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The influence of parental warmth and stress on reading through approaches to learning: Racial/ethnic variation

Tatiana Hill[1] | Natalia Palacios[2]

[1]First 5 Contra Costa Children and Families Commission, Concord, California

[2]Curry School of Education and Human Development, University of Virginia, Charlottesville, Virginia

Correspondence
Tatiana Hill, First 5 Contra Costa Children and Families Commission, Concord, CA, USA.
Email: thill@first5coco.org

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Abstract

When identifying parental socialization processes influencing children's reading achievement, building self-regulation is a potential underlying mechanism. Yet socialization (i.e., warmth, stress) of self-regulation may vary based on the sociocultural context of ethnic minority families. Using the ECLS-K: 2011 (N = 17,020; M_{Age} = 73.43 mos, SD = 4.48 mos), we explored: (RQ1) Do kindergarten approaches to learning (ATL), a composite of self-regulation behaviours in the classroom context, mediate the association between parental warmth and stress and first grade reading? and (RQ2) Is mediation moderated by race/ethnicity (White, Black, Hispanic, Asian)? ATL mediated the association between parental warmth and stress and reading, such that parental warmth contributed positively to reading through higher ATL, and parental stress contributed negatively to reading through lower ATL. However, the lack of moderation suggests that the adaptiveness of parental warmth and maladaptiveness of parental stress for children's reading through ATL may be similar across race/ethnicity. Findings inform intervention and practice targeting children's school readiness.

Highlights

- The current study explored whether parental warmth and stress influenced reading through approaches to learning skills, considering variation by race/ethnicity.

- The mediation model and conditional process analysis reveal that across race/ethnicity, warmth benefits reading and stress is detrimental for reading.
- Parental warmth and stress should inform interventions promoting children's school readiness, with attention to cultural practices of ethnically diverse families.

KEYWORDS
parental stress, parental warmth, race/ethnicity, reading, self-regulation

1 | INTRODUCTION

From kindergarten to first grade, children begin solidifying their ability to read as a foundation for developing academic content expertise (Clemens, Lai, Burke, & Wu, 2017; Pinto, Bigozzi, Vezzani, & Tarchi, 2016). Though parental socialization inputs in early childhood have strong implications for children's reading achievement (Bae, Hopkins, Gouze, & Lavigne, 2014; Merlo, Bowman, & Barnett, 2007; Oxford & Lee, 2011; Puccioni, 2018; Shelleby & Ogg, 2019), the exact mechanisms through which parents socialize children to achieve in reading are unclear. Typically, literature on parental socialization of school readiness in early childhood emphasizes the significance of warm and responsive interactions for catalysing development of self-regulation skills (Karreman, Tuijl, Aken, & Deković, 2006; Nordling, Boldt, O'Bleness, & Kochanska, 2016). Additionally, parental stress can deter from interactions valuable for self-regulation development by leading to less responsive and more severe parenting as well as conflict between parent and child (Conger et al., 2002). Self-regulation may be a key mechanism through which parents shape children's early reading development. Therefore, it is necessary to determine whether parents establish children's readiness for reading by supporting the development of children's self-regulation skills. Parents may specifically invest in approaches to learning (ATL), self-regulation skills entailing attentional competencies relevant for the classroom.

Additionally, the majority of research on the relation between parental socialization and self-regulation has been conducted with White, middle class families (Karreman et al., 2006; Meléndez, 2005). Consequently, previous work may neglect the sociocultural factors that frame the development of self-regulation in ethnic minority families (John & Tarullo, 2020). Considering variation in how psychological mechanisms function across ethnic minority groups allows us to acknowledge that inputs to socialization of self-regulation such as warmth and stress may not be mutually adaptive (or maladaptive) for ethnically diverse families (Coll et al., 1996). In addition to exploring ATL as a mediating mechanism through which parental warmth and stress influence reading achievement, we investigate whether the model varies for families of different races/ethnicities, including White, Black, Hispanic, and Asian American children.[1] Findings may inform culturally relevant practices in parenting and school readiness interventions in order to more effectively serve ethnically diverse children and families.

