

Early Absenteeism and Academic Outcomes: Evidence from a Longitudinal Study

Peter D. Goldie¹, Frances C. Hogan², Jill Gandhi³, Erin E. O'Connor²

¹ Montclair State University, ² New York University, ³ NORC at the University of Chicago

Socioeconomically Marginalized Youth of Color (SMYoC) across global contexts tend to receive lower academic grades and standardized test scores due to systemic racism and classism. Research suggests that preschool enrollment is associated with short-term positive academic effects, yet little is known about how absenteeism relates to later academic outcomes particularly among SMyoC. This is a crucial area of study as preschool can help to close opportunity gaps and promote educational equity, yet absenteeism may buffer its benefits. The present study investigated long-term associations between preschool absenteeism and academic outcomes and whether later absenteeism mediates this association among SMyoC in New York City. Analyses revealed significant negative associations between preschool absenteeism and both math and English language arts achievement in third through sixth grades. Additionally, we found mediation effects of assessment grade absenteeism (i.e., absenteeism rate during the year of the assessment) in third and sixth-grade math. Results highlight the importance of identifying strategies to increase preschool attendance rates to support academic outcomes.

Partout au monde, les jeunes de couleur marginalisés sur le plan socio-économique ont tendance à obtenir de moins bonnes notes à l'école et de moins bons résultats aux tests standardisés en raison du racisme systémique et du classisme. La recherche suggère que l'inscription à l'école maternelle est associée à des retombées scolaires positives à court terme, mais on sait peu de choses sur la façon dont l'absentéisme est lié aux résultats scolaires ultérieurs, en particulier chez ces jeunes. Il s'agit d'un domaine d'étude crucial, car si l'éducation préscolaire offre la possibilité de combler l'inégalité des chances et de promouvoir l'équité en matière d'éducation, l'absentéisme peut en atténuer les avantages. La présente étude a examiné les associations à long terme entre l'absentéisme préscolaire et les résultats scolaires et a cherché à déterminer si l'absentéisme ultérieur jouait un rôle médiateur dans cette association parmi les jeunes de couleur défavorisés de la ville de New York. Les analyses ont révélé des associations négatives significatives entre l'absentéisme préscolaire et les résultats en mathématiques et en anglais en troisième et en sixième année. En outre, nous avons trouvé des effets de médiation de l'absentéisme au cours de l'évaluation (c'est-à-dire le taux d'absentéisme au cours de l'année de l'évaluation) en mathématiques en troisième et en sixième année. Les résultats soulignent l'importance d'identifier des stratégies pour augmenter les taux d'assiduité des enfants d'âge préscolaire afin de favoriser les résultats scolaires.

Children's early experiences are critical to their development (Claessens & Garrett, 2014). As they explore their social world, they learn immensely from it. Upon approaching age three, this learning often begins to take place in school settings. For example, preschool offers opportunities for young children to bolster their cognitive skills and lays the foundation for later learning (Gormley et al., 2005; Gottfried, 2015; Rhoad-Drogalis & Justice, 2018). Research indicates that these foundations are crucial. Early academic outcomes play a key role in determining later achievement (Geiser & Santelices, 2007; Rimfeld et al., 2018) among other important life outcomes including but not limited to income status, job security, and general well-being (Levin, 2005; Quinn & Duckworth, 2007; U.S. Bureau of Labor Statistics, 2019).

Preschool in the United States and Beyond

Preschool refers to a diverse array of educational programs for youth not yet in kindergarten (Pianta et al., 2009). Preschool landscapes look somewhat different across cities in the United States (U.S.) as well as other countries. In this paper, we focus primarily on programs in the U.S. but offer some insights into global contexts as well. In New York City (NYC), there are four formalized types of preschool programs: District schools (housed in elementary schools), pre-kindergarten centers (housed in school buildings or other Department of Education [DOE] sites), early education centers (i.e., "community-based organizations that contract with the DOE"), and family child care (i.e., home-based programs facilitated by a licensed provider; NYC DOE, 2023). These preschool options are quite similar to those offered in other countries such as Australia and Canada (Claessens & Garrett, 2014; Friendly et al., 2020).

Despite the increasing availability of free and low-cost preschool programs in the U.S., only one-third of four-year-olds are enrolled in them (Friedman-Krauss et al., 2018). This is a lost opportunity for many children to develop strong early academic foundations (see Bassok et al., 2016). Of those enrolled, about half begin at age 3 and the other half at age 4 (Pianta et al., 2009), and NYC allows students to enroll during the calendar year in which they turn four. Children in the U.S. spend approximately 5 to 6 hours in preschool per day (e.g., Melo et al., 2022), which mirrors characteristics of programs in other countries (e.g., Australia; Grebennikov, 2006).

Among children across the globe who attend preschool programs, high rates of absenteeism are pervasive and hinder the development of long-lasting academic gains (Arbour et al., 2016; Carlberg & Granlund, 2019; Gottfried, 2015; Morrissey et al., 2014; Ready, 2010; Rhoad-Drogalis & Justice, 2018; Tamiru et al., 2017). Moreover, the negative association between absenteeism and academic achievement has been demonstrated through the elementary school years (Morrissey et al., 2014) and specifically among socioeconomically marginalized students (Chang & Romero, 2008). A growing body of work has drawn negative associations between preschool absenteeism and early achievement, yet further research is needed to understand whether this association holds for students' later achievement. To this end, the present study investigated the associations between chronic absenteeism in preschool and later achievement. Further, to provide a more nuanced analysis, we explored whether later chronic absenteeism (i.e., in the assessment grade) mediates the associations between early absenteeism and later academic outcomes. Taken together, findings from this work have implications for educational institutions and policymakers who are well-positioned to bolster academic outcomes.

Centering Systemic Oppression

From our perspective, it is important to forefront systemic oppression (i.e., the domination of groups in society by a powerful group; Mullaly & West, 2018) in research focused on inequitable outcomes for Socioeconomically Marginalized Youth of Color (SMYoC). SMyoC—in this manuscript, referring primarily to Black/African American and Hispanic/Latine youth—tend to receive lower academic test scores and grades than their white¹, Asian, and better-resourced peers (Hemphill & Vanneman, 2011; Vanneman et al., 2009; Stanford Center for Education Policy Analysis, n.d.). As Rust (2019) outlined, this is due to centuries of oppressive violence rather than SMyoC's cultural orientations or other characteristics (see also Fields, 2014; Ramey & Ramey, 1998; Yeung, 2012). Thus, scholars in recent years have moved toward using the term *opportunity gap* rather than *achievement gap*, which highlights the nuances undergirding racial and ethnic disparities in academic outcomes (Milner, 2012) and promotes a systems-centered understanding of them (see Flores, 2007; O'Reilly, 2020) rather than simply stating that they exist.

