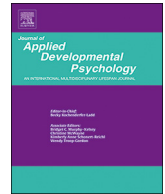




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Continuity and changes in classroom age composition and achievement in Head Start

Arya Ansari^{a,*}, Kelly M. Purtell^b^a University of Virginia, United States^b The Ohio State University, United States

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ABSTRACT

Using data from the Family and Child Experiences Survey 2009 Cohort ($n = 1073$), this study considered the implications of mixed-age education for young children's academic achievement when they experienced continuity and/or changes in classroom age composition across two years in Head Start (at age 3 and age 4). Results from these analyses revealed that children in classrooms with a greater number of younger children during their second year in Head Start exhibited fewer gains in mathematics and language and literacy. Additionally, children who transitioned from being in classrooms with largely older classmates during year one to classrooms with largely same-age peers during year two exhibited greater gains in academics than children who experienced two years of mixed-age classrooms. Stability in children's teachers, one of the hallmarks of mixed-age programming, was not associated with children's academic achievement nor did it attenuate the negative consequences of mixed-age classrooms.

Introduction

The growing recognition of early childhood as a critical developmental period, one that has lasting influences throughout the life course, has spearheaded the expansion of preschool education for both 3- and 4-year-olds across the country (Duncan & Magnuson, 2013; Yoshikawa et al., 2013). One way in which programs can expand is by including children of both ages in the same classroom (e.g., 3- and 4-year-olds). Indeed, recent national estimates reveal that over three quarters of children in Head Start—the largest federally funded preschool program in the United States—are enrolled in mixed-age classrooms (Ansari, Purtell, & Gershoff, 2016). Other national estimates also reveal that the majority of public and private preschool programs that serve 3- and/or 4-year-olds have over a 12-month difference in age between the oldest and youngest student in the classroom (National Survey of Early Care and Education, 2012, authors' calculations), suggesting that a large proportion of preschoolers in the United States experience mixed-age education. Even with the large number of mixed-age classrooms across the country, it remains unclear whether these programs are designed to provide children with multiple years of developmentally appropriate educational opportunities. In fact, to date, much of the mixed-age education literature has focused on children's classroom experiences during their first year in the program and, as a

result, what happens to children who go on to experience a second year in these types of programs, when they are often the older children, is unclear.

Some scholars also argue that continuity in children's peers and caregivers across school years—one of the hallmarks of mixed-age classrooms—is beneficial for children's early learning and development (Katz, Evangelou, & Hartmann, 1990; Veenman, 1995), whereas others contend that these type of settings are likely less conducive for children given the demands associated with mixed-age education (Mason & Burns, 1996). The purpose of the current investigation is to address these competing hypotheses by examining the academic implications of having different-age peers across two school years and the role of teacher continuity in evaluating the benefits and drawbacks of mixed-age classrooms in Head Start. This type of longitudinal empirical inquiry is of growing importance given the fact that some scholars and professional and national associations have been promoting mixed-age groupings as beneficial for children in early childhood programs even when there has been little evidence either in support of (or against) this type of educational programming (Katz et al., 1990).

Theoretical underpinnings of mixed-age education and its implications

Our interest in understanding the unique influence of classroom age

* Corresponding author at: Center for Advanced Study of Teaching and Learning, University of Virginia, PO Box 800784, Charlottesville, VA 22908-0784, United States.

E-mail address: aa2zz@eservices.virginia.edu (A. Ansari).

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composition across school years is grounded in several long-standing educational and developmental models. The overarching framework for our work is based on Bronfenbrenner's bioecological theory, which emphasizes the importance of contextual influences on children's early learning and development (Bronfenbrenner & Morris, 2006). In line with this theory, the current investigation considers how specific proximal processes within Head Start classrooms—age composition and teacher continuity—can influence children's academic achievement. Bandura's (1986) social learning theory and Vygotsky's (1978) theory of cognitive development also shape our developmental framework for this study as they both contend that one of the primary mechanisms through which development occurs in early childhood programs is through interactions between children and their classmates. Younger children can observe older and more skilled children in the classroom and mimic their behaviors and actions and older children can scaffold younger children who, in turn, can cement their own skills and knowledge. When taken together, these transactional processes among peers can constitute one of the key mechanisms through which early childhood programs impact children's academic and social-behavioral development (e.g., Henry & Rickman, 2007; Justice, Logan, Lin, & Kaderavek, 2014; Mashburn, Justice, Downer, & Pianta, 2009; Ribeiro, Zachrisson, & Dearing, 2017).

Despite its plausible theoretical underpinnings and endorsements by national organizations, the evidence behind these types of classrooms has been largely inconclusive when looking at children's early academic and socioemotional development, with some early childhood scholars documenting positive impacts (Blasco, Bailey, & Burchinal, 1993; Goldman, 1981; Guo, Tompkins, Justice, & Petscher, 2014; Justice, Logan, Purtell, Bleses, & Hogden, 2018) and others documenting null or negative associations (Ansari et al., 2016; Bell, Greenfield, & Bulotsky-Shearer, 2013; Moller, Forbes-Jones, & Hightower, 2008; Urberg & Kaplan, 1986; Winsler et al., 2002). Studies of the academic benefits of mixed-age (or multi-grade) classrooms serving children in the elementary grades has also been largely ambiguous, with some studies documenting academic effects that were positive, negative, and statistically indistinguishable (Ansari, 2017; Pratt, 1986; Proehl, Douglas, Elias, Johnson, & Westsmith, 2013; Thomas, 2012; Veenman, 1995; Way, 1981). Thus, across the educational spectrum, the empirical support for mixed-age education has been largely inconclusive.

