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PARENT-FOSTERED ENRICHMENT ACTIVITIES AND ACADEMIC OUTCOMES  
IN MIDDLE CHILDHOOD

A thesis document submitted in partial fulfillment of the requirements for the degree of  
Master of Science at Virginia Commonwealth University

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## **Abstract**

### **PARENT-FOSTERED ENRICHMENT ACTIVITIES AND ACADEMIC OUTCOMES IN MIDDLE CHILDHOOD**

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University

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2017

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Despite numerous educational reforms, elementary school children in the United States continue to lag behind their peers from other developed countries on reading, math and science outcomes. Many interventions focus on strategies aimed at increasing the amount of classroom work children undertake. However, the key to improving outcomes may lie in out of school enrichment activities that facilitate learning. Drawing from Eccles Expectancy-Value theory(Simpkins, Fredricks, & Eccles, 2012), the current study focuses on assessing the impact of parent-fostered enrichment activities on child academic outcomes in the first three years of

elementary school. Using secondary data from Early Childhood Longitudinal Study - Kindergarten cohort (ECLS-K), we find that parent educational expectations for their children influence their participation in enrichment activities. These enrichment activities significantly impact reading, math and science outcomes although their impacts vary as a function of the type of enrichment variable examined. Examinations of a moderating role of per capita income do not yield significance in the data. Finally, longitudinal analyses suggest direct effects of parent expectations in grade 1 on academic outcomes in grade 3 but no indirect effects of parent expectations on later academic outcomes via participation in enrichment activities. These results are discussed considering relevant literature and implications for parent and teacher practices are proposed.

## Parent-Fostered Enrichment Activities and Academic Outcomes in Middle Childhood

The latest educational rankings released by the Organization for Economic Cooperation and Development (OECD) place the United States in the 28<sup>th</sup> position in math and science achievement scores —well below other developed countries (OECD, 2015). There have been many efforts by government, schools and individuals to improve levels of achievement among school-aged children. These have led to costly strategies and interventions, many of which have failed to produce the desired levels of achievement across ethnic groups in the United States. Disadvantaged groups and minority groups, with the exception of Asian Americans, continue to drop out at higher rates and perform more poorly on achievement tests than their European American counterparts (Kena et al., 2016). These persistently low achievement rates, particularly in the domains of math and science are important to consider, examine and carefully address given their projected impact on future productivity as well as children’s quality of life (STEM Education Coalition, 2016).

Although some improvement has been made in recent years, persistently low rates of achievement in the United States are incongruent with the number of interventions and policies aimed at ensuring that all children excel academically. A solution to this challenge may lie outside the confines of the classroom: in enrichment activities that occur out-of-school and are enabled by parents often in “informal learning environments”. For example, engaging in activities such as visiting museums was positively associated with achievement outcomes in 21 of the 32 countries included in the OECD survey (not including the United States) (Suter, 2014). Proponents of enrichment activities argue that they give children the opportunity to gain real-life exposure to, and hands-on experience with, theories and concepts learned in the classroom (Salmi, 2001; Yavuz & Kiyici, 2013). This first-hand experience aids in the comprehension of

concepts learned in class and often provides more accurate visual aids than those provided in class (Henry, 1992; Tenenbaum, Rappolt-Schlichtmann, & Zanger, 2004). Further, these experiences provide a more informal, less pressured approach to reinforcing concepts than is typically provided in classroom contexts. Enrichment activities such as trips to museums also heighten interest and spark motivation; both of which have been shown to be better predictors of future college STEM courses and careers in comparison to actual grades (Tai, Qi Liu, Maltese, & Fan, 2006). Other studies suggest that this first-hand exposure may be particularly beneficial for children from rural and low income groups who rarely acquire opportunities of this nature (Bowen, Greene, & Kisida, 2013).

Beyond school field trips—which serve as the mechanism through which most of these variables are examined—parents are known to engage in these activities with their children. Some studies suggest that these practices are guided by parents’ beliefs about their children’s abilities and in the importance of the activities for development and child age (e.g., Bornstein, 2002). Although researchers have begun to explore the role of activities such as museum, zoo and aquarium visits on child academic outcomes, there remain a host of other activities and questions that have not been explored. For example, it remains a mystery whether these activities offer benefits by mere exposure through reinforcement of learned concepts, their close association with academic curriculum or their diverse nature.

Using data from a large nationally representative dataset—the Early Childhood Longitudinal Study-Kindergarten cohort (ECLS-K)—the proposed study examines participation in enrichment activities in out-of-school settings or informal learning environments among children 6 -12 years of age in elementary school. It seeks to disentangle the impact of four categories of activities: visits to art and science museums, visits to aquariums and zoos,

attendance of plays and concerts and participation in cultural/historical events, on math, reading and science achievement. It also seeks to identify whether the effects are domain specific, such that enrichment experiences impact related achievement outcomes versus experiences having a more general “enrichment” effect. Further, it examines whether parent expectations for their children truly influence the kind of activities they engage in with them. Lastly, testing the differential susceptibility hypothesis (Belsky & Pluess, 2009), the study examines whether the benefits of exposure to enrichment activities differ as a function of SES.

## **Literature Review**

### **Academic Outcomes in Middle Childhood**

Although a variety of school activities and subjects may be considered academic outcomes, they do not all carry equal weight at the global level. World rankings of academic achievement by institutions such as the Organization for Economic Cooperation and Development (OECD) and the National Science Foundation (NSF), report on three major areas of academic outcomes: math, reading and general knowledge in science. The global focus on these domains, particularly math and science, is closely linked to the fact that competency has important implications for a nation’s projected productivity as well as a child’s economic success and future quality of life (STEM, Education Coalition, 2016). Sadly, it is in these very domains that student performance in the United States is lagging behind that of the 20 top developed countries (OECD, 2015). This is so despite numerous costly, government and school-led efforts, to adopt policies, strategies, and interventions to ensure broad success.

From early childhood through elementary school, the nation spends over \$30 million dollars each year on interventions and policies such as Head Start, the “No Child Left Behind”

initiative and more recently the “Race to the Top” initiative by former President Obama, as well as multiple standardized tests employed to closely monitor academic gains being made by children and schools (Chingos, 2012; ProCon, 2016). In the bid to ensure 100% success, students, teachers and school administrators are placed under great pressure to perform and demonstrate evidence of high achievement scores. Teachers in the United States continue to lose their jobs on account of poor performance on standardized test and numerous schools have also been shut down as a result. For instance, by 2010, Michelle Rhee, former chancellor of the Washington D.C public schools had fired 600 teachers and closed another 23 schools for poor performance (Gillum & Bello, 2011). Not surprising, given the pressure to perform, students report higher levels of anxiety during standardized testing in comparison to regular school testing (Segool, Carlson, Goforth, Von der Embse, & Barterian, 2013). Further, there have been reports of widespread cheating by teachers and administrators to ensure higher test scores in their schools (Jacob & Levitt, 2003).

Other attempts to raise student scores in public schools include more time spent in the classroom, specialized tutoring for students, hiring professionals to identify loop holes in the teaching process and engaging in the specific training of teachers as well as a reduction in the amount of time spent in out-of-school enrichment activities and play. Although the efficacy of a number of these strategies has not been empirically tested, findings from some inquiries suggest that the effects of some of these practices such as the reduction and sometimes outright elimination of play from schools especially in kindergarten schools may have more detrimental than beneficial effects on child outcomes (Ginsburg & the Committee on Communications and the Committee on Psychsocial Aspects of Child and Family Health, 2007). Some reports also indicate negative associations between extra times spent studying and science outcomes (OECD,

2011). Hence, given that these practices that advocate increased formal learning appear ineffective, it may be useful to look outside the confines of the classroom and explore alternative approaches. A growing area of research is focusing on out-of-school activities and learning that can occur in “informal” settings;” such as museums and aquariums. In middle childhood, what is important about all these activities is that they are made possible by parents. As such, in the current project they are referred to as parent-fostered enrichment activities.

### **Theoretical Framework**

One theory that guides work on the role of parent-fostered enrichment activities on children’s outcomes is Eccles’ Expectancy Value Theory. It posits that children’s achievement choices, beliefs, performance, effort and persistence are influenced by their parents’ beliefs and practices (Wigfield & Eccles, 2002). Parent-held beliefs influence socialization practices, which in turn shape children’s psychosocial and cognitive schemas about their abilities and capabilities, and over time these schemas become internalized. In this framework parents’ beliefs include their perceptions about the importance of specific activities or events for their child’s development; judgments of their child’s efficacy and; estimations of their child’s ability (Simpkins et al., 2012). These beliefs influence a variety of parent behaviors including: modeling, encouraging engagement in specific activities, providing resources, and engaging with their child in a variety of practices and events. Consequently, parents’ beliefs and associated behaviors shape children’s motivational beliefs and achievement related behaviors (Simpkins et al., 2012). Few studies have examined the efficacy of the entire framework in explaining children’s achievement. However, preliminary evidence from research studies that the framework in its entirety show promise.

For example, in a recently published longitudinal study depicted in Figure 1, Simpkins, Fredricks and Eccles (2012) found that parent beliefs about math, sports and instrument playing predicted parents' provision of resources at home, which in turn influenced children's self-concept and value perceptions about these skills. Further, children's self-concept and value influenced their behaviors in these domains. In addition, mother's behaviors significantly mediated associations between mother's beliefs and youth beliefs in three of the domains examined- math, music and sports. Findings did not yield significance in the domain of reading (Simpkins et al., 2012). Youth beliefs also significantly mediated relations between mother's behaviors and youth behaviors within the three domains, giving further credence to the strength of this model. In sum, parents holding specific beliefs and values are more likely to engage in specific practices that may foster the development of similar values in their children. Beyond the domains of math, reading, music study and sports examined within the study, it is plausible that their findings extend to other domains of inquiry. Having verified the framework among a sample of mostly middle class European American youth, this study seeks to examine its utility in predicting outcomes in a more diverse middle childhood sample.

Examining these concepts during middle childhood is particularly salient because the period has been identified as one in which children demonstrate marked developmental strides in cognition. For instance, the pruning of synaptic connections known to be crucial for enhanced cognition begins to take place only after about 7 years of age (Huttenlocher, 2002 cited in Bernier, Carlson, & Whipple, 2010). This enhanced cognition enables greater mental representation, an increased sense of autonomy and independence coupled with an ability to recall greater amounts of information. Moreover, children at this developmental stage demonstrate improvements in their ability to reflect on information received from others and an



ability to solve problems within a variety of contexts (Eccles, 1999). Evidence of these increased capacities is also witnessed in their increased capacity for social comparisons among their peers in varied domains (Eccles, 1999). Other research also suggests that the development of these capacities is however facilitated through interactions in multiple contexts and with individuals within these contexts (Bernier et al., 2010).

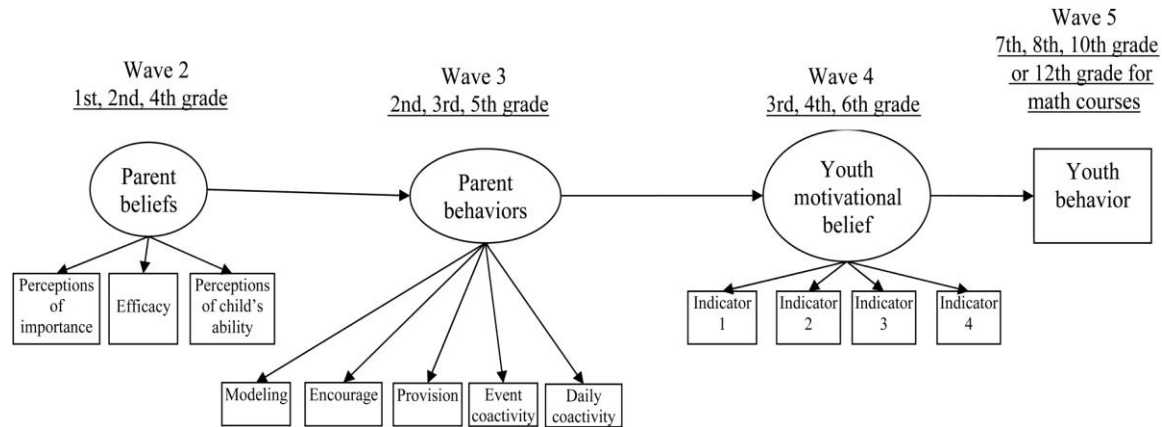
In addition to the provision of resources investigated by Simpkins et al. (2012), numerous studies have investigated the extent to which other specific activities such as parent-child reading, attending after school programs, math involvement at home and in school as well as a host of others impact child achievement (Anderson-Butcher & Cash, 2010; Bus, Van Ijzendoorn, & Pellegrini, 1995; Springer & Diffily, 2012). However, it is difficult to disentangle whether effects witnessed are a function of these organized, education-oriented practices or whether they are by mere exposure to varied events in themselves. Mere exposure to a variety of events through parent socialization practices allows children to attain hands-on knowledge about different opportunities available in the world. Through these, children interact with diverse individuals who may expose them to new concepts or help them solidified concepts learned in the classroom. These interactions may therefore serve as channels of inspiration for children and foster motivation in specific domains. Parents' exposure of their children to varied settings in themselves may therefore motivate and inspire interests, values and expectations in children which may influence their achievement choices and levels of persistence required to attain the desired goals (Eccles, 2005; Wigfield & Eccles, 2002). For instance, Tai et al.(2006) found that interest in science careers was a better predictor of selection of a science related college course in contrast to actual science grades. Opportunities to witness these events first-hand may make particular fields of endeavor appear more real and attainable (Tai et al., 2006).

Further, some studies on children's exposure to a variety of settings suggest that they may be more beneficial for children from impoverished backgrounds (e.g., Suter, 2014). Belsky's differential susceptibility hypothesis posits that children vulnerable to negative outcomes in negative circumstances may be similarly more likely to benefit disproportionately from positive experiences. This study sought to examine this more closely using a middle childhood sample to establish whether exposure to these activities is even more beneficial for children from disadvantaged backgrounds. Additionally, studies suggest that early exposure to enriched environments are beneficial for later outcomes. Although this phenomenon has been widely examined in literature on parent-child reading and parents' provision of educational resources, there are few studies that examine early exposure to informal enrichment experiences and later academic outcomes (e.g., Cunningham & Stanovich, 1997).

In summary, previous studies have explored varied sections of the Expectancy-Value framework proposed by Jacqueline Eccles (2005). However, only one study, to date, has explored the entire framework in a single publication. This study, using a largely middle class youth sample, found evidence suggesting that parents' beliefs influenced their provision of resources to children. Provision of youth resources in turn influenced youth beliefs and outcomes in specific domains. Few studies have examined separate sections of this phenomenon in middle childhood. Moreover, efforts have not been made to determine whether effects emerge by exposure to specific academic/domain-specific activities or exposure to other non-academic yet engaging enrichment activities, and the degree to which any benefits have a lasting impact on academic outcomes. Lastly, preliminary evidence suggests that exposure to these activities may have greater impact on children from lower socio-economic groups compared to others but this

has not been examined in a detailed manner. The current study seeks to fill these gaps in the literature on the impact of informal activities on child development.