1.1 | Parenting and reading

Especially in the early years of childhood, the home is the formative environment in which parents socialize children to engage in reading (Baker, 2013; Segers, Damhuis, van de Sande, & Verhoeven, 2016). Early reading skills such as letter recognition and print knowledge emerging in the home environment are indicators of later literacy and fluency

reading academic texts (Clemens et al., 2017; Pinto et al., 2016), which determine a child's capacity to learn. Parental warmth characterizes the quality of the relationship and environmental resources that parents provide for children's academic development in reading (Baumrind, 1971). In contrast, parental stress is known to be associated with decreased reading achievement, and may in fact detract from achievement by driving negative parenting practices or limiting positive practices in the home environment that normally support school readiness and adjustment (Conger et al., 2002; Oxford & Lee, 2011).

1.2 | Parenting and ATL

Children develop self-regulation by internalizing strategies for meeting expectations and demands in the context of social interaction (Bronson, 2000; Kopp, 1982). Before a child can self-regulate independently, they require external regulation from caregivers to navigate their environment (Bronson, 2000; Kopp, 1982). Parents build children's self-regulation by familiarizing children with expectations for social interaction and competency development (Calkins, Smith, Gill, & Johnson, 1998; Kuczynski & Kochanska, 1995). ATL have been described as encompassing attentional capacities such as application and flexibility of attention, organization, and persistent effort, consistent with early cognitive self-regulation (Li-Grining, Votruba-Drzal, Maldonado-Carreño, & Haas, 2010). Parents may provide opportunities for children to practice self-regulation skills such as ATL, which are foundational for learning in the home and classroom. Composites of self-regulatory competencies that are similar to ATL (see learning-related skills in Cerda, Im, & Hughes, 2014, Li-Grining et al., 2010, and McClelland, Acock, & Morrison, 2006; see approaches to learning in McWayne, Fantuzzo, & McDermott, 2004) as well as the ECLS-K composite of ATL are associated with more positive reading achievement (Li-Grining et al., 2010; Xu, Kushner Benson, Mudrey-Camino, & Steiner, 2010). Moreover, cultivating ATL in particular may socialize children to engage and excel in literacy tasks due to exercising agency and initiative to advance beyond basic decoding.

Building on evidence revealing the association between parenting and self-regulation (Gershoff, Aber, Raver, & Lennon, 2007; Karreman et al., 2006; Nordling et al., 2016), one study highlighted ATL as a mediator of the association between parental involvement and reading achievement (Xu et al., 2010). ATL may be an important mediating mechanism whereby parental socialization factors such as warmth and stress are internalized by children and manifest in specific learning behaviours associated with academic achievement. Building on the Xu et al. (2010) study, we propose that ATL are a mediating mechanism through which the parental inputs of warmth and stress are internalized by the child and take form as an approach to learning of skills applicable to reading.

1.3 | Self-regulation as mediator

1.3.1 | Parental warmth

In one study on the influence of aspects of parental warmth and self-regulation, a latent variable for parental responsiveness including warm acceptance was positively associated with conflict executive functioning and delay inhibition in an ethnically diverse, low-income sample of 5-year-old children (Merz, Landry, Montroy, & Williams, 2017). High maternal warmth also seems to be adaptive for inhibitory control development, such that the contribution of less attentional control in infancy to less inhibitory control at age 6 was minimized under high maternal warmth (Cioffi et al., 2020). Additionally, parental warmth was found to contribute to higher reading achievement directly (Merlo et al., 2007; Shelleby & Ogg, 2019) and through the agency of the child (Gurdal, Lansford, & Sorbring, 2016). It is necessary to expand on these findings by identifying the role of parental warmth in building children's self-regulation to optimize academic ability in reading.

