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Latent profile analysis of classroom behavior problems in an American national sample of prekindergarten children

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Abstract

Problematic behaviors impede young children's ability to succeed in the classroom. Examining individual patterns of behavior problems allows researchers to identify profiles of students most in need of support. This study applied latent profile analysis (LPA) among a national sample ($N = 2764$) of American prekindergarten children and found six distinct behavior profiles, which differed in the severity and type (underactive vs. overactive) of behavior problems and the classroom contexts in which problem behaviors arose (peer, learning, and teacher contexts). About two-thirds of children displayed positive behaviors across classroom contexts, performed well on assessments of early academic ability, and maintained positive relationships with their teachers, indicating generally appropriate adjustment to the preschool environment. Yet, 24% of children were classified into three risk profiles as they demonstrated elevated and pervasive underactive or overactive behavior problems in multiple classroom settings. Children with these profiles were deemed the most vulnerable in the sample, as those with underactive problems had the lowest academic proficiency, and those with overactive problems showed the most negative relationships with teachers and parents. Implications for practice are discussed.

1 | INTRODUCTION

Preschool children differ in their social–emotional needs and reactions to conflict, stress, and frustration in the classroom. These individual differences shape children's behavioral and learning outcomes as they enhance or inhibit positive engagement with social partners and learning activities (Campbell, 2006). Inattentiveness, timidity, distracting others, aggression towards peers, and other maladaptive behaviors impede young children's ability to thrive in the classroom (e.g., Fantuzzo et al., 2007; Hair et al., 2006), and such behavior problems can negatively impact children's long-term well-being, mental health, and academic success (Duncan & Magnuson, 2011; Zins et al., 2007). Inter-individual differences in behavior problems are evident in preschool and can persist as students move into higher grades (Basten et al., 2016); hence, early detection of maladjusted developmental patterns is crucial.

The present study applies person-centered methods among a national sample of economically disadvantaged American prekindergarteners in order to identify patterns of problem behaviors and the classroom contexts in which they occur. We operationalize a multifaceted conception of risk during early education by examining children's characteristic behavior in multiple classroom settings and different social and academic outcomes associated with behavior profiles. This research broadens our understanding of the prevalence and patterns of behavior problems in national preschool centers to provide guidance on which children may require additional support in academic and social settings.

1.1 | Behavior problems in preschool

Behavioral difficulties at school entry are relatively common, as children adjust to a new setting and bring emerging social–emotional skills to bear in a new inter-personal context (Rimm-Kaufman et al., 2000). The preschool years coincide with a normative phase of rapidly developing behavior-related skills, including effortful control and delay of gratification, language facility, negotiation strategies, and recognizing the needs of the self and others (Wakschlag & Danis, 2004). Nonetheless, behavior problems at both clinical and subclinical levels can be detected among children of this age (Sterba et al., 2007), and a small but meaningful proportion of children has persistent behavior problems throughout their childhood (Basten et al., 2016; Campbell et al., 2000).

Behavior problems are typically categorized as either externalizing or internalizing (Achenbach & Rescorla, 2000), also termed overactivity and underactivity (Canivez & Rains, 2002; Lutz et al., 2002). Among preschoolers, externalizing behaviors include fighting, throwing tantrums, being hyperactive, and disturbing others, whereas internalizing behaviors include avoiding others, being overly timid, and acting anxious or depressed (Duncan & Magnuson, 2011). Both internalizing- and externalizing-type problems in early childhood can result from insufficient capacity to manage challenging emotions, and they can persist and co-occur over time if children do not develop adequate emotional regulation skills and/or adaptive coping techniques (Basten et al., 2016; Blair et al. 2004).

Children with internalizing or externalizing problems may experience a variety of social and academic difficulties. Problematic behaviors can impede children's participation in classroom learning activities (Domínguez Escalón & Greenfield, 2009; Metsäpelto et al., 2015) and hinder positive interactions with teachers (Dobbs & Arnold, 2009) and peers (Coplan et al., 2009; Ladd et al., 1988). Accordingly, students with behavior problems often exhibit lower academic achievement (Cashiola et al., 2020; McDermott et al., 2017) due to lower rates of classroom engagement and difficulties in selfregulation (Baker et al., 2008a; Lonigan et al., 2017). Supportive teacher–student relationships can

buffer against the negative associations between problem behaviors and academic achievement (Bulotsky-Shearer et al., 2020; Domínguez et al., 2011), in that teacher interactions marked by warmth and trust support children's motivation to learn, success engaging in learning activities, and development of positive peer relationships (Baker et al., 2008b; Bosman et al., 2018; Pianta, 1999). However, some suggest that behavior problems inhibit the development of positive student–teacher relationships (Mejia & Hoglund, 2016; Skalická et al., 2015), which in turn may compound the academic and inter-personal struggles that children encounter.

1.2 | Latent profile analysis

Children's behavior problems have been increasingly studied through person-centered methods like latent profile analysis (LPA). In contrast to variable-centered methods that produce a single set of parameters to describe phenomena for an entire population, person-centered methods produce many sets of parameters that differentially characterize unique subpopulations (Howard & Hoffman, 2018). Often, such methods identify latent classes or profiles based on multiple indicators that vary in meaningful ways (Bergman & Magnusson, 1997) and are better suited to describing individual differences, their precursors, and their implications (Laursen & Hoff, 2006). LPA allows researchers to characterize unique subgroups of children with common behavioral tendencies and thus provides a more holistic and individualized picture of a child's social and behavioral adjustment (Denham et al., 2012; Hickendorff et al., 2018).

Extant LPA studies inform the current project. Abenavoli et al. (2017) identified four school readiness profiles among high-risk kindergarteners from low-income backgrounds, including well-adjusted, competent-aggressive, academically disengaged, and multi-risk groups with varying levels of academic ability, learning engagement, social–emotional skills, and disruptive behavior. Similarly, Basten et al. (2016) used LPA to study profiles of behavior problems in a population-based cohort of Dutch children at 1.5, 3, and 6 years. They found four latent profiles—co-occurring internalizing and externalizing, predominately externalizing, some internalizing, no problems—and children with co-occurring problems were found to have the most detrimental long-term outcomes. LPA has also been applied to study urban Head Start attendees using the Adjustment Scale for Preschool Intervention, a precursor of the instrument used in this study (Bulotsky-Shearer et al., 2012), revealing six distinct profiles of emotional and behavioral adjustment. Of these, five profiles were characterized by elevated underactive or overactive behavior problems, with overactivity (i.e., aggression, oppositionality, inattention/hyperactivity) being more common and extremely disruptive or disengaged profiles having the greatest academic deficits. Across all studies, the most common profile did not demonstrate behavioral problems in any domain (i.e., a "well-adjusted" group), whereas remaining profiles showed some pattern of elevated behavioral problems with varying degrees of longer-term risk, and highest-risk profiles were comparatively the rarest (i.e., comprised the smallest profile). Studies that found more profiles also used more indicators to identify profile membership (e.g., Bulotsky-Shearer et al., 2012), suggesting that more nuanced information on students' behavior problems allows us to distinguish between more subgroups of students who require different supports and intervention.

1.3 | Context-specific behavior problems

Incorporating context into the assessment of behavior is crucial for a complete picture of young children's classroom difficulties. Contextual theories (e.g., bioecological; Bronfenbrenner & Morris, 1998) highlight how individual characteristics and features of the proximal environment interact in shaping child development. From a "child × environment" (Ladd, 2004) perspective, behavior problems reflect a mismatch between a child's internal capacities and situational demands of the immediate context, such that specific classroom interactions with peers, teachers, or learning activities may each elicit distinct responses from an individual child (Mischel et al., 2002). Although there is often some continuity in a child's observed behavior from one context to another, behavior problems can vary considerably

across contexts that require different socio-emotional, relational, cognitive, or regulatory demands (Vitiello & Williford, 2020). For example, prekindergarteners who have difficulty communicating their needs or suppressing impulses might display behavior problems while interacting with teachers or playing with peers (Stenseng et al., 2016; Zhang & Sun, 2011). Similarly, children may appear oppositional or socially withdrawn during learning activities if they lack the specific cognitive, language, or self-regulation skills needed to engage in a particular learning task (Williford et al., 2017).

These concerns are especially acute for children from economically disadvantaged backgrounds. Scholars have identified multiple, inter-related processes through which financial hardship negatively impacts young students, including biological (e.g., malnutrition, exposure to toxins, inadequate health care), physiological (e.g., toxic stress, allostatic load, trauma), and psychological (e.g., parental depression, family and neighborhood violence, housing instability, systemic inequality) factors that can disrupt children's development of cognitive and socio-emotional resources (Evans, 2004; Magnuson et al., 2004; see Wadsworth et al., 2016). These factors make poorer children more likely to lack crucial cognitive, verbal, and/or social-emotional school-readiness skills (Ryan et al., 2014) and display higher rates of classroom behavior problems (Qi & Kaiser, 2003). Moreover, children from low-income backgrounds are less likely to access high-quality preschools (Bassok & Galdo, 2016; McCoy et al., 2015) and have close teacher relationships (Jerome et al., 2009) that could buffer against the negative academic and social implications of classroom behavior problems (Baker et al., 2008b; Bulotsky-Shearer et al., 2020; Domínguez et al., 2011). Understanding when and where children display behavior problems can help preschool teachers identify why behavior problems emerge in specific contexts (Bulotsky-Shearer et al., 2020) and modify these environments to decrease disruptive behaviors (Horner et al., 2010) and foster positive interactions. Thus, examining children's context-specific behavior problems can help reveal potential avenues for intervention.