Various factors contextualize opportunity gaps among racial and ethnic groups, several of which we outline below. Black and other Youth of Color are often removed from school environments via racist suspension practices, which renders it impossible for them to fully participate in academic activities (Blake et al., 2016; Henfield et al., 2014; Huang, 2020). As early as middle school, Students of Color report experiencing discrimination in school settings (Byrd & Andrews, 2016), rendering it difficult—if not impossible—to perform to their full ability (see English et al., 2016). Relatedly, activating negative stereotypes about Black students' academic competence in particular has been shown to negatively impact their performance on aptitude tests (Steele & Aronson, 1995). Despite many preschool programs' intentions to support and appropriately serve racially and ethnically diverse youth, this is not often the case (see Pianta et al., 2009). A broad literature focused on students across the globe, too, has found that parent education levels are positively associated with their children's academic outcomes (Azhar et al., 2014; Chiu et al., 2016). In the U.S., Black and Hispanic parents have lower levels of education than white and Asian parents on average (de Brey et al., 2019) due to relics of colonialism and current racism, another mechanism likely reinforcing this opportunity gap.

This opportunity gap may also be explained, in part, by SMyoC's considerably lower rates of preschool enrollment and attendance relative to their peers (Balfanz & Byrnes, 2012; Brandon, 2004; Chang & Romero, 2008; Ehrlich et al., 2014; Romero & Lee, 2007) which, again, requires an analysis of identity-based privilege, power, and relevant cultural factors. For instance, Parents of Color (e.g., Latine parents; Pérez & Zarate, 2006) may be disproportionately denied access to information about preschool due to language (among other) barriers (Barnett & Yarosz, 2007; Greenberg et al., 2016). Parents of SMyoC may also experience racial/cultural discrimination from teachers or live too far from preschools for their children to attend (Ansari et al., 2020). Inflated rates of violent crime among Black, Latine, and other Communities of Color—produced from longstanding racial inequities in the labor market and (in)justice systems (among other factors; Peterson & Krivo, 2010)—also appear to play a role. Purtell and Ansari (2022) identified that youth (primarily of Color) who live in neighborhoods perceived by their mothers to be violent miss significantly more preschool. Finally, African American and Latine students miss twice as many days of school due to sickness as compared to white students (Ehrlich et al., 2014). This may be due to negative environmental toxins that more commonly impact their communities due to racist federal policies, discriminatory housing practices, and classism, which

disproportionately harm SMYoC and their families (Bullard, 1990; Currie et al., 2009; Gochfeld & Burger, 2011).

Although the above analysis of systemic racism applies to Students of Color in general, it is important to note that opportunity gaps indicate that Asian students typically have the highest academic outcomes of all racial and ethnic groups. There are clearly other mechanisms at play here, many of which have been identified in the literature (see Kotok, 2017). For instance, Latine and African American students are more commonly placed into lower-level courses even when demonstrating high achievement (Oakes, 1995), reflecting unique institutional bias toward them. Presently, in Canada and the U.S., Asian families make higher incomes on average than Black and Latine families (Qiu & Schellenberg, 2022; Semega & Kollar, 2022); given that school funding in many countries (e.g., the U.S.) is tied to local property taxes, it is likely that Asian students attend higher resourced schools, on average, which may enhance their academic rigor and skills. Lastly, the stereotype that Asian students are unequivocally intelligent is incredibly harmful, restrictive, and racist (see Wing, 2007); however, it might serve to support their academic outcomes and, contrastingly, opposing stereotypes might reduce Black and Latine students' outcomes as a result of internalized social expectations (i.e., stereotype threat; Steele & Aronson, 1995). Yet readers should not misinterpret our statements; Asian students undoubtedly experience pernicious racism in school settings which must not be dismissed or invalidated.

Ultimately, challenging educational inequities that harm minoritized people is a moral imperative for education researchers. It is crucial to sensitively investigate the academic opportunity gap to promote educational equity and afford SMYoC the same opportunities as their peers. Across contexts, preschool has been shown to increase educational and social mobility (Bauer & Riphahn, 2009; Dumas & Lefranc, 2010).

Theoretical Framework

Ecological systems theory (Bronfenbrenner, 1977) provides a useful framework to understand the importance of preschool attendance. This model posits that proximal processes—the interactions between an individual and their environments—are at the core of human development. Central to creating proximal processes are other people (i.e., those who are physically close to the developing person; Vygotsky, 1978), environmental contexts (e.g., school), and time (i.e., temporal continuity of proximal processes; Bronfenbrenner & Morris, 1998). Applied to the classroom context, proximal processes are the foundation for why emotionally supportive environments tend to foster positive academic outcomes. When children feel a strong connection to their teachers and peers, they learn more by feeling supported and challenged by their environment. Reciprocally, teachers develop stronger relationships with children who attend school more frequently (Suldo et al., 2014) and perhaps are, therefore, better able to instruct them. Indeed, research has found that strong teacher-student relationships are linked with positive academic outcomes (Goldie & O'Connor, 2021; Hamre & Pianta, 2001; Roorda et al., 2017). In sum, preschool absenteeism disrupts the “time” element of proximal processes and leads to a discontinuity in students' learning at a developmental stage when relational stability appears vital (see Bronfenbrenner & Morris, 1998).

Ecological systems theory considers relevant larger, systems-level factors as well. For example, government policies and economic systems that harm Socioeconomically Marginalized Families of Color are part of children's macrosystems, yet directly affect them (e.g., increased policing in Communities of Color). For instance, the history of redlining in the U.S. (i.e., a policy

that produced differentials in mortgage loans supplied to individuals based on race) has systematically restricted Black families' abilities to build (generational) wealth (Lang & Nakamura, 1993). Among many other enduring implications, this renders Black and other Youth of Color less likely to have access to high-quality schooling in their neighborhoods among other educational resources (e.g., tutoring).

The theory further posits that consistent preschool attendance may provide beneficial environmental stimulation for students who are prohibited access due to socioeconomic marginalization. Relatedly, the compensatory education model (see Ramey & Ramey, 1998; Sameroff & Chandler, 1975), referred to here as a *supplementary effect* to acknowledge the existence of baseline skills and knowledge in all children (Gandhi, 2021), poses that high-quality preschool programs can offer Socioeconomically Marginalized Children more intensive resources than they have access to otherwise (Pianta et al., 2009). This results from a constellation of factors rooted in economic and racial oppression (e.g., comparatively lower parent education levels; Haywood, 1982) and might explain why youth from lower-resourced homes may reap greater benefits from preschool relative to their better-resourced peers (Anderson & Romm, 2020).

