

## Stability and sequence of center-based and family childcare: Links with low-income children's school readiness

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### ABSTRACT

The school readiness of a large sample ( $n=2682$ ) of ethnically and linguistically diverse, low-income children was examined as a function of whether children remained in family childcare (FCC) or center-based care (CBC) throughout their three and four-year-old preschool years, or whether they switched to the other type of childcare or to a public school pre-K program at age four. Children's pre-academic development (cognition, fine motor, and language) was assessed with the Learning Accomplishment Profile – Diagnostic (LAP-D), and teachers and parents rated children's social skills and behavior concerns with the Devereux Early Childhood Assessment (DECA) at three time points over two years. All children, regardless of childcare sequence, demonstrated some gains in school readiness. However, children receiving stable CBC over the two years made moderate gains in pre-academic skills and teacher-reported social skills. Children in stable FCC exhibited some gains in fine motor, language, and teacher reported-social skills but lost ground relative to national norms in cognitive skills. Children who switched between CBC and FCC did not show as much pre-academic growth (with those who switched to FCC gaining the least); however, children who switched from CBC to FCC did demonstrate strong teacher-reported social skills. Children who switched to public school pre-K programs at age four showed the strongest school readiness and were the only group to score above national averages in language and cognition.

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### 1. Introduction

Children's early years of development are dynamic and influenced by multiple biological and ecological factors (Bronfenbrenner, 1986; Clarke-Stewart & Allhusen, 2005). An important early ecological influence is childcare, which has seen rapid increases in use in the last few decades (Clarke-Stewart & Allhusen, 2005; Hofferth, 1996; Smith, 2002). Today, the majority of children under five experience at least one arrangement of childcare outside of their home and are likely to experience changes in their type of care over time (Miller, 2003; Smith, 2002; U.S. Census Bureau, 2005). Common options for early care and education include center-based childcare, family childcare settings, public school pre-K programs, and Head Start.

It is often suggested that public school pre-K programs and high-quality Head Start centers are better than other early education programs for fostering school readiness among low-income children, especially with regard to growth in pre-academic skills (Gormley, Gayler, Phillips, & Dawson, 2005; Li Grining & Coley, 2006; Winsler et al., 2008). Children in child care centers of average to high quality exhibit adequate gains in early academic development; however, some suggest that children may display heightened behavior problems with prolonged use of

low-quality center-based care (Burchinal et al., 2000; Crosnoe, 2007; Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007; Loeb, Fuller, Kagan, & Carrol, 2004; Magnuson, Lahaie, & Waldfogel, 2006). Children in family childcare settings have been found to show poorer school readiness skills compared to children in other types of programs (Ansari & Winsler, 2012; Burchinal et al., 2000; Loeb et al., 2004; NICHD, 2006). However, ethnically diverse children in poverty do make positive gains toward school readiness compared to national norms when enrolled in center-based care (Winsler et al., 2008).

Enrollment in different early education arrangements, however, varies across income groups, with children from low-income families being less likely to enroll in center-based care and non-relative family childcare compared to more financially advantaged families (Capizzano & Adams, 2000). Among low-income families, about one-third of 3- and 4-year-old children are enrolled in center-based care (including public school pre-K programs; 36.4%), while only one in ten children are enrolled in family child care (10.3%; Capizzano & Adams, 2000). Further, the literature on childcare selection suggests that White and Black families are more likely to enroll their children in center-based programs than Latino/Mexican families who are more likely to enroll their children in informal or relative care (Fuller, Hollaway, & Liang, 1996; Radey & Brewster, 2007; Tang, Coley, & Votruba-Drzal, 2012). However, the tendency for Latinos to prefer family childcare may be more true among Mexican-origin families than Latinos from other countries (Puerto Rico/

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Cuba; Espinosa et al., submitted for publication), and it may be more an issue of accessibility than cultural preference (Ansari & Winsler, 2012; Tienda & Haskins, 2011; Yesil-Dagli, 2011).

It is well documented that children in poverty are behind in the areas of school readiness in contrast to their more-affluent peers (Brooks-Gunn & Duncan, 1997; Dearing, McCartney, & Taylor, 2006; Duncan, Yeung, Brooks-Gunn, & Smith, 1998; Gershoff, Aber, & Raver, 2003). Low-income children face both biological and environmental risk factors that limit their school readiness including; low parental education, limited English proficiency, single-parent families, and immigrant and ethnic minority status (Huston & Bentley, 2009; Karoly, Kilburn, & Cannon, 2005). Low-income children exhibit different levels of school readiness upon kindergarten entry depending on the type and quality of early education programs in which they were enrolled (Gormley et al., 2005; Loeb et al., 2004; Winsler et al., 2008).

Many low-income families, however, cannot afford quality care (National Association of Child Care Resources & Referral Agencies [NACCRRA], 2011; Peisner-Feinberg & Yazejian, 2010). NACCRRA (2011) reports that the annual cost of childcare accounts for more than half of the income of underprivileged families, with childcare costs ranging from \$3900 to \$14,050, now exceeding one-year's worth of college tuition in some areas. As such, families are forced to cut back on spending and childcare altogether, while other families change their child's care arrangement due to financial concerns. Between 33 and 60% of children experience childcare instability before they begin elementary school (Chase, Arnold, Schauben, & Shardlow, 2005; Lowe, Weisner, & Geis, 2003; Miller, 2003; Tran & Weinraub, 2006) with children from disadvantaged families experiencing the most frequent changes (Ha, Magnuson, & Ybarra, 2012). Clearly, an emerging challenge facing low-income families is maintaining stable high-quality childcare.

Research has explored the effects of various types of childcare stability on children's school readiness. Stability of care has been defined in many ways including; (1) stability in day-to-day staff or teacher retention over time, (2) stability over time in a child's primary caregiver/teacher, (3) change over time in childcare settings or types, and (4) multiplicity, or having multiple caregiving arrangements at one point in time (Bacharach & Baumeister, 2003; Claessens & Chen, 2013; de Schipper, Van Ijzendoorn, & Tavecchio, 2004; Miller, 2003; Morrissey, 2008, 2009, 2010; Tran & Winsler, 2011). Children between the ages of two and five who experience multiple concurrent caregivers exhibit greater levels of behavioral problems, lower levels of social skills, and are more likely to experience health problems (Bacharach & Baumeister, 2003; Claessens & Chen, 2013; Morrissey, 2009, in press; Youngblade, 2003), compared to children enrolled in only one childcare program. Children between the ages of two and four who experience stable care for extended periods of time have been found to exhibit greater levels of cognitive and language skills and exhibit higher levels of teacher-rated initiative and attachment compared to children who experienced a change in centers (Loeb et al., 2004, 2007; Tran & Winsler, 2011). Prior studies suggest that children who experience a change of primary caregiver, compared to those whose caregiver/teacher remains stable over time, exhibit lower levels of social competence and lower levels of pre-academic skills and poorer classroom initiative, closeness with adults, and self-control (Howes & Hamilton, 1993; Tran & Winsler, 2011). Children who experience stable care appear to be more prepared for the transition to kindergarten in contrast to children who experience childcare or caregiver instability (Loeb et al., 2004, 2007; Tran & Winsler, 2011).

