Other	4.28	0.97-18.91		1.60	0.42-6.05		2.78	0.99-7.78				
Home Language not English	0.49	0.10-2.33	0.85	0.77	0.23-2.58	0.19	0.57	0.16-2.02	0.79			
Number of siblings			0.85			11.33 [†]						0.65
None [†]	–	–		–	–		–	–				
One	0.47	0.13-1.77		0.28	0.13-0.58		1.02	0.44-2.35				
Two	0.78	0.14-4.32		0.76	0.29-1.98		1.17	0.51-2.68				
Three or more	1.46	0.39-5.50		0.10	0.03-0.27		0.69	0.28-1.69				
Unmarried parents	11.64	2.98-45.48	12.97 [†]	4.08	1.67-9.97	9.84 **	2.97	1.24-7.12	6.12 *			
Mother's work status			0.71			5.39 **			11.42 [†]			
Full time [†]	–	–		–	–		–	–				
Part time	1.01	0.19-5.47		0.46	0.21-1.05		1.05	0.45-2.43				
Not working	0.59	0.20-1.72		0.31	0.15-0.63		0.20	0.09-0.44				
Mother's highest education			0.81			3.92 *			0.97			
Below high school	0.81	0.20-3.22		0.33	0.13-0.89		1.33	0.52-3.45				
High school or GED	1.42	0.42-4.81		0.33	0.14-0.74		1.94	0.73-5.15				
Some college or degree [†]	–	–		–	–		–	–				
Mother's age (1 year increments)	1.10	1.03-1.17	8.21 **	1.02	0.96-1.07	0.36	1.02	0.97-1.07	0.51			
Received of food subsidies	0.90	0.17-4.74	0.02	1.75	0.56-5.51	0.95	4.66	0.84-25.81	3.19			
Received of healthcare subsidies	2.11	0.48-9.26	1.01	1.68	0.68-4.14	1.33	2.92	0.59-14.56	1.76			

	Age 9-months			Age 2-years			Age 4-years		
	AOR	CI 95%	Wald F	AOR	CI 95%	Wald F	AOR	CI 95%	Wald F
Rural Residence (v. urban)	0.80	0.14-4.50	0.06	0.57	0.18-1.80	0.95	0.58	0.18-1.83	0.88
Region			2.71			0.19			0.48
Northeast [†]	–	–	–	–	–	–	–	–	–
Midwest	3.02	0.83-10.91		1.34	0.31-5.91		1.18	0.21-6.67	
South	0.92	0.29-2.94		0.94	0.27-3.29		0.68	0.13-3.50	
West	0.29	0.06-1.45		0.91	0.17-4.86		0.71	0.11-4.47	
Pseudo R^2 McFadden		0.31			0.24			0.19	

Note:

[†] indicates the reference category.

* p 0.05,

** p 0.01,

[†] p 0.001.