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## Growing up in poverty and civic engagement: The role of kindergarten executive function and play predicting participation in 8th grade extracurricular activities

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### ABSTRACT

In the United States a “civic engagement gap” persists between low-income youth and their higher-income counterparts. To examine the developmental origins of civic engagement in a sample of U.S. children growing up in poverty, a conceptual model was tested employing the Early Childhood Longitudinal Study-Kindergarten Class (ECLS-K) national data set. Using generalized linear models, we examined the contributions of kindergarten children’s executive function and exposure to classroom based play to participation in different extracurricular activities in 8th grade. Results suggest that executive function is a significant predictor of participation in drama and music clubs, sports and number of hours spent in extracurricular activities. Play was also a significant predictor of participation in school clubs, while controlling for executive function. These findings provide initial evidence of a developmental trajectory toward civic engagement beginning in early childhood.

*“...a child’s greatest achievements are possible in play, achievements that tomorrow will become her basic level of real action...”*

*Lev Vygotsky (1978, p. 100)*

The United Nation’s Convention of Children’s Rights (CRC, UN General Assembly, 1989) highlights young children and their role as a citizen with perspectives and experiences that are important to acknowledge, cultivate, and support (Ruck, Peterson-Badali, & Helwig, 2013). Yet, relative to the established body of research focusing on civic engagement in adolescents and young adults, the developmental roots of civic engagement historically received less interest (e.g., Easton & Hess, 1962; Hess & Torney, 1967; Moore, Lare, & Wagner, 1985). Scholars more recent emphasis on theoretical and methodological issues across differentiated populations addresses this limitation (e.g., Astuto & Ruck, 2010; Berti & Andriolo, 2001; Fridkin, Kenney, & Crittenden, 2006; Mac Naughton, Hughes, & Smith, 2008). Identifying developmental levers for young children’s civic engagement may allow for a more nuanced understanding of their role as citizens with rights, ideas, and goals (Mitra & Serriere, 2015).

A growing body of research suggests that preschoolers are capable of engaging in the world in meaningful

ways which contribute to their role as productive citizens such as developing democratic classroom rules or expressing their perspectives about a social justice issue such as not having a safe outdoor playground in their community (e.g., R. A. Hart, 1997; Jarvis, George, & Holland, 2013; Krechvsky, Mardell, & Romans, 2014; Lansdown, Jimerson, & Shahroozi, 2014). Community activists and educators underscore the need for young children and youth, especially those who grow up in contexts of poverty, to develop strong, coherent self-concepts, which include identities around their communities and social contexts (e.g., Finlay, Flanagan, & Black, 2007). For these reasons, exploring the relationships between early childhood contexts, such as kindergarten, and emerging civic engagement is critical to designing programs and policies that promote civic development and a healthy democracy (Wade, 2007; Wray-Lake & Syvertsen, 2011) particularly for historically, disenfranchised and marginalized communities. The current study assessed a conceptual model of the developmental roots of civic engagement with a national sample of children. We provide first-time empirical evidence that skills and experiences in Kindergarten for children growing up in poverty lead to participation in 8th grade activities, which serve as precursors to civic engagement.

## Civic engagement and growing up in the context of poverty

Although the benefits of sociopolitical development for marginalized youth are well documented (e.g., Diemer, 2009), youth and adults who live in poverty in America demonstrate lower levels of civic engagement on different indices of political participation, such as taking part in a march, or demonstration, being active in the local community, or voting (McIntosh & Muñoz, 2009; Verba, Burns, & Schlozman, 2003). In the 2012 U.S. presidential election, a 15-point gap between higher- and lower-income voter turnout was reported by Non-profit Vote (2013) with 62% of those with a household income of less than \$50,000 voted, compared to 77% of those living in households earning more than \$75,000. Specific to disadvantaged youth, the Center for Information and Research on Civic Learning and Engagement (CIRCLE) (2012) reports on what they call the persistence of the civic engagement gap in young voters (i.e., ages 18–29, 2012). Also noted in the 2012 presidential election, 35% of youth with zero college experience voted compared to 66% of youth with at least some college experience (CIRCLE, 2012). Using education level as a proxy for income, CIRCLE points to the dearth of civic learning opportunities available for low-income youth as a key contributor to this gap (2012). This “civic engagement gap” (Flanagan & Levine, 2010), is reflected in more than voting behaviors for low-income communities. Critical social civic behaviors like volunteering or community involvement are also less common for low-income students than their middle and upper class counterparts (D. Hart, Matsuba, & Atkins, 2014).

A number of scholars suggest that differences in civic engagement between low-income members of society and their wealthier counterparts stem from divergent childhood experiences (e.g., Flanagan & Levine, 2010; McBride, Sherraden, & Pritzker, 2011; Wilkenfeld, 2009) and that these differences are transmitted across generations (Verba et al., 2003). Among youth, it appears this civic engagement difference widened in recent years. For example, the gap between those who intend to vote versus not expanded between youth with 2-year versus 4-year college plans in the time between 1976 and 2005 (Syvertsen, Wray-Lake, Flanagan, Osgood, & Briddell, 2011). Although service learning experiences are noted to ameliorate such trends, these opportunities are not afforded to lower-income, non-college bound students at the same rate as their college-bound peers (S. Hart, 2006). The available evidence suggests that growing up in a context of poverty in America interferes with the opportunity for an optimal developmental trajectory of civic engagement (CIRCLE, 2012; Flanagan & Levine,

2010; McIntosh & Muñoz, 2009), including important social civic behaviors such as community organizing.

## Young children’s developing civic engagement

A considerable effort to conceptualize civic engagement as a coherent, contextually-driven aspect of one’s developmental trajectory from early childhood through adulthood exists (Astuto & Ruck, 2010; Brown, White, Chow, & Gillen-O’Neel, 2015; Torney-Purta, 2013). Identifying ways to test hypotheses, such as how young children’s experiences within and across developmental contexts provide levers for later engagement in society are important objectives for civic engagement researchers (Amnå, 2012; R. A. Hart, 1997; Sherrod, 2015; Sherrod, Flanagan, & Youniss, 2002). Although research with young children and civic engagement is limited, there is nevertheless evidence that young children have specific skills and knowledge that enables them to be active “citizens” in various settings (e.g., school, home, peer group). One of the first developmental accounts of the growth of children’s political knowledge was undertaken by Connell (1971). Based on interviews with Australian 5 to 16-year-olds, Connell proposed a stage model of the growth of children’s political thinking. This work provides rich data illustrating that children’s beliefs and ideas change over time with age. Similarly, using longitudinal, multi-nation data, Coles (1967, 1986, 2000) found that children’s (rudimentary) political awareness emerged as early as kindergarten. In their pioneering large-scale study, Hess and Torney (1967) explored political formation in children across 8 cities in America highlighting the important role of socialization into citizenship roles. Using participants from the National Longitudinal Survey of Youth (NLSY) data set examining personality type in early childhood to youth volunteer behaviors, resilient children, characterized by high levels of empathy, emotional regulation and positive emotionality, are more likely than their over-controlled and under-controlled counterparts to volunteer (Atkins, Hart, & Donnelly, 2005).