The sequence and timing of the childcare changes children experience over time is also an important factor for children's early developmental outcomes. Using data from the NICHD Study of Early Child Care and Youth Development, Morrissey (2010) examined three sequences of childcare for children between the infant and pre-school years, including; (1) children who experienced a transition from home to center-based care, (2) children who received continuous home care, and (3) children

who received continuous center-based care. Morrissey finds that children who experience home care and switch to center-based care between the ages of three and five show similar academic gains and fewer behavior problems than children who experience prolonged center care, with children in prolonged family childcare settings exhibiting greater social skills (Morrissey, 2010). It appears, therefore, that no sequence of care is particularly optimal because the effects of childcare patterns over time vary across domains of school readiness (e.g. social versus academic). As such, it is important to further examine both stability and sequence of childcare especially among low-income children who are influenced more by childcare settings (both negatively and positively; Crosby, Gennetian, & Huston, 2005), are more likely to experience multiple primary caregivers, (Hofferth & Collins, 2000; Howes & Hamilton, 1993; Loeb et al., 2004; U.S. Census Bureau, 2005), and have less access to high-quality care (Fuller et al., 1996; Magnuson & Shager, 2010; Wesley & Buysse, 2010), compared to their more affluent peers.

### 1.1. The current study

Although the existing literature has started to highlight the importance of stable childcare arrangements, there remains much to be known about the academic and social development of ethnically diverse and low-income children who experience childcare instability and different sequences of childcare type over time between the ages of three and four, the age at which many families make a transition toward more formal, center-based preschool settings (Capizzano, Adams, & Sonenstein, 2000; Morrissey, 2010). In the present longitudinal study, we examine stability over the 3- and 4-year-old prekindergarten years in the form of children experiencing a change in the type of their primary childcare arrangement – center-based childcare (CBC), family childcare (FCC), or public school pre-K programs (Pre-K). We examine whether social, cognitive, fine motor, language, or behavioral development shows different trajectories between the ages of 3–5 for a large group ( $n = 2682$ ) of low-income, ethnically diverse (Latino, Black) children who did or did not experience various transitions between these types of care. We use data from the Miami School Readiness Project (MSRP; Winsler et al., 2008, 2012). The MSRP was a large-scale, university-community applied partnership and program evaluation project in which children, county-wide, who were receiving subsidies to attend the community childcare type of their choice, and children attending public school pre-K programs were assessed for school readiness multiple times at ages 3 and 4. Children were directly assessed at the beginning (T1, Fall) of their three-year old year, and at the beginning (T2, Fall), and end (T3, Spring) of their four-year old pre-kindergarten year for motor, cognitive, and language development, and parents and teachers reported on children's social skills and behavior problems. Over the course of these two years and three time points, five sequences of childcare transitions were examined: (1) children who consistently attended family childcare through both their three and four-year old years (FCC–FCC), (2) children who consistently attended center-based care in the community (CBC–CBC), (3) children who attended family childcare at age three but switched to center-based care at age four (FCC–CBC), (4) children who switched from center-based care to family childcare (CBC–FCC), and (5) children who were in center-based care at age three but then moved to a public school pre-K program at age four (CBC–Pre-K). This last transition group, from center-based care to public pre-K programs, is of particular interest because scholars have yet to examine this type of transition (Morrissey, 2010), and there is much current policy interest in universal pre-K programs (Barnett, Brown, & Shore, 2004; Gormley et al., 2005; Howes et al., 2008).

We address the following research questions: (1) Do children who experience stability of childcare type (e.g. CBC–CBC and FCC–FCC) show greater gains over time in school readiness compared to children who experience a change in their type of care (e.g. FCC–CBC and CBC–FCC)? and (2) Which sequence group showed the greatest school readiness gains? Given that others have suggested that gender and ethnic

groups differences exist in children's reactions to childcare in general (Crockenberg, 2003; De Feyter & Winsler, 2009; Duncan & Magnuson, 2005; Votruba-Drzal, Coley, & Chase-Lansdale, 2004) and perhaps, childcare transitions (Cryer et al., 2005; Tran & Winsler, 2011), we also explored whether gender and/or ethnicity (Black vs. Latino) moderated any school readiness differences observed between the sequence groups. In terms of hypotheses, we expected that children who experienced stable childcare over this two-year period (CBC–CBC and FCC–FCC) would show stronger school readiness skills and gains than those who switched between these types (FCC–CBC and CBC–FCC), with the stable center-based care group (CBC–CBC) exhibiting greater school readiness gains over time but also showing greater behavior concerns, and the stable family childcare group (FCC–FCC) exhibiting stronger social and behavioral skills (Loeb et al., 2004; Morrissey, 2010). Although, this is the first study to examine those who transition from center-based care in the community to public school pre-K programs (CBC–Pre-K), given earlier work showing that, in general, children attending public pre-K programs do better in terms of school readiness than those in childcare (Gormley et al., 2005; Magnuson, Meyers, Ruhm, & Waldfogel, 2003; Winsler et al., 2008), we expected this group to exhibit the greatest gains in school readiness across all domains. Since the transition to more formal, center-based care as children approach the school years is seen as adaptive and appropriate (Morrissey, 2010), we expected that children who switched to center-based care from family childcare (FCC–CBC) would be doing better than those who switched from center care to family childcare (CBC–FCC) over the same time period.