1.3.2 | Parental stress

Parental stress is form of maladjustment often caused by the powerful environmental stressor of low socioeconomic status and gives rise to dysfunctional self-regulation in children (Conger et al., 2002; Gershoff et al., 2007). Living with economic hardship imposes economic pressure, which leads to parental stress. Parents with parental stress have an impaired capacity to cope with stress and emotions, which directly plays a role in children's approaches to coping stress (Cappa, Begle, Conger, Dumas, & Conger, 2011; McQuillan & Bates, 2017). Importantly, the experiences of ethnic minority families largely intersect with experiences of economic hardship, making ethnic minority families more susceptible to parental stress. The association between parental stress and children's developmental outcomes is grounded in the literature on economic hardship. However, there is emerging evidence of other contributors to parenting stress like acculturation, especially when considering sources of stress in the sociocultural context of ethnic minority families. Thus, further research should expand on findings implicating self-regulation as a key mediating mechanism through which parental stress influences reading achievement, particularly in the critical developmental period of early childhood.

1.4 | Between-group variation in ATL by race/ethnicity

Parenting socialization processes, such as parental warmth and stress, are culturally constructed (Trommsdorff, 2009). Culture plays a significant part in the goal-directed behaviour underlying cognitive aspects of self-regulation, as goal formation is predicated on values and belief systems (LeCuyer & Zhang, 2015; Trommsdorff, 2009). As such, the nature of associations between these contextual factors and children's processes and outcomes, may be different for children of varying racial/ethnic backgrounds. Racial/ethnic differences have been found in parental ratings of their children's ATL behaviours, while no contrasts have been tested in the association between ATL and other parenting predictors or between ATL and reading (García & Weiss, 2015). Some evidence suggests that ATL are universally adaptive for children's academic achievement across diverse ethnicities in the ECLS-K (Li-Grining et al., 2010). Race/ethnicity largely did not interact with fall kindergarten ATL to predict fifth grade reading or math growth from kindergarten to fifth grade, with two exceptions. The interaction between other and ATL positively predicted math growth in children between fall kindergarten and spring fifth grade, while the interaction between Hispanic and ATL negatively predicted reading growth in children between spring kindergarten and spring fifth grade (Li-Grining et al., 2010). Although parts of the mediation pathway such as the pathway from parental warmth and stress and psychological adjustment and between warmth and stress and academic outcomes have been tested within ethnic minority families in the United States (Conger et al., 2002; Hou, Kim, & Wang, 2016; McCabe, Mechammil, Yeh, & Zerr, 2016), to our knowledge studies have not tested the full mediation model within racial/ethnic populations in the United States. Given the importance of parenting context, particularly parental warmth and stress for early self-regulation, it is necessary to consider the extent to which the associations between parental warmth and stress and ATL and reading achievement differ for White, Black, Hispanic and Asian families.

1.5 | Moderated mediation by race/ethnicity

Given that the role of parental warmth and stress in development of self-regulation and academic competencies are established based on dominant cultural norms, the experiences and cultures of ethnic minorities are neglected (Karreman et al., 2006; Meléndez, 2005). Thus, it is critical to examine adaptiveness of warmth and stress for children's self-regulation in families of diverse races/ethnicities. We recognize within-group variation in each racial/ethnic group, even within the context of the United States (López, Ruiz, & Patten, 2017; Manuel Krogstad & Noe-Bustamante, 2020). Therefore, examining the adaptiveness of these parenting behaviours across broader racial/

ethnic groups should be an initial step to considering culturally specific socialization mechanisms not based on a standard of Whiteness, followed by examining how mechanisms vary within racial/ethnic groups.

1.5.1 | Black children

There have been mixed findings as to the importance of parental warmth in Black families. Research has documented Black families as exhibiting lower levels of warmth (Barbarin & Jean-Baptiste, 2013; Chao & Kanatsu, 2008) and elevated levels of control (Barbarin & Jean-Baptiste, 2013) compared to other ethnic groups. Warm parenting practices of elaborating, supporting, explaining and scaffolding were associated positively with increased language performance, social competence, literacy performance (Barbarin & Jean-Baptiste, 2013) and reading achievement overall (Bae et al., 2014). Evidence suggests that Black mothers effectively cultivated self-regulation such as autonomous compliance and responsibility in young children by incorporating warmth and authoritative parenting practices and minimizing authoritarian practices (Bae et al., 2014; LeCuyer & Swanson, 2017). However, contextual factors may compel Black families to rely on authoritarian parenting style as an adaptive approach in harsh environments (Harris & Graham, 2014), or as a means of maintaining parental authority (Barbarin & Jean-Baptiste, 2013).