In addition to the growth of basic political awareness and knowledge, young children show empathy for others’ perspectives and rights (R. A. Hart, 1997; Mitra & Serriere, 2015; Spinrad & Eisenberg, 2009). At 4-years of age children value friendships and understand power and reciprocity (Laursen & Hartup, 2002). Gill and Howard (2000) found that young children show a keen awareness that their age is associated with the amount of power they have (or don’t) in their lives. Young children seek out information in their environments to

learn how to interact with others and operate in their immediate context. Modeling prosocial behaviors, communicating concerns for others, and creating opportunities to practice civic skills affords the seeds for development of social responsibility in various settings and contexts (Wray-Lake & Syvertsen, 2011). Evidence also suggests that children as young as 6 years of age demonstrate structured political orientations during their first year of primary school (Van Deth, Abendschön, & Vollmar, 2011). Data of this nature calls for additional systematic exploration of how early developmental skills and experiences contribute to our understanding of children's early civic and political development.

### Early childhood and later civic engagement

Astuto and Ruck (2010) provide one of the first accounts of a conceptual framework addressing how early childhood competencies and experiences may lead to later civic engagement behaviors, attitudes and beliefs (e.g., community advocacy, voting, trust in political system). Children entering formalized school settings, such as kindergarten, are introduced to notions of citizenship, belongingness, and democratic values (Dewey, 1938, 1944; Erwin & Kipness, 1997; Flekkøy & Kaufman, 1997). Berti (2005) notes that early childhood experiences play a powerful role in developing notions of the democratic process. While young children are expanding their language skills and developing more complex concepts through playful learning, they are also learning to develop and follow social rules and operate with those who may have different affective responses and cognitive perspectives (see Astuto & Ruck, 2010 for detailed discussion). Based on the idea that other developmental outcomes such as social competence and aggression can be traced to infancy and early childhood (Bohlin, Hagekull, & Rydell, 2000; Renken, Egeland, Marvinney, Mangelsdorf, & Sroufe, 1989; Reynolds, Ou, & Topitzes, 2004), we suggest that the origins of civic engagement may also have roots in early childhood. Specifically, individual characteristics such as executive function (EF) and context-level variables such as playful experiences which promote language, creativity and problem-solving in young children, may be associated with youth participation in activities that predict to civic engagement outcomes in later years.

### Executive function as a predictor for civic engagement

Executive function, also known as cognitive controls, represents the intersection of cognitive and social-emotional competencies. Three core EFs, inhibition,

working memory and cognitive flexibility (Diamond, Barnett, Thomas, & Munro, 2007) are viewed as fundamental developmental skills for later civic engagement (see Astuto & Ruck, 2010 for detailed discussion). Scholars agree that depending on the discipline and/or researcher, different general cognitive processes under the categorical term "executive function" exist (Institute of Medicine [IOM] and National Research Council [NRC], 2015). The majority of empirical evidence links EFs to key school readiness and achievement abilities. For example, kindergarten EFs predict math and reading scores (Duncan et al., 2007), language (Blair & Razza, 2007), and later math skills (Bull & Scerif, 2001; Passolunghi & Siegel, 2001). We view EFs as the foundation for productive engagement in society. For example, executive functions such as inhibitory control and cognitive flexibility may allow young children to be active listeners to the social needs of others. When very young children control their impulses and desires in a social context, they are also learning that varying goals and objectives co-exist with their own. In early childhood we see the importance of these skills in the classroom, as well as on the playground, when social roles and rules are negotiated. EF skills may also lead to behaviors such as perspective-taking, sharing of material and emotional resources as well as working positively with others. Being able to problem solve and understand the perspective of others in the early years may enable youth to grasp the complexity of democratic values and develop dynamic solutions to social problems within their local context.

### Early childhood settings as a context for the development of civic engagement

Studies of early development contexts such as schools (Duncan & Raudenbush, 1999) and family (Bradley & Corwyn, 2006) improved our understanding of developmental processes and outcomes. For many children, preschool and/or kindergarten settings are the first "outside of the home" contexts (Miller & Olson, 2000), representing a blueprint of society for young children. It is here that 4- or 5-year-old children are introduced to the way rules develop, operate in context, are learned and followed by others, to how authority (outside of familial figures) is recognized, and individual rights and responsibilities. For example, by age four, children acquire the capacity to identify what attitudes, skills and behaviors are acceptable among a group of peers in the classroom, and thus learn how a democracy functions (Flekkøy & Kaufman, 1997).

Classroom-based play provides an opportunity for the development of executive function (Blair & Raver, 2014;

Diamond et al., 2007) and for engagement in prosocial behavior for preschoolers (Howes & Phillipsen, 1998). Specifically, engagement in complex imaginative play is linked to the development of executive function skills which includes elements such as controlling emotions, resisting impulses and exerting self-control and discipline (Barnett et al., 2008; Diamond et al., 2007). These skills include children's ability to follow rules, pay attention, and control emotions, and are vital for school readiness (Eisenberg & Fabes, 1992). We suggest that these skills are also critical for the development of youth citizenship and engagement in a democratic society. It is here where children learn to become an active member of a social group and follow-rules, foreshadowing the skills and behaviors of an (civically) engaged adolescent. Specifically, when young children are engaged in play they have the opportunity create and develop ideas—as well as a sense of community—with other children. Sharing and encouraging each other's curiosity, imagination and ideas through play may build a sense of appreciation for the value of working together toward a common goal, even when differences in “community” exists. These experiences may lead to involvement in later contexts where youth work and play together such as on sports teams or in drama clubs.

In addition, evidence suggests that classroom experiences continue to support civic development in older children and youth as they develop political knowledge through quality instruction (Milner, 2008). Students become communicative and invested in issues important to them through conversations about local, national and international controversies and events, for example (Campaign for the Civic Mission of Schools, 2011).

### **Executive function and play**

A small body of research highlights the relationship between children's executive function and young children's engagement in play. Research supports the relationship between time in make believe play and delay of gratification (see Cemore & Herwig, 2005), inhibitory control and symbolic play ability (see Kelly, Dissanayake, Ihsen, & Hammond, 2011), executive function (conflict and delay skills), and pretense play skills (see Carlson, White, & Davis-Unger, 2014), as well as children's theory of mind (ToM) and socio-dramatic play (see Qu, Shen, Chee, & Chen, 2015). Suggestive relationships between executive function, promoting make-believe play, and themes around play are documented, yet causal links of these relationships have been minimally explored (Berk & Meyers, 2013). In a small longitudinal study, executive function predicted play skills but early play skills did not predict

later executive function in a sample of children with developmental needs (Faja et al., 2016). It is important to note the variation in the directionality of links between executive function and children's engagement in play, suggesting more studies are needed to examine this relationship.

### **Youth experiences that lead to later civic engagement: Why predicting to different types of extracurricular activities matters**

With evidence suggesting engagement in the polity differs between the economically advantaged and those growing up in poverty, it is critical to identify, support and cultivate skills and experiences for children and youth which address this disparity. School settings provide many opportunities for student participation in diverse extracurricular activities, including student government, music groups, or sports (Kahne & Sporte, 2008; Schwartz, Cappella, & Seidman, 2015). Research suggests that youth participation in various types of school-sponsored extracurricular activities are positively related with increased civic behaviors later in life such as volunteering in community organizations, voting, or reaching out to public officials (Mahoney, Larson, Eccles, & Lord, 2005; McIntosh & Muñoz, 2009; Settle, Bond, & Levitt, 2011; Verba, Schlozman, & Brady, 1995). Using the National Educational Longitudinal Survey (NELS) McFarland and Thomas (2006) demonstrated that general involvement in extracurricular activities is important for civic development, regardless of SES, race or age, noting participation in community service and public-speaking activities yield the most significant impact. We build upon this body of research by examining how early childhood experiences and skills lead to participation in different extracurricular activities during adolescence.