## 2. Method

### 2.1. Participants

The present study examines a subsample from the larger MSRP database that originally included children receiving subsidies to attend childcare or attending public school pre-K programs in Miami-Dade County during the years of 2002–2007, who consented to be assessed for school readiness as a preschooler. The particular subsample selected for this paper were children who were receiving subsidies to attend either family childcare (FCC) or center-based care (CBC) as a three-year-old and were assessed for school readiness on at least one measure at age three, and who were assessed again as a four-year-old the following year ( $n=2682$ , 51% male). It should be noted that although families are allowed to use childcare subsidies for informal and relative care, the relatively small number of families doing so were not included in this project nor in the larger MSRP project due to lack of community resources to locate all such children for administering the child assessments. Participants were 57% Hispanic/Latino, 40% African American/Black, and 3% White/other and given that they all qualified for childcare subsidies, they were all in poverty or low income (overall annual household income = \$16,130). Some family demographic information (parental age and education, marital status, parent country of origin) was provided by parent report upon registration; however, this information was only available for one year/cohort of children. The majority of parents were single (63%), under thirty years of age ( $M=28.59$ ,  $SD=6.41$ ), born in the United States (51%), and had received the equivalent of a high-school education ( $M=11.55$  years,  $SD=1.68$ ).

Consistent with work showing that families receiving subsidies typically choose CBC over FCC (Ryan, Johnson, Rigby, & Brooks-Gunn, 2011; Shlay, Weinraub, Harmon, & Tran, 2004), a trend verified for subsidy recipients in this county (Ansari & Winsler, 2012; Winsler et al., 2008), the vast majority of our sample attended CBC during both years. Although quality of childcare was not systematically collected for all children, center-level quality was available for a fairly representative subsample of centers ( $n=288$ ) and children ( $n=2487$ ) from the larger MSRP. For this subsample, childcare quality measured by the ECERS-R (Harms & Clifford, 1998) was just below the cutoff between the ratings of mediocre and good quality (4.92; Winsler et al., 2008).

Out of our total sample, we created the following five sequence groups based on the type of program they attended during those two years of preschool, including children who attended: 1) stable center-based care (CBC–CBC;  $n=2078$ ); 2) stable family childcare (FCC–FCC;  $n=22$ ); and children who 3) switched from center-based care to family childcare (CBC–FCC;  $n=18$ ); and children who 4) switched from family childcare to center-based care (FCC–CBC;  $n=35$ ). At the time of data collection (and before universal, voluntary pre-K began in this county), Title-1 qualifying public schools offered full-day pre-K programs that children could attend free of charge. Some of the children formerly receiving center-based childcare subsidies choose to attend public school pre-K in their second year. This group (CBC–Pre-K;  $n=529$ ) formed our fifth sequence. Table 1 shows the demographic information available for the entire sample and for children listed separately by sequence group. We tested group equivalence on these variables with ANOVAs and Chi-Square analyses. There were no differences observed across the sequence groups on child gender, parent marital status, parent education, parent age, or family income. However, we did find that children in the CBC–FCC sequence group had a higher percentage of immigrant parents than the other groups while the CBC–Pre-K sequence group had a greater number of U.S. native-born parents. The CBC–Pre-K sequence group also had a somewhat larger proportion of Black children than the other groups. Note that the two years used to calculate the sequence groups involve age 3 (T1 Fall) and age 4 (T2 Fall and T3 Spring assessments). Children had to remain in the same childcare type for the entire 4-year-old period (both T2 and T3), to be included in the study, so children who switched childcare types again between T2 and T3 were not included. It is possible that children considered stable actually experienced some other kind of instability in childcare type between T1 and T2 that we did not know about. Finally, we only had information on the child's primary care type. It is possible that children have multiple care arrangements, but we did not have access to that information.

### 2.2. Measures/procedure

#### 2.2.1. Cognitive, language, and fine motor skills

Children's pre-academic skills were assessed directly through the Learning Accomplishment Profile – Diagnostic (LAP-D; Nehring, Nehring, Bruni, & Randolph, 1992). The LAP-D is a nationally norm-referenced instrument that matched up with the States' Early Learning Performance Standards and has been found to exhibit good internal consistency reliability (.93–.95) within the larger MSRP sample (Winsler et al., 2008). Each domain of the LAP-D includes two subscales: 1) cognitive – matching and counting, 2) fine motor – writing and manipulation, and 3) language – comprehension and naming. The LAP-D was administered at the beginning of children's three-year old year (T1 September/October), and the beginning and end of children's four-year old academic year (T2 September/October and T3 April/May), and for children attending childcare programs, the assessment was given by trained bilingual (Spanish/English) outside assessors (social workers/school psychologists). Assessors each had their list of children receiving subsidies that were to be assessed at various providers in their particular area of the county and they traveled to the childcare providers in a manner as efficient as possible to administer the assessments. For children in public school pre-K programs the second year, the LAP-Ds were administered by the child's pre-K teacher after she had completed similar rigorous training as that given the outside assessors. As is standard practice, the language in which the child was assessed on the LAP-D was determined by a combination of the teacher's report of the child's strongest language and the assessor's impression after speaking to the child for a while in both languages. Forty-five percent of children completed the LAP-D in Spanish at T1, 38% at T2, and 35% at T3.

We conducted ANOVA analyses to determine if language of LAPD assessment mattered for children's performance, if it varied across childcare sequences, and if childcare sequence differences in outcomes