1.4 | Current study

Building on the theory and research described above, this article investigates the prevalence and patterns of behavior problems in a nationwide American sample of prekindergarteners from low-income backgrounds. Specifically, we use LPA to explore heterogeneity in children's behavior problems and problem contexts so as to characterize subgroups of children in need of individual support.

We expand on previous research in several key ways. First, we investigate both problem behavior and the classroom contexts in which those behaviors occur. Much of the research to date has utilized behavior checklists (e.g., Child Behavior Check List; Achenbach & Rescorla, 2000) designed to detect general behavior disorders (see Basten et al., 2016) rather than school-specific behaviors most relevant to teachers (LeBoeuf et al., 2010). The current study enumerates both the characteristic behavior problems and problem contexts of each latent profile by employing the Adjustment Scales for Early Transition in Schooling (ASETS; McDermott et al., 2013, 2014), which consists of a large set of behavioral problem items embedded in learning, peer- and teacher-interaction contexts throughout the classroom. Learning is a socially embedded process, and behavior problems rooted in different classroom situations may yield different developmental outcomes (Hamre & Pianta, 2010; Reyes et al., 2020); therefore, our findings will indicate the prevalence and strength of different behavior problems across specific classroom contexts to inform where interventions may be most effectively employed.

We also generalize to a much larger population of prekindergarten students and examine a wide array of child and familial characteristics in relation to profile membership. The national sample used here comes from, to date, one of the most extensive studies of preschoolers from low-income backgrounds across the United States. Previous studies either had smaller sample sizes (Abenavoli et al., 2017) or included only students from a single school district (Bulotsky-Shearer et al., 2012). It is well established that many aspects of children's school-related skills, home environment, and socio-demographic milieu are associated with risk of behavior problems, although most extant literature has taken a variable-centered approach (see Qi & Kaiser, 2003 for review). Several studies have reported that boys are

overrepresented in risk profiles for behavior problems (Bulotsky-Shearer et al., 2012; Denham et al., 2012), yet fewer studies employing person-centered methods have investigated the relevance of maternal education, immigrant background, or a child's special needs status within a specifically low-income sample. We address this gap in the literature by including these characteristics in the present study.

We address three research objectives: (a) identify latent profiles of prekindergarten behavior problems and the contexts in which they arise, (b) determine which child and familial characteristics (e.g., child sex, race, maternal education) relate differentially to profile membership, and (c) examine how profile membership predicts pre-academic skills as well as relationships with teachers and parents at the end of prekindergarten. In light of extant literature, we hypothesized that our sample could be comprised of four to six theoretically meaningful latent profiles, and we expected that most children would belong to a profile exhibiting healthy behaviors across classroom contexts. We also anticipated that certain child characteristics, such as being male, would increase a child's probability of being classified in a risk profile (i.e., a profile with elevated behavior problems) and that children with risk profiles would have lower academic proficiency, more difficult relationships with teachers, and more behavior problems at home.

2 | METHOD

2.1 | Sample and participants

Data were drawn from the National Head Start Impact Study (HSIS; USDHHS, 2010a), a 4-year randomized control trial designed to assess the effectiveness of the Head Start Program. The sample includes children from both Head Start and non-Head Start preschool centers; thus, it is reflective of different forms of preschool learning environments and student populations. Head Start comprises two prekindergarten years available to 3- and 4-year-olds, respectively, where the second prekindergarten year is more heavily enrolled. Therefore, we focused on one cohort, the second year of prekindergarten data collection, with 2764 children attending 1032 preschool centers across 1815 classrooms, in both Head Start and non-Head Start settings. The sample consisted of children who were on average 4 years of age, 50.5% male, 36.9% Hispanic, 30.9% African American, and 32.3% White or another race/ethnicity. Approximately 13% of children received special education services, 25.7% were identified as English language learners (ELL), 82.6% lived in urban areas, and 50.9% lived with both biological parents. Among sample children's mothers, 45.2% were currently married, 15.8% were teenagers (aged <18 years) at the time of their participant child's birth, 18.7% were recent immigrants, and 37% had not completed high school. In this sample, there were no missing data for the demographic variables and behavior problem scales described below and minor missingness (<5%) of academic and social outcomes for which multiple imputations would provide little benefit (Schafer, 1999). More details on the HSIS data collection procedures and sample demographics are reported by USDHHS (2010a, 2010b) and McDermott et al. (2013).

2.2 | Measures

Behavior problems. Children's classroom behavior problems were measured with the seven indicators of the ASETS (McDermott et al., 2013, 2014), a teacher-rating device presenting 144 dichotomous items (scored present or absent over the past month) embedded within 22 classroom situations involving formal learning, peer interactions, organized and free play, and interactions with the teacher. Of these, 122 items describe problem behaviors and are used in scoring protocols, whereas the remaining 22 items describe positive or healthy behaviors and serve to reduce teacher response sets (alternatively associated with instruments that provide only long lists of problem behaviors; e.g., see

LeBoeuf et al., 2010). Items are descriptive, rather than requiring teachers to make judgments about children's unobservable psychological processes and characterize both the nature and setting of a given behavior. For example, an item might ask whether a child is "so shy it is difficult to get [them] to speak at all" (Underactive behavior problem) when "greeting [their] teacher" (Teacher context). Thus, the ASETS features two distinctive types of problem indicator scales—phenotype scales and situtype scales.

The four phenotype scales are: (a) Aggression (32 items, coefficient $\alpha = .96$; with example items "Overly rough with other children in games," "Deliberately destroys others' belongings"); (b) Attention Seeking (12 items, $\alpha = .87$; e.g., "Insists on sitting next to teacher," "Tells on others to gain teacher's favor"); (c) Reticence/Withdrawal (24 items, $\alpha = .92$; e.g., "Too timid to ask for help," "Won't get involved in games"); and (d) Low Energy behavior (12 items, $\alpha = .77$; e.g., "Cannot work up energy to face anything new," "Doesn't complete projects"). The phenotype scales were derived through exploratory and confirmatory factor analyses with the HSIS national sample and calibrated through multidimensional IRT (using the two-parameter logistic model). Scales were scored via Bayesian expected a posteriori (EAP) estimation where the latent population mean for scaled scores (SSs) equals 50 and standard deviation equals 10 (see McDermott et al., 2013). The Aggression and Attention Seeking scales are further folded into a higher-order Overactivity dimension and the Reticence/Withdrawal and Low Energy scales into an Underactivity dimension, as grounded in second-order factor analysis. These higher-order dimensions are not used as LPA indicators in this study but rather as aids for interpreting LPA findings. All of these scales are referred to as phenotypes because they describe patterns of problem behavior that function similarly across classroom contexts.

ASETS also provides three situtype scales describing contexts wherein problem behaviors emerge. Each of 22 classroom situations presents 3–7 different problem behaviors that may be observed over the past month, such that the score for any given situation may range 0–7 and constitutes a polytomous ordinal item. Exploratory and confirmatory factor analyses yielded three situtype scales for the HSIS national sample (McDermott et al., 2014). They are: (a) Peer Context Problems (10 situations, $\alpha = .91$; e.g., "Handling conflicts with other children," "Behaving while standing in line"); (b) Teacher Context Problems (5 situations, $\alpha = .73$; e.g., "Helping the teacher with jobs," "Talking with the teacher"); and (c) Learning Context Problems (7 situations. $\alpha = .83$; e.g., "Coping with new learning tasks," "Paying attention in the classroom"). The situtype scales were calibrated using the generalized partial credit model and EAP SSs estimated with population $M = 50$ and $SD = 10$. For the current sample, situtype and phenotype SSs range from 48.0 to 49.4, with standard deviations ranging from 6.1 to 9.0. Substantial concurrent and predictive validity evidence is provided for the four phenotype and three situtype scales as related to academic achievement and independent observations by parents and teachers (McDermott et al., 2013, 2014, 2019; Reyes et al., 2020).

Antecedent characteristics . Child and familial characteristics served as antecedent predictor variables in our analyses. All variables were coded dichotomously and include: the child's biological sex, race/ethnicity, English-language-learner status, and special needs status, whether the child lived with both biological parents, whether the child resides in an urban area, maternal marital status, mother's teenage status (<18 years) at birth of child, mother's immigration status, and mother's high school completion.

Academic and social outcomes . Academic and social–emotional outcome measures taken at the close of prekindergarten year 2 were used to externally validate the latent profile solution. Children's early academic skills were measured with the Pre-Academic Skills cluster of the Woodcock–Johnson III Tests of Achievement (WJ; Woodcock et al., 2002; $\alpha = 76-.78$, USDHHS, 2010b), which assesses age-appropriate reading skills and practical mathematics. The Student–Teacher Relationship Scale (Pianta, 1996) was administered to assess each participating child's social–emotional interactions. Teacher ratings on 15 items (e.g., "I share an affectionate, warm relationship with this child") were obtained on a 5-point scale ranging from 1 = "Does not apply" to 5 = "Definitely applies" ($\alpha = .88-.89$, USDHHS, 2010b). Parents rated children's aggressive or defiant, hyperactive, and withdrawn or depressed behavior using the Total Behavior Problem Scale (USDHHS, 2010b), originally developed for the Head Start Family and Child Experiences Survey national study (USDHHS, 2001). It includes 14 dichotomous items (e.g., "Is disobedient at home") and scores range 0–21, where higher scores indicate greater problematic behaviors ($\alpha = .78-.79$).