**Fig. 1: Eccles model examined by Simpkins et al., 2012.**



### Parent Beliefs as Precursors of Parenting Behaviors

In most situations, parents serve as the primary caregivers and socialization agents for children (Super & Harkness, 2002). Hill (2012) argues that parents do not only provide the basic framework by which their children initially interpret experiences in the world, but also overtly construct child experiences by, for instance, creating play dates and avenues for engagement outside the home. Bornstein (2002) further asserts that parents engage in specific activities at specific times that uniquely impact the development of their children. These practices are influenced by a variety of beliefs about what is essential for a child's development, their parental responsibilities and, perceptions about what would ultimately yield success (Hayes, 2011; Sy, & Schulenberg, 2005). For instance, evidence suggests that whereas Asian American parents typically view school and the activities therein as the responsibility of teachers, European American parents feel great responsibility for their children even within the school context (Sy &

Schulenberg, 2005). Therefore, European American parents are more likely to engage in school related activities with their children's schools than Asian American parents are (Sy & Schulenberg, 2005). These school related activities include, volunteering, attending Parent-Teacher conferences and engaging in frequent discussions with teachers in the school.

Much research examining associations between parent beliefs and behaviors has occurred within the school context and specifically in the domains of math and reading. However, results are not always consistent. Yamamoto and Sonnenschein (2016) found that although parents consistently emphasized the importance of reading and math skills for their children's development, they infrequently engaged in specific behaviors aimed at increasing those skills. In the math domain, parents expressed a lack of knowledge of specific skills that could help their children. Parental beliefs, therefore, do not automatically translate to parent behaviors. Additionally, parent beliefs in most studies refer to parents' perceptions of the importance of certain subjects or domains not parent expectations. It is important to examine whether parent expectations also influence opportunities and forms of exposure parents present children with.

### **Parent Expectations and the Provision of Opportunities for Learning**

Parent expectations of their children's achievement may cause them to engage in a variety of activities with them as well as expose them to a variety of settings. These may be done intentionally or unintentionally. Parents seeking to promote their children's achievement may engage in numerous activities. Alternatively, these activities may be engaged in solely for entertainment purposes. Whatever the reason for engagement, children often learn a lot from these experiences. These experiences may impact their academic and social development in untold ways. While some parents have explicit reasons for engaging in some activities at specific times, others have no such guiding theories and simply do so as these opportunities present

themselves (Bornstein, 2002). For some of these activities it remains unknown whether engagement during specific developmental periods is more beneficial than others. For instance, in the domain of reading, parent-child reading has been found to be most beneficial for children's reading success when engaged in during the early developmental years (Bus et al., 1995). However, for other activities such as visiting museums very little is empirically known about its developmental salience or the period when it is most beneficial for child development. Literature to date is replete with studies examining variables such as parent-child reading, enrollment of children into assorted after-school programs and clubs, parental involvement with homework and many more (e.g., Anderson-Butcher & Cash, 2010; Bus et al., 1995). Findings from these have influenced child-care policies and interventions from the smallest microsystem to the most extensive macrosystem. However, more remains to be learned about the influence of other parenting practices such as activity engagement on child development. In the current study, these activities are classified as enrichment activities. They refer to activities that parents engage in or provide for their children outside structured school involvement. These activities are termed enrichment because they are understood as influencing either directly or indirectly their children's cognitive development and school outcomes. Examples include parental provision of educational resources, visits to enrichment centers such as museums and visits to zoos and aquariums.

Parent engagement in these activities is influenced by factors such as their cultural beliefs, income and educational level as well as occupational status. A plethora of research indicates that parental level of education, particularly maternal education, is an important variable which influences a variety of behaviors and outcomes (Davis-Kean, 2005; Desai & Alva, 1998; Frost, Forste, & Haas, 2005; Lareau, 2010; Tamis-LeMonda, Briggs, McClowry, &

Snow, 2009). Education provides knowledge and access to information about best practices, serving as a useful guide to many parents. Closely associated with educational level, parental income level and occupational status also influences parent beliefs about beneficial practices for their children based on their expectations for them (Lareau, 2010).

### **Parents as Facilitators of Enrichment Activities**

In one of few studies examining the role of parent-facilitated out of home experiences on child academic outcomes, Powell, Son, File and Froiland (2012), found that 50% of the sampled parents increased out of home experiences between pre-Kindergarten and Kindergarten while 80% reported increases between kindergarten and first grade. This was accompanied by a simultaneous decrease in provision of cognitive stimulation through activities such as reading and teaching letters and words to children. Interestingly, both patterns were positively associated with math outcomes but not reading or literacy outcomes. This demonstrates that parents alter patterns of involvement over time and may engage more frequently in out of home enrichment activities with their children during the middle childhood period. This change may be more salient for that developmental stage than other stages of development. However, it is not known whether these experiences inspire enough interest in general academic achievement or its effects are more specialized. Is there a generalized “enrichment effect” on achievement to be witnessed as suggested by Eccles’ framework?

The current study focuses on informal enrichment activities that parents facilitate and engage in with their children. These activities include visiting art and science museums, zoos and aquariums, attending plays, concerts and celebrations of historical events. In studies of enrichment activities such as these, it is difficult to disentangle the effects of mere exposure to activities and content-based knowledge acquisition. Eccles' (2005) framework suggests that

parents engage in specific activities with their children based on their own beliefs that inspire motivation, interest in children and results in positive behavior outcomes. During these events children become exposed to a variety of settings and individuals. Exposure to diverse events of this sort enable children to directly interact with objects and persons of interests. Interactions of this kind may consequently inspire interests in novel fields which then become more attainable by virtue of direct exposure (Tai et al., 2006). Further, having attained an achievable goal it may then be plausible that children will persist towards their achievement goals.

Although many studies of informal learning opportunities rarely adopt a parenting lens it is important to do so for several reasons: First, it is without question that parents engage in these activities with their children. Second, although previous research conceptualize these experiences as largely facilitated by the school, evidence suggests that children may be at a disadvantage in accessing these experiences through school, whereas parent-fostered opportunities may offer unique advantages (Tal & Morag, 2007).

### **The Impact of Parent-Fostered Museum Visits on Academic Outcomes**

To date research on the impact of museum visits have largely focused on exploring its influence on middle and high school student samples, and in specific academic domains particularly science. In addition, studies often adopt a school context approach examining visits from the lens of field trips and rarely consider the phenomenon through a parenting lens. Interestingly, research from the school-facilitated contexts demonstrate that teachers may not be crucial components of these trips (Tal & Morag, 2007). Studies indicate that they often relinquish teaching responsibilities to docents during these visits, and in some cases allow children to freely explore exhibitions for themselves (Henry, 1992; Tal & Morag, 2007). Yet, this permission to freely explore does not appear to stifle or hamper learning but may rather

promote intimate interaction with objects of interest (Henry, 1992). Furthermore, on school-facilitated trips, reports indicate that some docents engage children in lengthy discussions prior to introducing them to the actual exhibits of interest and in some cases deprive them of the opportunity to even engage with the exhibits (Tal & Morag, 2007). This is likely due to a greater time constraint on the part of schools to transport students from the school to the enrichment center and back to the school in time for pick-up.

Henry (1992), investigating recall and retention of memories during a past museum visit, showed that students not only recalled the visit but also retained and provided vivid detailed accounts of their visit. Responses—collated through qualitative interviews—revealed high levels of student excitement at seeing exhibits of concepts previously learned in the classroom. They noted differences between the real-life forms observed in the museum and what they had been exposed to in the classroom. These interviews were conducted 18 months after the trip to the museum, which was a first for most of the 100 middle school students sampled. The researchers posited that the novelty of the experience was an important contributor to lasting impressions. This retained knowledge may also have resulted from the fact that their appetites were whetted through classroom lessons before the trip to the museum was embarked on. In this study, students were not accompanied by docents through the exhibits but chose for themselves exhibits of interest, which were mostly based on previous lessons.

Whitesell (2016) examined the impact of field trips to museums and found that trips to the museum were most beneficial when they were well-structured and fit the child's curriculum. In the study which utilized data spanning 6 years, she found that trips to the museum were most beneficial for children of low-income Hispanic backgrounds (Whitesell, 2016). Interestingly, for children from higher SES backgrounds and Asian American children, results were negative and



non-significant. Findings relating to African American students were likewise non-significant although positive. These findings are intriguing and highlight again the possibility of novelty in facilitating this learning process. This may be more plausible given the multi-ethnic landscape of New York City which is a hub for immigrants for whom this experience may likely be more novel and exciting. Again, this finding suggest that the effects of this exposure begin to wear of as SES increases. These speculations are made based on census data which indicates that in 2010, 33.3%, 25.5%, 23.6%,12.6% and 4.9% of the residents in New York City were non-Hispanic White, Black, Hispanic, Asian & Pacific Islander and ‘other’ respectively (U.S. Census, Bureau, 2010). In addition, White, White-Asian and White-Hispanic groups are averaged as having some of the highest SES levels while majority African American and Hispanics are among the poorest (The Furman Center for Real Estate and Urban Policy, 2011). The study sampled more than 185,000 children from the city (excluding Staten Island) and was conducted from 2007-2012. Finally, this study, although very recent, was the first to utilize standardized tests— standardized eighth grade science exam scores, as outcome variables, in its analysis.

Bowen, Greene and Kisida (2013), conducted the first randomized control trial in the field among a group of 3,811 kindergarten through 12 grade students. In this study students assigned to an experimental group that included guided tours showed evidence of greater critical thinking about art in contrast to the control group, who were offered guided tours later. In this experiment, students were familiarized with the artwork and museum etiquette prior to their trips to the museum, and the trips were designed to reinforce concepts which had already been taught in class (Bowen et al., 2013). As was the case in studies discussed above, students from disadvantaged backgrounds were found to evince more significant benefits from the trips to museums than those from less-advantaged backgrounds (Bowen et al., 2013).

In summary, studies on student's visits to museums demonstrate that the novelty of an alternative experience with phenomena may bolster the process of learning. In addition, these trips are acclaimed as most beneficial when they are well-structured and suit the current curriculum of students. They also appear to be most rewarding for children from impoverished or low SES backgrounds who tend to have limited exposure to these centers of fun and alternative learning. However, this has rarely been examined explicitly. Parent-fostered trips may allow for more time for child exploration and interaction with exhibits that stimulate their interests, but this has also rarely been examined and few studies include middle childhood samples.

### **The Impact of Trips to Zoos and Aquariums on Academic Outcomes**

Although less frequently researched in comparison to visits to museums, parents frequently visit zoos and aquariums with their children for recreational and/or educational purposes. Studies of these trips suggest that they may be more beneficial for children in elementary school than children in middle and high school. For instance, in a study by Suter (2014) student trips to zoos were not associated with increases in science achievement among either middle or high school students when assessed using data from the High School Longitudinal Survey (HSLs) and the Longitudinal Study of American Youth (LSAY). Similar findings were generated by Mulkerrin, Hill, Keiser, Grandgenett and Dlugosh (2012) in an experimental study which sampled high school students. In this study, no significant differences in performance were detected for students in the control group (classroom-based exposure) and the experimental group (zoo-based exposure). Both groups however showed improvements in knowledge gained at posttest. The only significant differences between the groups were in the perceptions of rigorous practice, program relevance and program relationships—all of which favored the zoo-based experimental group (Mulkerrin et al., 2012). The sample of 18 students

who comprised the experimental group were all Caucasian. Further information on the socio-economic backgrounds of these students was not provided in the study. It may be plausible to suggest that the intervention did not have such a significant effect on the experimental group due to their age and perhaps a history of prior exposure. The stimuli presented were therefore not as novel as those witnessed in the Henry (1992) study. Much more positive results are, however, demonstrated in the utility of educational trips to zoos and aquariums for children in elementary school.

For example, in a recent experimental study Wünschmann, Wüst-Ackermann, Randler, Vollmer and Itzek-Greulich (2016), sampled students in 3<sup>rd</sup> grade. Students in the experimental condition were exposed to reptiles and amphibians in the zoo while students in the control group were restricted to learning in the classroom setting only. The study examined both academic outcomes and level of motivation in each of the two groups and found that students in the experimental group achieved higher scores on the reptile knowledge test both at posttest and 2-week follow up. Results pertaining to motivation denote that students in the experimental group perceived that they had a higher level of control over what they studied than students in the class-based control condition. Children therefore had more opportunity to explore and initiate their own learning in this context. School-facilitated trips are rarely able to accomplish this due to their time constraint. Parent-fostered trips may allow more time for (self-directed) exploration.

The studies reviewed here evince first that, research specifying zoos and aquariums are fewer than studies specifying Art and Science museums as enrichment centers of interest. From these zoo-based studies, it appears that this specific form of enrichment may not be particularly beneficial for students in middle and high school. Examinations involving students in Elementary school (middle childhood) allude to more significant positive findings. However, at

present these findings are very scant and more investigations are needed to establish their credibility. In addition, studies to date have not examined whether the benefits of exposure to zoos and aquariums differ for children from varied SES backgrounds.

### **“Other” Parent-Fostered Enrichment Activities and Achievement Outcomes**

Beyond trips to museums, zoos and aquariums parents engage in a variety of other events with their children based on their beliefs, expectations and subjective preference. These include, participating in musical concerts and plays, attending cultural events, and visiting historical sites among others. While being entertained at these events, children get exposed to many different individuals, customs and traditions as well as cultures, thus, potentially gaining a wider and more diverse perspective on life. Studies on enrichment activities have to date focused little to no attention on the potential role attending other social events such as plays and concerts could have on child cognitive development. Previous studies on music engagement, however, imply that involvement in music such as learning to play an instrument offers cognitive benefits, which may be transferrable to other cognitive skills. Some studies however, suggest that evidence of transfer cannot be established due to inconclusive and contradictory evidence as well as the lack of uniform methodologies in these studies (Jaschke, Eggermont, Honing, & Scherder, 2013; Rickard, Bambrick, Gill, & Rickard, 2016; Southgate & Roscigno, 2009).

Exposure to music has also been found to be particularly beneficial for both cognitive and socio-emotional wellbeing when it is to music of preference, and its experience is found to be enjoyable (Sloboda, Lamont, & Greasley, 2008). In a series of experiments by Schellenberg, Nakata, Hunter and Tamoto, (2007), 5 year old Japanese children performed significantly better on drawing tasks when these tasks were preceded by exposure to familiar upbeat music in comparison to hearing unfamiliar music by Mozart or Albinoni before the tasks. Again, these

experiments give further credence to the possible impact of music exposure on varied cognitive domains. Other studies have posited paths which may lead to its impact on outcomes. For example, according to Schellenberg et al. (2007), it may occur through a positive alteration of the emotional state of the persons involved in the action. However, the current study simply aims at investigating associations with academic achievement.

Attending concerts and plays may offer preference-based opportunities to interact with other individuals, many of whom share similar tastes in the arts. Within these settings individuals can relax and simply enjoy the company of others as they listen to their artists of choice. Moreover, plays by their nature, can allow individuals to contemplate and even question norms often taken for granted in daily life. These contemplative activities can serve as a window offering a glimpse into the worldview and perspectives of others which hitherto may not have been consciously appraised: serving to broaden their own perspectives. Yet they are almost always recreational in nature and rarely align with any curriculum-based content. Hence, it is important to examine whether despite this, attendance may confer academic related benefits. In addition, they serve as modes of education in themselves. Although studies investigating this specific phenomenon are rare in the literature, a few suggest a theoretical link between exposure to drama and aspects of language development (Mages, 2006). Other studies in a similar domain however, suggest that exposure to drama through pretend play may positively impact child creativity, conversation, intelligence and theory of mind (Lillard et al., 2012).