Even with the conflicting empirical evidence in the existing literature, a study by Ansari et al. (2016) is of note as it represents the first national study of mixed-age classrooms in the United States for first time Head Start attendees. More specifically, Ansari et al. (2016) documented sizeable negative associations between mixed-age classrooms for newly enrolled 4-year-olds' math and language and literacy learning, and found that classroom age composition did *not* have mean-level associations with the early academic success of 3-year-olds. Practically speaking, the drawbacks of mixed-age classrooms for first-time 4-year-old Head Start attendees amounted to approximately four to five months of academic development when they attended classrooms that enrolled an equal number of 3- and 4-year-olds. There were, however, no benefits or drawbacks of mixed-age classrooms for children's socioemotional development (Ansari et al., 2016).

To date, however, no studies, including Ansari et al. (2016), have examined what happens to the 3-year-olds in their second year of Head Start. That is, what happens to children who spend two years in mixed-age classrooms? This type of empirical analysis has important implications for policy and practice as the majority of children who attend Head Start at age 3 remain in the program for a second year as 4-year-olds (Puma et al., 2010). In fact, this empirical inquiry into mixed-age education can point to one of the potential reasons why children who experience preschool—especially Head Start—at ages 3 and 4 make greater gains during their first year than in their second (Jenkins, Farkas, Duncan, Burchinal, & Vandell, 2016; Yoshikawa et al., 2013). Accordingly, our first research objective was to assess the academic implications of mixed-age classrooms for 3-year-olds during their

second year in the Head Start program. Based on the work of Ansari et al. (2016), we expected that children who were enrolled in classrooms with a greater share of younger classmates during their second year in Head Start as 4-year-olds would demonstrate smaller gains in areas of literacy and math.

Continuity and changes in classroom age composition

As part of the current investigation, we also consider the implications of mixed-age education for children's academic achievement when they experience continuity and/or changes in classroom age composition across two years in the Head Start program. In other words, what happens to children in the program who transition from classrooms where their classmates are largely the same age during year one to classrooms where there are largely different age peers in year two? Alternatively, what happens to children who are enrolled in classrooms with largely different age peers across both school years? Taking a multi-year perspective on children's classroom experiences is grounded in developmental theory (Bronfenbrenner & Morris, 2006) and can allow for a more nuanced understanding of the different ways in which classroom dynamics shape children's academic success.

Perhaps mixed-age classrooms require children to be present for multiple years to reap the maximum benefit (Lillard, 2016). For example, being a younger child in a classroom in one year—although not benefiting them immediately (Ansari et al., 2016)—may motivate children to be like one of their older classmates (Winsler et al., 2002) and, thus, in their second year, these children may start school with skills that allow them to more effectively scaffold for their younger peers and cement their own skills and knowledge. On the other hand, a recent report from the Department of Education clearly shows that the vast majority of educators feel underprepared to individualize and differentiate their instruction (Manship, Farber, Smith, & Drummond, 2016), and therefore, it is also conceivable that regardless of children's prior experiences in mixed-age settings, these types of environments are not optimal for their early learning. Regardless of the outcome, this type of longitudinal empirical inquiry is of utmost importance because these transitions across years likely represent qualitatively different experiences that might alter the meaning of mixed-age education for children in any given year. Examining 3-year-olds in the Head Start program in particular presents a unique opportunity to assess the implications of such transitions and we address this objective concerning children's classroom transitions in two different ways.

First, we use continuous measures of classroom age composition at years one and two, and then in the second set of analyses, we cross two sets of categorical indicators of high and low levels of same-age peers (for similar methods see: Burchinal, Lowe Vandell, & Belsky, 2014). The first set of analyses captures whether each unit increase in different age peers during year one moderates the effect of classroom age composition during year two (i.e., a linear effect). In the second set of analyses we test for the multiplicative effects of high (versus low) levels of different age peers across the two Head Start years using standard deviation cut points (see also, Ansari et al., 2016). In doing so, the second set of analyses captures potential non-linear effects that tap into qualitatively different classroom transitions (e.g., transitioning from different age classrooms at age 3 to same-age classrooms at age 4).

As discussed by Weiland and Yoshikawa (2014), there is no consensus for selecting a threshold, but possibilities include inflection points, conceptually defined points, empirically identified points, in addition to nonlinear methods. For the purposes of the present investigation, we test conceptually defined points that correspond to classrooms in which > 30% of children are of a different age. These estimates were based on prior work with these data that suggest that classrooms where 20–30% of children are of a different age represent qualitatively different experiences (Ansari et al., 2016). It is important to note that similar thresholds of 25–30% have also been used to demarcate preschool classrooms with economic diversity (Miller,

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