Previous studies point to strong fit of the family stress model for White, Hispanic and Black children (Conger et al., 2002; Raver, Gershoff, & Aber, 2007). Elevated parent stress was even more detrimental for parenting practices for Black and Hispanic families, yet the association between positive parenting practices and social competence was not as strong for Black families relative to White families (Raver et al., 2007).

1.5.2 | Hispanic children

Though findings are mixed as to levels of parental warmth reported in Hispanic families compared to other ethnic groups (Deater-Deckard et al., 2011; McCabe et al., 2016), parental warmth and supportiveness have developmental relevance for Hispanic children's self-regulation, seeming to protect against behavioural problems (McCabe et al., 2016) and promote emotion knowledge (Pintar Breen, Tamis-LeMonda, & Kahana-Kalman, 2018). However, a lack of warm or supportive parenting may not be as maladaptive for Hispanic children's emotion knowledge, social competence, and reading, potentially due to alignment with Hispanic cultural values of maintaining respect for authority and good behaviour (Bae et al., 2014; Lugo-Candelas, Harvey, & Breaux, 2015; Pintar Breen et al., 2018; Raver et al., 2007).

As mentioned earlier, the manner in which parental stress negatively influenced development of self-regulation and academic competencies in Hispanic families seems to be consistent with that of other ethnic groups, though the influence of parental stress may be more intense within Hispanic families (Raver et al., 2007). However, parental stress attributed to foreign born or immigrant parents' acculturation may have implications for the self-regulation behaviour of Hispanic children (Li-Grining, 2012).

1.5.3 | Asian American children

In the Asian American pan-ethnic group, expectations founded in the Confucianist belief system pertain to children demonstrating discipline, self-control, and inhibitory control to preserve collective harmony (Oh & Lewis, 2008). As a result, parents may not prioritize warmth in the form of supporting individual goals or emotions. Indigenous parenting constructs such as nurturing the child by favouring infants' physical needs over emotional needs (Ahadi, Rothbart, & Ye, 1993; Chen & Rubin, 2011), training them to be disciplined, work hard, exhibit good behaviour, and ultimately succeed in school (Chao, 1994; Mistry et al., 2016) may be more fitting depictions of Asian parental warmth, especially parental warmth that contributes to academic achievement through robust self-regulation ability.

A version of the family stress model constructed around stresses from acculturation contributed to parent child conflict, resulting in negative academic and psychological adjustment outcomes for Asian American adolescents (Hou et al., 2016). Though the source of parental stress may vary for Asian American families, parental stress could ultimately prove harmful for Asian American children's reading achievement. Further research should identify whether the harm that parental stress contributes to academic achievement functions through diminished ATL.

In summary, parental warmth may be protective for self-regulation in Black and Hispanic families (Barbarin & Jean-Baptiste, 2013; McCabe et al., 2016), and less relevant for self-regulation in Asian families (Chao, 1994; Mistry et al., 2016). Parental stress overall appears to be maladaptive for self-regulation across race/ethnicity (Hou et al., 2016; Raver et al., 2007). However, it is important to examine the influence of warmth and stress in socializing self-regulation skills for the classroom such as ATL, noting the implications for children's achievement in reading for different racial/ethnic groups.

1.6 | The present study

In order to expand on the literature on parental socialization (Conger et al., 2002; Gurdal et al., 2016; Karreman et al., 2006; Merlo et al., 2007; Nordling et al., 2016; Pearson et al., 2016; Xu et al., 2010) to highlight mechanisms for children to excel in reading, it is necessary to assess whether the self-regulation skills of ATL mediate the association between parental warmth and stress. Importantly, it is important to explore the mediating mechanism of ATL in order to establish the proximal role of warmth and stress on reading achievement through ATL in early childhood. Once we examine evidence of a proximal mechanism contributing to reading achievement, the current study may serve as the basis for considering distal effects of the mechanism on reading growth. Thus, in the present study we investigate the initial research question (RQ1): Do kindergarten ATL mediate the association between parental warmth and stress and first grade reading? We hypothesize that ATL mediate the association between parental warmth and stress and reading achievement (Gershoff et al., 2007; Gurdal et al., 2016; Karreman et al., 2006; Merz et al., 2017; Nordling et al., 2016; Pearson et al., 2016).