Although parents are known to engage in plays and concerts with their children, it is unknown whether these informal, relatively unstructured activities, possessing an indirect educational component, also contribute meaningfully to child cognitive development and whether this may be witnessed in academic outcomes. It is also unknown whether exposure to

plays and concerts has different degrees of impact on child outcomes as a function of developmental age or SES status (i.e., do children from poorer SES backgrounds perform better academically in comparison to children from higher SES backgrounds, when exposed to plays and concerts). This study examined parent-fostered attendance to plays and concerts as enrichment activities that may impact child academic outcomes. It would also probe differential effects that may be because of differences in SES levels.

Finally, like exposure to plays and concerts, some parents also expose their children to a variety of cultural and historic events. Although the nature of these events varies widely, and children are not all exposed to the same or even similar events, this only adds to its value. Children exposed to these events in essence are given an opportunity to engage in and come to appreciate events different from the norm thus, their worldviews may be expanded through exposure. Similar to the phenomenon of exposure to a big city, children exposed to these cultural/historical events may gain a greater appreciation for the past and present world, an appreciation more profound than their current nuclear setting may lend itself to. By this exposure, children may become inspired to attain higher and perhaps even more unconventional heights. This study measures its impact on academic attainment. Alternatively, these children may come to simply accept these forms of exposure and the world it paints for them as normative and as such organize their expectations and future goals to suit these norms. Either way, these children, through their parent-facilitated activities may develop similar expectations for themselves based on what they have witnessed and be more likely to persist in the hopes of attaining these set goals. Unfortunately, with the exception of some studies in marketing, associating advertisement exposure to preference for specific products, (e.g., Nicklas et al., 2011) this phenomenon or other related/similar phenomenon have rarely been examined in the field of

psychology. Here again, it remains a mystery whether exposure to cultural/historical events has different degrees of impact on child outcomes as a function of SES status (i.e. do children from poorer SES backgrounds perform better academically in comparison to children from higher SES backgrounds, when exposed to cultural events?). Furthermore, it is unknown whether exposure to these activities is more beneficial for specific academic domains or whether they have a more generalized effect on all major academic domains. It is therefore crucial that these forms of enrichment activities are carefully examined. The current study explored specific variables articulated in the Eccles framework in the context of development in middle childhood. More specifically, it probed parent expectations of their children's academic achievement (parent beliefs), the provision of enrichment activities or support through exposure (parent behavior), and children's academic performance in reading, math and science (child outcomes).

### **The Current Study**

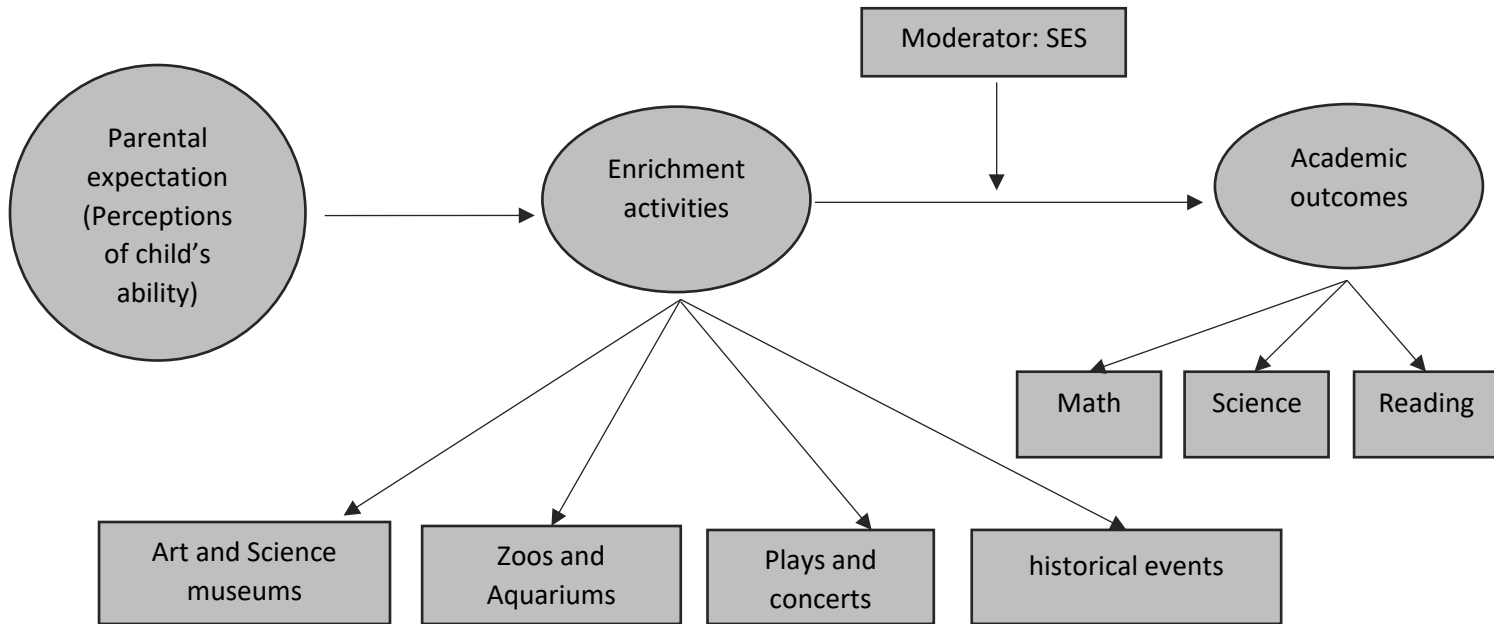
Using Eccles Expectancy Value model as a framework and data from a large nationally representative dataset- the Early Childhood Longitudinal Study-Kindergarten cohort (ECLS-K), this study examines out of school enrichments activities facilitated by parents among children between 6-12 years of age (1<sup>st</sup> and 3<sup>rd</sup> grade). This study seeks to disentangle the impact of four different types of cognitively stimulating activities and the extent to which these activities contribute uniquely to or have a combined and longitudinal impact on academic outcomes. The categories of activity include: 1) visits to art and science museums, 2) visits to zoos and aquariums, 3) attending plays and concerts, and 4) participating in cultural/historical events. The study also examines whether the benefits of exposure to these activities differ as a function of demographic factors, such as SES. Fig. 2 below depicts the current model for the thesis.

## Research Questions

1. Are parent beliefs/expectations associated with parent's provision of different types of enrichment?
2. Are the different types of enrichment activities associated with child achievement outcomes?
  - a. Does each activity impact achievement outcomes?
  - b. Do activities impact achievement only in specifically tailored domains or do they have a general impact on each academic domain?
3. Do parent expectations influence parent behaviors which in turn influence child outcomes?
  - a. Is the association between behavior/activity and child outcomes moderated by SES?
  - b. Does time of exposure—early and concurrent, and amount of exposure—cumulative exposure, have different impacts on academic achievement?



**Fig. 2. SEM Path Model for Current Study**



## **Method**

### **Participants**

The sample for this study was derived from the Early Childhood Longitudinal Study-Kindergarten cohort (ECLS-K). The ECLS-K study is a longitudinal study conducted by the National Center of Education Statistics (NCES). Data collection began in the kindergarten year of 1998 and was collected during 7 rounds of data collection at five-time points: Kindergarten, first grade, third grade, fifth and eighth grade. For the current study, data from students in their first, third and fifth years of elementary school would be sampled. The dataset contains nationally representative data from public and private schools across the United States.

The study employed a multistage probability sampling procedure, which oversampled Asians and Pacific Islanders (API's). The first stage, made up of Primary Sampling Units (PSU), consisted mainly of geographical areas within groups of counties. The second stage consisted of schools sampled within PSUs, while stage three consisted of students sampled within public and private schools offering kindergarten programs. In each school, two groups of strata were created- APIs and all other students. Students were then sampled using equal probability systematic sampling techniques after which parents of the sampled students were contacted for parental consent and to conduct the parent interview. The total number of students sampled in the first year (kindergarten) was 21,387. The third-grade sample included all children in the base year of data collection as well as children who were added to the original sample through a freshening up project in the previous years. The freshening up project was a procedure engaged in to ensure that children who were not enrolled in kindergarten at the start of the study and therefore had no chance of being included in the original sample had a chance of being included.

This project includes data from the second and third rounds of data collection (i.e., the fall and spring data collection periods of first grade). Thus, although there was some attrition in the sample during the period, this number was not large and there were 21,357 participants in the spring of third grade.

### **Procedure**

First and third grade data were collected in the fall of 1999 and the spring of 2002 respectively. Data consisted of: completing parent interviews through telephone and in-person computer-assisted interviewing (CAI); completing direct child assessments through computer-assisted personal interviewing (CAPI); completing teacher and school questionnaires, student record abstracts and facilities check list through self-administered questionnaires. In the previous fall, extensive measures were taken to ensure that previously identified children from the first round of data collection were tracked and parents were still willing to offer consent. This also included identifying the school of each sampled child, locating new schools if the child had changed schools or locating homes if the child was being home schooled. In addition, relevant training sessions were held for staff responsible for various aspects of the data collection process prior to data collection. This included, training in the automated Field Management System (FMS): in which all information from sampled parents, teachers and schools was inputted.

The questionnaires were mailed to schools to be self-administered by teachers and school administrators. Child assessments were all completed in English, lasted an average of 94 minutes and were conducted in a predetermined location—either the classroom or the library. Parent interviews lasted an average of 62 minutes and were conducted in person if the parents of a sampled child did not have access to a telephone. Quality control measures such as on-site observations of child assessments, which provided relevant feedback to the assessors on their

strengths and weaknesses, were also instituted to ensure that the quality of data was not compromised.

## **Measures**

***Direct child assessments.*** Direct child assessments consisted of cognitive assessments in language and literacy, mathematical thinking and general knowledge. These cognitive assessments included both open-ended and multiple-choice questions. IRT scale scores were used in this study. They are calculated based on the full set of test questions and take into consideration, a child's pattern of correct and wrong responses, omitted responses, the test difficulty, guess ability and a host of other factors in determining a child's level of ability. IRT scores are recommended over number right scores which only take into consideration the number of items correctly responded to. In addition, they are also recommended for use in cross-sectional and longitudinal analyses.

***Language and literacy.*** Language and literacy questions assessed reading, vocabulary and comprehension at 5 proficiency levels, which mirrored the progression of skills in the domain. The five levels consisted of; "identifying upper and lower case letters of the alphabet; associating letters with sounds at the beginning of words; associating letters with sounds at the end of words; recognizing common words by sight and; reading words in context" (Tourangeau et al., 2009).

***Mathematical thinking.*** Mathematical thinking items assessed conceptual knowledge, procedural knowledge and problem solving. It included questions on numbering, measurement, probability, algebra and functions. Items in this cognitive assessment were similarly assessed on a 5-point proficiency level: identification of one-digit numerals, reading all one-digit numerals,

reading two-digit numerals, solving simple addition and subtraction problems and, solving simple multiplication problems.

***General knowledge.*** General knowledge questions assessed children's knowledge of science and social studies. Questions comprising the social studies section were based on history/government, geography, economics and culture whereas science questions were based on either conceptual or skill-based comprehension of the natural world. Questions in this category were not assessed at different proficiency levels. In the current study, both general knowledge in social studies and science assessed in grades 1 and 3 were referred to as science in this study.

***Measures of enrichment activities.*** Enrichment activities—visits to art and science museums, zoos and aquariums, attendance of plays and concerts and historical events—were selected from ECLS-K's list of enrichment activities reported by parents during data collection. Parents were queried on whether anyone in the family had engaged in specific activities with the child in the past month. These specific activities were selected to reflect some academically oriented experiences as well as some informal, social and indirectly educational activities, which parents engage in with their children. Activities such as engagement in music lessons, after-school clubs and dance lessons were not selected because most of these contain some form of direct training/teaching. Responses were: yes (1), no (2) not applicable (-1), refused (-7), don't know (-8), not ascertained (-9). Participation and non-participation were recoded into 0s and 1s respectively to ease interpretation. Because the following responses: not applicable; refused; don't know and; not ascertained, were very few in the dataset (i.e., less than 20 cases each), they are considered as noise and deleted to bring greater clarity to the findings. For descriptive purposes, composite variables made up of the sum of enrichment activities reported were computed separately for grades 1 and 3.

***Parent expectations.*** Parent educational expectations for their children were assessed using one-question on a 6-point Likert scale. The question assessed how far parents expected their children to go in education. Response categories from the lowest to the highest where, less than a high school diploma, graduate from high school, attend two or more years of college, finish a 4/5-year college degree, obtain a master's degree and obtain a PhD or other professional degree. In situations where dummy variables were calculated such as during the logistic regressions, parents who expected their children to obtain a 4-year college degree at the minimum were used as the reference group because they made up the average of parent expectations.

***Per capita income.*** Per capita income, employed as an index of Socio Economic Status was calculated using the gross monthly household income and the number of persons in the household as the divisor. Indices such as these, in contrast to one variable factors like maternal income, have been shown to be better estimates of Socio Economic Status and thus, are more useful when conducting analyses.

## **Analysis Plan**

**Power analysis.** Using the G\*Power software a post-hoc power analysis was conducted to determine the level of power which could be attained given the approximated sample of 21,000 students in third grade (Faul, Erdfelder, Buchner, & Lang, 2009). On the basis of previous studies on the influence of visits to the museums on academic outcomes, an effect size of 0.05 was used for the computational process (Suter, 2014). The alpha level for this study was set at 0.05. Results of the analysis indicated that in the present study, estimating a small effect size of 0.05 and a sample of 21,000, power attained would be 0.99 ( $\alpha \leq 0.05$ ). As such, with this sample size there exists a 99.9% chance that a correct decision would be made in rejecting

the null hypothesis when it is false and subsequently make accurate inferences. Specific information for each analysis conducted is provided at the beginning of respective sections.

## **Results**

### **Preliminary Analyses**

Prior to running the main analyses, data was cleaned, coded and examined for missing data and distribution patterns. Preliminary results indicated acceptable skewness and kurtosis values on the variables of interest therefore data transformation was not needed. Before conducting each analysis, the data was weighted using grade and data specific weighting variables (i.e. child interview, child direct assessment and parent interview-c45cwo) provided in the ECLS-K dataset. This was done to ensure that inferences could be made extrapolating from the sample to the population, and to adjust for differences in non-response patterns as well as differential sampling methods employed during the ECLS-K sampling process. For instance, during sampling Asians and Pacific Islanders were purposefully over sampled and weights need to be applied for the data to be representative of their actual proportion in the general population. Since data from 1<sup>st</sup> and 3<sup>rd</sup> grade was used in the analyses, the weighting variable selected was specific to children who had data for both grade levels and therefore, restricts data to these grade levels only.