2.3 │ Analytic procedure

Statistical analyses were conducted in stages corresponding to the three research objectives. Successively complex LPA models were fitted to identify the best latent profile solution. Models with 1- through 7-profiles were assessed to determine the appropriate number of profiles based on multiple, a priori fit criteria (Hickendorff et al., 2018): (a) minimal values for Bayesian Information Criterion (BIC) and Integrated Classification Likelihood with Bayesian-Type Approximation (ICL-BIC; Biernacki et al., 2000), (b) maximal values for entropy and average posterior classification accuracy (Wang & Wang, 2019), (c) statistically significant Vuong–Lo–Mendell–Rubin (VLMR), Lo–Mendell–Rubin adjusted (LMR; Lo et al., 2001), and parametric bootstrapped (with 500 draws) likelihood ratio tests (BLRT; McLachlan & Peel, 2004), and (d) theoretically meaningful profiles retaining membership $\geq$ 5% of the full sample. LPA models that met most fit criteria simultaneously were regarded as preferable, with more conservative models satisfying the VLMR and LMR likelihood ratio tests given preference in order to avoid over-extraction of illusory profiles (Tofighi & Enders, 2008). Analyses were conducted with *Mplus* 8.3 (Muthén & Muthén, 2018) using full-information maximum-likelihood estimation and performed using 10,000 random sets of starting values with 500 iterations each where the 200 best solutions were retained for final stage optimization.

Multinomial logistic regression, using the three-step method (Asparouhov & Muthén, 2014), was then applied to the best-fitting LPA model to evaluate associations between profile membership and child and familial characteristics. Participant children's profile membership was based on posterior probabilities derived from individual response patterns, which account for relative uncertainty in classification accuracy. The best-fitting profile solution was regressed on binary antecedent characteristics noted above, and odds ratios with confidence intervals were computed for each explanatory variable to describe each profile's relative risk increment/reduction.

Finally, academic proficiency, teacher–student relationships, and parent behavior ratings were separately regressed on the latent profile membership variable to ascertain relevant implications of profile membership and thereby externally validate the LPA model. Means and standard errors for each profile were estimated through the *Mplus* DCON function, which accounts for relative classification accuracy, and profile results were compared for statistically meaningful differences using chi-square tests.

3 │ RESULTS

3.1 │ Latent profile model

An LPA model with six distinct profiles was retained; each profile was conceptually meaningful and clearly distinguishable by level, shape, and membership size. Solutions with seven or more profiles were improper because profile membership dropped below the minimal 5%, and there were signs of artificial splitting of classes into non-substantive profiles that produced no meaningful differences in level or shape. The 6-profile solution provided a better fit to the data than less complex models, as shown through BIC and ICL-BIC, and the more complex 7-profile model offered no significant improvement based on the VLMR and LMR (Table 1).

The 6-profile model is illustrated in Figure 1, and mean values of ASETS phenotypes and situtypes for each latent profile are provided in Table 2. Two profiles were characterized by well- or adequately adjusted behavior (64% of children), two profiles were characterized by underactive behavior problems (17%), and two profiles were characterized by overactive behavior problems (19%). Profiles were named based on the patterns of indicator means, where levels greater than 1 *SD* above the population mean represent meaningful (i.e., elevated) behavior problems, and levels ½ *SD* over the population mean represent moderate behavior problems. They are described in further detail below:

Profile 1—Well Adjusted . This profile includes the largest proportion of children in the sample (43%), among whom all estimated indicator means fall below the population mean. They are termed well-adjusted because they exhibit few, if any, behavior problems across contexts.

TABLE 1 Fit indices for latent profiles of prekindergarten problem behavior

Model	BIC	ICL-BIC	Entropy	Average PCA	Likelihood ratio tests		
					VLMR	LMR	BLRT
1-profile	134906.73				.000	.000	.000
2-profile	128047.74	128407.92	.91	.97	.000	.000	.000
3-profile	125823.94	126285.50	.92	.95	.000	.000	.000
4-profile	123967.40	124580.48	.92	.95	.005	.006	.000
5-profile	122697.53	123427.08	.92	.94	.025	.026	.000
6-profile	121880.15	122692.35	.92	.93	.043	.045	.000
7-profile	121045.42	121798.41	.93	.96	.325	.331	.000

Abbreviations: BIC, Bayesian Information Criterion; BLRT, bootstrapped likelihood ratio test; ICL-BIC, Integrated Classification Likelihood with Bayesian-Type Approximation; LMR, Lo–Mendell–Rubin; PCA, posterior classification accuracy; VLMR, Vuong–Lo–Mendell–Rubin.
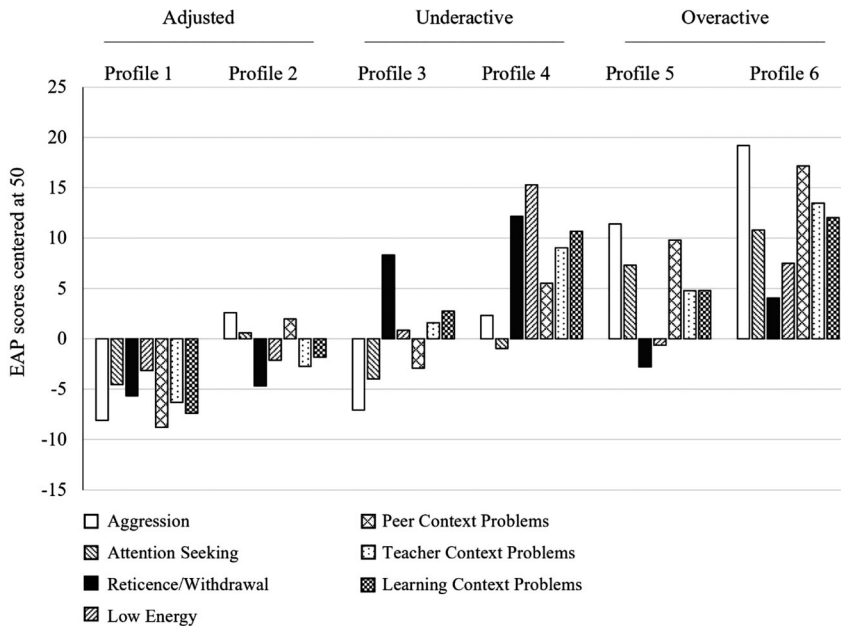
FIGURE 1 Results from 6-profile latent profile model

Profile 2—Adequately Adjusted . This group comprises 21% of children who exhibit normative behavior across contexts. All seven indicators fall within ½ *SD* of the population mean, although estimated means are consistently higher than in Profile 1.

Profile 3—Moderately Reticent/Withdrawn . Representing 12% of children, this profile is characterized by moderately high levels of reticence/withdrawal and much lower levels of aggression and attention-seeking. They have below-average peer context problems and their problems in teacher and learning contexts fall just above the population mean.

Profile 4—Underactive in Learning and Teacher Contexts . This profile, representing 5% of children, features relatively extreme reticent/withdrawn and low energy behavior that emerges primarily in learning and teacher contexts. They have moderate problems in peer contexts and near-mean levels of aggression and attention-seeking.

TABLE 2 Estimated means (and standard errors) for latent profiles of prekindergarten problem behavior

| Latent profile | ASETS phenotype indicator | | | | ASETS situtype indicator | | |
	Aggression	Attention seeking	Reticence/ withdrawal	Low energy	Peer context problems	Teacher context problems	Learning context problems
Profile 1 Well Adjusted(n = 1181, 43%)	41.90(.10)	45.44 (.18)	44.34(.19)	46.86(.07)	41.20(.16)	43.69(.16)	42.61(.17)
Profile 2 Adequately Adjusted(n = 593, 21%)	52.59(.35)	50.58(.49)	45.33(.53)	47.87(.29)	51.97(.42)	47.27(.60)	48.17(.61)
Profile 3 Moderately Reticent/Withdrawn(n = 329, 12%)	42.93(.33)	46.01(.41)	58.31(.73)	50.86(.66)	47.06(.39)	51.58 (.67)	52.74(.41)
Profile 4 Underactive in Learning and Teacher Contexts(n = 145, 5%)	52.31(1.21)	49.04(.77)	**62.16(1.60)**	**65.30**(.95)	55.50(.69)	59.03(1.18)	**60.67**(.74)
Profile 5 Aggressive in Peer Contexts(n = 384, 14%)	**61.39**(.91)	57.31(.62)	47.20(.50)	49.35(.48)	59.80(.65)	54.78(.52)	54.81(.48)
Profile 6 Overactive Across Contexts(n = 132, 5%)	**69.20**(.90)	**60.80**(1.20)	54.04(1.00)	57.50(1.38)	**67.17**(.78)	**63.48**(1.15)	**62.02**(.52)

Note: Values are EAP scored means where *M* = 50 and *SD* = 10. Values one standard deviation above or below the mean are in bold. Values half a standard deviation above or below the mean are in italics.

