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ORIGINAL ARTICLE

Heterogeneity in Parental Trauma, Parental Behaviors, and Parental Academic Involvement

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Abstract

We explored the role of selected parental environmental factors (e.g., adverse childhood experiences) and behavioral factors (e.g., discipline and parental empathy) in perceived parenting as it pertains to parent involvement (PI) in their child's education. Data were collected from families who resided in the southeastern and western USA ($N = 201$). Six parent profiles emerged from finite mixture model analysis: (1) high trauma/low involvement parent group ($n = 27$); (2) referent parent group ($n = 100$); (3) passively involved parent group ($n = 17$); (4) average trauma/intensively involved parent group ($n = 13$); (5) controlling parent group ($n = 29$); and (6) low trauma/ high involvement parent group ($n = 15$). Subsequent multinomial regression analyses demonstrated that primary profile membership for parents was generally unrelated to sex, race, socioeconomic level, or the mother's educational level. These distinct parenting profiles may be an additional tool to better understand PI that can ultimately be used as a mechanism to better understand child academic and functional outcomes.

Keywords Parenting profiles · Parenting behavior · ACES · Parent involvement

Understanding the relation between parent behaviors and beliefs about parenting is no small undertaking. Given the primary role that parents play in their child's development, it is unsurprising that the significant body of research exists correlating parent backgrounds to parent behaviors, parent beliefs to parent behaviors, and the attempted linkages of these constructs to child outcomes. A broad purview of the meta-analytic literature shows that parental involvement is positively correlated with their child's academic achievement, attitudes towards school, and academic motivation (Fan & Chen, 2001). Parents and caretakers shape the child's worldview and how they interact with other individuals and process information through their interaction with the child. Supportive parenting has been shown to be positively associated with developmental outcomes, such as academic achievement and high levels of self-regulation and competence (Abd-El-Fattah, 2006; Barnard, 2004; Elmore & Gaylord-Harden, 2013; Jeynes, 2005a, 2005b, 2007; Spera, 2005). Treat et al. (2019) reported that parents who are responsive, nurturing, and warm tend to encourage independent thinking and problem-solving that is indicative of higher executive functioning among children. Conversely, while nurturing parenting styles have been associated with positive child outcomes, punitive parenting styles have been associated with negative developmental outcomes for children such as in education and emotional regulation and expression (Amani et al., 2020; LaBrenz et al., 2020; Treat et al., 2019). For example, Tang and Davis-Kean (2015) found that punitive parenting practices (e.g., lecture and punishment) predicted lower academic achievement during adolescence. Additionally, Zubizarreta et al. (2019) found that punitive punishment can exacerbate both internalizing and externalizing features of depression even after controlling for the temperament of the child. Lastly, Grant et al. (2003) found that negative parenting behaviors partially accounted for childhood mental health symptom development and later life poverty.

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Parental involvement impacts on academic outcomes have also been of particular interest to research due to the number of studies that have positively linked the two (Grolnick et al., 1997; Jeynes, 2007; Pomerantz et al., 2012). However, it should be noted that some studies have failed to link parental involvement to positive academic outcomes (El Nokali et al., 2010), while still others have found variations in the relationship between parent involvement and educational achievement based on things such as race and SES (Hill & Craft, 2003; Hong & Ho, 2005; Lee & Bowen, 2006). These inconsistencies in findings have led some to wonder if other dimensions of parenting or factors associated with the parent (e.g., stress) and/or child (e.g., temperament) may be confounding these results (Domina, 2005; El Nokali et al., 2010).

Defining Our Terms and Limitations of Research

Here, we note the importance of defining key terms as the operationalization of *parenting* and *parenting involvement* often varies across studies according to both theoretical and measurement formulations (Fan & Chen, 2001). For the purpose of our present consideration, *parenting* includes both parenting practices (e.g., behaviors such as discipline) and beliefs (e.g., obedience and control). *Parental involvement* (PI) is the active participation in activities and education at home and school to improve their children's learning and education (Barnard, 2004; Fantuzzo et al., 2000; Hampden-Thompson et al., 2013).

Despite the extensive literature and evidence base on the relation of parenting and PI with various child outcomes, little research has specifically focused on biopsychosocial factors that correlate with parenting and PI themselves (Chang et al., 2015; Morrison et al., 2014), and the extent to which the correlations may imply a type of heterogenous measurement structure that could manifest as clusters of parent quality and PI with such correlates. As well, the convergence of literature notes that parenting is a complex, often multidimensional construct (e.g., Bornstein, 2016), yet few studies on parenting profiles have been conducted (e.g., Bowers et al., 2014), and to our knowledge, no studies have empirically tested for the presence of parenting profiles that are inclusive of parenting, parental involvement, and potentially corollaries of such constructs.