### **Participation in sports and civic engagement**

The role of participation in organized sports on later civic engagement is one that continues to gain empirical and theoretical attention (McIntosh & Muñoz, 2009) likely due to extant contradictory evidence. For example, the seminal work by Verba et al. (1995) using adults' recall of their adolescent participation, found an inverse relationship between sports participation and civic engagement, while more recent research has found either no relationship (Kahne & Sporte, 2008) or one that “disappears” once demographic variables are accounted for (McFarland & Thomas, 2006). Other recent research lends support to youth participation in sports on measures of civic engagement. Using the

National Youth Survey of Civic Engagement, Lopez and Moore (2006) reported that sports participation in adolescence was related to greater civic engagement in young adulthood (e.g., rates of volunteerism, registering to vote, following the news) after controlling for key demographic variables such as race/ethnicity, gender, age, educational attainment, marital status and income. Employing a sample of ethnically diverse high school students, McIntosh and Muñoz (2009) report that participation in sports yields a small but positive association with overall civic engagement/disposition (e.g., intention to vote, willingness to contact political officials, and community service). Using data from the nationally representative Child Development Supplement of the Panel Study of Income Dynamics, researchers found that adolescents who participated in sports compared to those who had low involvement in organized activities demonstrated higher rates of prosociality and charitable giving (Linver, Roth, & Brooks-Gunn, 2009); two widely accepted dimensions of civic engagement (Character Education and Civic Engagement Technical Assistance Center, U.S. Department of Education, 2008). Authors note that students who are involved in sports plus additional activities yield better outcomes than students who participate in sports alone.

### Participation in the arts and civic engagement

Participation in arts activities such as drama or music clubs is noted as a positive predictor of later civic engagement (e.g., Catterall, 2012; Glanville, 1999). Longitudinal studies employing national data sets such as the ECLS-K and NELS suggest that civic engagement gains for low-income students are worth noting (Catterall, 2012). Low-income high school students who participated in the arts (e.g., coursework in high school involving activities like dance, drama, or music; Early Longitudinal Study of 2002, ELS), demonstrate a rate of volunteerism in student government and service clubs four times greater than their low-income peers

who lacked those experiences (Catterall, 2012). By young adulthood, these students also had a greater likelihood of voting and/or participating in a campaign.

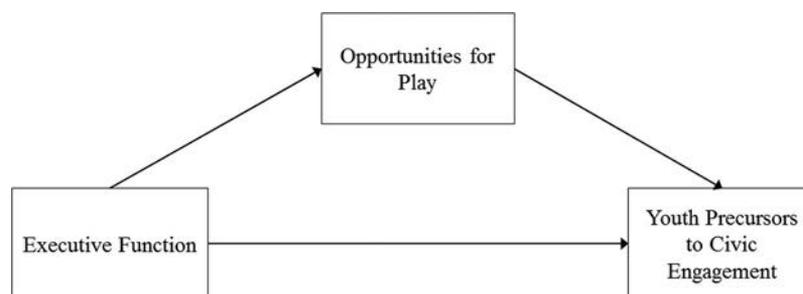
### Participation in clubs and civic engagement

Similar to participation in the arts, participating in school clubs such as the school yearbook or newspaper is a firmly established predictor of civic engagement (Fredricks & Eccles, 2006; McIntosh & Muñoz, 2009). Participation in school clubs predicts later civic engagement, measured by rates of political and social/charitable involvement as young adults, for example (Fredricks & Eccles, 2006).

### Present study

The current study utilized mediation analysis and generalized linear models to examine the contributions of kindergarten children's executive function and exposure to classroom based play to participation in eighth grade extracurricular activities with a nationally representative sample of children growing up in poverty.

First, an adapted version of the conceptual model proposed in Astuto and Ruck (2010) was explored using mediation models (Figure 1). "Prosocial skills" in kindergarten were not included as a predictor in these models (as initially proposed in Astuto & Ruck, 2010). We tested a series of models among the constructs in Figure 1, only including executive function in kindergarten as a child-level predictor. The following research question guided our analysis: *Do opportunities for play mediate the relationship between executive function in kindergarten with eighth grade extracurricular activities for children growing up in poverty in America?* Additionally, the contribution of "opportunities for play" was treated as a predictor, controlling for executive function, to answer the question: *Do opportunities for play significantly predict participation in eighth grade extracurricular activities, while accounting for executive function?*



**Figure 1.** Adaptation of 2010 (Astuto & Ruck, 2010) conceptual model, "Early Competence, Opportunities for Quality Play, and Later Youth Civic Engagement." This adaptation reflects the relationships tested through mediation analyses.

**Table 1.** Participant characteristics for kindergarteners and eighth grade youth in target outcomes.

Variable	Kindergarten sample ( <i>N</i> = 7,675)		Eighth grade sample (participation in sports) ( <i>n</i> = 2,854)		Eighth grade sample (participation in drama or music) ( <i>n</i> = 2,817)		Eighth grade sample (participation in clubs) ( <i>n</i> = 3,510)		Eighth grade sample (hours spent in extracurricular activities) ( <i>n</i> = 2,745)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<b>SES</b>										
Below poverty level	3,674	47.9	1,272	44.6	1,249	44.3	1,668	47.5	1,206	43.9
At poverty level	4,001	52.1	1,582	55.4	1,568	55.7	1,842	52.5	1,539	56.1
<b>Race</b>										
Caucasian	2,888	37.7	1,141	40.0	1,132	40.2	1,316	37.5	1,111	40.5
African American	1,799	23.5	543	19.0	528	18.8	788	22.5	513	18.7
Latino	2,058	26.8	846	29.7	836	29.7	1,019	29.0	809	29.5
Asian	386	5.0	126	4.4	124	4.4	153	4.4	122	4.4
Other	539	7.0	196	6.9	195	6.9	234	6.7	188	6.9
<b>Gender</b>										
Female	3,793	49.4	50.2	50.2	1,422	50.5	1,713	48.8	1,389	50.6
Male	3,882	50.6	49.8	49.8	1,395	49.5	1,797	51.2	1,356	49.4

## Methods

### Sample

A nationally representative sample of 22,782 children enrolled in 1,277 kindergarten programs during the 1998–1999 school year participated in the ECLS-K study. The children attended both public (85%) and private (15%) schools that offered full day and part-day programs (West, Denton, & Reaney, 2000). The final response rate included 21,260 children enrolled in 944 Kindergarten programs (Gershoff, Aber, Raver, & Lennon, 2007). The ECLS-K study was developed by the U.S. Department of Education, National Center for Education Statistics (NCES), and implemented by Westat, a research corporation (Gershoff et al., 2007). NCES (Curtin, Ingels, Wu, & Heuer, 2002) recommended removing five students from the sample for significant data errors, leaving a sample of 21,255 children for analyses. At entry to kindergarten children's ages ranged from 4 to 6 years old based on date of birth. By Spring 2007 the majority of children from the original kindergarten sample were in eighth grade, but also included others who had been held back, or promoted ahead by an extra year. In 2007 most children had been in school for at least 9 years with their ages ranging from 12 to 15 years old.