**Table 1**  
Demographic variables, by sequence type.

| Variables          | Overall (n = 2682) | CBC–CBC (n = 2078) | FCC–FCC (n = 22)  | CBC–FCC (n = 18)  | FCC–CBC (n = 35)  | CBC–Pre-K (n = 529) |
|--------------------|--------------------|--------------------|-------------------|-------------------|-------------------|---------------------|
| Marital status     |                    |                    |                   |                   |                   |                     |
| Single             | 1132 (62.7%)       | 874 (61.6%)        | 11 (68.8%)        | 6 (46.2%)         | 15 (53.6%)        | 226 (68.9%)         |
| Married            | 125 (6.9%)         | 101 (7.1%)         | 0 (0%)            | 1 (7.7%)          | 3 (10.7%)         | 20 (6.1%)           |
| Divorced/Separated | 547 (30.4%)        | 444 (31.2%)        | 5 (31.2%)         | 6 (46.2%)         | 10 (35.7%)        | 82 (25.0%)          |
| Parent education   | 11.55 (1.68)       | 11.54 (1.69)       | 11.93 (.80)       | 12.15 (.55)       | 11.97 (.19)       | 11.50 (1.76)        |
| M (SD)             |                    |                    |                   |                   |                   |                     |
| Family income      | \$16,130 (\$7535)  | \$16,079 (\$7373)  | \$15,181 (\$6901) | \$12,900 (\$6205) | \$19,073 (\$6669) | \$16,266 (\$8292)   |
| M (SD)             |                    |                    |                   |                   |                   |                     |
| Parent age         | 28.59 (6.41)       | 28.77 (6.46)       | 27.67 (7.45)      | 26.47 (5.74)      | 27.08 (4.87)      | 28.04 (6.25)        |
| M (SD)             |                    |                    |                   |                   |                   |                     |
| Parent country *   |                    |                    |                   |                   |                   |                     |
| USA                | 930 (51.4%)        | 687 (48.3%)        | 8 (50.0%)         | 5 (38.5%)         | 14 (48.3%)        | 216 (65.5%)         |
| Other              | 881 (48.6%)        | 736 (51.7%)        | 8 (50.0%)         | 8 (61.5%)         | 15 (51.7%)        | 114 (34.5%)         |
| Child gender       |                    |                    |                   |                   |                   |                     |
| Male               | 1327 (51.0%)       | 1055 (52.6%)       | 11 (52.4%)        | 8 (44.4%)         | 18 (51.4%)        | 235 (45.0%)         |
| Female             | 1274 (49.0%)       | 950 (47.4%)        | 10 (47.6%)        | 10 (55.6%)        | 17 (48.6%)        | 287 (55.0%)         |
| Child ethnicity *  |                    |                    |                   |                   |                   |                     |
| White              | 71 (2.6%)          | 64 (3.1%)          | 1 (4.5%)          | 0 (0%)            | 0 (0%)            | 6 (1.1%)            |
| Hispanic/Latino    | 1532 (57.4%)       | 1276 (61.2%)       | 15 (68.1%)        | 12 (66.7%)        | 20 (57.1%)        | 209 (39.7%)         |
| African American   | 1068 (40.0%)       | 729 (35.2%)        | 6 (27.3%)         | 6 (33.3%)         | 15 (42.9%)        | 312 (59.2%)         |

Notes. Data on these demographic variables were only available for a smaller subset of children and varied depending on the measure.

\*  $p < .05$ .

varied as a function of assessment language. We found a few main effects for assessment language where children performed slightly better on cognitive ( $F[2, 1817] = 5.93, p < .01$ ) and language skills ( $F[2, 1789] = 21.71, p < .001$ ) if they completed the assessment in English, however, fine motor skills ( $F[2, 1828] = 9.50, p < .001$ ) were slightly better when assessments were completed in Spanish. Assessment language also varied by childcare sequence group in that children who switched from center-based care to pre-K (CBC–Pre-K) and the FCC–CBC group were more likely to complete assessments in English (60% vs. 40%,  $\chi^2(8, n = 1888) = 164.79, p < .001$ ). Importantly, language of assessment did not interact with childcare sequence effects on children's school readiness outcomes when language of assessment was added as an additional independent variable in the ANOVAs described below.

### 2.2.2. Social skills and behavior concerns

Both parents and teachers rated children's social skills and behavior problems with the Devereux Early Childhood Assessment (DECA; LeBuffe & Naglieri, 1999) at the same time points as discussed above for the LAP-D. Forty-five percent of teachers and 43% of parents completed the Spanish form at T1, 27% of teachers and 36% of parents completed the Spanish form at T2, and 22% of teachers and 34% of parents completed the Spanish form at T3. Parents and teachers were asked to rate children's behavior on four sub-scales: initiative, self-control, attachment, and behavior concerns. For the behavioral concerns section, raters were asked to consider children's behavior from the prior four weeks on a scale of (0 = never, 1 = rarely, 2 = occasionally, 3 = frequently, and 4 = very frequently). The first three subscales, initiative, self-control, and attachment combine to make a total protective factors score, in which bigger numbers signal greater socio-emotional strengths. The behavior problems subscale stood alone, with bigger numbers indicating greater behavior problems. A sample question from the initiative subscale includes "starts or organizes play with other children," while an example item for self-control includes "listens to/respects others." For the attachment subscale, an example includes "responds positively to adult comfort when upset," and an example of the behavior scale items includes "fights with other children."

In the standardization sample, the DECA was reported to have internal consistency reliability alphas of .94 (teacher) and .91 (parent) for total protective factors and .80 (teacher) and .71 (parent) for behavior concerns, and 1–3 day test–retest reliabilities of .94 (teacher) and .74

(parent) for protective factors and .68 (teacher) and .55 (parent) for behavior concerns (LeBuffe & Naglieri, 1999). Internal consistency reliability within this Miami sample was .91 (parent) and .94 (teacher) for total protective factors, and .72 (parent) and .81 (teacher) for behavior concerns (Winsler et al., 2008). Within the MSRP sample, reliability on the DECA has been shown to be strong and not to vary as a function of either language of form (English or Spanish) or rater (teacher–parent; Crane, Mincic, & Winsler, 2011).

## 3. Results

### 3.1. Analysis plan

With three assessment time points over two years, multiple domains of child school readiness measured as dependent measures, and five childcare sequence groups as our main independent variable, our main analysis strategy was to conduct a series of 3 (Time – T1, T2, and T3)  $\times$  5 (sequence group CBC–CBC, FCC–FCC, FCC–CBC, CBC–Pre-K, and CBC–FCC) mixed repeated-measures ANCOVAs with each of the school readiness variables entered each in turn (fine motor, cognitive, language, teacher-reported social skills and behavior concerns, and parent-reported social skills and behavior concerns) as dependent variables. Because we observed differences in child ethnicity between the sequence groups, we controlled for child ethnicity (Latino/Black) in these analyses. Also, given that there were very few children in the same centers/classrooms, with most classrooms having mostly other, non-subsidized (and thus non-participating) children included, nesting was not seen as an issue and hierarchical linear models were, thus, deemed unnecessary. Of note are the unequal sample sizes and small sample sizes in the case of groups involving FCC, since most families, in general, and in our sample, attend center-based care. However, ANCOVA is robust and valid for use with unequal sample sizes when assumptions are generally met, as was the case here (Erceg-Hurn & Mirosevich, 2008). To provide the best parameter estimates possible, Table 2 shows all of the children's assessment scores at each time point T1, T2, and T3 by childcare sequence group, and provides the means (and SDs) including children who had that particular assessment score at that time point. In addition to the repeated-measures ANCOVAs reported below using list-wise deletion of missing data, we also ran single point in time ANOVAs using every possible child at each time point and found the same patterns in each case, suggesting that

systematic scale/item non-response was not a concern (Allison, 2002; Schafer & Graham, 2002). Also, the same analyses of childcare sequence effects were also run with language of LAP-D assessment entered in as covariate to test whether English language learner status influenced our findings. There were no meaningful differences with or without the inclusion of LAP-D language of assessment as a covariate. Thus, to keep higher degrees of freedom and to avoid losing cases of children for whom language of assessment was not available, we only present results below controlling for ethnicity. Finally, to establish that the statistical significance found in these models was not simply due to the very large sample size within the CBC–CBC group, we also re-ran all analyses with randomly selected 500 cases representing the CBC–CBC sequence group, and in each case, the results were the same.