Benefits of Preschool on Academic Outcomes

Extensive literature has found that preschool lays the early foundation of learning (e.g., Gormley et al., 2005; Gottfried, 2015; Rhoad-Drogalis & Justice, 2018), which is linked to later academic achievement (Watts et al., 2014). Magnuson et al. (2007) found that children enrolled in preschool perform higher than their peers in math and English language arts (ELA) through kindergarten. Other work has found longer-term academic benefits of preschool, such as higher grades and test scores through eighth grade (Bai et al., 2020; Schweinhart et al., 2005) and an increased likelihood of pursuing post-secondary education (Campbell et al., 2002). However, conflicting research reported that academic gains dissipate by first grade (Magnuson et al., 2007) or that attending preschool even reduces children's later achievement (e.g., Johnson et al., 2019; Lipsey et al., 2018). Limited research in this domain has centered on Youth of Color; however, extant work has found that these effects hold over time for African American youth from Socioeconomically Marginalized Families (Schweinhart et al., 2005) and many Black students from middle- and high-income families reap more benefits from attending preschool relative to their white peers (Bassok, 2010). In summary, a breadth of scholarship has reported lasting positive effects of preschool on achievement with minimal fadeout effects. More work is warranted, especially that which centers on the experiences of SMYoC who are often systematically understudied.

The Effects of Chronic Absenteeism on Academic Outcomes

Chronic absenteeism in the U.S. is defined as a student missing 18 or more school days (i.e., 10% of the total 180 days) over a given school year (Chang & Romero, 2008). By and large, chronic absenteeism is linked to lower academic outcomes. More specifically, within the more developed literature on chronic kindergarten (rather than preschool) absenteeism and later academic achievement, scholars have found strong associations between kindergarten absenteeism and first (Romero & Lee, 2007), third (Attridge, 2016), fifth (Ansari & Gottfried, 2021; Chang & Romero, 2008), and ninth-grade achievement (Ansari & Pianta, 2019).

Useful research by Ehrlich et al. (2014) suggested that chronic preschool absenteeism is associated with lower general academic skills at the end of preschool and lower reading achievement in second grade. However, research has inadequately explored how long and for which subgroups the negative relationship between preschool absenteeism and academic achievement persists. One notable study was conducted by Anderson and Romm (2020), who recruited a relatively large sample of racially diverse students ($N = 854$; 41% white, 59% of Color). Specifically, these authors investigated the relationship between administration-reported preschool absenteeism rates and third grade math and reading achievement (as measured by the Oklahoma Core Curriculum Test). They found no overall associations between preschool absenteeism and third grade math or reading achievement but reported that, among Socioeconomically Marginalized Students in particular, preschool absenteeism was negatively associated with reading test scores.

Current Study

Several gaps in extant research around chronic preschool absenteeism and academic outcomes warrant further investigation. First, although studies have investigated the relationship between chronic preschool absenteeism and achievement (e.g., Ansari & Purtell, 2018), none to our knowledge have examined this association beyond third grade. Second, as chronic absenteeism remains relatively stable over time (Ehrlich et al., 2014; Ansari & Gottfried, 2021; Ansari & Pianta, 2019), the relation between chronic preschool absenteeism and later achievement may be mediated by later chronic absenteeism. For example, Ansari and Purtell (2018) found that kindergarten attendance mediated the associations between chronic preschool absenteeism and kindergarten literacy and math achievement. However, this pathway has not been examined considering later absenteeism and achievement. Lastly, SMYoC are vastly underrepresented in the literature on preschool and achievement. It is necessary to represent them in research in this area for several reasons. Doing so will, first, create a more comprehensive understanding of the opportunity gap that restricts SMYoC through their academic careers. Further, centering SMYoC in studies offers opportunities for researchers and policymakers to understand how to support them and resists euro- and white-centric narratives that are rampant in education studies. To this end, the present study focuses on the NYC preschool system, which is of particular interest as the majority of NYC's elementary school students do not attain proficient scores on standardized math and ELA test scores (New York City Department of Education [NYC DOE], 2023).

The present study examines long-term associations between chronic preschool absenteeism and later math and ELA achievement. Additionally, we analyze the mediating role of within-year chronic absenteeism on the association between chronic preschool absenteeism and later math and ELA achievement. Specifically, we aim to address the following research questions and hypotheses:

1. Is chronic absenteeism in preschool associated with math and ELA achievement in the third, fourth, fifth, and sixth grades? Given prior evidence suggesting that chronic absenteeism is negatively associated with academic outcomes (e.g., Chang & Romero, 2008), we expect to find negative associations between chronic absenteeism in preschool and both math and ELA achievement in all four grades.
2. Does chronic absenteeism in the same grade as the academic assessment grade (third through sixth grades) mediate the association between chronic absenteeism in preschool and

later achievement? We expected to find significant mediating effects of chronic absenteeism in each attendance grade because of the stability in chronic absenteeism over time (Ehrlich et al., 2014), which is associated with lower levels of achievement (Ansari & Purtell, 2018).

Method

Participants and Setting

Ethical approval for this study was obtained by the New York University institutional review board. Data were drawn from a longitudinal randomized controlled trial of an early childhood social-emotional learning intervention, INSIGHTS into Children's Temperament (INSIGHTS; McClowry et al., 2005). INSIGHTS sought to reduce students' disruptive behavior, increase sustained attention, and improve teachers' classroom management. In sessions, caregivers and teachers learned to identify a child's temperament style and utilized strategies that match it (O'Connor et al., 2014a). The program was implemented in 22 schools in NYC that primarily served Socioeconomically Marginalized Students. The first phase of the INSIGHTS study took place from 2008 to 2012, several years before NYC began expanding access to high-quality, free preschool programming for eligible four-year-olds through the universal "Pre-K for All" program in 2014. We tracked a subsample of predominantly Socioeconomically Marginalized Black/African American, Hispanic, and biracial children in NYC across seven years. A research-practice partnership with the NYC DOE provided access to participants' administrative data, including attendance rates and standardized test scores. The NYC DOE collects such data on all students at the beginning (October) and end (June) of the school year. The INSIGHTS intervention began when participants were in kindergarten and, therefore, did not affect their preschool attendance rates.

The original study sample included 457 students. Given that this study examined the effects of preschool, the convenience sample was limited to the students who were enrolled in preschool, reducing our sample by 121 observations. The sample was further restricted to preschool students for whom the DOE had valid attendance data, reducing the sample by an additional 112 observations. After the removal of these students, our final sample included 224 preschool students (122 boys, 102 girls). The children were 4.2 years old ($SD = 0.35$) at preschool entry, on average, with the youngest 3.12 years old and the oldest 5.04 years old. The majority of the final sample (72%) qualified for free or reduced-price lunch (FRPL) at the beginning of preschool, indicating socioeconomically marginalized status. Participants were predominantly Students of Color identified by their parents or caregivers as Black/African American (non-Hispanic; 68%), Hispanic (non-Black; 14%), or biracial (12%). School-level demographic characteristics were based on census categories in which race and ethnicity were not mutually exclusive categories. The majority of respondents were mothers (84%) and fathers (9%).