Potential Role of Adverse Childhood Experiences (ACE) in Parenting and PI

One important contextual construct that may relate to parenting and PI focuses specifically on the negative environmental impacts on early development also known as adverse childhood experiences (ACEs). Herbell and Bloom (2020) define ACEs as "events experienced during childhood that affect the health and functioning of a person throughout their lifetime" (p. 409). Research has demonstrated that ACEs in early childhood development can manifest as diminished parenting capacity and insensitive parenting styles later in life cycle (Banyard et al., 2003; Treat et al., 2019). Zalewski et al. (2013) found that mothers who self-reported childhood emotional abuse were rated by their children as being less accepting and more likely to exhibit psychological control over their children. Several other studies have shown that traumatic events such as physical and emotional abuse during childhood were linked with later negative parenting behaviors (e.g., neglect and hostility; Newcomb & Locke, 2001) and perpetuated a continuing exposure to ACEs across generations (Cohen et al., 2008; Iyengar et al., 2014). Additional studies also demonstrated that experiencing ACEs decreased parental sensitivity and responsiveness (Fuchs et al., 2015; Harris et al., 2021), such that parents who had higher ACEs tended to withdraw from meeting their child's needs and not to monitor their children's behaviors (Yap et al., 2014). Dix et al. (2004) also illustrated that parents' abilities to provide optimal parenting to their children were regulated by their emotions, with higher parental distress related to fewer supportive behaviors exhibited by the parents.

From this review of the literature, we see that while parenting and parent involvement have been shown to be important factors in child development and academic outcomes, we also recognize that various factors can impact parenting and parent involvement. As noted above, no previous studies have simultaneously examined behavioral and environmental factors in parenting profiles specifically as it relates to parental involvement in their child's education. Additionally, while research has explored factors that impact parenting involvement (e.g., parent-teacher relationships, parent beliefs), few studies have empirically studied factors that influence parenting behaviors (such as ACEs) or specifically how varying parenting profiles might impact parental involvement. In the present work, we seek to understand the role of selected parental environmental factors (e.g., adverse childhood experiences) and behavioral factors (e.g., discipline and parental empathy) in perceived parenting as it pertains to parental involvement in their child's education.

Summary and Current Study

Studies have consistently identified parenting and PI as a lynchpin for a child's developmental flourishing and educational success and that each of parenting and PI are informed by a robust and multidimensional set of systems and components. Relatively few studies have explored the intersections among parenting involvement with parent

experiences with adverse childhood experiences, parental expectations, and discipline beliefs. Given the potential for understanding the potential complex relations among parenting, PI, and ACEs, the major research question guiding the present work is: To what extent can variation in parenting, PI, and ACEs be represented by distinct clusters from finite mixture model (FMM) analysis within a sample? Based on previous research, we hypothesized that heterogeneity exists within a sample of parent data across ACEs, behaviors, and school involvement such that higher ACE would be correlated with lower school involvement and that lower ACE would be correlated with higher school involvement.

Emerging research has used finite mixture models (FMMs) to empirically test for the presence of orthogonal subgroups according to measured variables. FMMs have been used to in various studies of ACE-related measurement studies (e.g., Brown et al., 2019; Rebbe et al., 2017; Shin et al., 2018) with some work focused on ACE and family functioning (Oshri et al., 2015) or ACE with other measurements of family stress (e.g., Herbers et al., 2019), but a dearth of empirical research exists on the extent to which variability in the confluence of parenting behaviors, parental ACEs, and parental involvement in their child's education could be modeled and understood through FMMs. We aim to build on the extant individual bodies of research by empirically testing the presence and diversity of parent profiles (parental ACEs, parental behaviors, and parental involvement) and the extent to which profile membership is related to parent demographics such as SES, race, and parental education.

Methods

Participants

Participants were $N = 201$ parents of children enrolled in kindergarten at the time of the study who resided in the southeastern and western USA, with 67% of respondents White, 19% Black, 12% Hispanic, and 2% other. English was the primary language in the home for 94% of families, 17% of families reported income < $35,000, and a substantial proportion of participants included a mother with at least a bachelor's degree (62%). Respondents were approximately equal in sex distribution of males and females (50%) with a majority of responding parents responding being married (73%), followed by single respondents (14%), divorced individuals (7%), separated individuals (4%), and widowed individuals (1%).

Measures

Adverse Childhood Experiences Survey

Parents were asked to complete the 10-item of ACEs questionnaire (Felitti et al., 1998). These items were used to assess previous exposures to child abuse, neglect, household alcohol/drug abuse, incarceration, and mental health issues before the age of 18. All items were rated as 0 = *no* and 1 = *yes*. A higher score reflected a higher level of parental ACE. Several studies have shown good internal consistency reliability of the ACEs scale in a variety of samples (e.g., $\alpha = .81$, Bruskas & Tessin, 2013; $\alpha = .72$, Karatekin & Hill, 2019; $\alpha = .86$, Treat et al., 2020). Karatekin and Hill (2019) reported satisfactory convergent validity of the ACEs scale with the measures of childhood trauma ($\tau = .29$, $p = .003$) and stressful life events ($\tau = .47$, $p < .001$). They also found acceptable concurrent validity from the results of the association between the ACEs scale and the measures of mental health ($\beta = -.33$, $p < .001$), depression ($\beta = .29$, $p < .001$), anxiety and stress ($\beta = .26$, $p < .001$). Furthermore, Hardt et al. (2010) examined the validity of adult retrospective reports of ACEs and found no bias in the retrospective assessment.