First however, we examined, in a preliminary way, whether ethnicity (Black vs. Latino – with the White/other group excluded due to small numbers) or gender moderated any observed effects of childcare sequence of childcare on children's outcomes by adding these variables one at a time as an additional independent variable in the ANOVAs. Although there were consistent main effects for gender (with girls typically outperformed boys in most areas of school readiness), gender never interacted with sequence group. Similarly, although there was one main effect for ethnic group (with parent-rated child social skills being rated higher by Latino parents than by Black parents), ethnicity did not moderate sequence group effects on children's skills.

3.2. Pre-academic skills

3.2.1. Fine motor

The first domain analyzed was LAP-D fine motor skills. As seen in Table 2 and displayed in Fig. 1, there was a significant effect for time ( $F[2, 1957] = 4.50, p < .01$ ), and a significant time-by-sequence-group interaction ( $F[8, 3916] = 8.66, p < .001$ ), indicating that children who experienced stable care in either family childcare or center-based care showed significant gains between their three and four year old year (time  $d$ 's around .30), while children who changed from either center-based or family childcare and later switched to the other one showed some losses relative to national averages in early fine motor skills (time  $d$ 's around .12). Children who initially experienced center-based care and later switched to public school pre-K during

their four-year old year showed the greatest gains from T1 to T3 (time  $d = .53$ ).

3.2.2. Cognition

The next domain analyzed was LAP-D cognitive skills. Results showed that there was no significant main effect for time ( $F[2, 1934] = 1.96, p = .14$ ). However, there was an interaction for time-by-sequence group ( $F[8, 3888] = 14.78, p < .001$ ), indicating that children who switched from CBC to public school pre-K programs made the greatest gains by the end of the four-year old year (time  $d = .71$ ), while children who experienced stable family childcare lost ground in early cognitive skills (time  $d = .61$ ), and all other children showed slight growth over the course of the two-years (time  $d$ 's around .14; see Fig. 2).

3.2.3. Language

For the language scale of the LAP-D, there was not a significant effect for time ( $F[2, 1912] = .09, p = .92$ ); however, there was a significant interaction between time and sequence group ( $F[8, 3826] = 17.45, p < .001$ ), where children who experienced CBC during their three-year old year and were later enrolled in a public school pre-K programs again showing the highest gains in language skills at the end of their four-year old year (time  $d = .92$ ). Also visible is that the two groups experiencing transitions within subsidized care (CBC–FCC and FCC–CBC) did not gain as much in their second year (time  $d$ 's around .17) as the children in stable groups (CBC–CBC time  $d = .48$ ; FCC–FCC time  $d = .27$ ) who tended to show reasonable growth in language development (see Fig. 3).

3.3. Social skills and behavior

3.3.1. Teacher-rated social skills and behavioral concerns

For children's social skills and behavioral concerns rated by teachers using the DECA, as seen in Fig. 4, analyses showed that there was a significant effect for time ( $F[2, 1340] = 4.03, p < .05$ ), and a significant interaction of time and sequence group ( $F[8, 2682] = 1.95, p < .05$ ). Children who switched from family childcare to center-based care exhibited the highest initial skills and larger gains in teacher-rated social skills by the end of their four-year old year (time  $d = .35$ ), while children who experienced other sequences of childcare showed moderate gains (time  $d$ 's