Procedure and Measures

Absenteeism

The absenteeism rates for preschool and third through sixth grades were reported by students' schools and obtained from the NYC DOE as the ratio of the total number of days absent over the number of days the child was enrolled ($M = 11.17$, $SD = 9.28$). The rate of preschool absenteeism

was found to be right-skewed (1.56) with a kurtosis of 5.86, likely due to the large number of children who missed zero days (the highest absenteeism rate was 50%). Preliminary models using the continuous absenteeism rate without variable transformations were determined to be misleading. However, the median rate of absenteeism was 8.54%, or nearly at the chronically absent classification of 10%. Research examining the linear relation between absenteeism and achievement has demonstrated discontinuity at 18 days of absences (i.e., the chronic absenteeism cutoff; Gershenson et al., 2017), suggesting that there may only be marginal differences in the achievement levels of students who are close to but do not meet the chronically absent threshold.

Students were considered chronically absent if they were absent for more than 10% of the days they were enrolled in preschool. In all analyses, we used a dichotomous indicator of chronic absenteeism (chronically absent = 1). Average chronic absenteeism rates were as follows: preschool: 44.2%, third grade: 23.3%, fourth grade: 26.0%, fifth grade: 23.3%, sixth grade: 29.3%. This rate of preschool chronic absenteeism is consistent with prior work focused on the experiences of SMYoC from a large city setting (e.g., Ehrlich et al., 2014).

Academic Achievement

Academic achievement was measured with the New York State ELA and math test scores, provided by the NYC DOE. All NYC public school students were required to take these standardized, untimed tests each spring from third through eighth grade. Thus, students in our sample were not tested prior to third grade. The ELA test contained questions about reading comprehension and written responses to literature that students listen to or read. The math test contained several types of multiple-choice and open-ended questions (NYC DOE, 2023). At the approximate time of most participants' assessments, the New York State Education Department (2015) reported strong internal consistency ($\alpha = .89$ or higher across grades 3–8 for math and ELA), unidimensionality, and minimal bias for these tests. The NYC DOE converted raw achievement scores into z-scores (i.e., standardized), which were normed relative to the school district; this allowed us to compare children with others who had similar school experiences. Analyses included z-scored math and ELA test scores from when students were in third, fourth, fifth, and sixth grades.

Covariates

To reduce the possibility of spurious associations, our analyses adjusted for a set of demographic variables reported by parents or caregivers and the NYC DOE. Covariates included child gender, FRPL status, race, ethnicity, parent education, parent age, parent work status, number of children in the household, child's learning and speech disability status, asthma diagnosis, and other disabilities. Parents provided the data on child race, ethnicity, parent education, parent age, work status, and the number of children in the household. All other variables were available in the district administrative dataset. We controlled for these potentially confounding factors as a breadth of literature has found that many (if not all) of them determine or are associated with differences in academic achievement (e.g., Hemphill & Vanneman, 2011; Goldie & O'Connor, 2021; Vanneman et al., 2009; Voigt et al., 2017) and chronic absenteeism (e.g., Balkis et al., 2016; Gershenson et al., 2017; Rappaport et al., 2011; Skedgell & Kearney, 2018; see also Ansari & Gottfried, 2021). Other similar studies have controlled for many of these variables (e.g., McCormick, Cappella et al. 2015; McCormick, O'Connor et al., 2015).

Additionally, we controlled for INSIGHTS treatment status in all models to account for the empirically-demonstrated positive effect of the intervention on children's academic outcomes in math (through first grade; O'Connor et al., 2014b) and ELA (through fourth grade; McCormick et al., 2021). Descriptive means and percentages of our covariates for the full sample and by chronic absentee status are presented in Table 1. We tested the significance of the differences in covariate means/percentages by chronic absenteeism status by regressing the chronic absenteeism indicator on each covariate in separate regression models that included robust clustered standard errors for preschool classroom to account for children who may have been grouped together.

Analytic Approach

To address our first research question regarding associations between chronic absenteeism in preschool and math and ELA achievement in third, fourth, fifth, and sixth grades, we regressed each dependent variable on our dichotomous indicator for chronic absenteeism, along with all described covariates. To address our second research question regarding the indirect effects of chronic absenteeism in the assessment grade (i.e., third through sixth grades) on the association between chronic preschool absenteeism and later academic achievement, we used path analysis.

Table 1

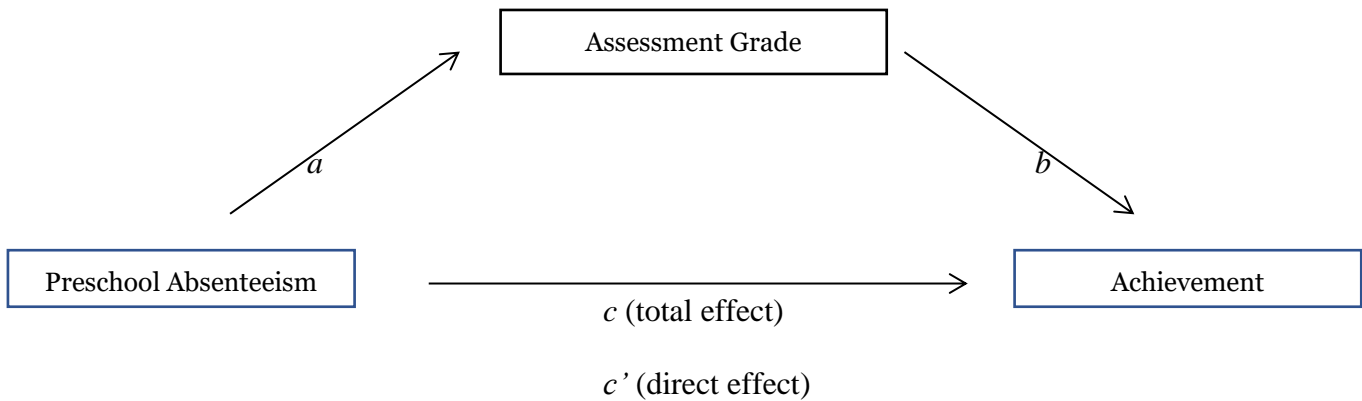
Descriptive Means and Percentages of Control Variables by Preschool Absenteeism