The ECLS-K was designed to study child development, school readiness, and early childhood experiences among American school children (Gershoff et al., 2007). Based on the conceptual model proposed in Astuto and Ruck (2010), items were chosen from the ECLS-K dataset to create constructs measuring children's executive function in kindergarten, opportunities for classroom-based play in kindergarten, and participation in 8th grade extracurricular activities. Once the items were selected and the constructs were developed, factor analysis and reliability tests were performed to test whether the measures were psychometrically sound.

Given our particular interest in how civic engagement develops for children who grow up in contexts of poverty, a poverty variable was computed<sup>1</sup> based on the 1998 poverty threshold from the U.S. Census Bureau's annual family income and household size variables from the ECLS-K dataset (U.S. Census Bureau, 2014). This approach provides a more accurate depiction of poverty than using family income alone (Magnuson, Meyers, Ruhm, & Waldfogel, 2004). Participants were included if they were at 100% poverty or below as defined above (*n* = 7,675). As shown in Table 1, children included in the sample were Caucasian (38%), Latino (27%), African American (23%), Asian (5%), Other (7%); 51% were male and 49% were female.

All data used in analysis were weighted to adjust for unequal selection probabilities at the school and child levels, and for nonresponse (National Center for Education Statistics (NCES), 2001). All K–Grade 8 weights are child-level weights. There are no longitudinal weights at the school or teacher level since school and teacher level weights were not computed for the eighth grade year (Curtin et al., 2002).

### Data cleaning

Skewness and kurtosis tests were performed on all selected variables to assure an approximately normal distribution of each variable. A Missing Values Analysis (MVA) was also performed in SPSS. All missing data were identified as “missing at random.” Results showed no bias and no monotonicity. We then imputed the ECLS-K dataset and created a dataset filtered by the poverty variable discussed previously. To account for missingness and compare against the original ECLS-K dataset we ran exploratory and descriptive analysis in

<sup>1</sup>0–\$10,915 = 1 (Below Poverty), \$10,916–\$21,830 = 2 (At Poverty–100%), \$21,830–\$32,745 = 3 (100%–200% poverty level), and (\$32,745–\$200,000,000) = 4 (200% poverty level and above).

**Table 2.** Statistics of differences in participant characteristic and eighth grade youth in target outcomes.

Variable	Participation in sports		$\chi^2$	Participation in drama or music		$\chi^2$	Participation in clubs		$\chi^2$	Hours spent in extracurricular activities	F-ratio
	Yes	No		Yes	No		Yes	No			
SES			20.3**			8.6**			.34		17.7**
Below poverty level	615	657		389	860		590	1,078			
At poverty level	899	683		571	997		669	1,173			
Race			42.7**			26.7**			10.20*		4.7**
Caucasian	636	505		447	685		487	829			
African American	319	224		174	354		301	487			
Latino	385	461		242	594		328	691			
Asian	52	74		38	86		51	102			
Other	121	75		59	136		92	142			
Gender			14.4**			40.9**			.35		1.87
Female	709	723		565	857		606	1,107			
Male	805	617		395	1,000		653	1,144			

Note. \* $p < .05$ . \*\* $p < .01$ .

both datasets. Outcomes and correlations were similar between the two datasets; the imputed dataset was used for the analysis due to a larger sample size. The final sample included ( $n = 7,675$ ) in kindergarten, ( $n = 2,854$ ) for the first eighth grade outcome (Participation in Sports), ( $n = 2,745$ ) for the second 8th grade outcome (Hours Spent in School Sponsored Extracurricular Activities Per Week), ( $n = 3,510$ ) for the third 8th grade outcome (Participation in Clubs), and ( $n = 2,817$ ) for the final eighth grade outcome (Participation in Drama or Music). From the kindergarten time point to eighth grade, the sample size decreased between 54–64%, depending on the outcome measured. Differences in participant characteristics across race and gender as well as differences in SES for the eighth grade sample respondents are noted in Table 2. These preliminary results indicate that there are significant differences in race across the study's outcomes and gender differences for participation in sports and in drama/music (as a result, race and gender were controlled for in subsequent analyses across all outcomes). Nuances in SES (at/below poverty level) were not controlled for due to the already refined criteria for sample inclusion (at 100% poverty or below).

### Construct development

Relationships between variables used in the analysis are reported in Table 3. Operational definitions for variable names are provided in Table 4.

### Executive function

Based on the assumption that parents and teachers have meaningful interactions with children in different settings that tap executive function, both parent and teacher reports were combined in order to provide a more comprehensive description of children's skills in this area (Toplak, West, & Stanovich, 2013). Developing composite variables using ECLS-K data has been done before (Gershoff et al., 2007). All reliability ratings reported were drawn from the ECLS-K psychometric report (see Rock & Pollack, 2002).

The child executive function composite was created using the ECLS-K Spring Kindergarten Teacher Questionnaire subscales of "Language and Literacy" ( $\alpha = 0.94$ ), and "General Knowledge" ( $\alpha = 0.89$ ), as well as the ECLS-K Fall Kindergarten Parent Questionnaire subscales of "Child's Health and Well-being" ( $\alpha = 0.69$ ).

**Table 3.** Correlations of kindergarten executive function and play variables with eighth grade youth outcomes.

Variable	1	2	3	4	5	6	7	8	9	10
1. Executive Function	–	.038**	.000	.024*	.016	.043**	.023	.115**	–.016	.084**
2. How often kindergarten children engage in music, art, dance/creative movement and theater/creative dramatics	–	–.028*	.301**	.221**	.172**	–.041*	–.012	–.014	–.031	
3. How much time kindergarten children engage in music, art, dance/creative movement and theater/creative dramatics	–		.117**	.017	.127**	–.035	–.007	–.012	–.004	
4. Frequency of use of art, music, and dramatic play materials in kindergarten	–			–	.220**	.153**	.026	.005	.008	.019
5. Present of interest areas for playing with puzzles/blocks, water/sand table, dramatic play, and art in kindergarten classroom	–				–	.169**	–.008	–.008	.018	–.015
6. Kindergarten children's time in self-directed classroom activities	–					–	.003	–.009	.018	.032
7. Participation in school sports in eighth grade	–						–	.111*	–0.150	.494**
8. Participation in drama/music in eighth grade	–							–	.030	.176**
9. Participation in school clubs (e.g., school yearbook, newspaper, hobby club, photography) in eighth grade	–								–	.022
10. Hours in school-sponsored extracurricular activities (e.g., sports, clubs, or other activities)	–									–

Note. \* $p < .05$ . \*\* $p < .01$ .

**Table 4.** Operational definitions for variable names.

Variable name	Construct development
Executive function	Executive function in kindergarten
Opportunities for Play in Kindergarten	
How Often Engagement in Play	How often kindergarten children engage in music, art, dance/creative movement and theater/creative dramatics?
Time in Play	How much time kindergarten children engage in in music, art, dance/creative movement and theater/creative dramatics?
Frequency of Play Materials	Frequency of use of art, music, and dramatic play materials in kindergarten.
Presence of Interest Areas	Presence of interest areas for playing with puzzles/blocks, water or sand table, dramatic play, and art materials in kindergarten classroom.
Self-Directed Activities	Kindergarten children's time in self-directed classroom activities.
Extracurricular Activities in Eighth Grade	
Sports	Participation in School Sponsored Activities: Sports
Drama/Music	Participation in School Sponsored Activities: Drama or Music
Clubs	Participation in School Sponsored Activities: Clubs
Hours	Hours Spent in School-Sponsored Extracurricular Activities

Four items (Items 1, 2, 6, and 7) were selected from the Language and Literacy subscale, which measure comprehension skills, such as understanding words in context, interpretation and reflection, and demonstrating critical lens. One item (Item 10) was selected from the General Knowledge subscale, which captures a child's understanding of the relationships between and among objects, events, or people. The three items selected from the Child's Health and Well-being subscale of the parent questionnaire ask about the child's attentiveness, ability to problem solve, and developing autonomy (Items CHQ.095, CHQ.100, CHQ.105).