Adult Adolescent Parent Inventory

Parenting behaviors were measured by the Adult-Adolescent Parenting Inventory-Version 2 (AAPI-2; Bavolek & Keene, 1999), which is designed to assess parenting behaviors and child rearing practices of abusive parents. Specifically, Form A from the AAPI-2 was used in this study, and this form included 40 items with 5 dimensions: (1) inappropriate expectations of children, (2) parental lack of empathy towards children's needs, (3) strong belief in the use of corporal punishment, (4) parent-child role reversal, and (5) oppressing child's power and independence (Bavolek & Keene, 2010). All items were rated on a five-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Higher scores indicated more abusive parenting behaviors.

The AAPI-2 has shown good internal consistency reliability coefficients for the full 40-item scale (e.g., $\alpha = .85$, Conners et al., 2006; $\alpha = .89$, Lawson et al., 2017). Each subscale yielded fair to poor Cronbach's α ranging from .48–.50 (oppressing child's power and independence) to .70–.78 (value of corporal punishment) (Conners et al., 2006; Lawson et al., 2017). On the other hand, the validity of the AAPI-2 subscales and the AAPI-2 dimensions diverged from the result reported by the instrument's developers. For example, Lawson et al. (2017) examined the predictive validity of the AAPI-2 (Form B) for child abuse and neglect using a *t*-test between the AAPI-2 subscale scores of parents who received

a child abuse report and those who did not. The results were not statistically significant as theoretically hypothesized. Whereas Conners et al. (2006) found the significant correlations between the full AAPI scale and related measures (e.g., HOME acceptance and Harsh control) in size from small ($r = .18$, $p < .01$) to moderate ($r = -.45$, $p < .01$). More importantly, the five-factor structure of AAPI-2 reported by the instrument's developers was not supported. For example, Conners' EFA models yielded 10 factors of AAPI-2, and only two factors were reflected in the original five factors (i.e., lack of empathy and corporal punishment). Similarly, the results from Lawson's EFA and CFA models did not support the five-factor model, and they suggested five different classes of parenting behaviors using the LCA approach. Due to the mixed results, we opted to conduct item-level factor analysis to better understand the latent formation of items (see "Results" section on item analysis for details).

Family Involvement Questionnaire

Parental involvement was measured by The Family Involvement Questionnaire (FIQ) to assess parental involvement in early childhood education and reflects various levels of parental activity across home, classroom, and school contexts (Fantuzzo et al., 2000). The FIQ consisted of 42 items with 3 dimensions:(1) home-based involvement (HBI), (2) school-based involvement (SBI), and (3) home-school connection (HSC). HBI included 14 items asking parents about their active promotion of a learning environment at home for their children (e.g., providing learning activities, materials, and regular routines). SBI included 16 items asking for parental engagement at school to improve their children's learning (e.g., volunteering in their child's classroom, participating in fundraising activities and class trips, meeting with other parents and teachers). HSC consisted of 12 items asking about parents' communications with school personnel for their child's educational experiences (e.g., talking to the teacher about the classroom rules, routine, their child's behavior, difficulties, and accomplishments). All items were rated on a four-point Likert scale (i.e., 0 = rarely, 1 = sometimes, 2 = often, 3 = always). Higher scores reflected higher levels of parental involvement at home and school.

Several studies have demonstrated acceptable reliability and validity of the FIQ scale and invariance of the FIQ dimensions across ethnicity, income, and early childhood setting. For example, Fantuzzo et al. (2004) reported that each construct was highly reliable with Cronbach's alpha of .85, .85, and .81, respectively. They also showed satisfactory concurrent validity from the results of the significant correlations ranging from −.18 to .41 ($p < .05$) between the FIQ subscales and children's classroom competencies (motivation, attention, and attitude) and behavioral problems (conduct problem, hyperactivity, and inattention). Furthermore, family status was also associated with lower levels of parental involvement, such as low maternal education and poverty (Fantuzzo et al., 2000, 2004; McWayne et al., 2008).

Procedure

Data for this study were collected on an annual basis from January through March over 3 years. At each year, the Family Involvement Questionnaire (FIQ), Adult and Adolescent Parenting Inventory (AAPI), and the Adverse Childhood Experiences (ACE) were mailed or sent home with the child from school (depending on the school year) for parents/caregivers. Procedures used in the study are described within their associated measure. Data were entered by trained graduate students, and 10% of data were double entered to ensure high inter-rater reliability (estimated at .93). The research procedures were approved by the institutional review board prior to conducting the study and consenting participants.