	Full Sample		Not Chronically Absent		Chronically Absent		N
	Mean/%	SD	Mean/%	SD	Mean/%	SD	
Female	0.46	0.50	0.44	0.50	0.47	0.50	224
Child Black/ Non-Hispanic	0.68	0.47	0.63*	0.48	0.74*	0.44	205
Child Hispanic/ Non-Black	0.14	0.35	0.11	0.31	0.18	0.39	208
Child biracial	0.12	0.33	0.18***	0.39	0.05***	0.22	212
Free/ reduced price lunch	0.72	0.45	0.66***	0.48	0.81***	0.40	189
Learning disorder diagnosis	0.05	0.22	0.03	0.18	0.07	0.26	216
Speech disorder diagnosis	0.08	0.27	0.08	0.27	0.08	0.28	216
Asthma diagnosis	0.24	0.43	0.22	0.42	0.26	0.44	216
Other diagnosis	0.06	0.24	0.07	0.26	0.04	0.20	216
Parent education (in years)	13.24	2.89	13.77*	3.29	12.58*	2.12	214
Parent age (in years)	35.55	7.97	37.17**	7.07	33.55**	8.58	213
Parent works part time	0.35	0.48	0.42**	0.50	0.26**	0.44	224
Parent works full-time	0.15	0.36	0.13*	0.34	0.18*	0.39	210
Parent unemployed	0.52	0.5	0.48	0.50	0.56	0.50	111
Number of children in household	1.63	1.34	1.53	1.34	1.75	1.34	214
INSIGHTS treatment	0.51	0.50	0.44**	0.50	0.61**	0.49	224
Observations	224		125		99		

Note. *p*-values represent differences in means/percentages between the chronically absent in preschool and not chronically absent in preschool groups. Differences between the groups were estimated using a series of OLS regressions of the chronic absenteeism indicator on each covariate with robust clustered standard errors for preschool classroom grouping. "Learning disorder diagnosis" includes children who were flagged as having a specific learning disability or ADHD diagnosis by the NYC DOE. "Other diagnosis" includes chronic illness, physical disability, or "other" as indicated by the NYC DOE.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 1

Conceptual Mediation Model

In our hypothesized model (Figure 1), we measured the following paths: (a) the direct paths from chronic absenteeism in preschool to chronic absenteeism in the assessment grade (i.e., third, fourth, fifth, or sixth; path *a*) and academic assessment scores in the third, fourth, fifth, or sixth grades (path *c*), (b) the direct paths from chronic absenteeism in the assessment grades to academic assessment scores within those same grades (path *b*), and (c) indirect paths from chronic preschool absenteeism to academic assessment scores through chronic absenteeism in the assessment grade. All mediation tests employed bootstrapping with 200 samples to calculate bias-corrected confidence intervals in the indirect effect estimates. All path estimates included the covariates listed in Table 1. Results were considered significant based on an alpha level of .05.

All analyses were estimated within a structural equation modeling framework using Stata 16.1. Given the potential non-independence of our observations resulting from children attending the same preschool centers, we ran all models with robust standard errors adjusted for clustering by preschool site enrollment in October. Item-level missing data rates were low, with missing values on whether parents or caregivers identified children as Black (6%), Hispanic (10%), white (6%), eligible for FRPL (1%), child's age (3%), and parent education level (4%). All of our statistical models accounted for missing data with full information maximum likelihood estimation (FIML) which fit the models directly to our data (Schafer & Graham, 2002) and used all available data for each case when estimating parameters, increasing the statistical power of estimated parameters (Enders & Bandalos, 2001).

Results

Due to concern that the students selecting into preschool may be fundamentally different from the collective INSIGHTS sample, we performed a series of baseline balance tests on our primary covariates by regressing the preschool enrollment indicator on each control variable in separate models. We found no indication of imbalance across all covariates. We then tested whether covariates differed by preschool enrollment by regressing the preschool enrollment indicator on the entire set of baseline covariates, employing an F-test to assess whether the set of covariates jointly differed from “0”. This analysis indicated that among students in the collective INSIGHTS

sample, at baseline, those enrolled in preschool did not differ significantly on any covariates from those who were not enrolled in preschool, $F(13, 81) = 0.78, p = 0.68$.

Descriptive differences in means and percentages of control variables revealed several significant differences between children who were chronically absent in preschool relative to those who were not chronically absent (see Table 1). Significant differences in demographic characteristics were expected between these two groups and correspond with prior descriptive studies on chronic absenteeism. Black children (not including biracial children) were more likely to be chronically absent than not ($p = .038$) and, conversely, biracial children were less likely to be chronically absent than chronically absent on average ($p < .001$). Children who qualified for FRPL ($p < .001$), children whose parents received less education ($p = .026$), and younger children ($p = .002$) were more likely to be chronically absent than not chronically absent. Children whose parents worked part-time were less likely to be chronically absent than not ($p = .001$), whereas those whose parents worked full-time were more likely to be chronically absent than not chronically absent ($p = .027$). Finally, children in the INSIGHTS treatment group were more likely to be chronically absent than those in the control group ($p = .002$), although the INSIGHTS randomization did not occur until after the preschool year.

Associations Between Preschool Absenteeism and Later Achievement

To address our first research question, Ordinary Least Squares regressions were run to examine the relationship between chronic absenteeism in preschool and standardized ELA and math test scores in third, fourth, fifth, and sixth grades. Results of each model are presented in Table 2. Results can be interpreted as effect sizes because achievement values were standardized.

Analyses revealed significant negative effects of chronic preschool absenteeism on math achievement in third ($\beta = -0.21, p < .001$), fourth ($\beta = -0.15, p = 0.01$), fifth ($\beta = -0.15, p = 0.01$), and sixth ($\beta = -0.17, p < 0.001$) grades. Similarly, analyses revealed significant negative effects of chronic preschool absenteeism on ELA achievement in third ($\beta = -0.18, p = 0.001$), fourth ($\beta = -0.17, p < 0.001$), fifth ($\beta = -0.18, p < 0.001$), and sixth grades ($\beta = -0.13, p = .02$). Students who regularly attended preschool scored higher than their chronically absent peers in both math and ELA through middle childhood and into early adolescence.

Table 2

Long-term Associations Between Preschool Chronic Absenteeism and Academic Outcomes

	Math		ELA	
	β	SE	β	SE
3 rd Grade	-0.21***	0.03	-0.18**	0.06
4 th Grade	-0.15*	0.06	-0.17***	0.03
5 th Grade	-0.15**	0.06	-0.18***	0.05
6 th Grade	-0.17***	0.04	-0.13*	0.06

Note. Coefficients presented in the table were estimated from eight separate models regressing a binary indicator for preschool chronic absenteeism (1 = chronically absent) on standardized test scores. Covariates included child gender, free/reduced-price lunch status, race/ethnicity, level of parent education, parent age, parent's work status, number of children in the household, child's learning and speech disability status, asthma diagnosis, other disabilities, and INSIGHTS treatment status. Standard errors were adjusted for preschool site-level clustering. Missing data on covariates were accounted for using Full Information Maximum Likelihood (FIML) estimation.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3