Following procedures outlined in Gershoff et al. (2007), correlation analyses were run and all the items were rescaled into a 4-point Likert scale. The six items from the teacher report were rescaled from a 5-point scale to a 4-point scale (e.g., 1 = *not yet or beginner*, and 4 = *proficient*). The three items from the parent report were rescaled so that larger numbers indicated greater skills. Parent and teacher responses correlated significantly ( $p < .000$ ) with correlations ranging from  $r = .129$  to  $r = .824$ . Finally, the composite ranged from 1 to 4,  $M = 2.74$ ,  $SD = .581$ .

### Opportunities for play

Play composites were created using items from the "Class Organization and Resources" subscale in the ECLS-K Spring Kindergarten Teacher Questionnaire and from the "Class Organization, Class Activities, and Evaluation" subscale in the ECLS-K Fall Kindergarten Teacher Questionnaire (Part B)<sup>2</sup>. All the reliability ratings described are drawn from ECLS-K's psychometric report.

<sup>2</sup>In the analysis "how often engagement in play" and "time in play" were collapsed into how much time per week children engage (total time in play) in in music, art, dance/creative movement and theater/creative dramatics. The "frequency" variable measures the extent to which children engage with art, music and drama materials. The presence of and having access to developmentally appropriate materials in early childhood classroom influences the quality of play in classrooms (e.g., Johnson, Christie, and Wardle, 2005).

*How often do kindergarten children engage in music, art, dance/creative movement and theater/creative dramatics?* A composite score was created (how often engagement in play) using four items from the "Class Organization and Resources" subscale in the ECLS-K Spring Kindergarten Teacher Questionnaire (Question 10: Items e, f, g, and h). The four items selected from the teacher questionnaire were rescaled from a 5-point scale to a 4-point scale, ranging from 0 = *never* to 4 = *daily*. The scale was recoded from a 1 - 5 scale to 0 - 4, in order to calculate a mean score for the composite. The items measured teacher ratings of how often kindergarteners engaged in activities such as music, art, dance, and theater. All the items were significantly correlated ( $r = .128$  to  $r = .718$ ,  $p < .000$ ). The composite ranged from 1 to 4,  $M = 2.18$ ,  $SD = .749$ .

*How much time do kindergarten children engage in music, art, dance/creative movement and theater/creative dramatics?* A composite score (time in play) was created using four items from the "Class Organization and Resources" subscale in the ECLS-K Spring Kindergarten Teacher Questionnaire (Question 10: Items e, f, g, and h). A 4-point Likert scale, ranging from 1 = *1 - 30 minutes a day* to 4 = *more than 90 minutes a day*, measured teacher report on the length of time kindergarteners spent engaged in music, art, dance and theater. All the items were significantly correlated ( $r = .321$  to  $r = .481$ ,  $p < .000$ ). The composite ranged from 1 to 4,  $M = 1.22$ ,  $SD = .338$ .

*Frequency use of art, music, and dramatic play materials in kindergarten.* A composite score (frequency of play materials) was created using three items from the "Class Organization and Resources" subscale in the ECLS-K Spring Kindergarten Teacher Questionnaire that measured the frequency of time kindergarten children used certain play-oriented materials in the classroom (i.e., art materials, musical instruments, and costumes for creative dramatics or theater) (Question 27: Items a, b, and c). The scale was recoded from a 0 - 6 scale to a 0 - 5, in

order to calculate a mean score for the composite. Item responses ranged from 0 = *never* to 5 = *daily*. All the items were significantly correlated ( $r = .372$  to  $r = .514$ ,  $p < .000$ ). The composite ranged from 1 to 6,  $M = 2.86$ ,  $SD = 1.00$ .

Presence of interest areas for playing with puzzles/blocks, water or sand table, dramatic play, and art materials in kindergarten classroom (presence of interest areas). For the presence of interest areas composite, four items were selected to identify the presence of creative and open-ended materials in the classroom. These items were obtained from the “Class Organization, Class Activities, and Evaluation” subscale of the ECLS-K Fall Kindergarten Teacher Questionnaire (Part B) (Question 2: Items f, g, j, and k) as well as from the ECLS-K Spring Teacher Questionnaire For Teachers New to the Study (Question 1: Items f, g, j, and k). These four items refer to the availability of areas for puzzles/blocks, water or sand table, dramatic play, and art materials (0 = No, 1 = Yes). A composite was created by adding the number of interest areas to reflect a sum of play areas; the composite ranged from 0 - 4. All the items were significantly correlated ( $r = .244$  to  $r = .299$ ,  $p < .000$ ),  $M = 3.26$ ,  $SD = .845$ .

**Kindergarten children’s time in self-directed classroom activities.** To measure kindergarten children’s time spent in self-directed classroom activities (self-directed activities), one item was selected from the “Class Organization, Class Activities, and Evaluation” subscale of the ECLS-K Fall Kindergarten Teacher Questionnaire (Part B). Teachers reported on the length of time that kindergarteners spent in a typical day in child-selected activities, in which response options ranged from 1 = *no time* to 5 = *3 hours or more*. The scale was recoded from 1 – 5 to 0 – 4 in order to calculate a mean score  $M = 1.61$ ,  $SD = .743$ .

#### **Participation in extracurricular activities**

The eighth grade outcomes were obtained from the ECLS-K Spring Eighth Grade Student Questionnaire. Four items were selected from the “Activities” section of the questionnaire where students report whether they independently participate in the following school sponsored activities: (1) school sports; (2) drama or music; and (3) school clubs. Students were also asked to report how many total hours are spent on all school-sponsored extracurricular activities in a typical week. Participation in school sports, drama or music, and school clubs was measured by collapsing the “participated” and the “participated as a leader, captain or officer” responses in order to create a dichotomous outcome of whether or not the student participated in the activities

(Question 10: Items a, b, and c). The number of hours spent in all school-sponsored extracurricular activities ranged from 0 – 15,  $M = 3.97$ ,  $SD = 4.47$  (Question 11). These four items were analyzed as independent outcomes of participation in extracurricular activities.

#### **Analytical plan**

To explore the first research question we ran a series of analyses to test mediation by following Preacher and Hayes’ macro process procedure of mediation using SPSS Version 21. Preacher and Hayes’ method of mediation analysis provides several advantages to other methods previously used (Hayes, 2009). Mediation analyses allow researchers to test the indirect effect of a proposed variable on an outcome by retrieving the effect’s statistical significance through the bootstrapping method. The bootstrapping method offers benefits to estimating the indirect effect because it does not make assumptions about the normality of the distribution of the variables or the sampling distribution by conducting a resampling method (Preacher & Hayes, 2004).