Data Analysis

To leverage the common variance across indicators of each respective latent construct within each measure, a set of confirmatory factor analyses was applied separately to each of the ACE, AAPI, and FIQ data. A single-factor model was initially tested for the ACE items, a five-factor model was initially tested for the AAPI items, and a three-factor model was initially tested for the FIQ items. Items across all assessments were treated categorically (Rhemtulla et al., 2012) using a probit link with Mplus software (Muthén & Muthén, 1998-2023) in order to obtain global fit indices to evaluate the model including the comparative fit index (CFI; Bentler, 1990), Tucker-Lewis index (TLI; Bentler & Bonett, 1980), and the root mean square error of approximation (RMSEA). CFI and TLI values > .90 are considered to be indicative of good fit (Bentler & Bonett, 1980) as are RMSEA values < .10 (Chen et al., 2008). Coefficient H was used as a measure of the construct reliability for each latent factor in the respective item response models (Hancock & Mueller, 2001).

Estimated factor scores resulting from the best-fitting CFA models were used in exploratory latent profile analysis (LPA) to estimate the number of parenting profile subgroups that may exist according to scores on the ACE, AAPI, and FIQ. Our model fitting process included the testing of 3-class through 8-class solutions using a variety of fit indices to select the best fitting model, including Akaike information criterion (AIC), sample adjusted Bayesian information criterion (SABIC), Kullback information criterion (KIC), and the bootstrapped likelihood ratio test (BLRT) were used to judge whether of a model of k size (e.g., 4-class) or model k-1 (e.g., 3-class) provided better bit. Lower AIC, SABIC, and KIC values for

k model versus *k*-1 were indicative of better model fit. Entropy was used as an indicator of model usefulness, whereby values closer to 1.0 suggest better utility. Based on the final selected model from the LPA, multinomial regression analyses tested the extent to which class membership could be predicted based on sex, race, income, or level of mother's education. The *tidyLPA* (Rosenberg et al., 2019) and *nnet* (Venables & Ripley, 2002) packages in R software were used for latent profile analysis and multinomial regression, respectively.

Results

Preliminary Analysis

A review of the raw data showed that between < 1 and 16.34% of the data were missing across the three parent measures (Table 1). Little's test of data missing completely at random (MCAR) resulted in a failure to reject the null that the data were missing completely at random, $\chi^2(11) = 10.50$, $p = .486$. Because our data analytic strategy involved both a psychometric analysis of each parent measure and a latent profile analysis of the resulting parent measure trait scores, a combined approach to the treatment of missing data was used. The weighted least squares multivariate (WLSMV) estimator was used in the item-response model for each of the ACE, FIQ, and AAPI. Prior to using the resulting, integrated trait scores across measures in the latent profile analysis, multiple imputation was used in the combined measure dataset with 10 imputations. Scores were aggregated and then compared to the original data to evaluate the extent to which the correlation or mean structure changed that may result in biased estimates in the subsequent profile analysis.

Item Response Analysis

Adverse Childhood Experience Survey (ACE)

A one-factor model of the items in the sample revealed good model fit to the data, $\chi^2(20) = 32.61$, CFI = .99, TLI = .99, RMSEA = .056 (90% CI = .014, .090) with Coefficient H = .97.

Family Involvement Questionnaire (FIQ)

A three-factor model conforming to the structure of the published assessment resulted in reasonable model fit to the data, $\chi^2(591) = 1004.43$, CFI = .91, TLI = .91, RMSEA = .064 (90% CI = .057, .071). Modification indices indicated that model fit could be improved by removing 3 items from the assessment that present with high potential cross-load structure (i.e., items 12, 26, and 28). The removal of these items led to improved model fit, $\chi^2(492) = 714.44$, CFI = .95, TLI = .94, RMSEA = .052 (90% CI = .043, .060) with Coefficient H as .92 (school-based involvement), .93 (home-based involvement), and .94 (home-school connection).

Adult Adolescent Parent Inventory (AAPI)

A five-factor model conforming to the structure of the published assessment resulted in poor model fit, $\chi^2(730) = 1583.50$, CFI = .78, TLI = .76, RMSEA = .079 (90% CI = .074, .085). A revised four-factor yielded good model fit, $\chi^2(318) = 425.82$, CFI = .96, TLI = .96, RMSEA = .043 (90% CI = .031, .053) with Coefficient H as .89 (AAPI1), .95 (AAPI2), .84 (AAPI3), and .65 (AAPI4). Thirteen items were dropped (items 1, 8, 16, 18, 23, 24, 27, 30, 31, 33, 34, 35, 38) due to negative loadings. Due to the low reliability of AAPI4, student scores were not used in subsequent latent profile analyses. AAPI1 (items 2, 5, 7, 11, 12, 13, 17, 20, 25, 36) included items that broadly described parental self-interest, AAPI2 (items 6, 10, 14, 19, 21, 22, 26, 32, 37, 39)