Current techniques of modelling self-regulation development must shift away from a deficit-oriented approach that establishes White parenting as ideal to represent varying developmental mechanisms within minority ethnic groups. In the present study, we expand on work on parenting and self-regulation based on White families (Gershoff et al., 2007; Karreman et al., 2006; Merz et al., 2017; Nordling et al., 2016) and in ethnic minority families (Barbarin & Jean-Baptiste, 2013; Hou et al., 2016; McCabe et al., 2016; Raver et al., 2007) to investigate whether parental mechanisms influencing reading through self-regulation vary depending on race/ethnicity. We implement Hayes' (2019) conditional process analysis approach in considering the following (RQ2): Does child race/ethnicity (White, Black, Hispanic or Asian) moderate the mediation pathway? Our approach to the present study of self-regulation will make a significant contribution to the literature by allowing researchers to examine whether processes of building ATL in interactions defined by parental warmth and stress to support children's school readiness are culturally relevant for different racial/ethnic groups in the United States (Trommsdorff, 2009).

We hypothesize that the pathway from parental warmth to ATL behaviour (the *a* pathway) and the pathway from parental warmth to reading achievement (the *c′* pathway) will be moderated by race/ethnicity. We will not test moderation of the pathway from ATL to reading due to a focus on the role of culture in shaping divergent mechanisms of parental socialization (Trommsdorff, 2009). Conditional process analysis is very similar to a multigroup modelling approach in structural equation modelling, and conditional process analysis allows for testing moderation of individual pathways in the mediation model. We hypothesize that for Black families, parental warmth may function differently from other ethnic groups in contributing to academic achievement through ATL. Furthermore, we hypothesize that parental warmth may not be essential in driving Asian children's academic achievement through stronger ATL. However, we hypothesize that parental warmth will support reading achievement through enhanced ATL for White children and Hispanic children.

We believe the pathway from parental stress to ATL and the direct effect pathway will also be moderated. We believe that parental stress will contribute to lower reading achievement due to stress having a harmful influence on ATL behaviour, contributing to an overall negative indirect effect. However, in line with previous findings of more amplified effects in ethnic minority families (Conger et al., 2002; Raver et al., 2007), the magnitude of the indirect effect will likely be stronger for Hispanic families than European families. We predict that the magnitude will be strongest for Black families (Conger et al., 2002; Raver et al., 2007).

2 | METHOD

2.1 | Analytical sample

We conducted longitudinal analyses using restricted data from the kindergarten and first grade waves of the Early Childhood Longitudinal Study-kindergarten to second grade cohort (National Center for Education Statistics, 2012a), a nationally representative and ethnically diverse sample of children (N = 18,170). The analytical sample for the current study includes White (49.9%), Black (14.1%), Hispanic (26.9%) and Asian (9.1%) children (n = 17,020). A slight majority (52.2%) of the sample was at or above 200% of the poverty threshold (in the remainder of the sample, 25.7% were below the poverty threshold, and 22.1% were at or above poverty threshold below 200%). For the majority of families (55.4%), the highest level of parental education was above high school but no college (in the remainder of the sample, 19.5% of parents had less than a high school degree, and 25.1% completed college or above). Most families (79.6%) spoke English at home, and most families (73.7%) also had at least one United States born parent (compared to 26.3% both foreign born parents). Lastly, most of the sample had an older sibling in the house (58.9%). This cohort started kindergarten in fall of 2010, with child reading assessments collected in the fall and spring of kindergarten through second grade. Data was also collected from focal children's parents, from which we use parent reports on children's ATL, parental warmth and stress taken in spring of kindergarten as well as demographic information (Tourangeau et al., 2017).