Mediation Analysis: Direct and Indirect Effects of Chronic Preschool Absenteeism

Path/Effect	Math Achievement			ELA Achievement		
	β	b	SE	β	b	SE
3 rd Grade						
<i>a</i>	0.32***	0.27	0.07	0.32***	0.27	0.07
<i>b</i>	-0.25**	-0.58	0.21	-0.12	-0.24	0.17
<i>c</i>	-0.21**	-0.41	0.15	-0.17*	0.30	0.14
<i>c'</i>	-0.13 \times	-0.25	0.16	-0.14	-0.24	0.16
Indirect effect	-0.08* \times	-0.16	0.07	-0.04	-0.07	0.05
4 th Grade						
<i>a</i>	0.16 \times	0.14	0.08	0.15	0.13	0.07
<i>b</i>	-0.28**	-0.58	0.20	-0.23**	-0.55	0.21
<i>c</i>	-0.14 \times	-0.27	0.14	-0.18**	-0.39	0.15
<i>c'</i>	-0.10 \times	-0.19	0.14	-0.15*	-0.31	0.15
Indirect effect	-0.04 \times	-0.08	0.06	-0.03	-0.07	0.05
5 th Grade						
<i>a</i>	0.15 \times	0.13	0.08	0.15	0.13	0.08
<i>b</i>	-0.15 \times	-0.32	0.21	-0.07	-0.16	0.25
<i>c</i>	-0.18* \times	-0.33	0.15	-0.18*	-0.36	0.16
<i>c'</i>	-0.16 \times	-0.29	0.15	-0.17*	-0.34	0.16
Indirect effect	-0.02 \times	-0.04	0.04	-0.01	-0.02	0.04
6 th Grade						
<i>a</i>	0.28**	0.26	0.08	0.28**	0.26	0.08
<i>b</i>	-0.24* \times	-0.47	0.18	-0.16	-0.33	0.20
<i>c</i>	-0.18* \times	-0.32	0.15	-0.14	-0.26	0.14
<i>c'</i>	-0.11 \times	-0.20	0.15	-0.09	-0.17	0.14
Indirect effect	-0.07* \times	-0.12	0.05	-0.05	-0.09	0.06

Note. Mediator is assessment year absenteeism. *a* path is from predictor to mediator; *b* path is from mediator to outcome; *c* path is total effect, or the path from predictor to the outcome without controlling for the mediator; *c'* path is from predictor to outcome after controlling for the mediator. Mediation tests employed bootstrapping with 200 samples and missing data on covariates were accounted for using Full Information Maximum Likelihood (FIML) estimation. Standard errors were adjusted for preschool site-level clustering. Bootstrapped standard errors (SE) were estimated from the unstandardized coefficients (b), which are presented alongside the standardized coefficients (β) as reference. All models were adjusted for the full list of control variables (see Table 1).

* $p < .05$, ** $p < .01$, *** $p < .001$.

The Mediating Role of Assessment Grade Absenteeism

We conducted eight separate mediation analyses to investigate the mediating effects of chronic absenteeism within the assessment grade on the association between chronic preschool absenteeism and later achievement. These analyses included chronic preschool absenteeism as predictors, chronic assessment year absenteeism as mediating variables, and achievement (third through sixth grade, math and ELA respectively) as outcome variables. Figure 1 presents the overall conceptual model of this relationship and Table 3 shows path estimates from each model.

Our first set of analyses examined math outcomes. When including assessment year

absenteeism as a mediator, direct associations between preschool absenteeism and math achievement were weakened. Third-grade absenteeism significantly mediated the association between preschool absenteeism and third grade achievement ($\beta = .08, p = .02$), and sixth-grade absenteeism mediated the association between preschool absenteeism and sixth-grade achievement ($\beta = .07, p = .03$). There were not significant mediation effects of assessment year absenteeism in grades four and five.

Subsequently, we analyzed ELA outcomes. Adding assessment year absenteeism as a mediating variable reduced direct associations between preschool attendance and later ELA achievement; however, none of these effects reached statistical significance. Results indicated that later absenteeism is not a pathway through which students who were chronically absent in preschool demonstrate lower ELA achievement through elementary and early middle school. In conclusion, the second hypothesis was partially supported, and the indirect effects of assessment year absenteeism were stronger in math than ELA.

Discussion

SMYoC tend to perform lower academically relative to their white, affluent peers (Hemphill & Vanneman, 2011; Vanneman et al., 2009), which can be contextualized by considering enduring systemic racial oppression (e.g., redlining; social discrimination in schools). SMYoC's comparatively lower academic outcomes can have meaningful and urgent long-term implications, such as decreases in earning potential (Levin, 2005). Preschool enrollment can bolster educational equity by offering children from Socioeconomically Marginalized Families an opportunity to support their early and later learning (Gormley et al., 2005; Gottfried, 2015; Rhoad-Drogalis & Justice, 2018) and easing the transition to kindergarten (Ansari & Purtell, 2018). However, preschool is underutilized by those who may benefit from it the most (Brandon, 2004). Additionally, chronic preschool absenteeism—which is exceedingly common among SMYoC due to various systemic barriers (Ehrlich et al., 2014; Greenberg et al., 2016)—is associated with significantly lower academic benefits. Despite a recent increase in the literature around the effects of chronic preschool absenteeism (e.g., Anderson & Romm, 2020; Ansari & Purtell, 2018; Chang & Romero, 2008), few studies have examined the associations between preschool absenteeism and achievement beyond third grade.

The present study investigated whether chronic preschool absenteeism was associated with later academic achievement and whether assessment year absenteeism mediated these associations. Results supported the first hypothesis, indicating that chronic preschool absenteeism is significantly associated with lower math and ELA achievement in third through sixth grades. Chronically absent preschool students scored significantly lower on standardized tests than those who were not chronically absent across academic subjects and grade levels, suggesting that academic gaps associated with preschool absenteeism tend to be sustained through elementary and into middle school. Ecological systems theory (Bronfenbrenner, 1977) contextualizes these findings. When the "time" piece of proximal processes is interrupted due to chronic absenteeism and students receive a lower dosage of preschool, they are more likely to experience lower academic outcomes. It is likely that this is due to reduced continuity in lessons but could, relatedly, result from receiving limited attention from teachers and having fewer opportunities to connect with others in their school environments. Indeed, recent work by Goldie and O'Connor (2021) found significant associations between close early teacher-student relationships and later achievement, suggesting that these relationships—which they must be

present to build—play a vital role in supporting their achievement.