Profile 5—Aggressive in Peer Contexts. This group, comprising 14% of children, displays elevated aggression and moderately high attention-seeking, which arises primarily in classroom contexts with peers.

Profile 6—Overactive Across Contexts. This profile represents 5% of children who have overactive behavior problems across all classroom contexts. They display elevated attention-seeking behavior and relatively extreme aggression compared with population levels.

Twenty-four percent of children were classified into risk profiles with the most elevated behavior problems, Profile 4 for underactivity and Profiles 5 and 6 for overactivity, and were deemed the most vulnerable children in the sample.

3.2 | Antecedent characteristics

Multinomial logistic regression was used to identify child and family characteristics that are differentially associated with profile membership. Table 3 presents odds ratios and risk increments/reductions, whereby Profiles 2–6 were compared against the well-adjusted group (Profile 1) as reference.

Overall, child demographic variables (e.g., sex, ethnicity) were more strongly associated with profile membership than familial socio-demographic variables (e.g., parent education). Children in the adequately adjusted group (Profile 2) were more likely to be male, African American, and receiving special needs services. Being male was a significant risk factor for membership in profiles with elevated underactivity problems and increased the risk of membership by 48.6% for Profile 3 and 228.1% for Profile 4. Having an immigrant mother was also a risk factor for membership in Profile 4, but being African American was a protective factor for membership in Profile 3.

Among children with overactive behavior problems, those who were male, required special needs services, or had an immigrant mother had a greater risk of membership in Profile 5 (risk increments by 146.7%, 70.9%, and 66.0%, respectively). Risk reduction was associated with ELL status (54.5%) and having a mother that is married (35.3%). For Profile 6, three of these factors were significant: children who were male or required special needs services had a substantially increased risk of membership to Profile 6 (675.2% and 145.5%, respectively), whereas ELL status was associated with a 66.9% reduction in risk.

3.3 | Academic and social outcomes

Table 4 presents mean academic and social outcomes associated with latent profile membership. The well-adjusted group (Profile 1) had the highest academic proficiency of all the profiles, and although academic proficiency among Profiles 2, 3, and 5 was lower than well-adjusted Profile 1, levels were not all statistically different from one another. The lowest academic proficiency was reported for Profile 4, which is comprised of children who display low energy with reticent/withdrawn behaviors in classroom contexts characterized by learning activities and interactions with teachers.

Regarding teacher–student relationships, the highest ratings were observed for Profiles 1–3; children in Profiles 4–6 had significantly lower scores. The most negative relationships with teachers were reported for overactive children, whose problems arose in all three classroom contexts (Profile 6). Similarly, the most positive parent reports of child behavior were found for Profiles 1 and 3. Results also suggest that parents perceive children who are moderately withdrawn (Profile 3) as having fewer behavior problems than those who are overactive or highly withdrawn (Profiles 4–6), as well as those who exhibit adequate behavior in the classroom (Profile 2).

4 | DISCUSSION

This study examined patterns of individual differences in classroom behavior problems among a national sample of prekindergarteners from low-income backgrounds. We employed LPA to distinguish profiles of children's behavior

TABLE 3 Odds ratios and risk increment/reduction for explanatory covariates for membership in latent profiles of prekindergarten problem behavior

Explanatory variable	Odds ratio (95% confidence limits)	% Risk increment	% Risk reduction
Odds for classification as Adequately Adjusted (Profile 2) vs. Well Adjusted (Profile 1)			
Child is male	2.01 (1.61/2.51)	+101.0	
Child is African American	1.49 (1.12/1.99)	+49.2	
Child is provided special needs services	1.57 (1.12/2.21)	+57.5	
Odds for classification as Moderately Reticent/Withdrawn (Profile 3) vs. Well Adjusted (Profile 1)			
Child is male	1.49 (1.12/1.96)	+48.6	
Child is African American	.48 (.32/.74)		−51.6
Odds for classification as Underactive in Learning and Teacher Contexts (Profile 4) vs. Well Adjusted (Profile 1)			
Child is male	3.28 (2.20/4.90)	+228.1	
Child has an immigrant background	1.93 (1.12/3.31)	+92.5	
Odds for classification as Aggressive in Peer Context (Profile 5) vs. Well Adjusted (Profile 1)			
Child is male	2.47 (1.90/3.20)	+146.7	
Child is provided special needs services	1.71 (1.18/2.47)	+70.9	
Child has an immigrant background	1.66 (1.10/2.52)	+66.0	
Child uses English as a secondary language	.46 (.27/.76)		−54.5
Child's parent is married	.65 (.45/.92)		−35.3
Odds for classification as Overactive Across Contexts (Profile 6) vs. Well Adjusted (Profile 1)			
Child is male	7.75 (4.56/13.19)	+675.2	
Child is provided special needs services	2.45 (1.47/4.09)	+145.5	
Child uses English as a secondary language	.33 (.13/.83)		−66.9

Note: Risk increment and reduction equal odds ratio−1(100). Table includes only significant predictors, and coefficients are statistically significant at $p < .05$ or lower. Antecedent characteristics comprise child's biological sex, race/ethnicity (i.e., African American, Hispanic, with White as reference group), English-language-learner status, and special needs status, whether the child lived with both biological parents, whether the child resides in an urban area, maternal marital status, mother's teenage status (<18 years) at birth of child, mother's immigration status, and mother's high school completion.

problems and the classroom contexts in which they occur. We found six distinct profiles comprising well- and adequately adjusted groups with minimal behavior problems (Profiles 1 and 2), a moderately reticent/withdrawn group (Profile 3), and three risk profiles characterized by elevated overactive or underactive problem behavior in different classroom contexts (Profiles 4–6).

As hypothesized, most children displayed positive behavior across classroom contexts and thus have a lower risk of academic or social difficulty during the school transition. Forty-three percent of children were considered Well Adjusted (Profile 1), with better-than-average behavior across classroom settings. They scored highest on academic

TABLE 4 Distal outcomes associated with latent profiles of prekindergarten problem behavior

		Adjusted		Underactive		Overactive	
Outcome	M(SD)	Profile 1 Well Adjusted	Profile 2 Adequately Adjusted	Profile 3 Moderately Reticent/Withdrawn	Profile 4 Underactive in Learning and Teacher Contexts	Profile 5 Aggressive in Peer Contexts	Profile 6 Overactive Across Contexts
Preacademic skills	368.08 (21.01)	373.01	367.24_a	365.03_{ab}	357.14_c	363.47_b	361.78_{bc}
Teacher–student relationships	64.89 (8.59)	69.47	64.82_a	65.11_a	58.32_b	58.15_b	50.12
Total problem behaviors	5.51 (3.65)	4.80_a	5.68	5.19_a	6.54_b	6.70_b	7.44_b

Note: Means that do not share a subscript are significantly different at $p < .05$.

achievement tests, had the most positive teacher relationships, and were rated by parents as the most well-behaved at home. A further 21% (Profile 2) were adequately adjusted in their classroom behavior, having near-mean levels of behavior problems, with a slight tendency towards externalizing behaviors in peer contexts that accords with social and self-regulatory tasks central to this developmental stage (Kopp, 1982; Wakschlag & Danis, 2004). These children typically performed well on assessments of early academic ability and maintained positive relationships with their teachers, indicating generally appropriate adjustment to the preschool environment.

An additional 12% of children (Profile 3) were classified as Moderately Reticent/Withdrawn, although their behavior problems were not particularly elevated in peer, teacher, or learning contexts. Despite having lower preacademic skills and less positive teacher relationships than well-adjusted children (Profile 1), this group scored similarly on these measures as the adequately adjusted group (Profile 2) and were rated by parents as having significantly fewer behavior problems in the home. These atypically shy behaviors may characterize an introverted or slow-to-warm temperament that is apparent in the classroom but does not have negative implications for overall school adjustment or interpersonal relationships.

We found that 24% of our sample had behavior problems that reached 1 SD above the population mean in at least one domain and were thus considered at risk of school difficulties. These children were classified into one underactive and two overactive risk profiles and, as hypothesized, had generally poorer social and academic outcomes at the end of the preschool period. Children with underactive problems in learning and teacher contexts (Profile 4) are considered vulnerable to difficult school transitions, as underactive behaviors were moderate in peer contexts, high in teacher contexts, and acute in learning contexts. They also had more parent-rated behavior problems, poorer teacher relationships, and the lowest academic proficiency of all six profile groups. This is consistent with reports that teachers' relationships with preschool children with internalizing problems are characterized by relatively less positivity and more dependency and conflict, such that poor student–teacher relationships may impede teachers' ongoing provision of academic and social support (Mejia & Hoglund, 2016; Zatto & Hoglund, 2019). Children with underactive behavior problems often have difficulties seeking help from their teacher, coping with new learning tasks, getting involved in classroom activities, etc. (McDermott et al., 2013); collectively, these behaviors represent an inability to appropriately engage with activities and social partners that drive learning in the classroom (Coplan & Arbeau, 2008; Kalutskaya et al., 2015). Prior research has shown that such disengagement is associated with academic difficulties among young children (Fantuzzo et al., 2007; McDermott et al., 2017; Olivier et al., 2020), and our results reinforce this conclusion.