Differentiating effects across levels of analysis were not of concern considering that, although the mediating variables are at the classroom level, the average number of children per classroom is small (see Claessens, Duncan, & Engel, 2009). Additionally, available procedures for testing multilevel mediation using hierarchical linear models (HLM) do not include a Level 1-2-1 model, where the mediators can be conceptualized as context-level as in our study (Zhang, Zyphur, & Preacher, 2009).

In our analysis, we were interested in using child-level characteristics as controls as well as test the effect of multiple mediators on eighth grade outcomes. Control variables, multiple mediators, and the ability to estimate models with a dichotomous outcome, are permitted in the Indirect macro approach developed by Preacher and Hayes (2008). Multiple mediation analysis also has an advantage over testing for indirect mediation effects by running several simple mediation models. Multiple mediation models have been shown to represent more accurate results due to the reduction of the omitted variable bias (Preacher & Hayes, 2008).

The multiple mediation models tested for mediation effects with the “opportunities for play” kindergarten variables entered simultaneously as mediators. Mediation was tested through the significance of the indirect effect of the independent variable (IV), through the multiple mediators (M), on the dependent variable (DV). Four multiple mediator models were run using executive function as the IV, the five “opportunities for play” variables as mediators (M), with child gender and race as controls (C). Each of the three multiple

mediator models had a different eighth grade outcome, measuring participation in extracurricular activities: participation in school sports (“Sports”), participation in drama or music (“Drama/Music”), and participation in school clubs (“Club”). Each of the three outcomes responses were in binary form (i.e., did not participate, participated/participated as a leader, captain, or officer) and were analyzed using maximum likelihood estimators. The fourth eighth grade outcome, the number of hours spent in school-sponsored extracurricular activities in a typical week (“Hours”), was not analyzed using this multiple mediation analysis due to violations of assumptions with least squares estimators. This outcome was analyzed using a series of regressions discussed further in the following section. Following Preacher and Hayes (2008), the bootstrapping method, a resampling procedure, derived means from 5,000 estimates to test the indirect effect and compute 95% confidence intervals. Significance values and confidence intervals for the indirect effects were generated. Indirect effects are considered to be significant when the confidence interval does not include zero.

Variables measuring opportunities for play were analyzed as possible significant predictors of participation in extracurricular activities to explore the second research question. Our model selection process aimed to fit the best model by comparing likelihood estimates for a progression of models predicting the outcomes of the present study. Logistic regression (LR) and Poisson regression models were applied to test the effects of executive function on the eighth grade outcome variables. Next, the variables measuring “opportunities for play” were treated as predictors of participation in extracurricular activities.

## Results

### Mediation analysis

Results from the three multiple mediation models are reported in Table 5. The multiple mediation results did not indicate significant indirect effects of the independent variables measuring opportunities for play. However, “opportunity for play” was shown to be related to executive function, as shown by the *a* paths in the multiple mediation results and the correlation matrix as reported in Table 3. The contribution of the mediators in this analysis was further analyzed using additional statistical techniques to predict to participation in extracurricular activities.

### Relationship between executive function and participation in extracurricular activities

Differences in executive function for kindergarteners and eighth grade youth in target outcomes are reported in Table 6. Although there are differences in executive function between kindergarten and the sample remaining in eighth grade, these differences are observed as a result of the large sample size and therefore, sample selection is not a concern. Multiple regression analyses were conducted to test the effects of executive function on the eighth grade outcome variables. All eighth grade outcomes were explored; regression analyses yielded two significant models and one model trending towards significance. For all models, gender and race were entered as controls in the analysis (to partial their contribution as potentially important demographic variables).

Logistic regression was used for the binary (DV) outcome in eighth grade participation in drama or music

**Table 5.** Summary of multiple mediation analysis.

Independent Variable	Mediating variable ( <i>M</i> )	Effect of IV on <i>M</i> ( <i>a</i> )	Effect of <i>M</i> on DV ( <i>b</i> )	Direct effect ( <i>c'</i> )	Indirect effect		Total effect ( <i>c</i> )	<i>R</i> <sup>2</sup>
					( <i>axb</i> )	95% CI		
DV = Sports				.12			.12	.03
Executive function	How Often Engagement in Play	.07*	-.12*		-.01	(-.02-.00)		
	Time in Play	.01	-.17		.00	(-.01-.00)		
	Frequency of Play Materials	.04	.08 <sup>a</sup>		.00	(.00-.02)		
	Presence of Interest Areas	.00	.01		.00	(.00-.00)		
	Self-Directed Activities	.05*	.04		.00	(.00-.01)		
DV = Drama/Music				.33**			.33**	.04
Executive function	How Often Engagement in Play	.07*	.01		.00	(-.01-.01)		
	Time in Play	.01	-.01		.00	(-.01-.00)		
	Frequency of Play Materials	.04	-.01		.00	(-.01-.00)		
	Presence of Interest Areas	.00	-.03		.00	(-.00-.00)		
	Self-Directed Activities	.05*	-.02		.00	(-.01-.01)		
DV = Clubs				-.05			-.05	.01
Executive function	How Often Engagement in Play	.01	-.07		.00	(-.01-.00)		
	Time in Play	.01	-.09		.00	(-.01-.00)		
	Frequency of Play Materials	.03	.06		.00	(.01-.01)		
	Presence of Interest Areas	-.02	.03		.00	(-.01-.00)		
	Self-Directed Activities	.07**	.03		.00	(-.01-.01)		

<sup>a</sup>Child gender and race were included in each multiple mediation analysis as control variables.

\**p* < .05. \*\**p* < .01.

**Table 6.** *T*-test of differences in executive function for kindergarteners and eighth grade youth in target outcomes.

Variable	Eighth grade sample		
	<i>M</i>	<i>SD</i>	<i>t</i>
Participation in Sports	2.77	.58	2.37*
Participation in Drama or Music	2.77	.57	2.59*
Participation in Clubs	2.73	.59	-1.22
Hours Spent in Extracurricular Activities	2.78	.57	3.36**

Note. The one-sample *t*-test compared final means with value based on kindergarten sample (*M* = 2.74).

\**p* < .05. \*\**p* < .01.

(i.e., did not participate, participated/participated as a leader, captain, or officer). Model One was performed to assess the relationship between executive function in kindergarten on eighth grade participation in drama or music. Adolescent drama or music participation was significantly predicted by executive function in kindergarten ( $b = .292$ ,  $SE = .081$ , Wald  $\chi^2 = 12.902$ ,  $p < .001$ ). Model Two was performed to assess the relationship between executive function and eighth grade participation in school sports. Adolescent sports participation was trending towards significance when predicted by executive function in kindergarten ( $b = .114$ ,  $SE = .067$ , Wald  $\chi^2 = 2.838$ ,  $p = .092$ ).

Poisson regression was used for the “hours” outcome, for hours spent in eighth grade in school-sponsored extracurricular activities. Ordinary Least Squares (OLS) analysis predicting this outcome by executive function and child-level control variables indicated non-normally distributed residuals, Shapiro-Wilk test of normality was significant,  $W = 0.86$ ,  $p < 0.01$ . Transformations of the outcome to test non-linear relationships did not provide solutions for the non-normally distributed residuals. The possible solution of checking for omitted variables did not allow us to indicate a relationship between executive function and the outcome. As a result, a generalized linear models (GLM) approach was used, resulting in a Poisson regression to fit the data and account for the distribution of the error terms. The Poisson regression provides more accurate estimates for counted data (Gardner, Mulvey, & Shaw, 1995). Model Three was performed to assess the relationship between executive function in kindergarten and hours in eighth grade spent in school-sponsored extracurricular activities. Adolescent hours spent in extracurricular activities were significantly predicted by executive function in kindergarten ( $b = .629$ ,  $SE = .152$ , Wald  $\chi^2 = 84.851$ ,  $p < .001$ ; shown in Figure 2).