**Descriptive Analyses.** There were 1,485,912 children in this sample. In the fall of first grade and the spring of third grade there were 1,375,508 and 1,285,932 children respectively. The sample was mostly male (51.4%), and a little more than half (54.6%) were non-Hispanic White, 19.8% Black or African American, 9.1% Hispanic from specified origins, 8.7% Hispanic

with unspecified origins, 2.5% Asian, 6% Native Hawaiian or other Pacific Islander, 1.3% American Indian or Alaskan Native and 3.3% were mixed race.

Due to an extremely large amount of missing data on residential location in 1<sup>st</sup> grade (i.e. 63.1%), this variable was excluded from analyses in that grade. For the 3<sup>rd</sup> grade sample 42.2% lived in large and mid-size suburbs and large towns, 37.3% lived in Large and Mid-Size cities, and 15.5% lived in rural areas.

ANOVAs were used to investigate mean differences in parent expectations and participation in enrichment activities as a function of race and gender in grade 1, and race, gender and residential location in grade 3 (See Table 1).

*Table 1: Differences in Parent Expectations And Enrichment Variables by Grade.*

Predictors	Outcomes	df	F	$\eta^2$
	Gr.1 Parent Expectations			
Race		7	1649.34**	.021
Gender		1	3930.02**	.007
Race*Gender		7	1216.58**	.016
error		534336		
	Gr.3 Parent Expectations			
Race		7	1645.32**	.010
Gender		1	2186.55**	.002
Residential location		2	1151.88**	.002
Race * Gender		7	2403.91**	.015
Race *Res. Location		14	476.30**	.006
Gender* Res. Location		2	5.21**	.000
Race*Gender* Res. Location		14	785.97**	.010
error		1133148		
	Gr. 1 Enrichment			
Race		7	2096.10**	.027
Gender		1	1308.34**	.002
Race*Gender		7	590.10**	.006



error		530717		
	Gr. 3			
	Enrichment			
Race		7	234.64**	.001
Gender		1	91.85**	.000
Residential location		2	682.10**	.001
Race*Gender		7	791.67**	.005
Race*Res. Location		14	582.42**	.007
Gender*Res. Location		2	171.07**	.000
Race*Gender* Res. Location		14	737.26**	.009
	error	1129854		

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Note: \* \*p<.001 \*p<.05

**Examining First and Third Grade Parent Expectations.** In both grades, there were significant differences in parent expectations as a function of each demographic variable (race, gender and residential location) and their respective interactions. In general, parents from the larger minority groups—Black or African American, Hispanic and Asian—had higher expectations for their children compared with non-Hispanic White parents. Non-Hispanic white parents had higher expectations than all other races examined. Expectations were generally higher for girls compared to boys in both grades. In third grade, expectations were higher for children in large and mid-size cities, followed by those residing in suburbs and then those in rural areas. Race by gender interaction effects were stable across grades: being higher for girls compared to boys among non-Hispanic Whites, Hispanics from specified and unspecified origins, Native Hawaiians or other Pacific Islander and American Indians or Alaskan Natives. They were however, higher for boys compared to girls among Asian and mixed-race families. African Americans on the other hand reported higher expectations for boys than for girls in first grade but the opposite in third grade. The gender by residential location interaction showed that mean level expectations were highest for boys in cities followed by those in the suburbs and then those in small-towns and rural areas. Mean level parent expectations were not different for girls

living in cities and suburbs but were lower for those in rural areas. The three-way interaction between race, gender and residential location in third grade produced a complex set of interactions with no discernable pattern.

**Examining First and Third Grade Participation in Enrichment Activities.** Significant differences emerged in the analyses probing differences in demographic variables on enrichment activity participation. Main effects for race in first grade showed that participation among white students was higher compared to all other races examined. However, in third grade, participation rates were higher among whites only in comparison with African Americans, Hispanics from specified origins, Asians and Native Hawaiians/ Pacific Islanders. Children of all other racial groups participated more frequently than whites (i.e. mixed race, Hispanics from unspecified origins and American Indians).

Overall, boys participated more frequently than girls across grades but the interaction between race and gender showed that this pattern was more common among Native Hawaiians, Hispanics from specified origins and American Indians. Participation patterns changed across grade levels for whites, Hispanics from unspecified origins, Asians and mixed-race children. For all groups except mixed race, participation was higher for boys than girls in first grade, but lower for boys in third grade. African American/Black children were the only racial/ethnic group in which participation was higher for girls for both grades. In third grade, participation was highest among residents of cities followed by residents of large and mid-size suburbs and then residents of small towns and rural areas. Although the three-way interaction between gender, race and residential location was also significant, there was no discernable pattern in the findings.

## Investigating Differences in Academic Outcomes as a Function of Demographic

**Variables.** Means and Standard deviations for achievement outcomes by grade, residential location and gender are first presented in Table 2.

*Table 2. Achievement Outcome Means and Standard Deviations by Grade, Gender and Residential location*

			Mean	Standard Deviation	
<b>Grade 1</b>					
Reading	Male		50.6	18.89	
	female		52.97	16.26	
Math	Male		42.22	15.1	
	female		41.79	12.79	
Science	Male		30.19	8.05	
	Female		29.53	7.72	
<b>Grade 3</b>					
Reading	Male	large city	117.82	27.17	
		large town	124.47	28.76	
		small town	115.24	28.84	
	Female	large city	121.91	27.61	
		large town	128.98	26.22	
		small town	125.63	24.77	
	Math	Male	large city	95.22	24.99
			large town	100.53	25.93
			small town	92.9	24.33
Female		large city	90.23	23.26	
		large town	96.48	23.01	
		small town	92.03	21.65	
Science	Male	large city	47.25	15.02	
		large town	51.97	14.58	
		small town	49.49	14.17	

Female			
	large city	44.14	14.42
	large town	48.43	13.92
	small town	47.68	11.9

**Differences in Grade 1.** A Multivariate Analysis of Variance test (MANOVA) was used to investigate mean differences in academic outcomes—reading, math and science—based on demographic variables (race and gender). There were significant main effects of race (Wilks'  $\Lambda = .793$   $F_{(21, 1508872.42)} = 6050.82$ ,  $p < .001$ , partial  $\eta^2 = .074$ ), gender (Wilks'  $\Lambda = .985$   $F_{(3, 525472)} = 2629.08$ ,  $p < .001$ , partial  $\eta^2 = .015$ ), and their interaction (Wilks'  $\Lambda = .981$   $F_{(21, 1508872.42)} = 469.30$ ,  $p < .001$ , partial  $\eta^2 = .006$ ). Results are displayed in Table 3.

*Table 3: MANOVA Examining Academic Outcomes by Demographic Variables in Grade*

1.

Predictor	Criterion	df	F	Partial $\eta^2$
Race	Reading	7	3281.42**	.042
	Math	7	7718.71**	.093
	Science	7	17386.17**	.19
Gender	Reading	1	1493.16**	.003
	Math	1	806.90**	.002
	Science	1	603.67**	.001
Race*Gender	Reading	7	468.40**	.006
	Math	7	268.11**	.004
	Science	7	452.38**	.006
	Reading (error df)	525474		
	Math (error df)	525474		
	General knowledge (error df)	525474		

\*\* $P < .001$

Girls obtained higher mean IRT scores in reading ( $t_{(525474)}=3.90/.10=39$ ,  $p<.05$ ) than boys but boys obtained higher mean IRT scores in math ( $t_{(525474)}=2.21/.08=27.63$ ,  $p<.05$ ) and science ( $t_{(525474)}=.1.01/.041=25.25$ ,  $p<.05$ ). Interaction effects revealed diverse patterns in academic outcomes across racial/ethnic groups and gender. In general, non-Hispanic white students attained higher mean level scores in each academic outcome compared to students of all other racial/ethnic groups. The only exception was in the case of reading where Asian students attained higher scores compared to non-Hispanic white students.

***Differences in Grade 3.*** A second MANOVA probed differences in third grade academic outcomes by demographic variables. Significant main effects of race (Wilks'  $\Lambda=.868$   $F_{(21,3958348.49)}=9509.45$ ,  $p<.001$ , partial  $\eta^2=.044$ ), gender (Wilks'  $\Lambda=.999$   $F_{(3,1378514)}=4671.10$ ,  $p<.001$ , partial  $\eta^2=.010$ ), and residential location (Wilks'  $\Lambda=.993$   $F_{(6,2757030)}=1663.870$ ,  $p<.001$ , partial  $\eta^2=.004$ ) emerged. The following interaction effects were also significant: race by gender (Wilks'  $\Lambda=.988$ ,  $F_{(21,3958348.49)}=809.642$ ,  $p<.001$ , partial  $\eta^2=.004$ ), race by residential location (Wilks'  $\Lambda=.999$   $F_{(42,4089334.14)}=734.43$ ,  $p<.001$ , partial  $\eta^2=.011$ ), gender by residential location (Wilks'  $\Lambda=.999$   $F_{(6,2757030)}=343.68$ ,  $p<.001$ , partial  $\eta^2=.001$ ) and, race by gender by residential location (Wilks'  $\Lambda=.978$   $F_{(42,4089334.14)}=724.30$ ,  $p<.001$ , partial  $\eta^2=.007$ ). An analysis of between-subjects' effects showed differences in each predictor variable on academic outcomes; results are presented in Table 4.

Table 4: MANOVA Examining Academic Outcomes by Demographic Variables in Grade

3.

Predictor	Criterion	df	F	Partial $\eta^2$
Race	Reading	7	12053.06**	.058
	Math	7	11233.20**	.054
	Science	7	26709.53**	.119
Gender	Reading	1	1765.07**	.001
	Math	1	1469.33**	.001
	Science	1	713.69**	.001
Res. Location	Reading	2	3270.18**	.005
	Math	2	1769.19**	.003
	Science	2	3506.88**	.005
Race*Gender	Reading	7	883.29**	.004
	Math	7	1023.37**	.005
	Science	7	730.08**	.004
Race*Res. Location	Reading	14	975.35**	.010
	Math	14	1180.94**	.012
	Science	14	2019.23**	.020
Gender* Res. Location	Reading	2	3109.08**	.000
	Math	2	77.05**	.000
	Science	2	218.57**	.000
Race* Gender* Res. Location	Reading	12	684.38**	.007
	Math	12	577.09**	.006
	Science	12	982.77**	.010
	Reading (error df)	1378516		
	Math (error df)	1378516		
	General knowledge (error df)	1378516		

Note: \*\*p<.001

Like the results in first grade, non-Hispanic White students obtained higher mean level scores in reading, math and science, compared to students of all other races. Again, girls had higher mean IRT reading scores ( $t_{(1378516)}=5.457/.130=$ ,  $p<.05$ ) but boys had higher math ( $t_{(1378516)}=4.381/.114=41.98$ ,  $p<.05$ ) and science scores ( $t_{(1378516)}=1.710/.064=26.72$ ,  $p<.05$ ).

Differences by residential location showed that students in suburbs and large towns had higher mean IRT scores in reading, followed by students in cities and, students in rural areas. For math, students in rural areas had the highest mean scores followed by those living in suburbs and then residents of cities. Finally, for science scores, students in suburbs and large towns obtained the highest mean level scores followed by those in small towns and rural areas and then, city residents. Interaction effects were similarly significant but varied in nature without any dominant patterns emerging (See Figure 3, 4 and 5 respectively for comparisons between residential location and grade, gender and grade and, race and grade on academic outcomes).

**Correlational Analyses.** Correlations were run to examine associations between variables at each grade level (i.e. 1<sup>st</sup> (below the diagonal) and 3<sup>rd</sup> (above the diagonal) grades) at an alpha level of  $p < .05$ . See table 5 for inter-correlations between variables in grades 1 and 3.

*Table 5: Inter-Correlations between Parent Expectations, Composite Enrichment Activities and Academic Outcomes.*

	1	2	3	4	5
1. Parent expectations	1	.13**	.26**	.24**	.19**
2. Enrichment	.16**	1	.07**	.07**	.09**
3. Reading IRT	.26**	.15**	1	.74**	.72**
4. Math IRT	.29**	.23**	.70**	1	.71**
5. Science IRT	.27**	.31**	.53**	.66**	1

Note: \*\* $p < .01$

## **Main Analyses**

Using a variety of analytical strategies; including binomial logistic regression, hierarchical multiple linear regression, and structural equation modeling, we sought to answer four research questions: Do parent beliefs/expectations predict parent's provision of different types of enrichment? Is engagement in the different types of enrichment activities associated with child achievement outcomes? Do parent expectations influence parent behaviors and subsequently child outcomes?

Binomial logistic regressions were used to examine whether parent expectations predicted participation in enrichment activities in first and third grade, with gender, race, per capita income and residential location entered as control variables. Hierarchical multiple linear regressions, which controlled for age, gender, race, per capita income and residential location were run to assess the impact of varied enrichment variables on academic achievement—IRT reading, math and general knowledge in science scale scores. Finally, using MPLUS 8.0 (Muthen & Muthen, 2017), SEM models were used to validate the hypothesized relationships between parental expectations, composite enrichment (latent variable that included each type of enrichment activity), per capita income and academic achievement (latent variable with reading, math, and science scores).

Assessments of goodness of fit for the models were made based on the following criteria: values greater than .95 were considered acceptable for Comparative Fit Indices (CFI) and Tucker-Lewis indices (TLI) (Geiser, 2013), while a value of .05 or less was considered an acceptable index of Root Mean Square Error of Approximation (RMSEA) (Geiser, 2013).

### ***Research question 1.***



*Do parent beliefs/expectations predict parent's provision of different types of enrichment?* Hierarchical binary logistic regression analyses were conducted, and in step 1 included the following for dummy-coded variables: race, gender, per capita income and residential location and Per capita income. Non-Hispanic white children, boys and residents of large and mid-size cities, were the reference groups for race, gender and residential location respectively. The parent expectations variable was entered in step 2, and the reference group was parents who expected their children to attend a 4-year college. Analyses were run separately for Grade 1 and Grade 3.

### **Grade 1 Enrichment Activities**

**Museums.** Results pertaining to visits to museums were significant (Wald statistic= 3998.92,  $p < .001$ ). The chi square statistic for the overall model was also significant ( $\chi^2(14) = 41073.08$ ,  $p < .001$ ) and correctly predicted 63.7% of museum attendance. Compared to non-Hispanic White children, only Asian and Mixed-race children were more likely to visit Museums in first grade. Children of all other races were less likely to visit Museums than non-Hispanic white children but none of these had an odds ratio that was greater than 1.06. Therefore, compared to non-Hispanic White children, their probability of participating was no greater than chance. Girls were .71 times less likely to attend museums than boys and unit increases in per capita income were associated with a 90-point increase in the likelihood of attending museums. Parents who expected their children to graduate with less than a high school degree were 1.5 times more likely to attend museums than parents who expected their children to attend a 4-year college while parents who expected their children to attain a master's degree were 1.1 times more likely to visit museums. But all other parent expectation categories were less likely to visit museums with their children.