Children in Profile 5 (14%) showed elevated aggressive and attention-seeking behaviors primarily localized to peer contexts. Children with this profile performed lower on measures of academic ability, had more behavior problems at home, and had less positive teacher relationships than well-adjusted children. Aggression towards peers is a significant risk factor for poor social development in early childhood and beyond: aggressive behavior is associated with lower prosociality (Nantel-Vivier et al., 2014), peer rejection and victimization in preschool (Crick et al., 2006), difficult kindergarten transitions (Gower et al., 2014), and, if persistent, delinquency in adolescence (e.g., Nagin & Tremblay, 1999). Peers are also a crucial learning resource during early education (e.g., Fantuzzo et al., 2004; Sabol et al., 2018; Weiss et al., 2021), which may contribute to the comparatively low academic achievement of children with this profile. Thus, children who display aggression in peer contexts may suffer long-term problems if behaviors persist.

Finally, the 5% of children classified as Overactive Across Contexts (Profile 6) may be the most at-risk in our sample, as they exhibit the highest levels of problem behavior in multiple classroom contexts. This profile is characterized by elevated attention-seeking behaviors and very high levels of aggression, almost reaching 2 SDs above the population average. Although problem behavior for most profiles remained within overactive or underactive domains, children with this profile also exhibited moderate levels of low energy problems. This finding is consistent with research suggesting that internalizing- and externalizing-type behavior problems often coincide among young children with severe or clinical behavior problems (McDermott et al., 2022; Willner et al., 2016). Problems persisted across contexts, manifesting at high levels during interactions with teachers, peers, and learning activities; accordingly, these children were rated as having by far the least positive teacher relationships and the most behavior problems as observed by parents. In this vein, they may experience the aforementioned problems associated with aggressive behavior and are less likely

to benefit from the buffering effects that supportive teacher and peer relationships can have on children's emerging academic and behavioral difficulties (Criss et al., 2002; Silver et al., 2005). It may be that children with this profile represent a small proportion of children with clinical psychopathology, although the ASETS is not a diagnostic instrument and further research would be needed to understand the processes that give rise to such pervasive behavioral difficulties.

Collectively, our results affirm a multi-faceted conceptualization of risk as it pertains to early classroom behavioral adjustment (Richardson et al., 1989; May & Kundert, 1997). Overall, externalizing behaviors were more strongly indicative of social difficulties (i.e., poor teacher relationships, problems in peer contexts) and internalizing behaviors were more strongly related to academic struggles (i.e., academic non-proficiency, learning context problems). The severity of problems tended to align with pervasiveness across contexts, such that children with moderate or localized behavior problems had relatively better school outcomes. Boys were at greater risk of being classified into all risk profiles, for example, they were almost eight times as likely to be classified as Overactive Across Contexts. Beyond gender, however, a clear pattern of antecedent predictors only emerged for overactive profiles: receiving special needs services increased children's risk and speaking English as a second language decreased children's risk of being classified in either overactive risk profile.

These findings both reinforce and build upon extant literature. The antecedent risk increments and decrements noted above echo prior reports that boys exhibit higher levels of behavior problems in preschool and beyond (Bulotsky-Shearer et al., 2012; Campbell, 2006), that gender differences are especially pronounced for externalizing behaviors (Lumley et al., 2002), and that special needs and ELL statuses are associated with higher and lower risk, respectively (Dekker et al., 2002; Han, 2010). Children in risk profiles in other LPA studies also demonstrated less positive relationships with teachers (Denham et al., 2012), more problems with parents (Degnan et al., 2008), and lower academic proficiency (Collie et al., 2019).

Moreover, the overall prevalence of healthy vs. problematic behavior in this study falls within the range of earlier studies. In our sample, 24% of children were considered at risk. In comparison, prior prevalence rates of risk profiles ranged from approximately 8%–18% (Basten et al., 2016; Degnan et al., 2008) to as many as 43% for smaller community samples (Bulotsky-Shearer et al., 2012; Collie et al., 2019; Denham et al., 2012). In general, prevalence rates were more conservative for studies that used an assessment of problem behaviors (vs. social-emotional skills) and applied a more stringent threshold for determining risk. This study offered several advantages over prior work: it relied on a contextually based measure of problem behaviors, employed a stringent definition of behavioral risk, and used one of the largest and most representative samples of both Head Start and comparable non-Head Start students available to date. Hence, our prevalence rate provides a more dependable estimate, indicating that about one-quarter of prekindergarten children from low-income backgrounds may require additional support for successful learning and school transitions.

4.1 | Limitations and future directions

The findings we have presented offer a generalizable and nuanced view of children's classroom behavior. Nonetheless, some limitations remain. Some areas of the country and populations were not sampled because they did not meet the inclusion criteria of the HSIS (e.g., children that were previously exposed to Early Head Start). This study focuses on children from low-income backgrounds; hence, outcomes and prevalence rates may not be applicable within wealthier samples or the population at large. Although we include important markers of socioeconomic status as antecedent predictors, the federal HSIS data lack information on poverty-related risk factors that may influence children's behavior on a physiological level, such as health characteristics (e.g., food insecurity and/or malnutrition, exposure to toxins or lead, low birth weight) or stressful home environments (e.g., housing instability or crowding, familial violence, trauma). Likewise, there was a lack of process data detailing specific classroom interactions that may spur behavior problems. As is typical for research on classroom behavior, the current study relies on teacher reports of child behavior

problems; this offers ecological validity but can nonetheless reflect teachers' implicit biases and/or reciprocal effects of the student–teacher relationship (Dobbs & Arnold, 2009; Zhang & Sun, 2011). Thus, more research is needed to corroborate these findings with observations from other informants such as parents or trained observers (e.g., Watkins et al., 2020). Finally, this study focuses on one cohort, that is, the second year of prekindergarten, although HSIS provides 4 years of student observations. A natural extension of this article is to perform latent transition analysis, which compares successive LPA models, to examine whether behavioral profiles are stable over time (see, e.g., Basten et al., 2016). This approach can address longer-term social–emotional and academic outcomes beyond the scope of this study.

4.2 | Implications for practice

It is clear from this and earlier research that preschool is a crucial time for intervention. Although this study does not examine specific behavioral support practices, our findings reinforce the importance of intervening in accordance with the specific needs of individual children as manifested in certain contexts. Behavior problems in preschool frequently emerge due to a mismatch between the demands of a specific classroom context and students' skills; thus, supporting the acquisition of specific skills or modifying the environment (Baker et al., 2008a) may help to reduce negative interactions with teachers and peers, and promote academic achievement. For instance, children who are highly underactive in learning and teacher contexts (Profile 4) may benefit from more support in learning situations, for example, closer attention from teachers or classroom aides, opportunities to experience mastery and self-efficacy, practice labeling challenges, and employing positive self-talk (Stormont et al., 2015). Children who demonstrate aggressive behaviors in peer contexts (Profile 5) may instead benefit more from targeted programming designed to bolster the self-regulatory, socio-emotional, and/or linguistic skills that support healthy peer relations (Durlak et al., 2011; Hebert-Myers et al., 2006). For example, training kindergarten teachers in using precorrective statements and behavior-specific praise (Smith et al., 2011) and implementing school-wide positive behavior support systems can help reduce externalizing behaviors in preschoolers (Stormont, 2002).

In addition, preschool teachers working with children in underserved communities should be trained and supported in developing positive relationships with their students to help mitigate the implications of behavior problems. Teachers play an important role in structuring a classroom environment that supports positive interactions with and between students by, for example, maintaining consistent routines, setting high expectations, and providing activities that help children to engage in positive ways with one another (Baker et al., 2008b; Bulotsky-Shearer et al., 2020). Likewise, structured preschool activities such as interactive storybook readings designed to teach children socio-emotional and literacy skills simultaneously (e.g., Little talks; Manz et al., 2017) can foster a nurturing and engaging classroom environment, explicitly teach social and behavioral skills, and prevent disruptive behaviors rather than react to them when they occur. Studies on context-specific behavioral problems in low-income preschool classrooms suggest that children show significantly greater engagement and fewer disruptive behaviors during child-managed settings (e.g., small group work, free play) compared with teacher-structured activities like whole-group instruction (Booren et al., 2012; Vitiello & Williford, 2020), with differences being even more pronounced for boys (Qi et al., 2006). Thus, to mitigate the impact of behavior problems on children from low-income backgrounds, the training of teachers in developmentally appropriate and culturally responsive classroom strategies is critical.

Finally, preschools serving low-income communities should consider interventions that specifically strengthen the relationship between teachers and preschool boys (e.g., Playing-2-gether; Vancraeyveldt et al., 2015) as well as special needs students (e.g., Response-to-Intervention; Grosche & Volpe, 2013) as they are at the highest risk of exhibiting severe behavior problems in the classroom. Such interventions aim to improve teacher–child interaction quality, promote positive behavior management strategies, and prevent the exclusion of children from regular education classrooms (through suspensions or placement into special education classes), which would limit their ability to interact with and learn from their behaviorally adjusted peers. High-quality preschools that can devote resources to

supporting children's social and behavioral development across classroom contexts may be better able to set their students up for success in kindergarten and beyond.