### Model selection for binary outcomes

The simplest model was formed to indicate the role of “opportunities for play,” which indicated to be significant predictors of eighth grade participation in sports and

clubs. The remaining eighth grade outcome measuring participation in drama or music was also explored but did not yield simple models. Child gender and race were included in each model as control variables<sup>3</sup>. Considering that time in play was asked in conjunction with how often engagement in play in the teacher survey, these two constructs were interacted to show a total of how much time per week children engaged in music, art, dance/creative movement and theater/creative dramatics (total time in play). Criteria comparisons led us to accept the following reduced models based on Likelihood-ratio tests as well as an increase in Nagelkerke  $R^2$ .

For the likelihood of participation in school sports, the following model was accepted; Nagelkerke  $R^2 = 0.033$ :

$$\begin{aligned} \text{Logit}[\pi_i] = & \alpha + \gamma_1 \text{Male}_{1i} + \gamma_2 \text{Caucasian}_{2i} \\ & + \gamma_3 \text{Latino}_{2i} + \gamma_4 \text{AfricanAmerican}_{2i} \\ & + \gamma_5 \text{Asian}_{2i} + \beta_1 \text{ExecutiveFunction}_{3i} \\ & + \beta_2 \text{FrequencyofPlayMaterials}_{4i} \\ & + \delta_1 \text{TimeinPlay}_{5i} \text{HowOftenEngagementinPlay}_{6i} \end{aligned}$$

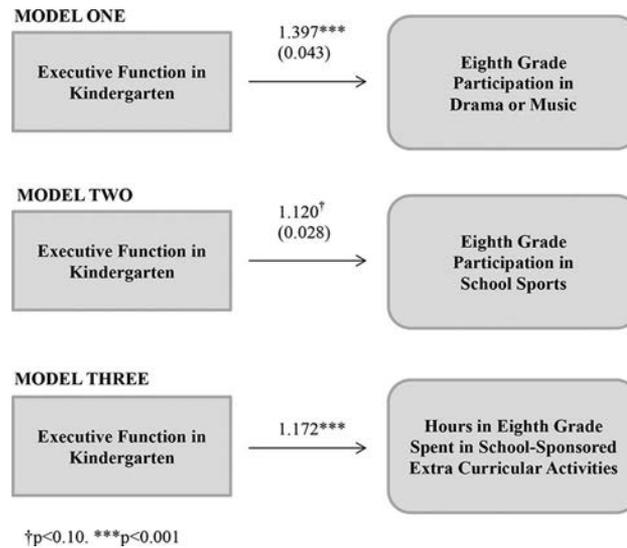
Compared to the model with only executive function as a predictor of participation in sports, this model indicates a larger Nagelkerke  $R^2$ . For total time in play, teachers who reported time above three standard deviations of the sample mean were excluded ( $M = 2.6$ ,  $SD = 1.24$ , skewness = 2.3, kurtosis = 11.56). Results indicated that the frequency of play materials was approaching significance,  $b = .072$ ,  $SE = .043$ , Wald  $\chi^2 = 2.84$ ,  $p = .092$ , when holding constant child executive function and total time in play. The increased frequency of use of play materials was associated with a moderately significant increase in the likelihood of participation in school sports in the eighth grade<sup>4</sup>.

For the likelihood of participation in school clubs, the following model was accepted; Nagelkerke  $R^2 = 0.01$ :

$$\begin{aligned} \text{Logit}[\pi_i] = & \alpha + \gamma_1 \text{Male}_{1i} + \gamma_2 \text{Caucasian}_{2i} + \gamma_3 \text{Latino}_{2i} \\ & + \gamma_4 \text{AfricanAmerican}_{2i} + \gamma_5 \text{Asian}_{2i} \\ & + \beta_1 \text{ExecutiveFunction}_{3i} + \beta_2 \text{SelfDirectedActivities}_{4i} \\ & + \beta_3 \text{FrequencyofPlayMaterials}_{5i} \\ & + \beta_4 \text{PresenceofInterestAreas}_{6i} \\ & + \delta_1 \text{TimeinPlay}_{7i} \text{HowOftenEngagementinPlay}_{8i} \\ & + \delta_2 \text{FrequencyofPlayMaterials}_{5i} \\ & \text{PresenceofInterestAreas}_{6i} \end{aligned}$$

<sup>3</sup>“Female” served as the reference category for child gender and “other” served as the reference category for child race/ethnicity.

<sup>4</sup>Allocating time in play activities may be important, but the opportunity to directly engage with materials (in art, music, and dramatic play) is a predictor of eighth grade participation in sports, regardless of a measure of time alone.



**Figure 2.** Diagram of regression Models One, Two, and Three with child gender and race were included in each model as controls. Models One and Two report  $\exp(\beta)$  of executive function with the Nagelkerke  $R^2$  reported in parentheses. Model Three reports the  $\exp(\beta)$  of executive function.

The model includes all independent variables previously established as “opportunities for play.” The model did not indicate significant main effects for self-directed activities, frequency of play materials, presence of interest areas, or total time in play. However, when controlling for these variables as well as child’s executive function, gender, and race, the interaction between frequency of play materials and the presence of interest areas is marginally significant,  $b = .100$ ,  $SE = .053$ , Wald  $\chi^2 = 3.63$ ,  $p = .057$ . This model was compared to the model without the frequency of play materials and the presence of interest areas interaction; when adding the interaction term, there was a marginally significant change in predicting the outcome,  $\chi^2 = 3.64$ ,  $p = 0.056$ .

### Model selection for predicting hours spent in extracurricular activities

The added contribution of “opportunities for play” was explored in predicting the number of hours students spent in school-sponsored extracurricular activities in eighth grade ( $Y = \text{Hours}$ ). The model selection process builds from the baseline model reported in Model Two, Figure 2, where executive function served as a significant predictor of the number of hours spent in extracurricular activities. The following reduced model was accepted based on Deviance, AIC (Akaike’s Information Criterion), and BIC (Bayesian Information Criterion) measures of model goodness-of-fit; where information criteria is

in small-is-better form:

$$\ln[n_i] = \alpha + \gamma_1 \text{Male}_{1i} + \gamma_2 \text{Caucasian}_{2i} + \gamma_3 \text{Latino}_{2i} + \gamma_4 \text{AfricanAmerican}_{2i} + \gamma_5 \text{Asian}_{2i} + \beta_1 \text{ExecutiveFunction}_{3i} + \beta_2 \text{FrequencyofPlayMaterials}_{4i} + \beta_3 \text{SelfDirectedActivities}_{5i}$$

The model’s goodness-of-fit was significantly better than the baseline model previously reported, as indicated by the incremental Likelihood-ratio test,  $p < 0.001$ . Results indicated that when controlling for child gender, race, executive function as well as frequency of play materials, kindergarten children’s time in self-directed classroom activities showed to be a significant predictor,  $b = .044$ ,  $SE = .014$ ,  $\beta = 1.04$ , Wald  $\chi^2 = 9.14$ ,  $p = .002$ . Adolescent hours in school-sponsored extracurricular activities was 1.04 times larger when kindergarten children’s time in self-directed activities increased by one unit (i.e., from “half hour or less” to “about one hour”), holding constant all other variables in the model.