**Historical sites.** A significant Wald statistic (2243.73,  $p < .001$ ) and overall chi square value ( $\chi^2 (14) = 32710.42$ ,  $p < .001$ ) emerged for historical site visits with the model correctly predicting 63.1% of visits in first grade. Hawaiians or Pacific Islanders and American Indians or Native Alaskans were 2.2 times and 2.0 times more likely to visit Historical sites than non-Hispanic White children. Children of all other races were less likely to visit historical sites than non-Hispanic White children but none of them had a probability that was greater than a chance occurrence value of 1. Females were .95 times less likely to visit these sites compared to males and for every unit increase in per capita income, children were 9.3 times more likely to visit historical sites. Parents with lower expectations were less likely to visit with their children than parents who expected their children to attend a 4-year college. However, parents who expected their children to attain a master's degree or a PhD were respectively 2.3 times and 1.8 times more likely to visit historical sites than those with 4-year college expectations.

**Zoos and Aquariums.** The initial model comprised of the control variables predicted 60.8% of visits to Zoos and Aquariums correctly. However, when parent expectations were included in the model it significantly improved this prediction by 4%. The Wald test statistic (Wald statistic=1090.17,  $p < .001$ ) as well as the Chi square values for the overall model ( $\chi^2 (14) = 21911.74$ ,  $p < .001$ ) were significant. Hispanic children from unspecified origins were 1.5 times more likely to visit zoos and aquariums than non-Hispanic white children. In addition, Black or African American children were more likely to visit zoos and aquariums, but this was not more than 1 times greater. Children of all other races except for American Indians and Native Alaskan (which yielded a non-significant finding) were less likely to visit zoos and aquariums than White children. Girls were less likely to visit than boys, and a unit increase in per capita income was associated with a 10-point increase in the likelihood of visiting zoos and aquariums. Children

residing in suburbs were 1.3 times more likely to visit zoos and aquariums, while children in small towns and rural areas were less likely to visit compared to their city dwelling peers. For parent expectations, parents who expected a 2-year college degree and parents who expected a master's degree were 1.5 times and 1.3 times more likely to visit these sites than parents who expected their children to get a degree from a 4-year college institution. All other parent expectation categories were less likely to visit zoos and aquariums than parents who expected a 4-year college degree.

*Plays and Concerts.* Significant Wald Statistic ( $df(1) = 10992.71, p < .001$ ) and overall chi square statistic ( $\chi^2(14) = 20382.98, p < .001$ ) emerged for play and concert attendance, and the overall model correctly predicted 75.7% of attendance. Except for Hispanics, all other races were less likely to participate in these events compared to non-Hispanic White children but none of these at levels greater than chance. Girls were slightly more likely to attend these events than boys and a unit increase in per capita income was associated with a 2-point increase in the likelihood of attendance. Furthermore, parents who expected their children to attain a master's degree were 2 times more likely to attend plays and concerts compared to children whose parents expected them to only complete a 4-year degree. All other parent expectation categories were less likely to attend plays and concerts compared to those who expected their children to attain a 4-year degree. See Table 6 for regression results.

Table 6: Binary Logistic Regression Analyses Predicting Participation in Enrichment

Activities (grade 1).

		Museums	Historical Sites	Zoos and Aquariums	Plays and Concerts
Percentage correct	Step 0	58.1	58.5	62.1	75.9
	Step 1	60.7	60.7	61.3	75.9
	Step 2	63.7	63.1	63.6	75.8
Model coefficients					
	Exp (B) constant	.590**	.682**	.130**	.390**
Race (White-ref.)					
	Black	.885**	.545**	1.15**	.498**
	Hispanic (S) <sup>a</sup>	.863**	.468**	.700**	1.016**
	Hispanic (US) <sup>b</sup>	.820**	.555**	1.52**	.408**
	Asian	1.09	.397**	.558**	.416**
	Hawaiian	.287**	2.283**	.509**	.623**
	American Indian and NA <sup>c</sup>	.707**	1.981**	1.046**	.673**
	Mixed Race	1.13**	.578**	.826**	.447**
Gender (boys-ref.)					
	Girls	.714**	.945**	.901**	1.035**
Per capita income		96.71**	9.30	10.96**	1.97
Parent expectations (4-yr degree-ref.)					
	No high School	1.50**	.546**	1.14**	.497**
	High School	.504**	.747**	.648**	.671**
	2-year college	.639**	.784**	1.50**	.729**
	Master's degree	1.130**	2.289**	1.29**	2.108**
	PhD or higher ed.	.781**	1.750**	.515**	.598**

Note: \*\*p<.001, <sup>a</sup> S-specified origin, <sup>b</sup> US-unspecified origin, <sup>c</sup> NA-Native Alaskan

### **Grade 3 Enrichment Activities**

*Museums.* A similar set of analyses were computed to examine the likelihood of participating in each enrichment activity in grade 3. Here, the model again significantly correctly predicted 68.7% of responses pertaining to visits to Museums (Wald statistic  $df(1)= 157024.36$ ,  $p<.001$ ,  $\chi^2= 49158.39$ ,  $p<.001$ ). Children of mixed race origin were 1.1 times more likely to visit museums than non-Hispanic White children but children of all other races except for Hawaiian children (where results were not significant) were less likely to visit museums than non-Hispanic White children. However, the likelihood of this happening was less than 1% in each case. Girls remained .85 times less likely to visit museums than boys in third grade and for every unit increase in per capita income there was 2 times the likelihood of visiting museums. Children living in suburbs and rural areas were slightly less likely to visit museums than children living in large and mid-size cities. Parents who did not expect their children to graduate from high school, those who expected their children to attain a master's degree and those who expected their children to attain a PhD were 1.4, 1.4 and 1.2 times respectively more likely to visit museums than parents who expected a 4-year degree from their children. All other parent expectation categories were less likely to visit museums with their children.

*Zoos and Aquariums.* This model was significant (Wald statistic  $df(1)= 149699.85$ ,  $p<.001$ ,  $\chi^2(16)= 17330.78$ ,  $p<.001$ ) and the percentage of correct responses predicted was 68.1%. This percentage did not change from baseline even after other variables-control and main predictor variables—were included. In third grade, children of all other races were more likely to visit Zoos and Aquariums than non-Hispanic White children. The odds ratios for these are in Table 7. Girls were .94 times less likely to visit zoos and aquariums than boys and with each unit

increase in per capita income, children were 1.4 times more likely to more likely to visit zoos and aquariums. Children in large and mid-size suburbs as well as children in small towns and rural areas were slightly less likely to visit zoos and aquariums. Also, parents who did not expect their children to graduate with a high school diploma were the most likely to visit zoos and aquariums compared with all other parents.

*Plays and Concerts.* The model was statistically significant (Wald statistic  $df(1)=68895.74$ ,  $p<.001$ ,  $\chi^2(16)=26346.44$ ,  $p<.001$ ) with a correct prediction rate of 62.2%. In this model, Hawaiians and children of mixed race backgrounds were about 1.2 times more likely to attend plays and concerts. Children from all other races, apart from American Indian and Alaskan Natives, were less likely to attend plays and concerts compared to non-Hispanic White students. Like findings in first grade, girls were 1.2 times more likely to attend plays and concerts than boys and with each unit increase in per capita income came a 1.4 time increase in the likelihood of attending plays and concerts. Children residing in small towns and rural areas were 1.3 times more likely to attend plays and concerts compared to children in cities. Lastly, children whose parents expected them to attain master's and Ph.Ds., with odds ratios of 1.328 and 1.077 respectively, were the most likely to attend plays and concerts compared to children whose parents expected them to graduate with a degree from a 4-year college. Third-grade results are presented in Table 8.

In summary, the results show that parent expectations predict participation in enrichment activities (except for plays and concerts) over and above the role of demographic variables. However, the predictive capacity of expectations is much stronger in first grade than it is in third grade.

Table 7: Binary Logistic Regression Analyses Predicting Participation I Enrichment Activities (Grade 3).

		Museums	Zoos and Aquariums	Plays and Concerts
Percentage correct	Step 0 (no predictors/ all no responses)	68.5	68.1	62.1
	Step 1	68.5	68.1	62.0
	Step 2	68.8	68.1	62.2
Model coefficients				
	Exp (B) constant	.609**	.453**	.535**
Race (White-ref.)	Black	.587**	1.085**	.874**
	Hispanic (S) <sup>a</sup>	.677**	1.118**	.753**
	Hispanic (US) <sup>b</sup>	.841**	1.659**	.957**
	Asian	.793**	1.328**	.518**
	Hawaiian	.977(n.s)	1.076	1.258**
	American Indian and NA <sup>c</sup>	.749**	1.533**	.996 (n.s)
	Mixed Race	1.151**	1.442**	1.294**
Res. Location. (city_ref.)	Large and Mid-size suburbs	.940**	.953**	1.118**
	Small town and rural areas	.509**	.821**	1.337**
Gender (boys- ref.)	Girls	.850**	.941**	1.208**
Per capita income		2.019**	1.446**	1.495**
Parent expectations (4/5- ref.)	No high School	1.436**	1.575**	.525**
	High School	.511**	.994**	.563**
	2-year college	.666**	.616**	.741**
	Master's degree	1.404**	1.019**	1.328**
	PhD or higher ed.	1.260**	1.216**	1.077**

Note: \*\*p<.001, \*p<.05, <sup>a</sup> S-specified origin, <sup>b</sup> US-unspecified origin, <sup>c</sup> NA-Native Alaskan

## Research Question 2:

*Is engagement in the different types of enrichment activities associated with child achievement outcomes?*

To assess the impact of each enrichment activity on academic outcomes, three separate hierarchical multiple regression analyses were run for each grade level. In these models, age, gender and per capita income were entered first as control variables, and then grade-specific enrichment activities were entered. Each model was regressed onto one of three possible academic achievement outcomes: reading, math and general knowledge in science. In first grade, the overall model probing the influence of varied enrichment activities on reading outcomes was significant ( $F_{(8, 461557)} = 7497.62, p < .001$ ) and accounted for 11.5% of the variance in reading scores. Control variables significantly predicted reading scores ( $F_{(4, 461561)} = 12876.76, p < .001, R^2 = .105$ ) and an additional 1.5% of the variance was explained by enrichment variables ( $\Delta F_{(4, 461556)} = 1905.90, p < .001, \Delta R^2 = .015$ ).

Similar methods were used to examine the influence of enrichment activities on first grade math outcomes. In this case as well, the overall model was significant ( $F_{(8, 473915)} = 14277.73, p < .001$ ) and explained 19.4 % of the variance in 1<sup>st</sup> grade math scores. Control variables significantly accounted for 17% of the variance ( $F_{(4, 473919)} = 24187.15, p < .001, R^2 = .170$ ) and the inclusion of the enrichment variables accounted for an additional 2.5% of the variance in first grade math outcomes ( $\Delta F_{(4, 473914)} = 3627.89, p < .001, \Delta R^2 = .025$ ).

The overall regression model for science in first grade was also significant: ( $F_{(8, 460526)} = 23162.17, p < .001$ ) and accounted for 28.7% of the variance in science outcomes. Control variables alone, entered in the first step of the model significantly predicted the model ( $F_{(4, 460526)} = 12876.76, p < .001, R^2 = .105$ ) and an additional 1.5% of the variance was explained by enrichment variables ( $\Delta F_{(4, 460526)} = 1905.90, p < .001, \Delta R^2 = .015$ ).



(4,460530) = 35383.37,  $p < .001$ ,  $R^2 = .235$ ). But an additional 5.2% of the variance in science outcomes was explained by enrichment variables added in step 2 ( $\Delta F_{(4, 460526)} = 8369.19$ ,  $p < .001$ ,  $\Delta R^2 = .052$ ). Table 8 provides  $\Delta R^2$  and beta scores for each of the models.

*Table 8: Hierarchical Multiple Regression Analyses Predicting Academic Outcomes (Grade 1).*

Predictor	Reading		Math		Science	
	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$
Model 1	.100**		.170**		.235**	
Age		.168**		.227**		.216**
Gender		.099**		.012**		-.016**
Race		-		-		-.172
Per capita income		.074**		.145**		
		.198**		.229**		.306**
Model 2	.015**		.025**		.052**	
Museums		.118**		.111**		.171**
Historical sites		-		.050**		.068**
		.027**				
Plays and concerts		.050**		.053**		.094**
Zoos and aquariums		-		.025**		-.012**
		.011**				

Note: \* $p < .05$ , \*\* $p < .001$

Similar analytical strategies were used to examine the influence of enrichment activities on third grade academic achievement outcomes. In step 1 of each model, control variables—age, gender, race, per capita income and residential location—were entered in the model. These were followed by a cluster of enrichment variables in step 2 of the model, and reading, math and

science outcomes were entered as the dependent variables. The overall model predicting reading scores in grade 3 was significant  $F_{(8, 408633)} = 9232.90, p < .001, R^2 = .153$ . Enrichment activities explained an additional 1.9% of the variance in reading ( $\Delta F_{(3, 408632)} = 3021.80, p < .001, \Delta R^2 = .019$ ). The overall model for math outcomes was similarly significant ( $F_{(8, 412558)} = 10318.77, p < .001$ ) and accounted for 16% of the variance in grade 3 math scores, with enrichment activities accounting for an additional but negligible .007% of the variance. Lastly, the overall model predicting science outcomes in third grade was significant ( $F_{(8, 410765)} = 12630.71, p < .001, R^2 = .197$ ). Enrichment variables accounted for an additional 1.4% variance ( $\Delta F_{(3, 410757)} = 2423.15, p < .001$ ). See Table 9.

In summary participation in varied enrichment activities significantly influenced reading, math and science outcomes. However, their impact was most substantial in first grade and visiting museums appeared to be most beneficial for science outcomes.

Table 9: Hierarchical Multiple Regression Analyses Predicting Academic Outcomes

(Grade 3).

Predictor	Reading		Math		Science	
	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$	$\beta$
Model 1	.134**		.160**		.183**	
Age		.091**		.139**		.150**
Gender		.055**		-.128**		-.111**
Per capita income		.292**		.287**		.297**
Race		-.162**		-.168**		-.195**
Res. Location		.000 (n.s)		.023**		.071**
Model 2	.019**		.007**		.014**	
Museums		.132**		.067**		.122**
Plays and concerts		.032**		.038**		.000 (n.s)
Zoos and aquariums		-.046**		.007**		-.039**

Note: \* $p < .05$ , \*\* $p < .001$

These analyses demonstrate that valued added enrichment is most evident for math and science, but the amount of variance explained by the sum of enrichment activities is negligible for all three subjects in 3<sup>rd</sup> grade.

### Research Question 3:

*Do parent expectations influence parent behaviors and subsequently child outcomes?*

The following analysis was conducted using MPLUS v.8 (Muthen & Muthen, 2017). A latent variable representing an enrichment activity composite was created using enrichment activity variables in grades 1 and 3, and another latent variable representing academic

achievement was created using IRT reading, math and science scores in grades 1 and 3 separately.