DATA AVAILABILITY STATEMENT

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REFERENCES

Abenavoli, R. M., Greenberg, M. T., & Bierman, K. L. (2017). Identification and validation of school readiness profiles among high-risk kindergartners. *Early Childhood Research Quarterly*, *38*, 33–43. https://doi.org/10.1016/j.ecresq.2016.09.001

Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for the ASEBA preschool forms and profiles*. University of Vermont, Research Center for Children, Youth, & Families.

Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: Three-step approaches using M plus. *Structural Equation Modeling: A Multidisciplinary Journal*, *21*(3), 329–341. https://doi.org/10.1080/10705511.2014.915181

Baker, J. A., Clark, T. P., Maier, K. S., & Viger, S. (2008a). The differential influence of instructional context on the academic engagement of students with behavior problems. *Teaching and Teacher Education*, *24*(7), 1876–1883. https://doi.org/10.1016/j.tate.2008.02.019

Baker, J. A., Grant, S., & Morlock, L. (2008b). The teacher-student relationship as a developmental context for children with internalizing or externalizing behavior problems. *School Psychology Quarterly*, *23*(1), 3–15. https://doi.org/10.1037/1045-3830.23.1.3

Bassok, D., & Galdo, E. (2016). Inequality in preschool quality? Community-level disparities in access to high-quality learning environments. *Early Education & Development*, *27*(1), 128–144. https://doi.org/10.1080/10409289.2015.1057463

Basten, M., Tiemeier, H., Althoff, R. R., van deSchoot, R., Jaddoe, V. W. V., Hofman, A., Hudziak, J. J., Verhulst, F. C., & van derEnde, J. (2016). The stability of problem behavior across the preschool years: An empirical approach in the general population. *Journal of Abnormal Child Psychology*, *44*(2), 393–404. https://doi.org/10.1007/s10802-015-9993-y

Bergman, L. R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. *Development and Psychopathology*, *9*(2), 291–319. https://doi.org/10.1017/s095457949700206x

Biernacki, C., Celeux, G., & Govaert, G. (2000). Assessing a mixture model for clustering with the integrated completed likelihood. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *22*(7), 719–725. https://doi.org/10.1109/34.865189

Blair, K. A., Denham, S. A., Kochanoff, A., & Whipple, B. (2004). Playing it cool: Temperament, emotion regulation, and social behavior in preschoolers. *Journal of School Psychology*, *42*(6), 419–443. https://doi.org/10.1016/j.jsp.2004.10.002

Booren, L. M., Downer, J. T., & Vitiello, V. E. (2012). Observations of children's interactions with teachers, peers, and tasks across preschool classroom activity settings. *Early Education & Development*, *23*(4), 517–538. https://doi.org/10.1080/10409289.2010.548767

Bosman, R. J., Roorda, D. L., van derVeen, I., & Koomen, H. M. Y. (2018). Teacher–student relationship quality from kindergarten to sixth grade and students' school adjustment: A person-centered approach. *Journal of School Psychology*, *68*, 177–194. https://doi.org/10.1016/j.jsp.2018.03.006

Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In *Handbook of child psychology: Theoretical models of human development* (pp. 993–1028). John Wiley & Sons Inc.

Bulotsky-Shearer, R. J., Bell, E. R., & Domínguez, X. (2012). Latent profiles of problem behavior within learning, peer, and teacher contexts: Identifying subgroups of children at academic risk across the preschool year. *Journal of School Psychology*, *50*(6), 775–798. https://doi.org/10.1016/j.jsp.2012.08.001

Bulotsky-Shearer, R. J., Fernandez, V. A., Bichay-Awadalla, K., Bailey, J., Futterer, J., & Qi, C. H. (2020). Teacher–child interaction quality moderates social risks associated with problem behavior in preschool classroom contexts. *Journal of Applied Developmental Psychology*, *67*, 101103. https://doi.org/10.1016/j.appdev.2019.101103

Campbell, S. B. (2006). *Behavior problems in preschool children: Clinical and developmental issues*. Guilford Press.

Campbell, S. B., Shaw, D. S., & Gilliom, M. (2000). Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*, *12*(3), 467–488. https://doi.org/10.1017/s0954579400003114

Canivez, G. L., & Rains, J. D. (2002). Construct validity of the Adjustment Scales for Children and Adolescents and the Preschool and Kindergarten Behavior Scales: Convergent and divergent evidence. *Psychology in the Schools*, *39*(6), 621–633. https://doi.org/10.1002/pits.10063

Cashiola, E. B., Bulotsky-Shearer, R. J., & Greenfield, D. B. (2020). Bidirectional associations between preschool classroom behavior and language and literacy skills. *Topics in Early Childhood Special Education*, *40*(3), 143–158. https://doi.org/10.1177/0271121420948603

Collie, R. J., Martin, A. J., Nassar, N., & Roberts, C. L. (2019). Social and emotional behavioral profiles in kindergarten: A population-based latent profile analysis of links to socio-educational characteristics and later achievement. *Journal of Educational Psychology*, *111*(1), 170–187. https://doi.org/10.1037/edu0000262

Coplan, R. J., & Arbeau, K. A. (2008). The stresses of a "Brave New World": Shyness and school adjustment in kindergarten. *Journal of Research in Childhood Education*, *22*(4), 377–389. https://doi.org/10.1080/02568540809594634

Coplan, R. J., DeBow, A., Schneider, B. H., & Graham, A. A. (2009). The social behaviours of inhibited children in and out of preschool. *The British Journal of Developmental Psychology*, *27*(4), 891–905. https://doi.org/10.1348/026151008x396153

Crick, N. R., Ostrov, J. M., Burr, J. E., Cullerton-Sen, C., Jansen-Yeh, E., & Ralston, P. (2006). A longitudinal study of relational and physical aggression in preschool. *Journal of Applied Developmental Psychology*, *27*(3), 254–268. https://doi.org/10.1016/j.appdev.2006.02.006

Criss, M. M., Pettit, G. S., Bates, J. E., Dodge, K. A., & Lapp, A. L. (2002). Family adversity, positive peer relationships, and children's externalizing behavior: A longitudinal perspective on risk and resilience. *Child Development*, *73*(4), 1220–1237. https://doi.org/10.1111/1467-8624.00468

Degnan, K. A., Calkins, S. D., Keane, S. P., & Hill-Soderlund, A. L. (2008). Profiles of disruptive behavior across early childhood: Contributions of frustration reactivity, physiological regulation, and maternal behavior. *Child Development*, *79*(5), 1357–1376. https://doi.org/10.1111/j.1467-8624.2008.01193.x

Dekker, M. C., Koot, H. M., van derEnde, J., & Verhulst, F. C. (2002). Emotional and behavioral problems in children and adolescents with and without intellectual disability. *Journal of Child Psychology and Psychiatry*, *43*(8), 1087–1098. https://doi.org/10.1111/1469-7610.00235

Denham, S. A., Bassett, H. H., Mincic, M., Kalb, S., Way, E., Wyatt, T., & Segal, Y. (2012). Social–emotional learning profiles of preschoolers' early school success: A person-centered approach. *Learning and Individual Differences*, *22*(2), 178–189. https://doi.org/10.1016/j.lindif.2011.05.001

Dobbs, J., & Arnold, D. H. (2009). The relationship between preschool teachers' reports of children's behavior and their behavior toward those children. *School Psychology Quarterly*, *24*(2), 95–105. https://doi.org/10.1037/a0016157

Domínguez Escalón, X., & Greenfield, D. B. (2009). Learning behaviors mediating the effects of behavior problems on academic outcomes. *NHSA DIALOG*, *12*(1), 1–17. https://doi.org/10.1080/15240750802590768

Domínguez, X., Vitiello, V. E., Fuccillo, J. M., Greenfield, D. B., & Bulotsky-Shearer, R. J. (2011). The role of context in preschool learning: A multilevel examination of the contribution of context-specific problem behaviors and classroom process quality to low-income children's approaches to learning. *Journal of School Psychology*, *49*(2), 175–195. https://doi.org/10.1016/j.jsp.2010.11.002

Duncan, G. J., & Magnuson, K. (2011). The nature and impact of early achievement skills, attention skills, and behavior problems. In G. J. Duncan & R. J. Murnane (Eds.), *Whither Opportunity?: Rising Inequality, Schools, and Children's Life Chances* (pp. 47–70). Russell Sage Foundation.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, *82*(1), 405–432. https://doi.org/10.1111/j.1467-8624.2010.01564.x

Evans, G. W. (2004). The environment of childhood poverty. *The American Psychologist*, *59*(2), 77–92. https://doi.org/10.1037/0003-066X.59.2.77

Fantuzzo, J., Bulotsky-Shearer, R., McDermott, P. A., McWayne, C., Frye, D., & Perlman, S. (2007). Investigation of dimensions of social-emotional classroom behavior and school readiness for low-income urban preschool children. *School Psychology Review*, *36*(1), 44–62. https://doi.org/10.1080/02796015.2007.12087951

Fantuzzo, J., Perry, M. A., & McDermott, P. (2004). Preschool approaches to learning and their relationship to other relevant classroom competencies for low-income children. *School Psychology Quarterly*, *19*(3), 212–230. https://doi.org/10.1521/scpq.19.3.212.40276

Gower, A. L., Lingras, K. A., Mathieson, L. C., Kawabata, Y., & Crick, N. R. (2014). The role of preschool relational and physical aggression in the transition to kindergarten: Links with social-psychological adjustment. *Early Education & Development*, *25*(5), 619–640. https://doi.org/10.1080/10409289.2014.844058

Grosche, M., & Volpe, R. J. (2013). Response-to-intervention (RTI) as a model to facilitate inclusion for students with learning and behaviour problems. *European Journal of Special Needs Education*, *28*(3), 254–269. https://doi.org/10.1080/08856257.2013.768452

Hair, E., Halle, T., Terry-Humen, E., Lavelle, B., & Calkins, J. (2006). Children's school readiness in the ECLS-K: Predictions to academic, health, and social outcomes in first grade. *Early Childhood Research Quarterly*, *21*(4), 431–454. https://doi.org/10.1016/j.ecresq.2006.09.005

Hamre, B. K., & Pianta, R. C. (2010). Classroom environments and developmental processes. In J. L.Meece & J. S.Eccles (Eds.), *Handbook of research on schools, schooling, and human development* (pp. 25–41). Routledge.