Results partially supported the second hypothesis that assessment grade chronic absenteeism (i.e., absenteeism rate during the year of the assessment) would mediate associations between chronic preschool absenteeism and later achievement. We expected to see consistent, significant indirect effects in all models. Although there were detectable indirect effects in all models, only the third- and sixth-grade math models reached significance; the fourth- and fifth-grade math models, as well as all ELA models, did not. This pattern of effects is perplexing. The indirect effect of third grade absenteeism might suggest that consistent attendance in the concurrent year of assessment is critical for math achievement, particularly in the early grades. Indeed, younger children require greater foundational academic skill development and, thus, lower attendance might be more detrimental as they miss instruction required for later skill development. However, the nonsignificant indirect effects of fourth and fifth grade absenteeism, coupled with the emergence of significant indirect effects in the sixth grade, weaken the argument for foundational skill development. It is possible that the importance of third and sixth grade absenteeism in our findings represent important standardized assessment transition points for NYC teachers. The third grade is the first year of student standardized assessment (NYC DOE, 2023), and the sixth grade is students' introduction to middle school, often considered a critical transition in formal academic development (see Alspaugh, 1998; Rockoff & Lockwood, 2010). As a result, teachers may tailor their instruction more directly towards the aims and potential content of the standardized assessments, making each day of attendance more important. Overall, these findings indicate that absenteeism, when conceptualized linearly with grade level, is not a mechanism through which chronic preschool absenteeism is associated with later achievement; however, given these mixed results, future research in this area is warranted.

Two unexpected findings emerged. First, mediation effects were far weaker in fifth grade (in both subjects) than all other grades. This might be best explained by weak *b* paths (i.e., associations between fifth-grade absenteeism and math and ELA achievement, respectively), although we found no theoretical grounding for this finding. It would be helpful for scholars to further explore whether associations between absenteeism and academic outcomes remain stable over time, perhaps specifically for SMYoC. Second, although some effects were nonsignificant, indirect effects of later absenteeism were stronger in each of our math models than ELA models for those same grades. This suggests that attendance dosage over time (both in preschool and through late elementary and early middle school) may be more influential in the development of math relative to ELA skills. Math skills development may be more restricted to school settings, whereas students may read or engage in other activities that promote ELA skills outside of academic contexts.

The present findings support a relatively broad literature highlighting the importance of enrollment in preschool on later achievement (e.g., Bai et al., 2020; Chang & Romero, 2008; Gormley et al., 2005; Watts et al., 2014). Less work, however, has clarified the role of preschool absenteeism in determining academic outcomes for adolescents and young students (Anderson & Romm, 2020). To our knowledge, one recent study had a similar focus and research design. The present findings partially converged with Anderson and Romm (2020). These authors found that preschool attendance rate was not associated with third-grade math or reading test scores in general; however, among Socioeconomically Marginalized Students, they found a positive association in reading (but not math) scores. Discrepancies between findings are indicative of a need for further investigation, especially across cultural and social contexts and demographic groups.

Extremely little work has proposed mediation models to test the indirect effects of later (e.g., elementary school) absenteeism on academic outcomes. In the only existing study, to our knowledge, Ansari and Purtell (2018) found that kindergarten absenteeism mediated the associations between chronic preschool absenteeism and kindergarten literacy and math achievement, respectively. They reported that higher rates of chronic preschool absenteeism were related to higher rates of chronic kindergarten absenteeism, which were associated with lower literacy scores. Surprisingly, in math, they reported that higher rates of chronic preschool absenteeism were associated with higher rates of chronic kindergarten absenteeism, which were associated with higher math scores. Although the present mediation findings by and large did not reach significance, its pathways are worth comparing to these authors'. We found that chronic preschool absenteeism was related to chronic assessment grade absenteeism in math and ELA, but only in third and sixth grades. Moreover, chronic assessment grade absenteeism was associated with lower achievement scores in third grade (math only), fourth grade (math and ELA), and sixth grade (math only), demonstrating a contrasting pattern of findings. These discrepant results might be due to differences in demographics (i.e., the present study included many more SMYoC), teachers' levels of competence, measures/indices of achievement, study designs, and geographic locations (e.g., rural versus city environments). It is also possible that the destructive effects of early absenteeism on achievement are unique to each academic and sociocultural environment. Moreover, Ansari and Purtell (2018) used a nationally representative U.S. sample, whereas the present study examined only the experiences of students in NYC. It would be beneficial for future work to employ similar mediation models in other geographical areas and countries, and center diverse samples to provide a more comprehensive understanding of how chronic absenteeism relates to achievement over time in other populations. Indeed, further internationalizing education studies will strengthen it.

A few characteristics of the present study are uniquely valuable. First, we assessed the associations between chronic preschool absenteeism as well as later absenteeism on academic outcomes over several years and into middle school—addressing a significant gap in the present literature. Second, this study centered a population that may need and benefit from preschool most yet encounters the most barriers to enrollment and attendance due to racialized socioeconomic marginalization and is often left out of educational research. As Heckman (2006) described, investing in marginalized youth (in this case, through intervention and research) is a way to promote social justice. We hope that researchers in this area continue to center marginalized populations to enact necessary justice-oriented change and are cautious not to inappropriately overgeneralize findings (Roberts et al., 2020).

Limitations and Future Directions

The present study was not without limitations. First, as Lipsey et al. (2018) described, a key methodological challenge in evaluating the effects of preschool is that parents self-select into programs; there may be meaningful contextual differences between those who enroll in preschool and those who do not. For instance, as described, language barriers disproportionately present among Socioeconomically Marginalized Families of Color in the U.S. might limit their access to information about the availability or benefits of free preschool. In addition, the first phase of the INSIGHTS study took place before NYC began expanding access to high-quality, free preschool programming. The present NYC preschool landscape is, as a result, different from the one we examined in this study with respect to the accessibility of programming. Relatedly, early

educational landscapes in other U.S. cities and states are likely structured somewhat differently, as are those in other countries. The present study remains pertinent as even more children in the NYC area are now enrolled in preschool, rendering it increasingly important to elucidate the conditions under which they benefit from it. Further investigation in this area, though, would be confirm the replicability of these findings across other demographic groups and cultural and educational contexts.

Second, findings were based on correlational analyses and, therefore, we cannot conclude that preschool absenteeism causally leads to lower achievement. We controlled for several factors associated with academic achievement; however, it is possible that findings are impacted by unmeasured factors (Ansari & Gottfried, 2021). As with many other absenteeism studies, our data sources were limited to parent report and district administrative data. However, classroom processes and interactions such as child conduct problems, school engagement, and teacher-student relationships are known to be related to both achievement and absences. Future studies of absenteeism should aim to account for classroom factors.

Although also a strength, our geographically and somewhat racially homogeneous sample limits generalizability to other populations (e.g., affluent white students, rural students, non-U.S. contexts). Additionally, as Buchanan et al. (2021) expressed, including only SMYoC in the literature (as opposed to middle- or upper-class Students of Color, for example) can disparage Communities of Color and promote white supremacy. We hope that future research diversifies—not only to include more Students of Color, but more diverse groups of Students of Color with varying experiences of privilege and marginalization. Finally, we were not able to analyze outcomes for racial groups separately (as such analyses would have yielded very low power) yet hope that readers avoid homogenizing People of Color (Buchanan et al., 2021), including those in our sample. There is extensive within-group diversity among racial and ethnic groups.