Prior to conducting the SEM models, Confirmatory Factor Analyses (CFAs) based on the hypothesized models were conducted using MPLUS v. 8 (Muthen & Muthen, 2017). This was to ensure that the latent variables created using different variables were indeed measuring the same construct. Four different latent constructs were assessed: enrichment and academic outcomes in grade 1 and separately in grade 3. Enrichment in grade 1 consisted of visits to museums, visits to zoos and aquariums, visits to historical sites, and attending plays and concerts. In third grade enrichment activity consisted of visits to museums, visits to zoos and aquariums, and attending plays and concerts. Visits to historical sites were not assessed in grade 3, so it was not included in the grade 3 enrichment latent variable. A final latent variable was created combining enrichment variables in grade 1 and 3. This was used to assess the possibility of a cumulative effect of enrichment activities in grade 1 and 3 on grade 3 outcomes. CFA analyses showed good model fits for enrichment in grade 3 (CFI=1, TLI= 1RMSEA=0.00) and the cumulative enrichment latent variable. However, CFA analyses did not yield good model fit indices for enrichment in grade 1 as CFI and TLI estimates were .911 and .733 respectively. Furthermore, it yielded an RMSEA estimate of 0.092 with a 1.7% chance that the population RMSEA estimate would be less than .05. Therefore, the analyses did not proceed with models specifying enrichment in first grade. Acceptable fit indices emerged for academic outcomes latent variable which consisted of IRT Math, Reading and Science scores in grades 1 and 3 with CFI and TLI estimates of 1.00 and RMSEA estimate 0.00 for both grades.

Two models were examined exploring the impact of grade 3 parental expectations on grade 3 academic outcomes via enrichment activities in grade 3, while the second assessed the

impact of grade 1 parental expectations on academic outcomes in grade 3 via the cumulative effect of enrichment activities in both grades. For both these analyses, the moderating role of per capita income on the association between enrichment activities and academic outcomes was simultaneously examined.

The first SEM model examining the relationship between parent expectations, enrichment and academic outcomes in third grade showed evidence of a good model fit. CFI and TLI estimates were 0.983 and 0.971 respectively while the RMSEA estimate was 0.044 with an 87.4% probability that the population RMSEA would be less than .05. The SRMR estimate was 0.030. Figure 6 depicts the modeled relationship.

Parent expectations significantly and positively predicted engagement in enrichment activities in grade 3 ( $B_{21} = 0.029$ ,  $z = 5.702$   $p < .0001$ ,  $B_{21}^{\text{standardized}} = 0.195$ ), such that in grade 3, children who had parents with higher expectations participated in more enrichment activities. Controlling for the effect of the interaction between enrichment in that grade and per capita income, parent expectations significantly predicted academic outcomes in third grade ( $B_{31} = 5.955$ ,  $z = 12.332$   $p < .0001$   $B_{31}^{\text{standardized}} = 0.259$ ); and enrichment significantly and positively predicted academic outcomes ( $B_{32} = 13.643$ ,  $z = -2.660$ ,  $p = 0.008$   $B_{32}^{\text{standardized}} = 0.088$ ). The direct effect from parent expectations to academic outcomes in grade 3 was significant ( $p < .0001$ ) as was the indirect effect from parental expectations to academic outcomes in grade 3 via participation in enrichment activities in that same grade.

The final model examined the impact of parental expectations in first grade and the cumulative value of enrichment activities in first and third grade on academic outcomes in third grade. Like the previous models, fit indices for this model were adequate: RMSEA estimate 0.045 with an 84.9% probability that the population RMSEA would be less than .05. The CFI

index was .956 while the TLI index was .942. Parent expectations had a significant positive impact on enrichment ( $B_{21}=-0.061$ ,  $z= 5.56$ ,  $p<.001$ ,  $B_{21}^{\text{standardized}}= 0.231$ ). Further, controlling for the effect of the interaction of per capita income and enrichment, there was a significant positive impact of parent expectations on academic outcomes in grade 3 ( $B_{31}=5.641$ ,  $z= 7.667$ ,  $p<.001$ ,  $B_{21}^{\text{standardized}}=0.243$ ). There was also a significant positive impact of enrichment on academic outcomes in third grade ( $B_{32}=24.95$ ,  $z= 6.348$ ,  $p<.001$ ,  $B_{32}^{\text{standardized}} = 0.283$ ). Also after controlling for the impact of parent expectations, per capita income did not significantly moderate the relationship between enrichment and academic outcomes ( $B_{21}=6.829$ ,  $z= 0.955$ ,  $p=n.s$   $B_{21}^{\text{standardized}}= 0.031$ ). The model is depicted in figure 7.

**Longitudinal analyses.** A longitudinal SEM analyses was conducted to examine the impact of early expectations (grade 1) and enrichment (grade 1) on later academic outcomes, controlling for prior achievement (grade 1 academic outcomes), gender, race and per capita income. Results indicated a poor fit for the data  $\chi^2(11, N=9575) = 1854.68$ ,  $p<.001$ ,  $RMSEA=0.067$ ,  $CFI= .884$ ,  $TLI= .745$ ,  $SRMR=.043$ . However, based on prior research positing differences across the three major ethnic groups—African American, Hispanics and Asians—in contrast to non-Hispanic White populations, two separate analyses were conducted examining the same model in these two categories: category 1—non-Hispanic White students only and category 2—majority minority racial/ethnic group students only (African American, Hispanics and Asians).

The longitudinal SEM model examining the impact of early expectations (grade 1) and enrichment (grade 1) on later academic outcomes, while controlling for prior achievement (grade 1 academic outcomes), gender and per capita income among non-Hispanic White students only, showed that the model was just-identified  $\chi^2(9, N=4984) = 000$ , therefore, fit indices could not

be determined. Controlling for grade 1 academic outcomes, gender and per capita income, there was no significant effect of participation in enrichment activities in grade 1 on grade 3 academic outcomes ( $p=.108$ ) for non-Hispanic white children. Grade 1 parent expectations significantly predicted participation in enrichment activities ( $p<.001$ ). Direct effects were evidenced from parent expectations in grade 1 to academic outcomes in grade 3 ( $p<.001$ ). The bootstrapping results revealed a non-significant indirect effect of parent expectations in grade 1 on academic achievement in grade 3 via participation in enrichment activities in grade 1 (95% confidence interval= [-0.002, 0.023]. Figure 8 depicts this model.

The last model examining the impact of early parent expectations and enrichment on later outcomes among the three minority samples while controlling for gender and per capita income was also just identified:  $\chi^2(9, N=4056) = 0.000$ . Therefore, fit indices could not be determined. However, controlling for grade 1 academic outcomes, gender and per capita income, there was no significant effect of participation in enrichment activities in grade 1 on grade 3 academic outcomes ( $p=.83$ ) for minority. Grade 1 parent expectations significantly predicted participation in enrichment activities ( $p<.001$ ). No direct effects were evidenced from parent expectations in grade 1 to academic outcomes in grade 3 ( $p=.10$ ). The bootstrapping results revealed a non-significant indirect effect of parent expectations in grade 1 on academic achievement in grade 3 via participation in enrichment activities in grade 1 (95% confidence interval= [-0.009, 0.012]. Figure 9 depicts this model.

## **DISCUSSION**

Despite numerous interventions and strategies that have been employed to boost school achievement, evidence suggests that children in the United States are lagging behind their peers

from other developed countries in reading, math and science outcomes. Drawing insight from Eccles Expectancy value framework, the current study sought to examine whether participation in out of school enrichment activities positively impacts academic achievement among children in elementary school. Specifically, it assessed whether parents' beliefs were associated with their provision or facilitation of participation in different types of enrichment activities. It also investigated whether participation in these enrichment activities was associated with specific academic outcomes or participation had a general enrichment effect on all academic outcomes equally. Finally, it examined whether pathways existed from parent expectations to child academic outcomes through their participation in enrichment activities using cross-sectional and longitudinal methods.

### **Overall Summary of Findings**

Our results suggest that parents' expectations for their children's academic outcomes influences their engagement in enrichment activities specifically, visits to museums, historical sites and zoos and aquariums. However, this association is more strongly witnessed in grade 1 and by grade 3 become almost negligible. We also found that participation in enrichment activities in turn, significantly impacted academic outcomes but, the effect was strongest in grade 1 and reduced substantially by grade 3. Of the different enrichment activities assessed, visits to museums most strongly influenced science outcomes, followed by math and reading outcomes. Other enrichment activities also significantly impacted all academic outcomes, but their effects were not as strong as the effects of museum visits on science outcomes. This suggests that participation in enrichment activities holds some benefit for general academic performance but that some activities may be more beneficial than others. The analysis of hypothesized SEM models revealed significant paths between parent expectations, participation in enrichment



activities and academic outcomes in grade 3. Finally, longitudinal analyses exploring path models from parent expectations in first grade to academic outcomes in third grade, through participation in enrichment outcomes, did not yield significant path models.

### **Parent Expectations and Participation in Enrichment Activities**

Prior to discussing whether parent expectations predicted participation in enrichment activities, we discuss interesting racial/ethnic and gender differences in parent expectations that emerged in the results.

*Racial/Ethnic Differences in Expectations.* In first grade, Hispanic and Asian parents reported significantly higher expectations for their children than parents from all other ethnic groups examined in this study. However, by third grade a significant change occurred for African American parents whose expectations paralleled those of Asian and Hispanic parents. These three groups had higher educational expectations than everyone else. This is interesting and partially supports previous findings that argue that parents from minority racial/ethnic groups—Asian, Hispanic and African Americans—tend to have higher expectations for their children than non-Hispanic White parents (Qian & Blair, 1999). In their study which sampled students in eighth grade, they reveal different factors such as human, financial and social capital that account for these differences across ethnic groups (Qian & Blair, 1999). Our study adds to the literature evidence suggesting that these patterns are not constant but may change over time since we find that African American parents have lower educational expectations for their children compared to non-Hispanic White parents in grade 1 but by grade 3, African American parents have higher average educational expectations than non-Hispanic White parents. These changes in parent expectations may be prompted by individual, social, cultural or academic factors which alter

parents' views about the potential of their children. It is important that future research examines specific factors that result in this change.

*Gender Differences in Expectations.* Not many studies have examined differences based on child gender in parent expectations. The few studies that do exist are premised on the notion that parents and teachers may have lower educational expectations for boys than for girls (Wood, Kaplan, & McLoyd, 2007). Our study also found that expectations were generally higher for females than they were for males supporting the findings of Wood and colleagues where low expectations for boys did not change overtime but remained constant with increases in youth's age (Wood et al., 2007).

Interestingly, parent expectations that differed based on child gender varied depending on racial/ethnic group. Specifically, in grade 1, non-Hispanic White, Hispanic, Native Hawaiian or other Pacific Islander and American Indian or Alaskan native parents had higher expectations for girls than for boys whereas African American, Asian and mixed-race parents reported higher expectations for boys than for girls. These gender differences may stem from societal advances which have promoted the importance of educating the female child (Reynolds & Burge, 2008). Furthermore, studies show that many more girls have higher educational expectations for themselves than do boys (Wells, Seifert, Padgett, Park, & Umbach, 2011). These individualized aspirations for educational success among females often inspires hard work which might influence parents' perception of potential in their children. The findings may also reflect socialization practices and gender-based expectations linked to children's demonstration of responsibility. Numerous studies suggest that girls attain emotional and physical maturity earlier than boys (Halpern, 1997) and this fact may be influencing parents educational goals for their girls.

Importantly, a developmental shift occurs among African American parents: by grade 3 expectations were higher for girls than boys although the opposite pattern emerged in grade 1. Expectations across all other ethnic groups remained the same. This finding clearly demonstrates that while gender-based academic expectations may remain consistent among most ethnic groups, there is a noticeable shift in African American sub-populations. This shift may be due to the child's performance in school, the relationship between school authorities and the parents and a host of other reasons (Hayes, 2011). This finding may be associated with societal factors such as racial discrimination and threats to survival that are more commonly faced by African American males (Joe, Davis, Earl, & Temple, 2016). The shift we witness here may be hinting at parents' initial realization that chances for achievement may differ for their male and female children. From a developmental perspective it is also important to examine how this shift in parent perceptions may influence child wellbeing and success in both boys and girls. Alternatively, this change may be the result of parents noticing struggles faced by their male children in school. Some studies suggest that African American boys lack motivation to perform well in school because experiences there fail to meet their specific socio-emotional and cultural needs (Tatum, 2006). This has prompted interventions aimed at enhancing motivation for academic success (Tatum, 2006). However, according to our results, there may be a need for interventions focused on parents as well. Future studies should examine this change more critically to establish factors that may precipitate it as well as how this change might impact child outcomes.

### **Predicting Participation from Parent Expectations.**

A primary aim of the current study was to examine whether parents' educational expectations predict their engagement or participation in specific enrichment activities and we

found evidence for this in our results. Specifically, parents with higher expectations for their children (beyond a 4-5-year college degree) were more likely to visit museums and historical sites than parents who expected a 4-5-year college degree or less. These parents with very high expectations were no more likely to visit zoos and aquariums and attend plays and concerts than other parents. The engagement of these parents with high expectations in these specific activities that are more likely to be structured and aligned with children's curriculum in schools is worthy of note. Previous studies have demonstrated that parents' beliefs about sports, math and music influenced their provision of experiences for children that facilitated the development of these skills in them (Simpkins et al., 2012). It may be that parents' beliefs about academic achievement and the factors/experiences that promote academic achievement may be driving their participation in these specific enrichment activities.

Contrary to our hypothesis, we also found that parents who did not expect their children to graduate from high school also frequently participated in the full range of enrichment activities assessed in this study. Although, at first glance, this may seem surprising but it may not be without credence. It is possible that these parent's expectations are driven by things they know about their child, for example that their child has an organic/biological disability or an evident disinterest in academic work which make it unlikely their child will to get to college. As such parents might therefore invest more heavily in enrichment activities which they believe may enhance their children's quality of life or tap into new domains of interest and opportunities for motivation.

Also noteworthy: parents who expect their children in first grade to get Master's degree and PhD degrees, are not more likely than those who just expect a bachelor's degree to visit museums, zoos and aquariums or plays and concerts with their children, but are more likely to

visit historical sites. In first grade, visits to historical sites was the only enrichment activity that parents who expected less than a high school diploma from their children were not more likely to engage in compared to the reference group of parents with expectations of a 4-year college degree. Visits to historical sites may require greater amounts of cognitive engagement and parents with the highest-level expectations may be more inclined to this exposure. It may also be that children are driving this exposure.

### **Participation in Enrichment Activities and Child Academic Outcomes**

The second primary question guiding this study assessed whether participation in enrichment activities influenced child academic outcomes. Here again, racial/ethnic and gender differences in participation in enrichment activities are discussed prior to addressing the main question of influence.