Han, W.-J. (2010). Bilingualism and socioemotional well-being. *Children and Youth Services Review*, *32*(5), 720–731. https://doi.org/10.1016/j.childyouth.2010.01.009

Hebert-Myers, H., Guttentag, C. L., Swank, P. R., Smith, K. E., & Landry, S. H. (2006). The importance of language, social, and behavioral skills across early and later childhood as predictors of social competence with peers. *Applied Developmental Science*, *10*(4), 174–187. https://doi.org/10.1207/s1532480xads1004_2

Hickendorff, M., Edelsbrunner, P. A., McMullen, J., Schneider, M., & Trezise, K. (2018). Informative tools for characterizing individual differences in learning: Latent class, latent profile, and latent transition analysis. *Learning and Individual Differences*, *66*, 4–15. https://doi.org/10.1016/j.lindif.2017.11.001

Horner, R. H., Sugai, G., & Anderson, C. M. (2010). Examining the evidence base for school-wide positive behavior support. *Focus on Exceptional Children*, *42*(8), 1–14.

Howard, M. C., & Hoffman, M. E. (2018). Variable-centered, person-centered, and person-specific approaches: Where theory meets the method. *Organizational Research Methods*, *21*(4), 846–876. https://doi.org/10.1177/%2F1094428117744021

Jerome, E. M., Hamre, B. K., & Pianta, R. C. (2009). Teacher-child relationships from kindergarten to sixth grade: Early childhood predictors of teacher-perceived conflict and closeness. *Social Development*, *18*(4), 915–945. https://doi.org/10.1111/j.1467-9507.2008.00508.x

Kalutskaya, I. N., Archbell, K. A., Moritz Rudasill, K., & Coplan, R. J. (2015). Shy children in the classroom: From research to educational practice. *Translational Issues in Psychological Science*, *1*(2), 149–157. https://doi.org/10.1037/tps0000024

Kopp, C. B. (1982). Antecedents of self-regulation: A developmental perspective. *Developmental Psychology*, *18*(2), 199–214. https://doi.org/10.1037/0012-1649.18.2.199

Ladd, G. W. (2004). Probing the adaptive significance of children's behavior and relationships in the school context: A child by environment perspective. *Advances in Child Development and Behavior*, *31*, 43–104. Elsevier. https://doi.org/10.1016/s0065-2407(03)31002-x

Ladd, G. W., Price, J. M., & Hart, C. H. (1988). Predicting preschoolers' peer status from their playground behaviors. *Child Development*, *59*(4), 986. https://doi.org/10.2307/1130265

Laursen, B., & Hoff, E. (2006). Person-centered and variable-centered approaches to longitudinal data. *Merrill-Palmer Quarterly*, *52*(3), 377–389. https://doi.org/10.1353/mpq.2006.0029

LeBoeuf, W. A., Fantuzzo, J. W., & Lopez, M. L. (2010). Measurement and population miss-fits: A case study on the importance of using appropriate measures to evaluate early childhood interventions. *Applied Developmental Science*, *14*(1), 45–53. https://doi.org/10.1080/10888690903510349

Lo, Y., Mendell, N. R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika*, *88*(3), 767–778. https://doi.org/10.1093/biomet/88.3.767

Lonigan, C. J., Spiegel, J. A., Goodrich, J. M., Morris, B. M., Osborne, C. M., Lerner, M. D., & Phillips, B. M. (2017). Does preschool self-regulation predict later behavior problems in general or specific problem behaviors? *Journal of Abnormal Child Psychology*, *45*(8), 1491–1502. https://doi.org/10.1007/s10802-016-0260-7

Lumley, V. A., McNeil, C. B., Herschell, A. D., & Bahl, A. B. (2002). An examination of gender differences among young children with Disruptive Behavior Disorders. *Child Study Journal*, *32*(2), 89–101.

Lutz, M. N., Fantuzzo, J., & McDermott, P. (2002). Multidimensional assessment of emotional and behavioral adjustment problems of low-income preschool children: Development and initial validation. *Early Childhood Research Quarterly*, *17*(3), 338–355. https://doi.org/10.1016/S0885-2006(02)00168-0

Magnuson, K. A., Meyers, M. K., Ruhm, C. J., & Waldfogel, J. (2004). Inequality in preschool education and school readiness. *American Educational Research Journal*, *41*(1), 115–157. https://doi.org/10.3102/00028312041001115

Manz, P. H., Power, T. J., Roggman, L. A., Eisenberg, R. A., Gernhart, A., Faison, J., Ridgard, T., Wallace, L. E., & Whitenack, J. M. (2017). Integrating the little talks intervention into Early Head Start: An experimental examination of implementation supports involving fidelity monitoring and performance feedback. *Children and Youth Services Review*, *79*, 87–96. https://doi.org/10.1016/j.childyouth.2017.05.034

May, D. C., & Kundert, D. K. (1997). School readiness practices and children at-risk: Examining the issues. *Psychology in the Schools*, *34*(2), 73–84. https://doi.org/10.1002/(SICI)1520-6807(199704)34:2(73::AID-PITS1)3.0.CO;2-T

McCoy, D. C., Connors, M. C., Morris, P. A., Yoshikawa, H., & Friedman-Krauss, A. H. (2015). Neighborhood economic disadvantage and children's cognitive and social-emotional development: Exploring Head Start classroom quality as a mediating mechanism. *Early Childhood Research Quarterly*, *32*, 150–159. https://doi.org/10.1016/j.ecresq.2015.04.003

McDermott, P. A., Rovine, M. J., Watkins, M. W., Chao, J. L., Irwin, C. W., & Reyes, R. S. (2017). Latent national subpopulations of early education classroom disengagement of children from underresourced families. *Journal of School Psychology*, *65*, 69–82. https://doi.org/10.1016/j.jsp.2017.07.002

McDermott, P. A., Rovine, M. J., Weiss, E. M., Gladstone, J. N., Fatima, S. F., & Reyes, R. S. (2022). Latent change and co-occurrence of overactive and underactive behavior problems in American early education. *School Psychology Review*, *114*, https://doi.org/10.1080/2372966X.2021.2000842

McDermott, P. A., Watkins, M. W., Rovine, M. J., & Rikoon, S. H. (2013). Assessing changes in socioemotional adjustment across early school transitions-new national scales for children at risk. *Journal of School Psychology*, *51*(1), 97–115. https://doi.org/10.1016/j.jsp.2012.10.002

McDermott, P. A., Watkins, M. W., Rovine, M. J., & Rikoon, S. H. (2014). Informing context and change in young children's sociobehavioral development––The national Adjustment Scales for Early Transition in Schooling (ASETS). *Early Childhood Research Quarterly*, *29*(3), 255–267. https://doi.org/10.1016/j.ecresq.2014.02.004

McDermott, P. A., Watkins, M. W., Rovine, M. J., Rikoon, S. H., Irwin, C. W., Reyes, R. S., & Chao, J. L. (2019). Emergent growth patterns of early education self-control problems among children from underresourced American families. *Early Childhood Research Quarterly*, *48*, 1–13. https://doi.org/10.1016/j.ecresq.2018.08.010

McLachlan, G. J., & Peel, D. (2004). *Finite mixture models*. John Wiley & Sons, Ltd.

Mejia, T. M., & Hoglund, W. L. G. (2016). Do children's adjustment problems contribute to teacher–child relationship quality? Support for a child-driven model. *Early Childhood Research Quarterly*, *34*, 13–26. https://doi.org/10.1016/j.ecresq.2015.08.003

Metsäpelto, R.-L., Pakarinen, E., Kiuru, N., Poikkeus, A.-M., Lerkkanen, M.-K., & Nurmi, J.-E. (2015). Developmental dynamics between children's externalizing problems, task-avoidant behavior, and academic performance in early school years: A 4-year follow-up. *Journal of Educational Psychology*, *107*(1), 246–257. https://doi.org/10.1037/a0037389

Mischel, W., Shoda, Y., & Mendoza-Denton, R. (2002). Situation-behavior profiles as a locus of consistency in personality. *Current Directions in Psychological Science*, *11*(2), 50–54. https://doi.org/10.1111/1467-8721.00166

Muthén, L. K., & Muthén, B. (2018). Mplus (Vers 8.3).