Table 1 Descriptive statistics and correlations among latent measures

Variable	% Missing	Original *M*	Original SD	Imputed *M*	Imputed *SD*	1	2	3	4	5	6	7
1. ACE	< 1.00%	−0.00	0.91	−0.01	1.01	1.00	.12	−.01	−.10	−.03	−.07	−.07
2. AAPI1	7.43%	0.00	0.99	0.04	0.95	.08	1.00	.50**	−.64**	.03	−.03	−.05
3. AAPI2	7.43%	0.01	0.94	−0.06	0.95	−.03	.52**	1.00	−.76**	.20*	.18*	.10
4. AAPI3	7.43%	−0.01	0.99	0.04	0.98	−.08	−.64**	−.71**	1.00	−.04	.16	.10
5. SBI	16.34%	0.00	0.93	−0.01	0.90	−.09	−.02	.18*	−.08	1.00	.54**	.74**
6. HBI	16.34%	0.00	0.94	−0.03	0.96	−.13	−.06	.20*	.14	.53**	1.00	.73**
7. HSC	16.34%	0.00	0.96	−0.01	0.97	−.07	−.08	.12	.06	.72**	.72**	1.00

Upper diagonal of correlation matrix = post-imputation correlations, lower diagonal of correlation matrix = pre-imputation correlations. *ACE*= adverse childhood experiences trait score, A*API1*= Adult Adolescent Parenting Inventory – Parent Self-Interest trait score, *AAPI2*= Adult Adolescent Parenting Inventory – Behavioral Control trait score, *AAPI3*= Adult Adolescent Parenting Inventory – Obedience and Will trait score, *SBI*= School-Based involvement, *HBI*= Home-Based Involvement, *HSC*= School Connections. *$p < .05$, **$p < .01$

included items that described behavioral control, and AAPI3 (items 4, 15, 28, 29) captured obedience and will.

Descriptive Statistics and Correlations

Resulting descriptive statistics and correlations among the trait scores estimated from the item response analyses are reported in Table 1 where descriptions of each trait score are provided. The means across all trait scores from the original data were approximately 0 with a standard deviation of approximately 1.00. Correlations among the trait scores (lower diagonal, Table 1) ranged from −.02 between AAPI1 and SBI and .72 between HSC and both SBI and HBI. As previously described, the prevalence of missing data (1–16%) was missing completely at random. Ten imputations using the mice package (van Buuren & Groothuis-Oudshoorn, 2011) in R were conducted with aggregate imputation scores used for the purpose of the latent profile and multinomial regression analyses. Post-imputation descriptive statistics (Table 1) did not meaningfully depart from the original data distributions (max Hedges $g = 0.07$). Correlations among imputed scores (upper diagonal, Table 1) well approximated the correlations among the original scores.

Latent Profile Analysis and Multinomial Regression

Latent Profile Analysis

Results from the latent profile analysis (Table 2) showed that a consistent decrease across the three information criteria (i.e., AIC, SABIC, and KIC) was observed as the number of classes increased from 3 to 8. Each of the classes was marked by reasonable values of entropy (.79 in the 3-class solution to .87 in the 4-class solution) with similar minimum average latent class membership probabilities (.83 in the 7-class solution to .87 in the 4-class solution) and maximum average latent class membership probabilities (.92 in the 3- and 4-class solutions to 1.00 in the 8-class solution). The proportion of sample assigned to the smallest class for each test ranged from < .01 in the 8-class solution to .24 in the 3-class solution, and the proportion of sample assigned to the largest ranged from .31 in the 8-class solution to .50 in 3-class solution. The relative similarity of fit across the models led us to consider the meaningfulness of the solutions. The 6-class solution was selected based on sample size across classes and overall usefulness (entropy = .84). Mean performance by class is provided in Fig. 1. Class 1 (high trauma/low involvement parent group, $n = 27$, 13.4% of sample) was characterized by the highest average ACE scores ($M = 0.33$) and the lowest average SBI ($M = -1.05$), HBI ($M = -0.98$), and HSC ($M = -1.12$) scores. Their AAPI1 and AAPI2 scores were below average, but their AAPI3 score was above average. This means that the class 1 parents who had the highest ACEs valued child adherence to parents' need and expectation. That is, the parents had a higher probability of believing that children should obey their parents and that parents should push their children to do better. Also, they showed the lowest parental involvement in their children's activities at home and school and communication with school personnel. Class 2 (referent parent group, $n = 100$, 49.7% of sample) was average (i.e., $M \sim= 0.00$) on all tasks. That is, the class 2 parents who had average ACE scores showed the average levels of parent self-interest, behavioral control, obedience, and will. They also showed the average levels of parental involvement at home, school, and home-school connections. Class 3 (passively involved parent group, $n = 17$, 8.5% of sample) presented with very low scores on AAPI1 and AAPI2 but a very high score on AAPI3. Their ACE and parental involvement scores were lower than average. That is, the class 3 parents who had lower ACEs were very against the use of corporal punishment; however, they strongly believed child adherence to parents' need and expectation by emphasizing their children's obedience. They had lower levels of parental involvement at home, school, and home-school connections. Class 4 (average trauma/intensively involved parent group, $n = 13$, 6.5% of sample) has relatively higher AAPI1 and AAPI2 as well as high SBI, HBI, and HSC scores > 1.00. That is, the class 4 parents who experienced average adverse childhood