*Racial and socio-economic differences in engagement.* Whereas non-Hispanic White Children were more likely to attend plays and concerts, Native American or other Pacific Islander children and American Indian or Alaskan Native children visited historical sites more frequently. These may hint at both cultural and perhaps socio-economic factors which may be influencing choice of engagement among persons in these minority ethnic groups. Preferences witnessed may be due to efforts by parents aimed at instilling cultural knowledge and pride in their children. Studies sampling children from other minority racial/ethnic groups suggest that parents intentionally engage in what is referred to as racial socialization to ensure that children are always aware of their history and can take pride in their heritage (Hughes et al., 2006). This practice has been associated with a myriad of positive outcomes and may be evidenced among these less well researched racial/ethnic groups (Hughes et al., 2006). Alternatively, differences in cultural heritage may make visits to historical sites preferable for Native American or other

Pacific Islander children and American Indian or Alaskan Natives. Further, this pattern may be attributed to accessibility and a likelihood that these types of enrichment activities are more likely to be free, inexpensive alternatives. Few studies have examined the factors promoting engagement among these smaller minority ethnic groups in the country. Therefore, patterns and preferences are not well known. Lastly, Hispanic children were found to be more likely to visit zoos and aquariums than non-Hispanic White children. Asian and Mixed-race children are more likely to visit museums in first grade than non-Hispanic White children. This finding aligns with others in the field that suggest the Asian parents are more likely to engage in out of home educational activities with their children than parents of other racial groups (Okagaki & Frensch, 1998) but the current study extends this finding to include Mixed-race parents or Mixed-race couples. Reasons why these parents are more likely to engage in such activities with their children are unknown and may be gleaned through qualitative approaches. However, one could speculate that they may be associated with cultural values and a desire for exposure, especially among people groups not native to the United States, economic reasons or a combination of the desire for exposure and economic reasons. Economic reasons are cited as a possible factor particularly because unit increases in per capita income were associated with an over 90 times increase in the likelihood of attending museums in this study. Additionally, Asians and non-Hispanic White groups have been found to be more likely to have better socio-economic standing compared to other racial/ethnic groups in the United States (Hoover & Yaya, 2010). In general, increased per capita income was always associated with higher probabilities of attending these enrichment activities. However, its impact was most pronounced in first grade. By third grade—although it remains a significant and important factor—its influence had diminished.

***Gender differences.*** In general, across grade levels and enrichment activities examined, boys were more likely to participate than girls. The only exception was in the case of attendance of plays and concerts where girls were more likely to attend than boys. Literature is replete with evidence that boys tend to engage in greater amounts of physical activity and have higher energy levels than girls (Ridgers, Salmon, Parrish, Stanley, & Okely, 2012; Sarkin, McKenzie, & Sallis, 1997). Therefore, it is unsurprising to find that their parents are more likely to foster engagement in enrichment activities that support high levels of physical activity such as visiting museums, zoos and historical sites: which allow for greater amounts of mobility and exploration. Girls on the other hand, have been found to prefer art-related activities (Simpkins, Ripke, Houston & Eccles, 2005), supporting our findings in plays and concerts.

### **Predicting Child Achievement from Enrichment Activities.**

Participation in enrichment activities significantly impacted children's achievement in first and third grades. The effects of enrichment activities on reading, math and science outcomes in these grades were more influential than the effects of control variables examined and accounted for significant amounts of the variance explained in each outcome. Visits to museums made the highest contribution to science outcomes in first grade although it impacted other variables as well. This is congruent with other studies in the field showing visits to museums are significantly associated with science outcomes (Suter, 2014). The strong impact of enrichment activities on science outcomes may be attributed to their structured environment and efforts to align exhibits with school based curriculum: both of which have been found to be most beneficial for children's learning outcomes (Whitesell, 2016). Visits also provide children with enriched visual presentations of concepts they may have studied in class: facilitating comprehension of those concepts (Henry, 1992; Tenenbaum et al., 2004). Attending plays and

concerts and visits to historical sites also contributed significantly to math and science outcomes in first grade.

An important aspect of this investigation was to examine whether engagement in enrichment activities has exclusive effects on some subject domains and not others. For instance, does exposure to science museums only yield benefits for science outcomes or does it significantly influence outcomes in other subject domains as well? These results show that exposure to enrichment activities has broader scopes of influence although their impact on certain subject domains especially science may be higher than in other domains like reading and math. Furthermore, these results show that visits to historical sites and attending plays and concerts may have equally beneficial effects on academic achievement. Despite this, some enrichment activities appear to negatively impact some academic outcomes, particularly reading. In the first grade, historical site visits and attendance of plays and concerts appear to negatively influence reading scores but visits to zoos and aquariums negatively impact 3<sup>rd</sup> grade reading. Different factors may explain these peculiar findings. In first grade, it is plausible that these activities when engaged in excessively may detract from children's development of crucial reading skills: leading to the poor outcomes in the domain. Reports of non-significant findings in investigations exploring the influence of visits to zoos and aquariums on academic outcomes are not new. For instance, Suter (2014) found that trips to zoos were not associated with increases in science test scores for high school students. In a different experimental study that explored whether high school students in a zoo-based learning environment would perform better than students in a classroom-based set-up, there were no significant differences between groups (Mulkerrin et al., 2012). Reasons posited for these findings include the fact that although zoos and aquariums may be good for exploration, learning of complex information is often more



difficult in these settings (DeWitt & Storksdieck, 2008). Our study is the first to show these trends at the elementary school level. Perhaps it may be that their contribution to child development may occur even earlier than at the elementary school phase.

The influence of all enrichment activities on academic outcomes also appear to wane significantly by grade 3 to the point that some, for example attending plays and concerts, have no significant effect on science outcomes. Here as well, it may be that as academic work becomes more specialized and complex the influence of these enrichment activities become weaker. Given that the data was collected on the same set of children over the different time periods, it may also be the case that earlier exposure to these enrichment activities have influenced outcomes to the extent possible. These children may now require new learning experiences to supplement classroom experiences, experiences that differ from those that they may have grown accustomed to.

### **Modeling Parent Expectations and Academic Achievement**

Findings from our overall models reveal partial support for our hypothesis. In third grade, parents with high expectations were more likely to participate in enrichment activities with their children and there was a direct relationship between expectations and child outcomes. This direct effect was likewise present in the longitudinal analyses examining early parent expectations on outcomes via early participation in enrichment activities. But there was no evidence of an indirect relationship between parent expectations and academic outcomes through earlier participation/engagement in enrichment activities in either grades or longitudinally. In their proposed model on the effects of parent beliefs on youth outcomes, Simpkins and colleagues posit that parent beliefs influence behaviors which subsequently influence youth beliefs and behavior (Simpkins et al, 2012). In their study, they found evidence for this where mother's

belief in sports, music and math predicted their own behaviors, youth's self-concepts in those domains and the amount of time they (youth) spent in these activities. Unfortunately, since the original study did not examine actual achievement related outcomes in these domains, it is difficult to tell whether the beliefs are linked to these outcomes in the same way. It appears that parent expectations uniquely influence child academic outcomes at both grade levels but participation in enrichment activities may be most beneficial only very early in elementary school. Our findings may also have resulted from the fact that engagement in enrichment activities did not strongly predict achievement in grade 3 as strongly as they did in grade 1. However, because the latent variable structure for enrichment activities in first grade did not have good model fit indices we could not explore this pathway in first grade. It may also be the case that parents' expectations for their children's academic outcomes does not always result in engagement in behaviors that will meet that goal. Some studies show that although parents may have good expectations for their children they lack knowledge on behaviors and practices that will ensure that these outcomes are attained in their children (Yamamoto & Sonnenschein 2016).

Our examination of the moderating effect of SES on outcomes was not significant in either model. This differs from other studies in the field which suggest that children from low SES background may benefit more significantly from participation in these enrichment activities (Whitesell, 2016). The extensive nature of our dataset may have cancelled out possible effects in the population. An examination of this using a pure low SES group may help to glean additional insight.

On the other hand, we found novel evidence suggesting that the cumulative effect of enrichment positively impacts outcomes in grade 3. This suggests that the participation in enrichment activities may have an additive effect on later child outcomes. Therefore, it may be

plausible that although the effect of enrichment activities based on records in grade 3 alone do not seem to have a strong impact on outcomes in that grade, children may greatly benefit from their past experiences. Indeed, knowledge gained in the past may serve as strong foundations for future learning and achievement. Additional research is needed to substantiate this finding.

### **Limitations and Implications**

*Limitations.* The current study is not without limitations, first, participation in enrichment activities was measured using a dichotomous variable (yes or no). This prevented an assessment of the frequency with which parents had engaged in the activities with their children and how that may have influenced academic achievement. Assessing whether a parent has taken a child to a specific location at least once a month does not provide an adequate sense of frequency. Further, it places parents who engage in these activities on at least a weekly basis on the same scale as parents who have only engaged in the activity once that month. Measuring frequency of engagement/participation in enrichment activities in a more detailed fashion may yield greater insights into the effects of these enrichment variables.

Second, even though we consider the inclusion of ethnic/racial sub-groups not typically represented in this study as a strength, we also acknowledge that this approach may have prevented a more nuanced assessment of within group differences that are known to exist in all ethnic groups and to account for factors that might precipitate these differences.

Another limitation of the study arose from the restricted nature of the data set employed. In third grade the number of enrichment variables assessed were much fewer than those assessed in first grade. For instance, in the case of visits to historical sites, the variable was only assessed in first grade, making it impossible to examine longitudinal effects of exposure to this variable. In addition, the dataset contained few variables that assessed exposure to unstructured

enrichment activities. Thus, we were very restricted in our choice of variables for unstructured enrichment activities.

Another important limitation of our study pertains to the general measure of parent educational expectations used. The variable did not assess specific expectations such as expectations for science outcomes or other specific academic outcomes. Examining expectations that are more closely associated with their outcomes may yield greater insights into how parent expectations influence child outcomes.

Finally, with regards to the results themselves, some of the significant findings in the study, accounted for a very small amount of variance in the outcome variable. For instance, the effect of some enrichment variables accounted for very little of the variance in academic outcomes especially in third grade. Given the large sample size in this study, these small variances must be interpreted and generalized with caution.

***Implications.*** The results of the current study have implications for parents and elementary school teachers alike. They provide insight into the importance of parental expectations, the influence these expectations have on their own behavior and the outcomes on their children. More importantly, the findings reveal that participation in enrichment activities such as visiting museums is beneficial for child outcomes: particularly math and science outcomes. The findings also hint at developmental stages where exposure to these enrichment activities may be most beneficial. For teachers, the findings reveal specific enrichment activities that influence children's academic outcomes. They also show how parents' engagement with their children can bolster academic achievement in children: strengthening school-parent partnerships to ensure well-rounded education of children.

*Future Directions.* Given that children from smaller minority groups, children living in rural areas and parents with the highest expectation for their children are more likely to visit historical sites, future studies should explore whether engagement in these activities offer superior benefits to children's academic achievement in different domains. Additional research should critically examine how visits to historical sites influence a child's cognitive development. Moreover, future studies must examine whether these visits to historical sites positively influence children's perceptions of their identities and consequently their socio-emotional and cognitive development. This is important given the substantial evidence showing that racial socialization among African Americans positively influences the development of identity and impacts social-emotional and cognitive development by protecting people of this racial/ethnic group from the negative effects of discrimination (Neblett, Philip, Cogburn, & Sellers, 2006). Visits to historical sites may be an important mechanism of socialization employed by Native Hawaiians or other Pacific Islanders and American Indians or Alaskan Natives which promotes knowledge of the culture among children and may serve as a protective factor for people of these racial/ethnic groups.

Fig. 3. Comparison of Means by Residential location, Grade and Academic Outcomes

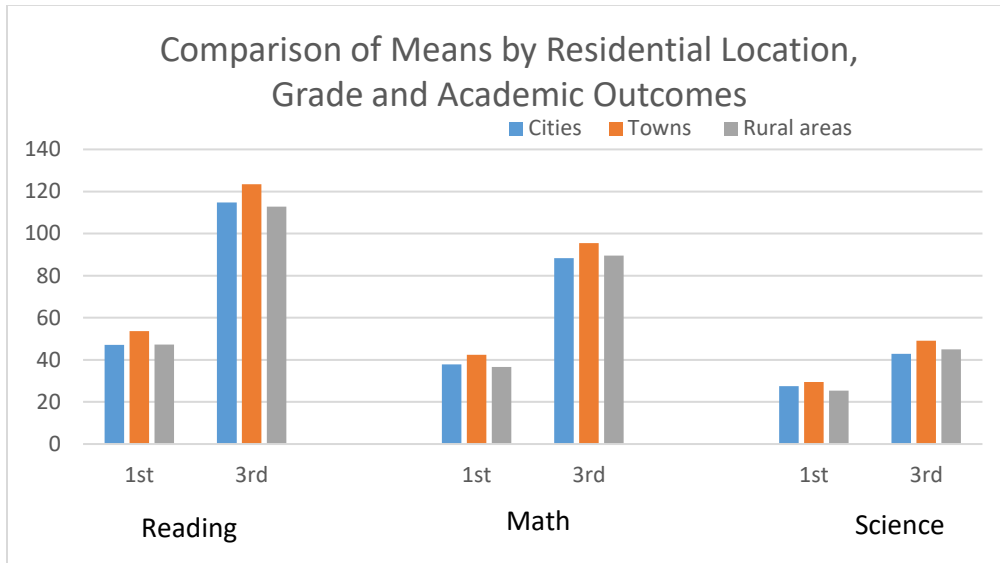


Fig. 4. Comparison of Means by Gender, Grade & Academic Outcomes

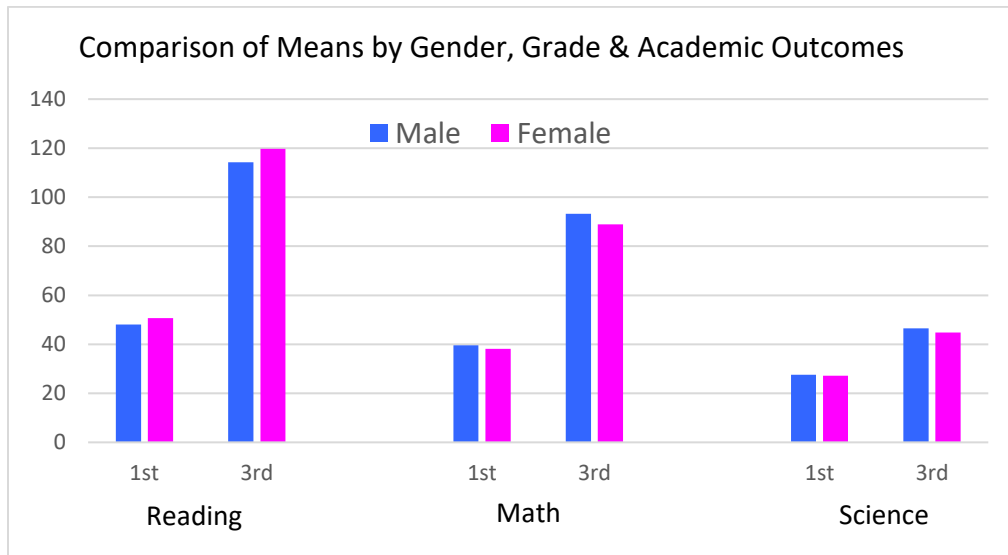


Fig. 5. Comparison of Means by Race, Grade and Academic Outcomes

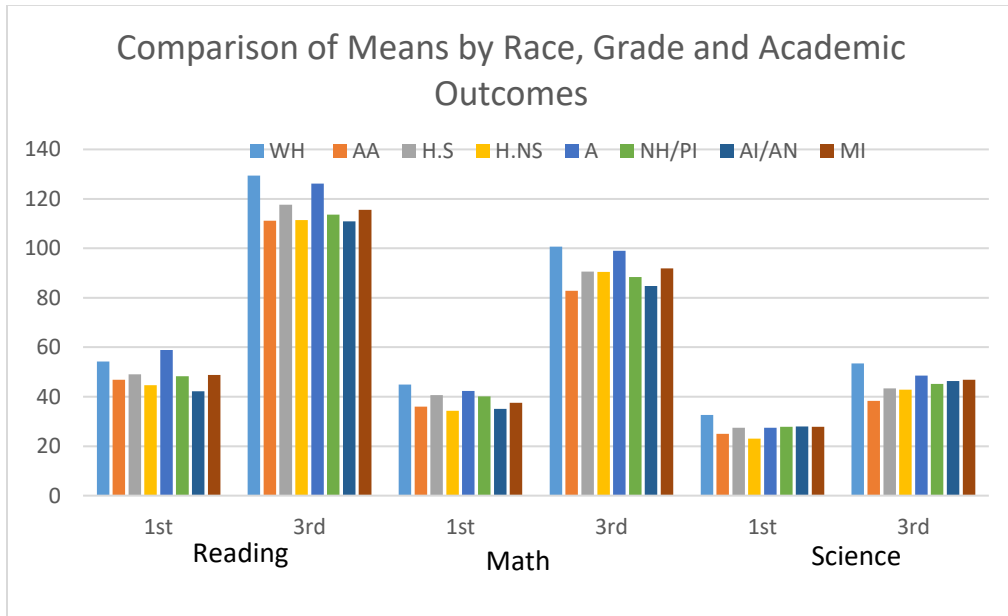




Fig. 6. SEM Model Exploring the Effect of Parent Expectations on Academic Outcomes Through Enrichment Activity Participation in Grade 3.