The current study, in addition, highlights a need for future investigation in this area. Given that our mediation findings were mixed across academic grades, replication studies would clarify the importance of both early and later absenteeism. It would also be beneficial for future work to explore parents' perspectives on preschool and grade school absenteeism—perhaps using qualitative methodologies—to understand how it can best be addressed.

Implications and Conclusions

The present study offers insights into the associations between early absenteeism and later academic achievement, a topic seldom investigated in the current education literature. Chronic absenteeism during preschool was associated with lower long-term achievement among SMYoC, who are far more likely to be chronically absent than their peers (Balfanz & Byrnes, 2012; Chang & Romero, 2008). As Chang and Romero (2008) described, addressing early absenteeism may reduce the opportunity gap between SMYoC and their peers. These authors offered numerous recommendations for policy-related changes to address chronic absenteeism, including increasing access to preventive health care and engaging all families in youth's education. This study substantiates their work and should inform the way educators, researchers, interventionists, and policymakers address academic achievement issues and invest in all students.

Relating to research, our results underscore the importance of consistent preschool attendance among SMYoC and highlight the need for increased knowledge around the factors that underlie their high rates of chronic absenteeism using an equity lens. Valuable recent scholarship

has reported that social support, family stress, health status, and neighborhood violence are strong predictors of preschool absenteeism among primarily Black and Latine youth (Purtell & Ansari, 2022). Scholars should seek to replicate these findings and identify other factors that impact attendance rates along axes of racial and socioeconomic marginalization. Moreover, to the extent possible, they should disseminate such findings to individuals who are positioned to appropriately secure resources for Socioeconomically Marginalized Communities of Color (e.g., politicians); this would likely bolster students' attendance rates and, by extension, academic outcomes. Researchers might also consider using community-based participatory methods to partner with communities in which absenteeism is prevalent to sensitively work to address it (e.g., Greenwood et al., 2022).

In addition, it will be crucial to expand research around effective racially- and culturally-sensitive practices that challenge white supremacy in schools and address barriers to attendance (e.g., police presence; see Javdani, 2019), which might boost attendance rates among Students of Color. The collection and dissemination of experimental data would yield causal results and substantive information about how preschool programs improve academic achievement for SMYoC (i.e., the specific aspects of programs that foster academic growth). Finally, expanding the extant literature on the association between teacher-student relationships and absenteeism might have implications for existing theory and practice.

Relating to practice, as Ehrlich et al. (2014) described, chronic preschool absenteeism is a metric that can (and should) be used to identify students who will likely have difficulties with later attendance and learning outcomes. Early intervention models would benefit from tracking preschool absenteeism and collaboratively working with students' families to support attendance. Moreover, in communities with high levels of absenteeism, establishing partnerships between schools, families, and community agencies offers opportunities to implement comprehensive plans to increase attendance rates (Chang & Romero, 2008). Additionally, policymakers should push for the allocation of funds to increase the accessibility of formal preschool programming to children from Socioeconomically Marginalized Families (Bassok et al., 2016), such as creating new bus routes, offering flexible after-school care, and subsidizing preschool in areas where there is an associated cost. Any individual, however, can and should consider advocating for the accessibility of preschool programming (e.g., by contacting politicians). Lack of financial access to preschool appears a significant barrier to enrollment across global contexts (e.g., Canada, Kyrgyzstan; Rwanda; Adams & Kirova, 2006; Annonciata & Nadege, 2020; Giddings et al., 2007), which is likely a mechanism sustaining opportunity gaps across racial groups.

Further, schools should take measures to bolster equity and inclusion for SMYoC from a young age. For instance, it would be beneficial for teachers to have mandatory training during staff development days to increase cultural responsiveness in their lessons, behaviors, and teaching strategies, which can incentivize attendance, support students' learning, and increase belongingness. In doing so, school environments can foster critical consciousness (i.e., an understanding and recognition of sociopolitical conditions and one's ability to resist them; Freire, 1970, 1973; Watts et al., 2011), reinforcing counternarratives to rampant racist messages to which SMYoC are exposed. Recent research has found that critical consciousness is positively associated with standardized test scores among Adolescents of Color (Seider et al., 2020) and it might decrease absenteeism rates among younger students by facilitating empowerment.

In conclusion, participation in preschool offers a wealth of empirically-demonstrated academic benefits (Gormley et al., 2005; Gottfried, 2015; Rhoad-Drogalis & Justice, 2018). It is clear that chronic absenteeism can hinder these gains. Absenteeism must be addressed by

analyzing and addressing longstanding structural barriers to attendance (e.g., socioeconomic marginalization, health inequities). This would support students' achievement, promote educational equity, and create pathways for long-term academic and financial success.

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Note

¹ We have intentionally used a lower case “w” when spelling “white” as a racial identifier given recent guidance advanced by Scholars of Color. Specifically, capitalizing white may be an enactment of white supremacy (see Buchanan et al., 2021; Laws, 2020).

Peter D. Goldie is a third-year student in the Clinical Psychology PhD program and adjunct faculty member at Montclair State University. His research centers on queerphobia, racism, and other systemic oppressions. They received their Bachelor's degree in Applied Psychology from New York University and Master's degree in Counseling and Mental Health Services from the University of Pennsylvania. His research has been published in journals across disciplines, including *Perspectives on Psychological Science*, *SN Social Sciences*, and *Journal of Homosexuality*.

Frances C. Hogan is an adjunct faculty member in the departments of Teaching and Learning and Applied Psychology at New York University's Steinhardt School of Culture, Education, and Human Development. She is a former Residency Director and Field Mentor for graduate and undergraduate students in early childhood, childhood, secondary, and special education. She received her Master's in Human Rights Studies from Columbia University and is currently a Doctoral Candidate in Teaching and Learning with a focus on Early Childhood Education at New York University.

Jill Gandhi is a Research Scientist in the Bridge department of NORC at the University of Chicago. Her research focuses on the role of early childhood care and education in children's developmental outcomes and their families' well-being. In her current role, she contributes to several mixed-methods research projects on early childhood care and education programs funded by the Office of Planning, Research, and Evaluation. Gandhi received her PhD in Developmental Psychology from New York University.

Erin O'Connor is a Professor in Teaching and Learning at New York University's Steinhardt School of Culture, Education, and Human Development, and Program Leader for Early Childhood at NYU. She is also the Chief of Education at Cooper. She received her doctorate in Human Development and Psychology from Harvard University, a masters in School Psychology from Columbia University and a masters in teaching from Fordham University. Her research focuses on development within the context of social interactions. She has over 50 publications in peer-reviewed journals with more than 3,000 citations.