**Table 2**  
Overall progress in academic and social development for different childcare type groups.

|                                  | CBC–CBC         |                 |                 | FCC–FCC       |               |               | CBC–FCC       |               |               | FCC–CBC       |               |               | CBC–Pre-K      |                |                |
|----------------------------------|-----------------|-----------------|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|
|                                  | T1              | T2              | T3              | T1            | T2            | T3            | T1            | T2            | T3            | T1            | T2            | T3            | T1             | T2             | T3             |
| LAP-D                            | <i>n</i> = 2021 | <i>n</i> = 2008 | <i>n</i> = 1650 | <i>n</i> = 22 | <i>n</i> = 22 | <i>n</i> = 14 | <i>n</i> = 18 | <i>n</i> = 17 | <i>n</i> = 13 | <i>n</i> = 35 | <i>n</i> = 34 | <i>n</i> = 30 | <i>n</i> = 505 | <i>n</i> = 438 | <i>n</i> = 398 |
| Fine motor <sup>a, b</sup>       | 46.28           | 53.05           | 55.85           | 50.14         | 54.41         | 60.43         | 47.89         | 54.00         | 50.31         | 47.40         | 50.56         | 48.00         | 43.15          | 49.29          | 60.99          |
| <i>M</i> ( <i>SD</i> )           | (28.53)         | (29.21)         | (27.09)         | (29.29)       | (31.61)       | (26.35)       | (23.59)       | (32.07)       | (28.80)       | (27.13)       | (24.58)       | (25.34)       | (28.18)        | (30.11)        | (28.67)        |
| Cognitive <sup>b</sup>           | 42.36           | 44.19           | 46.56           | 45.55         | 47.73         | 36.58         | 49.28         | 47.06         | 50.84         | 43.03         | 40.15         | 44.21         | 42.25          | 45.52          | 62.14          |
| <i>M</i> ( <i>SD</i> )           | (28.43)         | (27.83)         | (26.97)         | (26.71)       | (30.39)       | (24.84)       | (27.10)       | (28.70)       | (26.69)       | (27.12)       | (24.93)       | (21.77)       | (28.35)        | (29.52)        | (28.09)        |
| Language <sup>b</sup>            | 27.27           | 35.14           | 39.46           | 31.09         | 41.09         | 42.36         | 35.00         | 46.88         | 34.54         | 33.56         | 37.23         | 34.53         | 28.62          | 33.14          | 54.24          |
| <i>M</i> ( <i>SD</i> )           | (23.62)         | (27.30)         | (25.73)         | (26.88)       | (29.50)       | (25.70)       | (25.97)       | (26.95)       | (26.83)       | (24.42)       | (24.34)       | (23.51)       | (24.11)        | (27.83)        | (30.04)        |
| DECA – Teacher                   | <i>n</i> = 1610 | <i>n</i> = 1739 | <i>n</i> = 1496 | <i>n</i> = 13 | <i>n</i> = 12 | <i>n</i> = 9  | <i>n</i> = 13 | <i>n</i> = 12 | <i>n</i> = 9  | <i>n</i> = 23 | <i>n</i> = 30 | <i>n</i> = 30 | <i>n</i> = 387 | <i>n</i> = 483 | <i>n</i> = 463 |
| Social skills <sup>a, b</sup>    | 47.87           | 53.86           | 59.69           | 47.77         | 62.33         | 65.11         | 55.15         | 53.75         | 60.89         | 65.87         | 66.63         | 75.30         | 50.57          | 50.46          | 60.80          |
| <i>M</i> ( <i>SD</i> )           | (27.92)         | (28.24)         | (28.21)         | (26.81)       | (28.13)       | (33.92)       | (25.04)       | (35.50)       | (27.93)       | (26.59)       | (30.97)       | (23.37)       | (30.12)        | (26.95)        | (27.35)        |
| Behavior concern <sup>c, d</sup> | 60.58           | 55.71           | 54.44           | 69.23         | 66.33         | 61.44         | 75.08         | 64.58         | 72.67         | 58.35         | 50.57         | 44.50         | 59.91          | 46.47          | 48.26          |
| <i>M</i> ( <i>SD</i> )           | (27.21)         | (28.37)         | (28.86)         | (28.74)       | (29.97)       | (31.70)       | (22.01)       | (35.74)       | (31.79)       | (28.97)       | (29.53)       | (29.87)       | (27.58)        | (28.63)        | (28.78)        |
| DECA – Parent                    | <i>n</i> = 1456 | <i>n</i> = 1396 | <i>n</i> = 1181 | <i>n</i> = 12 | <i>n</i> = 12 | <i>n</i> = 9  | <i>n</i> = 12 | <i>n</i> = 10 | <i>n</i> = 10 | <i>n</i> = 21 | <i>n</i> = 25 | <i>n</i> = 28 | <i>n</i> = 344 | <i>n</i> = 440 | <i>n</i> = 397 |
| Social skills                    | 44.61           | 48.86           | 52.71           | 50.42         | 49.17         | 50.67         | 36.50         | 54.60         | 44.10         | 53.19         | 64.56         | 66.14         | 45.34          | 47.21          | 52.42          |
| <i>M</i> ( <i>SD</i> )           | (31.39)         | (32.03)         | (31.63)         | (36.26)       | (37.40)       | (42.04)       | (23.92)       | (35.02)       | (32.02)       | (32.62)       | (30.30)       | (30.73)       | (31.32)        | (30.77)        | (31.02)        |
| Behavior concern                 | 74.04           | 70.22           | 68.53           | 72.25         | 70.50         | 69.67         | 81.58         | 74.60         | 81.10         | 66.86         | 61.60         | 56.92         | 73.09          | 70.31          | 68.59          |
| <i>M</i> ( <i>SD</i> )           | (26.46)         | (27.95)         | (28.93)         | (31.37)       | (28.62)       | (40.41)       | (23.55)       | (24.81)       | (18.92)       | (33.73)       | (34.33)       | (30.60)       | (27.17)        | (28.08)        | (27.52)        |

Notes.  
<sup>a</sup> Significant time effect ( $p < .05$ ).  
<sup>b</sup> Significant time\*sequence group effect ( $p < .05$ ).  
<sup>c</sup> Marginally significant time effect ( $p < .10$ ).  
<sup>d</sup> Marginally significant time\*sequence group effect ( $p < .10$ ).

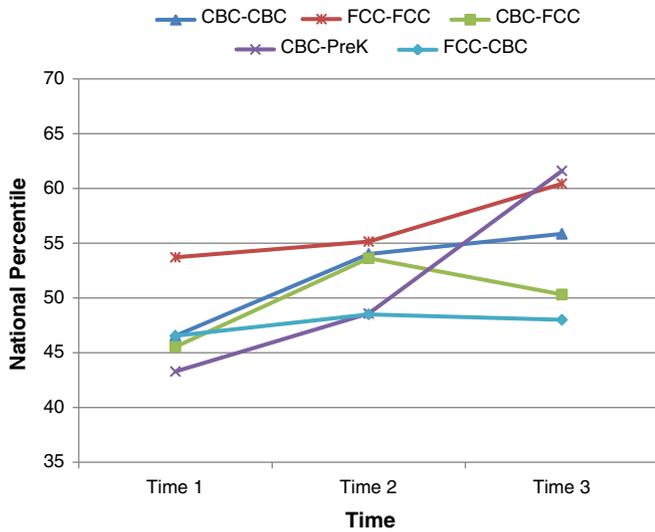


Fig. 1. Fine motor skills at T1, T2, and T3 for children who experienced different sequences of childcare.

around .30) although were not scoring as high as those who switched from FCC–CBC. For teacher-rated behavioral concerns on the DECA, there was a marginally significant effect for time ( $F [2, 1340]=2.57, p=.08$ ), and a marginally significant interaction between time and group ( $F [8, 2682]=1.88, p=.06$ ). Although most care type groups showed steady declines in behavior problems from ages three to four (time  $d$ 's around .34), those who switched from CBC to FCC showed a notable increase in behavior problems during their 4-year-old year (time  $d = .26$ ).

3.3.2. Parent-rated social skills and behavioral concerns

For parent-rated social skills as assessed by the DECA, there were no effects for time ( $F [2, 912]=2.30, p=.10$ ) nor an interaction between time and sequence group ( $F [8, 1826]=1.05, p=.40$ ). Analyses of children's behavioral concerns according to the parent also showed no effects for time ( $F [2, 912]=.65, p=.52$ ), nor an interaction between time and sequence group ( $F [8, 1826]=.53, p=.83$ ). Parent-rated social skills and behavioral concerns were generally similar across both years and children exhibited little growth in either area over time regardless of sequence or stability of childcare.