Table 2 Latent profile analysis fit indices

Classes	LogLik	AIC	SABIC	KIC	Entropy	prob_min	prob_max	n_min	n_max	BLRT	BLRT_*p*
3	−1729.27	3518.54	3522.74	3551.54	0.79	0.86	0.92	0.24	0.50	114.36	0.00
4	−1684.56	3445.13	3450.45	3486.13	0.82	0.87	0.92	0.05	0.40	89.41	0.00
5	−1647.95	3387.90	3394.34	3436.90	0.82	0.86	0.97	0.05	0.36	73.23	0.00
6	−1619.61	3347.23	3354.79	3404.23	0.84	0.84	0.95	0.05	0.40	56.67	0.00
7	−1603.03	3330.06	3338.74	3395.06	0.85	0.83	0.97	0.04	0.36	33.17	0.00
8	−1586.62	3313.24	3323.05	3386.24	0.86	0.86	1.00	0.00	0.31	32.51	0.01

LogLik= log-likelihood, *AIC*= Aikake Information Criterion, *SABIC*= sample adjusted Bayesian information criterion, *KIC*= Kullback information criterion, *prob_min*= minimum of diagonal of the average latent class probability for most likely class membership, *prob_max*= maximum of diagonal of the average latent class probability for most likely class membership, *n_min*= proportion of the sample assigned to the smallest class, *n_ax*= proportion of sample assigned to the largest class, *BLRT*= bootstrapped likelihood test, *BLRT_p*= BLRT *p*-value

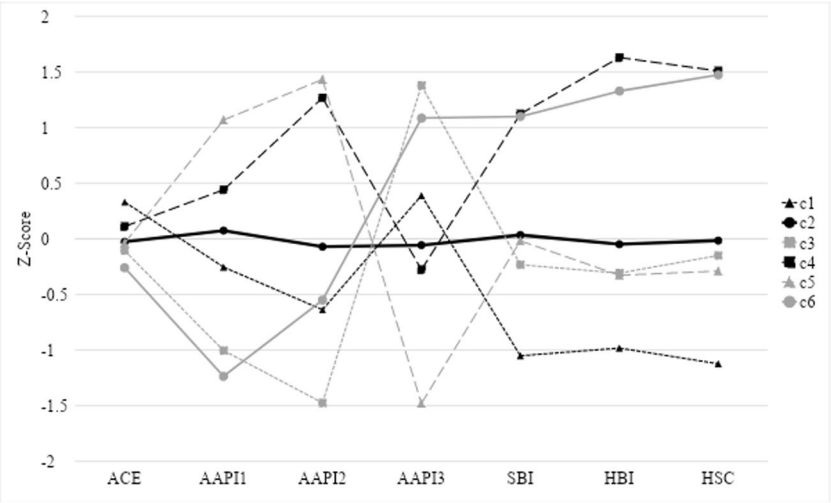

Fig. 1 Latent profile analysis line charts of standardized scores by class. ACE= adverse childhood experiences trait score, AAPI1= Adult Adolescent Parenting Inventory – Parent Self-Interest trait score, AAPI2= Adult Adolescent Parenting Inventory – Behavioral Control trait score, AAPI3= Adult Adolescent Parenting Inventory – Obedience and Will trait score, SBI= School-based involvement, HBI= Home-based involvement, HSC= Home-school connections. The six class solution is described as follows: c1 = Class 1 (high trauma/low involvement; n = 27; 13.4% of the sample); c2 = Class 2 (referent parent group; n = 100, 49.7% of the sample), c3 = Class 3 (passively involved parent group; n = 17; 8.5% of the sample), c4 = Class 4 (average trauma/intensively involved parent group; n = 13; 6.5% of the sample), c5 = controlling parent group; n = 29; 14.4% of the sample), c6 = low trauma/high involvement group; n = 15; 7.5% of the sample)

had stronger self-interest in childrearing and believed in the value of corporal punishment. However, they did not emphasize children's obedience. They were very actively involved in children's activities at home, school, and home-school connections. Class 5 (controlling parent group, n = 29, 14.4% of sample) had high levels of AAPI1 and AAPI2 (i.e., > 1.0) with very low AAPI3 ($M = -1.50$), and below average SBI, HBI, and HSC (i.e., < 0). Their ACEs and parental involvement scores were below average. As opposed to the class 3 parents, the class 5 parents strongly believed in the value of corporal punishment but did not emphasize their children's obedience. Class 6 (low trauma/high involvement parent group, n = 15, 7.5% of sample) had the lowest ACE and AAPI1 scores with relatively higher AAPI3, SBI, HBI, and HSC > 1.00. That is, the class 6 parents who had the lowest ACEs were against the use of corporal punishment, however, demanded their children's obedience. They were very actively involved in their children's activities at home and school and communication with teachers about children's educational progress.