### Discussion

The purpose of this study was to examine early childhood executive function and the context of play to participation in 8th grade extracurricular activities with a nationally representative sample of children growing up in poverty in America. We provide evidence that EF in kindergarten is a significant predictor to

participation in drama or music clubs, as well as hours spent in extra-curricular activities overall. As a predictor, EF approached significance to participation in sports in 8th grade ( $<.1$ ). The amount of time kindergarten children spend in self-directed classroom activities predicts the number of hours in school sponsored extracurricular activities in 8th grade. Additionally, when controlling for EF and demographics, participation in school clubs in 8th grade was predicted by the interaction of the frequency of use of materials such as art, music and dramatic play and number of interest areas in kindergarten.

In America, 5.7 million children under the age of six live in poverty (Jiang, Ekono, & Skinner, 2015). The risks associated with growing up in this context are well documented (Kids Count Policy Report; The Annie E. Casey Foundation, 2013; Yoshikawa, Aber, & Beardslee 2012). Empirical evidence suggests that building on children's strengths through high-quality classroom-based experiences in early childhood may ameliorate the effects of growing up poor, notably in areas such as literacy, math and self-regulation (Blair & Raver, 2015; McLoyd, Mistry, & Hardaway, 2014; Raver et al., 2011; Weiland & Yoshikawa, 2013). Others note that being civically engaged is a mechanism to help overcome the challenges faced by growing up in poverty. Notably, youth who engage in volunteerism are more likely to advocate on behalf of their community (Opportunity Nation, 2014). The current study highlights the important role of early childhood in creating and supporting the foundation for such trajectories. These findings are particularly important to consider given the significant civic engagement gap between those who are economically secure and those who are living in poverty (Levinson, 2010; Verba et al., 1995).

When young children enter a kindergarten classroom, parents, teachers, and policy-makers alike are concerned with how effectively children will develop skills such as print concept, numeracy identification and phonemic awareness. Children are also expected to learn how to sit in a circle, take-turns and engage in collaborative play with others. These developing competencies and experiences are considered important predictors to later school success and garner an enormous amount of empirical attention. Are there no other aspects of development in the early years that are equally critical to the well-being of children and society? The present study provides initial evidence that the early childhood skill, executive function, and engagement in classroom-based play, are not only important for being "school-ready" but may be unique pathways to becoming "civic ready" for children growing up in the context of poverty. Understanding which levers cultivate, support and sustain children's

active role as a citizen is a goal shared by educators, researchers and social activists alike.

### ***From kindergarten to adolescence: A path to "engagement"***

Engagement in extracurricular activities during adolescence is a strong indicator that youth will be active citizens. Reports suggest that youth who engage in these activities will exhibit civic behaviors later in life such as volunteering in community organizations, voting, or reaching out to public officials (Mahoney et al., 2005; McIntosh & Muñoz, 2009; Verba et al., 1995). In this study, we linked executive function skills in kindergarten to engagement in eighth-grade drama or music clubs, as well as the overall amount of hours youth engage in extracurricular activities. Although we need additional empirical investigation of which, how often, and in what combination of participation in extracurricular activities lead to the most meaningful outcomes for children, the results presented here provide a first glimpse of these pathways. In addition, expanding empirical evidence of how EFs benefit young children growing up in poverty beyond school readiness and achievement is a new paradigm warranting further examination.

Although the initial conceptualization of "play opportunities" as a mediating variable (Astuto & Ruck, 2010) between executive function and eighth grade outcomes was not supported by the analytical models presented here, these experiences appear important to consider when discussing the path from early childhood to youth civic engagement. For example, how frequently children used play-based materials in kindergarten such as art materials, dramatic/theatrical play props and musical instruments (when controlling for the impact of executive function, other play context variables, and child demographics) predicted participation in sports during eighth grade. Similarly, kindergarten children's engagement in self-directed activities significantly predicted youth's overall engagement in extracurricular activities. If children are "engaged" in their kindergarten classrooms through amount of time spent in play and self-directed activities they will continue this "engagement" as evidenced by their participation in extracurricular initiatives during adolescence.

The results speak to the unique role of play in early childhood classrooms today—particularly within low-income communities. It is well documented that the value of playful learning is being challenged despite evidence of its critical role in the healthy development of children growing up in poverty (e.g., Milteer & Ginsburg, 2012) and the development of critical school and readiness skills such as executive function for such communities

(Blair & Raver, 2014). Further discussion on how to integrate and sustain meaningful, child-directed, playful learning experiences within early childhood classrooms is essential in light of these findings and the role of play in supporting paths to civically-engaged youth. Early childhood educators, for example, may want to consider the quantity, quality and availability of art materials, dramatic/theatrical play props and musical instruments in their classrooms and how much access young children have to these materials on a daily basis.

### **Study limitations and future directions for research**

Although the results presented here spark our understanding of the influence of executive function and classroom based play to pathways of civic engagement for children in poverty, limitations should be noted. First, data for executive function and the play constructs were based on commonly employed teacher and parent reports (Thorell & Nyberg, 2008; Toplak et al., 2013). Nevertheless, limitations in data generated using self-report measures instead of direct observational tools or direct assessment (of child's executive function, for example) are well noted. Despite this limitation, the current data allowed the testing of a conceptual model with a nationally representative data set, identifying unique and important relationships between early childhood contexts and developing civic engagement. Support for using parent and teacher report of executive function exists (Toplak et al., 2013) and is commonly used (Thorell & Nyberg, 2008). Second, although we controlled for race and gender within this low-income sample, we note that there are significant effects of these controls. Further examination of the relationships reported here should be tested across varying ethnic and racial groups to capture the nature of experiences from children living within diverse communities.

Research on civic engagement would benefit from exploring how aspects of civic and democratic thinking arise in young children. For example, critical reflection or critical consciousness (an awareness of social inequalities) is an important component of civic engagement but has been studied primarily in marginalized adolescents and youth (Diemer, Kuuffman, Koenig, Trahan, & Hsieh, 2006; Watts, Diemer, & Voight, 2011). Recent research suggests that even before adolescence young children have an awareness of social inequality and injustice (Killen, Rutland, & Ruck, 2011). In addition, with the current expansion of publicly funded preschool opportunities, future research should consider if these findings generalize to preschool classrooms. The full conceptual model presented in Astuto and Ruck (2010) which

includes “prosocial skills” as possible predictors to later precursors of civic engagement should be tested to further our understanding of key developmental pathways to civic engagement. Future studies can expand what we know about civic developmental pathways from early childhood to adolescence by examining other critical exogenous variables such as young children's self-concept and classroom climate.

### **Conclusion**

New evidence of a developmental pathway from early childhood to eighth grade extracurricular activities offers ample opportunity to further explore the mechanisms by which these trajectories develop over time. We suggest here and elsewhere that young children's first social blueprint is the early childhood classroom setting. This context is ripe for the development of skills and exposure to experiences, which build the foundation for future engagement in learning, exploration, social-interaction—and eventually, society.

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