Nagin, D., & Tremblay, R. E. (1999). Trajectories of boys' physical aggression, opposition, and hyperactivity on the path to physically violent and nonviolent juvenile delinquency. *Child Development*, *70*(5), 1181–1196. https://doi.org/10.1111/1467-8624.00086

Nantel-Vivier, A., Pihl, R. O., Côté, S., & Tremblay, R. E. (2014). Developmental association of prosocial behaviour with aggression, anxiety and depression from infancy to preadolescence. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *55*(10), 1135–1144. https://doi.org/10.1111/jcpp.12235

Olivier, E., Morin, A. J. S., Langlois, J., Tardif-Grenier, K., & Archambault, I. (2020). Internalizing and externalizing behavior problems and student engagement in elementary and secondary school students. *Journal of Youth and Adolescence*, *49*(11), 2327–2346. https://doi.org/10.1007/s10964-020-01295-x

Pianta, R. C. (1996). *Manual and scoring guide for the Student–Teacher Relationship Scale*. University of Virginia.

Pianta, R. C. (1999). *Enhancing relationships between children and teachers.* American Psychological Association.

Qi, C. H., & Kaiser, A. P. (2003). Behavior problems of preschool children from low-income families. *Topics in Early Childhood Special Education*, *23*(4), 188–216. https://doi.org/10.1177/02711214030230040201

Qi, C. H., Kaiser, A. P., & Milan, S. (2006). Children's behavior during teacher-directed and child-directed activities in Head Start. *Journal of Early Intervention*, *28*(2), 97–110. https://doi.org/10.1177/105381510602800202

Reyes, R. S., McDermott, P. A., Watkins, M. W., Rovine, M. J., & Chao, J. L. (2020). Forecasting accuracy of earliest assessment versus transitional change in early education classroom problem behavior among children at risk. *School Psychology Review*, *49*(1), 47–59. https://doi.org/10.1080/2372966X.2020.1717372

Richardson, V., Casanova, U., Guilfoyle, K., & Placier, P. (1989). *School children at-risk*. Taylor & Francis.

Rimm-Kaufman, S. E., Pianta, R. C., & Cox, M. J. (2000). Teachers' judgments of problems in the transition to kindergarten. *Early Childhood Research Quarterly*, *15*(2), 147–166. https://doi.org/10.1016/S0885-2006(00)00049-1

Ryan, R. M., Fauth, R. C., & Brooks-Gunn, J. (2014). Childhood poverty: Implications for school readiness and early childhood education. In *Handbook of research on the education of young children* (pp. 341–364). Routledge. https://doi.org/10.4324/9781315045511-28

Sabol, T. J., Bohlmann, N. L., & Downer, J. T. (2018). Low-income ethnically diverse children's engagement as a predictor of school readiness above preschool classroom quality. *Child Development*, *89*(2), 556–576. https://doi.org/10.1111/cdev.12832

Schafer, J. L. (1999). Multiple imputation: a primer. *Statistical Methods in Medical Research*, *8*(1), 3–15. https://doi.org/10.1177/096228029900800102

Silver, R. B., Measelle, J. R., Armstrong, J. M., & Essex, M. J. (2005). Trajectories of classroom externalizing behavior: Contributions of child characteristics, family characteristics, and the teacher–child relationship during the school transition. *Journal of School Psychology*, *43*(1), 39–60. https://doi.org/10.1016/j.jsp.2004.11.003

Skalická, V., Stenseng, F., & Wichstrøm, L. (2015). Reciprocal relations between student–teacher conflict, children's social skills and externalizing behavior: A three-wave longitudinal study from preschool to third grade. *International Journal of Behavioral Development*, *39*(5), 413–425. https://doi.org/10.1177/0165025415584187

Smith, S. C., Lewis, T. J., & Stormont, M. (2011). The effectiveness of two universal behavioral supports for children with externalizing behavior in Head Start classrooms. *Journal of Positive Behavior Interventions*, *13*(3), 133–143.

Stenseng, F., Belsky, J., Skalicka, V., & Wichstrøm, L. (2016). Peer rejection and attention deficit hyperactivity disorder symptoms: Reciprocal relations through ages 4, 6, and 8. *Child Development*, *87*(2), 365–373. https://doi.org/10.1111/cdev.12471

Sterba, S., Egger, H. L., & Angold, A. (2007). Diagnostic specificity and nonspecificity in the dimensions of preschool psychopathology. *Journal of Child Psychology and Psychiatry*, *48*(10), 1005–1013. https://doi.org/10.1111/j.1469-7610.2007.01770.x

Stormont, M. (2002). Externalizing behavior problems in young children: Contributing factors and early intervention. *Psychology in the Schools*, *39*(2), 127–138.

Stormont, M., Herman, K. C., & Reinke, W. M. (2015). The overlooked children: How teachers can support children with internalizing behaviors. *Beyond Behavior*, *24*(2), 39–45. https://doi.org/10.1177/107429561502400206

Tofighi, D., & Enders, C. K. (2008). Identifying the correct number of classes in growth mixture models. *Advances in Latent Variable Mixture Models*, *2007*(1), 317–341.

U.S. Department of Health and Human Services. (2001). Head Start FACES: Longitudinal findings on program performance: Third progress report. Administration for Children and Families.

U.S. Department of Health and Human Services. (2010a). Head Start Impact Study final report. Administration for Children and Families.

U.S. Department of Health and Human Services. (2010b). Head Start Impact Study technical report. Administration for Children and Families.

Vancraeyveldt, C., Verschueren, K., Wouters, S., vanCraeyevelt, S., vanden Noortgate, W., & Colpin, H. (2015). Improving teacher-child relationship quality and teacher-rated behavioral adjustment amongst externalizing preschoolers: Effects of a two-component intervention. *Journal of Abnormal Child Psychology*, *43*(2), 243–257. https://doi.org/10.1007/s10802-014-9892-7

Vitiello, V. E., & Williford, A. P. (2020). Context influences on task orientation among preschoolers who display disruptive behavior problems. *Early Childhood Research Quarterly*, *51*, 256–266. https://doi.org/10.1016/j.ecresq.2019.09.004

Wadsworth, M. E., Evans, G. W., Grant, K., Carter, J. S., & Duffy, S. (2016). Poverty and the development of psychopathology. In D.Cicchetti (Ed.), *Developmental psychopathology* (pp. 1–44). John Wiley & Sons, Inc. https://doi.org/10.1002/9781119125556.devpsy404

Wakschlag, L., & Danis, B. (2004). Assessment of disruptive behavior in young children: A clinical-developmental framework. In R.DelCarmen-Wiggins & A. S.Carter (Eds.), *Handbook of infant, toddler, and preschool mental health assessment* (pp. 421–440). Oxford University Press.

Wang, J., & Wang, X. (2019). *Structural equation modeling: Applications using Mplus.* John Wiley & Sons, Ltd.

Watkins, M. W., McDermott, P. A., Chao, J. L., Worrell, F. C., & Hall, T. E. (2020). Latent profile analysis of school and home versions of the Adjustment Scales for Children and Adolescents among primary school children in Trinidad and Tobago. *Caribbean Journal of Psychology*, *12*(2), 13–47.

Weiss, E. M., McDermott, P. A., Rovine, M. J., & Oh, J. (2021). Latent growth trajectories of peer context behavior problems across preschool, kindergarten and first grade. *Early Education & Development*, 1–19. https://doi.org/10.1080/10409289.2021.1928445

Williford, A. P., LoCasale-Crouch, J., Whittaker, J. V., DeCoster, J., Hartz, K. A., Carter, L. M., Wolcott, C. S., & Hatfield, B. E. (2017). Changing teacher–child dyadic interactions to improve preschool children's externalizing behaviors. *Child Development*, *88*(5), 1544–1553. https://doi.org/10.1111/cdev.12703

Willner, C. J., Gatzke-Kopp, L. M., & Bray, B. C. (2016). The dynamics of internalizing and externalizing comorbidity across the early school years. *Development and Psychopathology*, *28*(4pt1), 1033–1052. https://doi.org/10.1017/S0954579416000687

Woodcock, R. W., McGrew, K. S., & Mather, N. (2002). *Woodcock–Johnson III tests of achievement*. Riverside Publishing.

Zatto, B. R. L., & Hoglund, W. L. G. (2019). Children's internalizing problems and teacher–child relationship quality across preschool. *Early Childhood Research Quarterly*, *49*, 28–39. https://doi.org/10.1016/j.ecresq.2019.05.007

Zhang, X., & Sun, J. (2011). The reciprocal relations between teachers' perceptions of children's behavior problems and teacher-child relationships in the first preschool year. *The Journal of Genetic Psychology*, *172*(2), 176–198. https://doi.org/10.1080/00221325.2010.528077

Zins, J. E., Bloodworth, M. R., Weissberg, R. P., & Walberg, H. J. (2007). The scientific base linking social and emotional learning to school success. *Journal of Educational and Psychological Consultation*, *17*(2–3), 191–210. https://doi.org/10.1080/10474410701413145