Multinomial Regression

The most likely posterior class membership from the 6-class solution was used at the participant level as a categorical indicator of class. A series of multinomial regressions of class membership separately on sex, race, poverty, and mother's education were run to test the extent to which selected participant characteristics predicted specific class membership classification. Two strata of regressions were run, one that treated Class 2 (i.e., average) as the referent and one that treated Class 1 (i.e., high ACE) as the referent. The Class 2 referent multinomial regressions (Table 3) showed that with the exception of mother's education (−1.28, p = .029), none of the selected characteristics significantly differentiated class membership compared to the average class ($p > .05$). When considering Class 1 as the referent (Table 4), the results showed that sex, race, and mother's education did not significantly predict class membership. Low income significantly predicted class membership such that participants from low-income backgrounds were more likely than non-low-income participants to be classified in Class 1 vs. Class 5 (−1.75, p = .016).

Discussion

The current study provides important contributions to the literature on parenting profiles (parental ACEs, parental behaviors, and parental expectations), when also considering a parent's involvement in their child's education, and the extent to which such profiles are related to important background characteristics. Results contribute to one of the first studies, to our knowledge, that specifically explores complexity in parenting profiles independent of sociodemographic factors such as SES, gender, race, and parental education. Results from the present analyses

Table 3 Multinomial regression of posterior class membership on demographic characteristics (Class 2 referent)

Class	Intercept	SE	*p*	Male	SE	*p*
1	−1.53	0.65	<.001	0.35	0.45	0.153
3	−2.04	0.40	<.001	0.43	0.58	0.488
4	−2.44	0.68	<.001	0.52	0.66	0.308
5	−1.43	0.55	<.001	0.34	0.44	0.124
6	−1.88	0.25	<.001	0.41	0.56	0.659
	Intercept	SE	*p*	White	SE	*p*
1	−0.88	0.38	0.020	−0.50	0.47	0.291
3	−1.39	0.46	0.002	−0.56	0.58	0.334
4	−1.79	0.54	0.001	−0.41	0.67	0.546
5	−1.1	0.41	0.007	−0.05	0.48	0.919
6	−1.23	0.43	0.004	−0.97	0.59	0.099
	Intercept	SE	*p*	Black	SE	*p*
1	−1.16	0.24	<.001	−0.39	0.68	0.571
3	−1.99	0.34	<.001	0.96	0.62	0.123
4	−2.34	0.4	<.001	1.09	0.69	0.114
5	−1.07	0.23	<.001	−0.47	0.68	0.489
6	−2.09	0.35	<.001	1.06	0.63	0.091
	Intercept	SE	*p*	Low Income	SE	*p*
1	−1.45	0.28	<.001	0.90	0.47	0.055
3	−1.73	0.31	<.001	−0.11	0.70	0.873
4	−2.27	0.40	<.001	0.72	0.68	0.291
5	−1.00	0.23	<.001	−0.85	0.66	0.203
6	−2.02	0.35	<.001	0.87	0.59	0.139
	Intercept	SE	*p*	MomBS+	SE	*p*
1	−0.95	0.34	0.005	−0.37	0.45	0.410
3	−1.49	0.42	<.001	−0.46	0.56	0.417
4	−2.34	0.60	<.001	0.39	0.71	0.585
5	−1.64	0.45	<.001	0.71	0.51	0.167
6	−1.13	0.36	0.002	−1.28	0.59	0.029

MomBS+ =Mother education of at least a completed bachelor's degree

confirmed heterogeneity in the sample with six orthogonal parenting profiles that revealed parents who are low or high in parenting behaviors such as the use of corporal punishment and parenting beliefs about child adherence to parents' wishes varied along lines of ACE scores. Likewise, parent involvement (PI) appears to vary along the lines of broader parenting profiles and parent ACE scores.

Our results are consistent with previous findings that the only demographic variable in our model that was related to PI was lower SES (Grolnick et al., 1997) and were partially consistent with previous findings in that we also demonstrated a lack of relation between demographic variables (with the exception of lower SES), parenting profiles, and PI. These results seem to suggest that more research is needed as some previous research shows a simple relationship between demographic variables such as education and parenting behaviors (Cabrera et al., 2014; Castillo et al., 2011; Trifan et al., 2014).

As was discussed earlier, previous research has identified relationships among varying parent factors when different combinations are explored; of particular note is the negative effects ACEs have been shown to have on parental behaviors (Banyard et al., 2003; Treat et al., 2019) and PI (Barnard, 2004; Fantuzzo et al., 2004; Hampden-Thompson et al., 2013; Hoover-Dempsey et al., 2005). However, here again, our findings seem to support Domina's (2005) conclusions that the contributions to PI are much more complex than originally believed, specifically as it relates to the inclusion of parent ACE scores as a contributing factor in the parenting profile. First, the lack of relation between demographic characteristics, parenting profile membership (which included parenting behaviors), and ACE scores in our study would provide support for discriminant validity, in that when we talk about high or low ACE scores in parenting profiles, it is not just a matter

Table 4 Multinomial regression of posterior class membership on demographic characteristics (Class 1 referent)