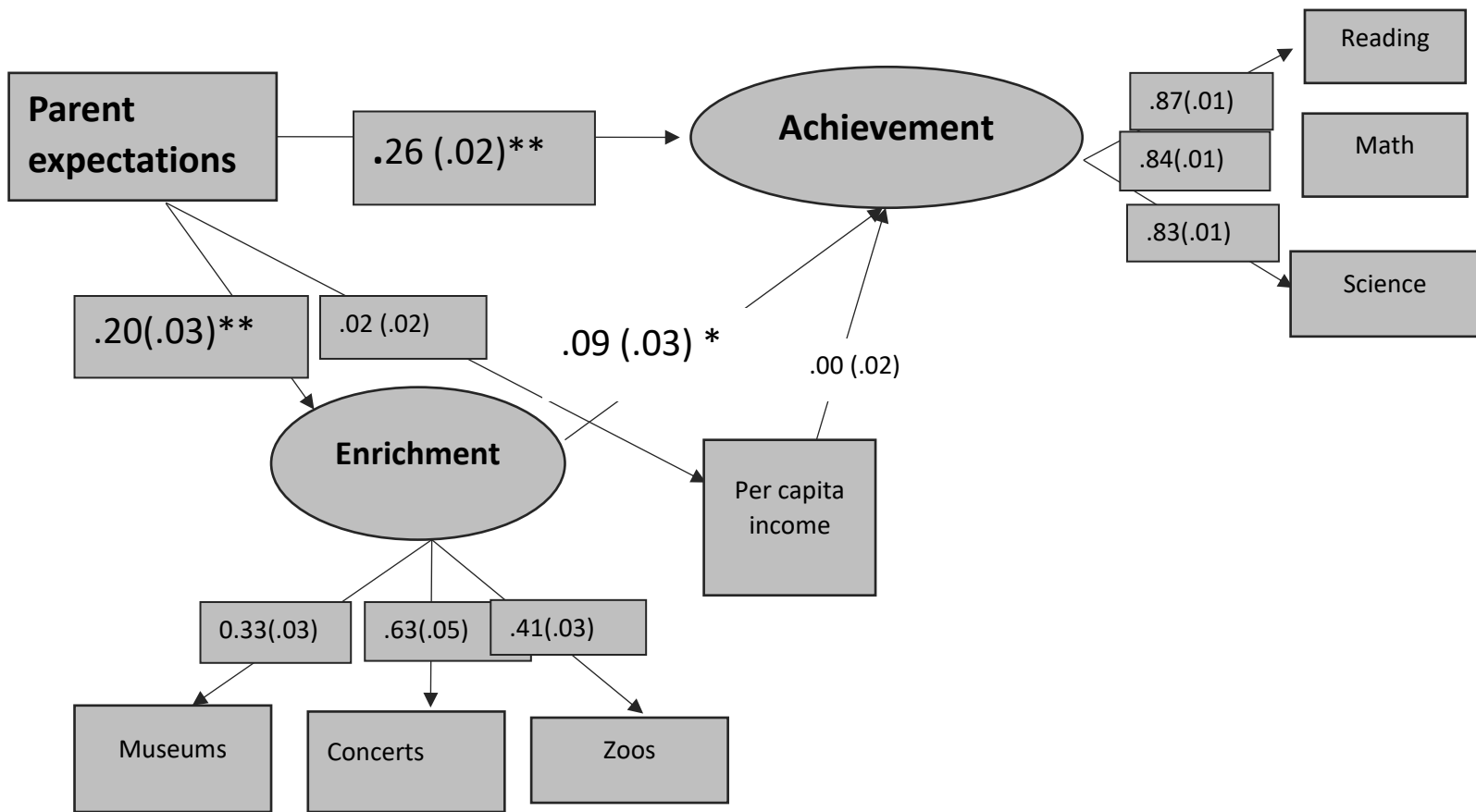


Fig. 7. SEM Model Exploring the Effects of Parent Expectations on Academic Outcomes Through Cumulative Enrichment Participation in grade 3.

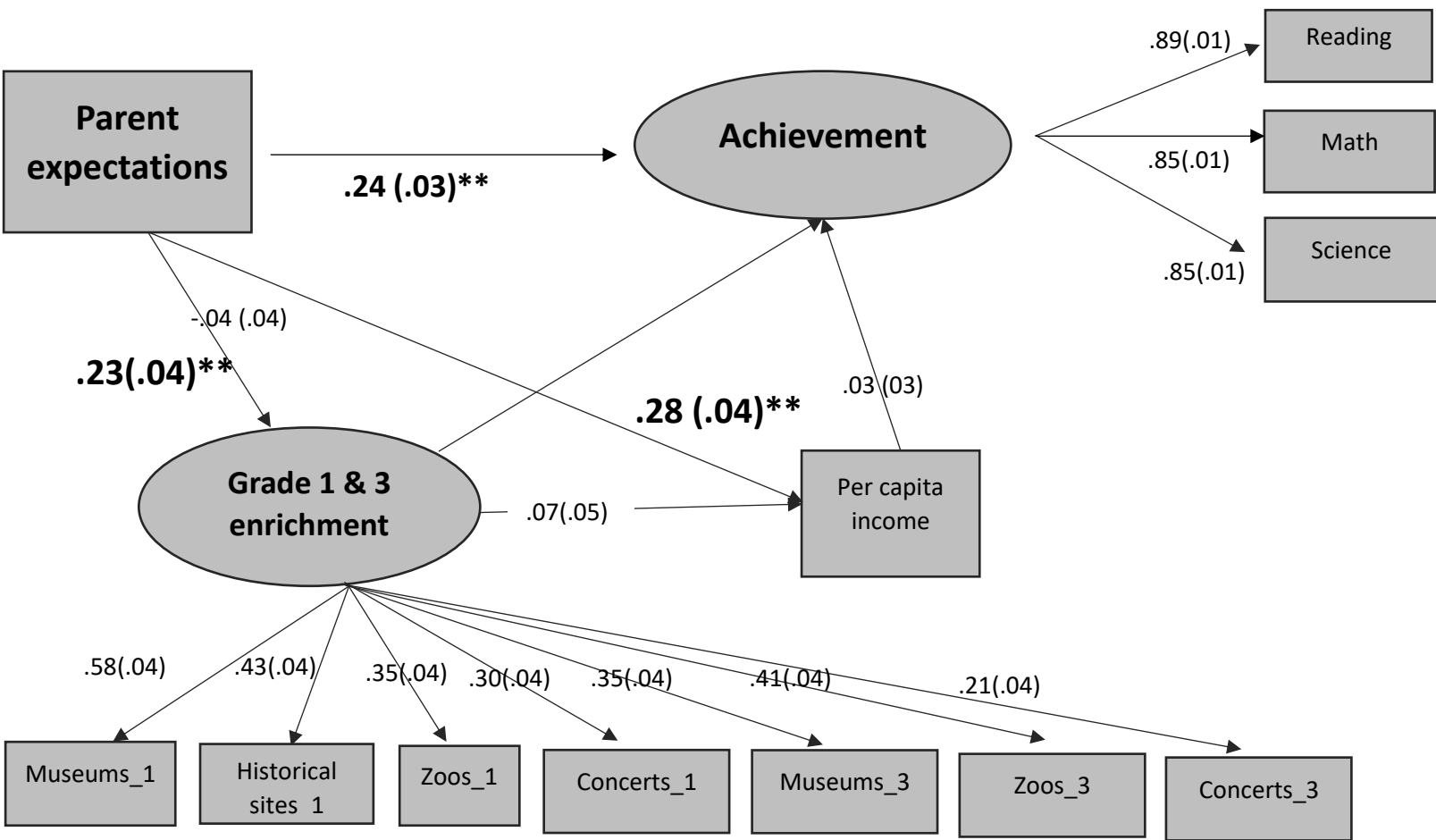


Fig. 8. Longitudinal SEM Exploring Academic Outcomes among Non-Hispanic Whites Only

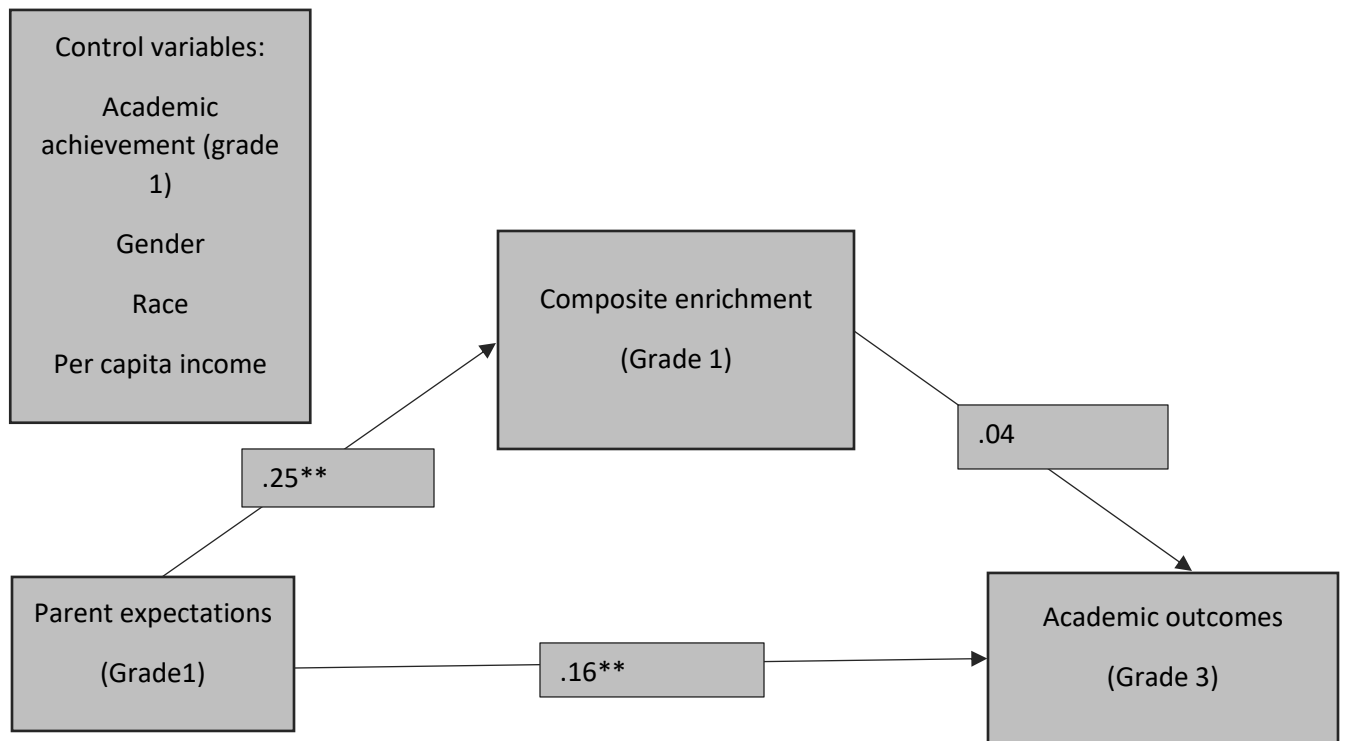
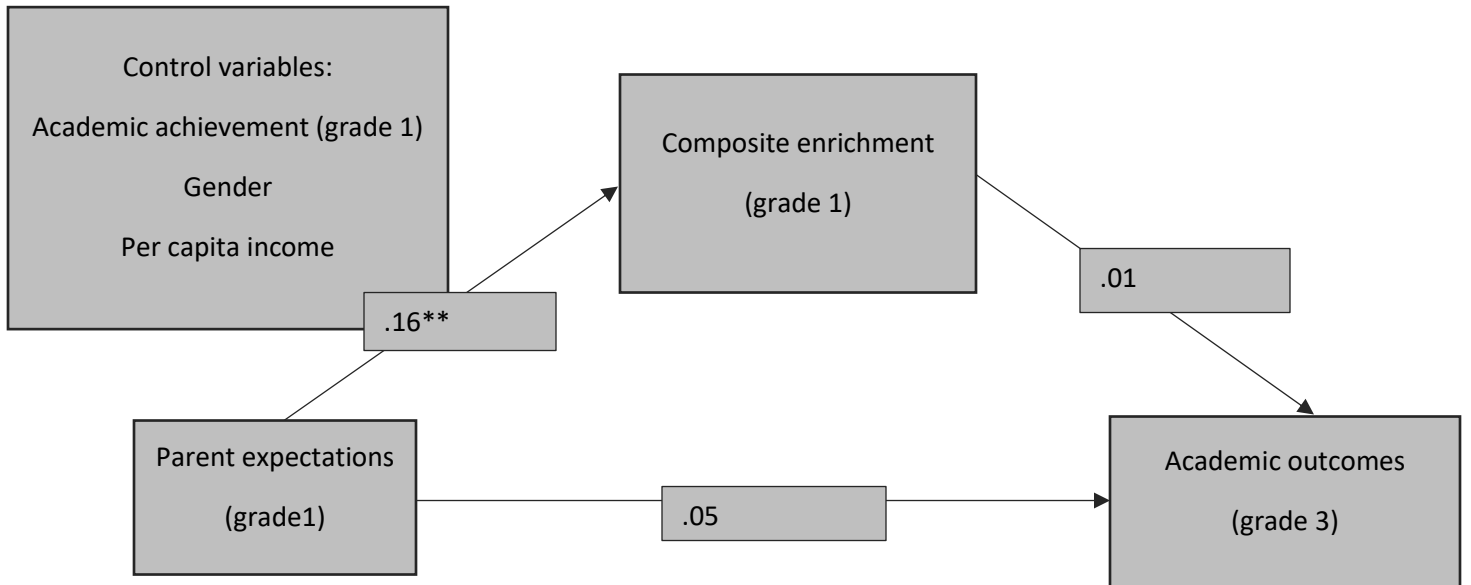


Fig 9. Longitudinal SEM Exploring Academic Outcomes among Minority Groups Only



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### **Vita**

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