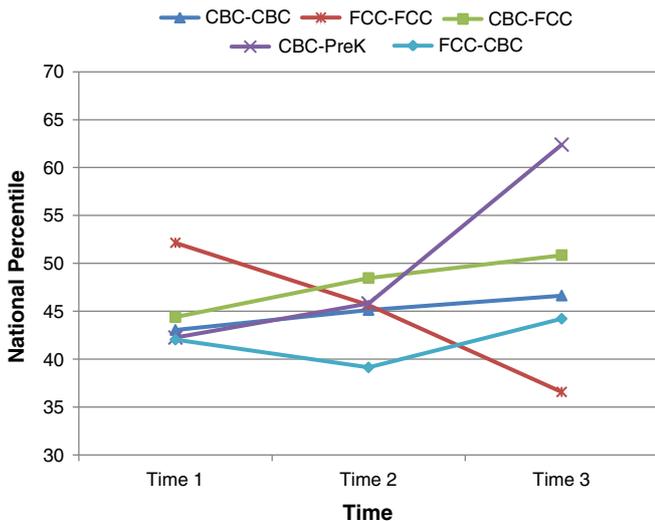


Fig. 2. Cognitive skills at T1, T2, and T3 for children who experienced different sequences of childcare.

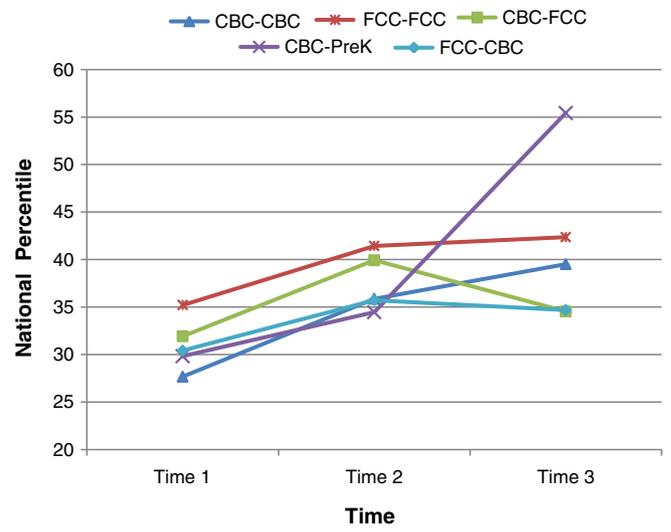


Fig. 3. Language skills at T1, T2, and T3 for children who experienced different sequences of childcare.

4. Discussion

The main purpose of this study was to assess differences in low-income, ethnically diverse children's early pre-academic and social development as a function of different childcare stability and sequence patterns. Understanding links between early childcare and children's school readiness is of great importance due to growing costs and increased usage of childcare (NACRRRA, 2011; Smith, 2002; U.S. Census Bureau, 2005), and the fact that low-income children enter school already behind in school readiness compared to their peers with more economic means (Brooks-Gunn & Duncan, 1997; Dearing et al., 2006; Duncan & Magnuson, 2005; Duncan et al., 1998; Gershoff et al., 2003). Further, children in poverty are also more likely to experience multiple and changing primary caregivers before the age of five (Howes & Hamilton, 1993; Loeb et al., 2004; Morrissey, 2009, 2010; Zigler, Gilliam, & Jones, 2006), and children who experience childcare instability are less prepared for the transition to kindergarten compared to children experiencing more stable childcare (Loeb et al., 2004, 2007; Miller, 2003; Morrissey, 2010; Tran & Winsler, 2011). The present study examined five different sequences of childcare experiences during the critical last two

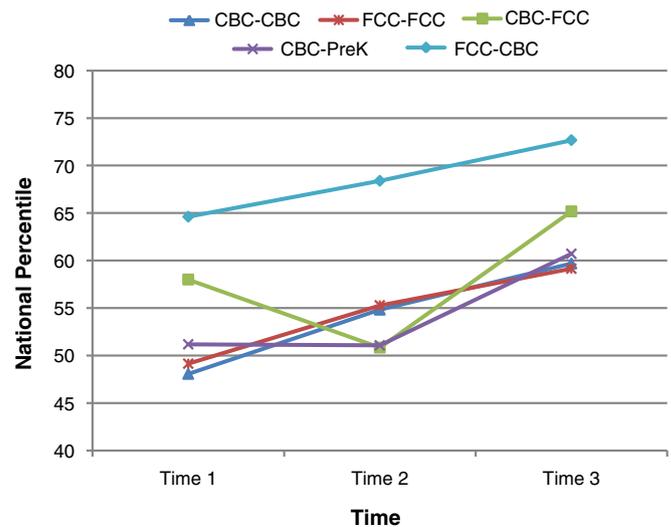


Fig. 4. Teacher-rated DECA social skills at T1, T2, and T3 for children who experienced different sequences of childcare.

years before children start kindergarten: stable center-based care during the entire time (CBC–CBC), stable family childcare (FCC–FCC), switching from FCC to CBC, switching from CBC to FCC, and moving from CBC to public school pre-K (CBC–Pre-K). This study extends the literature on childcare stability by examining an ethnically diverse sample of childcare subsidy recipients, and exploring childcare sequences new to the literature (CBC–FCC and CBC–Pre-K).

One consistent pattern that was observed was that although all children were at-risk in pre-academic development, children who transitioned from center-based childcare to public school pre-K programs for their four-year-old kindergarten year showed the best growth (+15–20 percentile points across T1–T3) and final outcomes compared to all other sequences. For cognitive and language skills, this was the only sequence group to eventually score reasonably above the national averages (>50th percentile) for this age group. Entering school with enhanced readiness in these areas is known to be associated with greater academic success for children in elementary school and beyond (Barnett, 2008; Duncan et al., 2007; Vandell et al., 2010). This finding was consistent with our expectations and prior literature showing the positive effects generally of universal pre-K programs associated with public schools (Gormley et al., 2005; Howes et al., 2008). This finding is also consistent with prior work within this community and the MSRP showing that children attending public school pre-K programs show school readiness advantages compared to children attending childcare in the community (Winsler et al., 2008), that they perform better in kindergarten and are less likely to repeat kindergarten (Winsler et al., 2012), and that they more likely to be identified as gifted later in elementary school (Winsler, Gupta, Kim, & Levitt, submitted for publication). It is notable that this sequence group had a larger proportion of Black children (60%, compared to about 40% for other groups) which suggests that perhaps low-income Black families in this community are more aware of the benefits of pre-K programs and are choosing to utilize them more often than Latinos in the community. However, it is important to note that the positive effects of switching to pre-K programs observed here were the same for both Latino and Black children.