Class	Intercept	SE	*p*	Male	SE	*p*
2	1.53	0.35	<.001	−0.65	0.45	0.154
3	−0.51	0.52	0.322	−0.24	0.67	0.717
4	−0.92	0.59	0.121	0.03	0.74	0.969
5	0.09	0.44	0.827	−0.09	0.56	0.864
6	−0.36	0.49	0.469	−0.40	0.65	0.543
	Intercept	SE	*p*	White	SE	*p*
2	0.88	0.38	0.02	0.50	0.47	0.291
3	−0.51	0.52	0.323	−0.06	0.66	0.922
4	−0.92	0.59	0.121	0.09	0.75	0.904
5	−0.22	0.47	0.638	0.45	0.58	0.442
6	−0.36	0.49	0.469	−0.47	0.67	0.483
	Intercept	SE	*p*	Black	SE	*p*
2	1.15	0.24	<.001	0.39	0.68	0.571
3	−0.83	0.38	<.001	1.34	0.82	0.102
4	−1.19	0.43	<.001	1.48	0.88	0.092
5	0.08	0.29	<.001	−0.08	0.87	0.923
6	−0.94	0.39	<.001	1.45	0.83	0.081
	Intercept	SE	*p*	Low Income	SE	*p*
2	1.45	0.28	<.001	−0.90	0.47	0.055
3	−0.29	0.38	<.001	−1.01	0.76	0.180
4	−0.83	0.45	<.001	−0.19	0.74	0.802
5	0.45	0.32	<.001	−1.75	0.73	0.016
6	−0.58	0.42	<.001	−0.03	0.66	0.962
	Intercept	SE	*p*	MomBS+	SE	*p*
2	0.95	0.34	0.005	0.37	0.45	0.410
3	−0.53	0.48	0.257	−0.09	0.65	0.889
4	−1.39	0.65	0.032	0.76	0.78	0.331
5	−0.69	0.5	0.166	1.08	0.60	0.074
6	−0.18	0.43	0.67	−0.92	0.67	0.172

MomBS+ Mother education of at least a completed bachelor's degree

of differences in race, gender, or SES. Second, it would also appear that ACE score impact on parenting and PI is also more complicated than just the ACE score itself (high or low). For one parent, experiencing many adversities in childhood may cause them to have high expectations of their child's behavior and/or over-engage in their child's learning, while for another parent, adverse childhood experiences may cause them to have low expectations and reduce their engagement in their children's educational learning. Future research needs to explore factors (e.g., receiving treatment) that may explain how similar ACE scores among parents can result in differing parenting practices (e.g., expectations and disciplinary styles) and levels/type of PI. The significance of further exploration of parenting profiles is to better understand the role parent involvement may play on academic outcomes. Additionally, in identifying the factors that make up different parenting profiles, we might also be better able to develop specific strategies to target differing parent profiles in the educational engagement of their children.

Limitations and Future Directions

The findings of our study must be viewed in the context of its limitations. The parent profiles from this study suggest that a more complex conceptualization of parenting practices is needed to consider its relation to children's outcomes, although the current study did not include child-related outcomes. Thus, future research would also benefit by including child variables to explore how parental factors impact child outcomes. Moreover, our sample was over-represented by White families (67%) and under-representative

of economically disadvantaged families (17%); thus, replication across different samples of participants is necessary.

Consideration of the literature above and our findings suggest several next steps for continued research. We offer a sample of suggestions below, focused primarily on increased understanding of parenting constructs that influence PI and ultimately student outcomes. First, studies on parenting practices have relied heavily on self-reported measures that reflect subjective perceptions of parenting behaviors varying across environmental contexts (Borden et al., 2014). While useful, parent self-report cannot fully capture momentary parenting behaviors in relation to child outcomes. Previous studies also raised the question of retrospective self-reports of adverse childhood experiences due to a degree of forgetting and under-reporting (Hardt & Rutter, 2004). Therefore, future study would gain power by including objective measures such as observation or multiple respondents to provide a more comprehensive approach of both parenting behaviors and the parent-child context. As well, future work may wish to consider the differential role of parent/caregiver respondents and the potential moderating role that may present in the statistical modeling. Lastly, as was discussed, exploring parental awareness of and support for adversities might also improve our understanding of the specific impacts of ACEs on parenting and PI.

Emerging science has posited that individual differences in education primary education outcomes such as reading and math may be understood by broader risk and resilience models of learning (Catts & Petscher, 2022; Zuk et al., 2021). As developmental psychologists and cognitive psychologists who study reading increasingly focus their attention on the role of family stress, our work may be extended through both replication of the profiles found here and extensions to predicting student outcomes. Empirical evaluating of the extent to which these family differences are linked to student outcomes would support ongoing efforts to better understand stress factors related to reading development.

Conclusion

Our findings highlight a general picture that high-level constructs such as PI should not be viewed as independent or in a vacuum. In using latent profile as an analytic tool, we were able to explore typology in this study. This tool allows for future research to empirically test through confirmatory latent profile analysis whether what we found here in this sample can be generalized. This research also suggests that future predictions of child learning outcomes such as reading, language, and math are not as bivariate as some literature might suggest inasmuch as the clusters found in the current study suggest a more complex conceptualization of parent behaviors, beliefs, and expectations are needed to consider its relation to child academic outcomes.

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Declarations

Conflict of Interest The authors declare no competing interests.

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