Another goal of this investigation was to see, within those who remained in the subsidized childcare system, if children who switched either way between care types (CBC and FCC), and thus experienced unstable care types over the two years, would show lower school readiness outcomes and growth compared to those who stayed in either CBC or FCC the whole time. For the outcomes of fine motor skills, language skills, and teacher-rated social skills, this pattern did hold as expected. Children who switched between center-based care and family childcare (CBC–FCC and FCC–CBC) did not show as much growth in these areas as those whose childcare type remained stable over time (CBC–CBC and FCC–FCC). This is consistent with prior studies of childcare stability suggesting that children who experience stable childcare were better equipped for the transition to kindergarten in contrast to children who experience instability in childcare (Loeb et al., 2004, 2007; Morrissey, 2010). It is notable that the sequence group that went against the grain (CBC–FCC), that is, the opposite of the movement typical and adaptive for most families – from a more family-oriented, informal arrangement to a more center-based, formal childcare arrangement (FCC–CBC) that takes place between ages 3–5 (Morrissey, 2010), was the only childcare instability sequence group in which a regression (relative to national averages) was observed in the areas of fine motor skills and language abilities. This group was also the only one to show a notable increase in behavior problems from the beginning to the end of the four-year-old year.

We also found, as did Morrissey (2010), that children who experienced stable family childcare the whole time exhibited significantly lower levels of cognitive skills at the end of their four-year old year in contrast to children in all other sequences. The stable FCC group actually showed negative growth in cognitive skills compared to national percentiles over time. Such findings resonate with other studies suggesting that family child care, although an essential and flexible child care choice

with perhaps positive consequences for other outcomes (Morrissey, 2007, 2010), does not appear to facilitate cognitive development as much as center-based care or public school pre-K programs (Ansari & Winsler, 2012; Loeb et al., 2004; Morrissey, 2010). Additionally, these findings are consistent with recent MSRP work where young Latino children who experienced family childcare at age four demonstrated lower levels of pre-academic and social skills compared to children in center-based programs (Ansari & Winsler, 2012).

There were few effects of childcare sequence on children's social-emotional skills and behavior problems. We expected that children who remained in family child care the whole time would show the best social skills and behavior given studies showing concerns with child behavior for those remaining in CBC for long periods of time (Loeb et al., 2004), but this was not confirmed. Generally, all sequence groups showed increasing social skills and decreasing behavior problems as reported by both parents and teachers between the ages of 3–5. This is similar to the prior developmental literature that suggests that children experience growth in early social skills and a reduction in behavioral concerns during children's early years (Howes et al., 2008; Miner & Clarke-Stewart, 2008; Winsler et al., 2008). Other studies in the literature have often found children's care type to be unrelated to children's short-term (Loeb et al., 2007; Magnuson, Ruhm, & Waldfogel, 2007) or long-term behavior problems (Votruba-Drzal, Coley, Maldonado-Carreño, Li-Grining, & Chase-Lansdale, 2010). It should also be noted that Morrissey (2010) found no effects of center stability/sequence on parent-rated behavioral concerns and social skills using data from the NICHD study of early childcare. Thus, there was no evidence in this study of increased behavior problems found among children attending center based care.

Findings from this study have implications for policymakers, parents, and practitioners. Primarily, it is important to point out that the overall trend, across sequence groups and areas of school readiness assessed, is that this low-income, at-risk group of preschoolers made notable school readiness gains relative to national norms throughout the two years, which supports prior assertions that enrollment in some form of early childhood education program is beneficial for low-income children's school readiness (Burger, 2010; Winsler et al., 2008). Similar to the growing body of literature on family childcare (Ansari & Winsler, 2012; Loeb et al., 2004; Morrissey, 2010), results from the present study suggest that although family childcare might facilitate development in some domains of school readiness, growth is not as substantial as when children are enrolled in either center-based care or public school pre-K programs. Therefore, quality improvement initiatives in family childcare settings might be necessary to provide children greater learning opportunities. Additionally, children who experienced public pre-K programs at age four demonstrated dramatic gains in school readiness compared to national averages, which might suggest the need for greater support for universal pre-K. Finally, considering that Latino families utilize pre-K programs less often than Black families (Capizzano, Adams, & Ost, 2006; U.S. Census Bureau, 2005; Winsler et al., 2008), policy efforts should be made toward investing in parent education so that Latino parents are better informed of their childcare choices and of the benefits of pre-K programs for their young children.

Even though this study used a large longitudinal dataset to investigate the early effects of childcare stability and sequences on children's school readiness, there are limitations that need to be noted. Most importantly, we do not have information regarding *why* children experienced changes in their childcare type over the course of the two years, nor have information on children's child care experiences prior to age three. However, as noted by Tran and Winsler (2011), these complications are present in most childcare stability studies. Further, we had a small sample of children attending FCC, and none switched from family childcare at age three to public school pre-K programs at age four. In the future, studies need to examine these transitions from family childcare to public pre-K programs to better understand such stability/sequence effects on children's early school readiness. Future studies should also

examine longitudinal effects to see if these patterns are maintained into elementary school.

It is also well documented that families select children's childcare arrangements non-randomly (Singer, Fuller, Keiley, & Wolf, 1998), and selection bias according to cultural factors is a limitation of the present study. Even though we controlled for child ethnicity, which varied some as a function of childcare sequence, this does not completely address selection bias. We also did not have complete demographic information for all children and families, and in our analyses we did not impute missing data. Because of the limited information on children's home and neighborhood setting, it is also possible that some of the differences we find between care-types, particularly for children enrolled in family childcare, might be as a result of other factors (e.g. parent's work hours, instability in the home, and neighborhood factors) which we could not take into account. Finally, given that the childcare sequence groups were based on children's primary childcare arrangement, it was also possible that some of these children in public pre-K programs might actually have been going to center-based or some other type of care after the pre-K program was over each day, but we did not have such information.

In sum, the present study examined links between stability and sequence of childcare and children's gains in early school readiness. Given the increasing costs of early education programs (NACCRRRA, 2011; Peisner-Feinberg & Yazejian, 2010), this study provided timely new analyses from a sample of ethnically diverse and low-income children from Miami. In general, results supported our hypotheses in that children who experienced stable care were generally doing better than children who experienced a change in their primary childcare arrangement. Moreover, children who experienced public school pre-K during their four-year old year were doing significantly better in pre-academic skills compared to all other children. It appears that sequence of childcare, at least in this sample, may play an important role for children's early school readiness gains. In contrast to peers who experienced a change from family childcare to center-based care at age four, children who switched from center-based care to family childcare generally did worse in areas of early school readiness. In conclusion, these data show that at least in this ethnically diverse, low-income sample, center stability appears to be beneficial for children's early school readiness over the course of two years; however, public school pre-K programs at age four appear stronger for promoting children's early school readiness.

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