2.2 | Measures

2.2.1 | Parental warmth

The predictor variable for parental warmth is a composite of four items from the kindergarten spring parent interview questions from the section on discipline, warmth and emotional supportiveness. The parent rated the following statements on a scale ranging from completely true (1), mostly true (2), somewhat true (3), not at all true (4) (not ascertained, do not know, refused, and not applicable responses coded as missing): '{CHILD} and I often have warm, close times together', 'Most of the time I feel that {CHILD} likes me and wants to be near me', 'Even when I'm in a bad mood, I show {CHILD} a lot of love', and 'I express affection by hugging, kissing, and holding {CHILD}' (National Center for Education Statistics, 2012b). The composite was created by reverse coding each item and taking the sum across all items (Beaver, Wright, & Delisi, 2007). Hence, higher scores on the parental warmth composite are indicative of stronger parental endorsement of warmth behaviours [Overall: α = .67 (see similar composite, parental affection, α = .60 in Beaver et al., 2007); Asian children: α = .63; Black children: α = .70; Hispanic children: α = .69; White children: α = .66).

2.2.2 | Parental stress

The predictor variable for parental stress is a composite of four items based on the Parenting Stress Index (Abidin, 1990) from the spring kindergarten parent interview section on discipline, warmth and emotional

supportiveness. The parent rated the following statements on a scale ranging from completely true (1), mostly true (2), somewhat true (3), not at all true (4) (not ascertained, do not know, refused, and not applicable responses coded as missing): '"Being a parent is harder than I thought it would be", {CHILD} does things that really bother me', 'I find myself giving up more of my life to meet {CHILD}'s needs than I ever expected'., and 'I often feel angry with {CHILD}', (National Center for Education Statistics, 2012b). The composite was created by reverse coding the items and taking the average across all items. Previous studies have used similar four-item composites as part of nationally representative datasets [Kim, Viner-Brown, & Garcia, 2007: parental stress composite, alpha not available; Moore, Probst, Tompkins, Cuffe, & Martin, 2007: parental stress composite, alpha not available; Nomaguchi & House, 2013: parenting stress composite, α = .53 (Spring kindergarten wave)]. Thus, higher scores on the parental stress composite indicate endorsement of higher levels of stress related to parenting and the parent–child relationship (Overall: α = .60; Asian children: α = .58; Black children: α = .59; Hispanic children: α = .59; White children: α = .62).

2.2.3 | Reading achievement

Reading achievement is the outcome variable based on a scale score on a 120-item assessment administered in spring of first grade. Reading achievement in spring of kindergarten is included as a covariate in the model. Assessments occurred in two stages, with the first stage used to establish the level of difficulty for the next stage of assessment. Items were composed of language and literacy skills ranging from fundamental skills such as letter and word recognition and print familiarity to more advanced skills such as reading comprehension and vocabulary knowledge (Tourangeau et al., 2017). Assessors collected children's responses to word and pictorial images on an easel and to short passages as part of a larger direct cognitive assessment. The reading achievement items had high reliability (θ = .93–.95; Tourangeau et al., 2017).

2.2.4 | ATL

The ATL variable used in the analyses is a composite created for the ECLS-K (Tourangeau et al., 2017). As described in the codebook, the composite is an average score of six items rated by parents in the spring of kindergarten on a scale ranging from never (1) to very often (4) and which related to the frequency of the following learning behaviours: 'keep working at something until finished; show interest in a variety of things; concentrate on a task and ignore distractions; help with chores; eager to learn new things; creative in work and play' (Tourangeau et al., 2017). As reported by the ECLS-K, the ATL items for the spring of kindergarten had a reliability of .98 for the overall sample (White children: α = .97; Black children: α = .99; Hispanic children: α = .98; Asian children: α = .97).

2.2.5 | Covariates and auxiliary variables

We included covariates that have previously been established in the literature as being predictive of self-regulation and reading achievement (Baker, 2013; Hill & Palacios, 2019; Li-Grining et al., 2010) as well as auxiliary variables in the model. Covariates and auxiliary variables included in the model were prior reading achievement in spring of kindergarten, home environment quality, parental education (1 = completed college or above [omitted], 2 = above high school but no college, 3 = less than high school degree), poverty threshold level [1 = below poverty threshold, 2 = at or above poverty threshold but below 200%, 3 = at or above 200% of poverty threshold (omitted)], foreign born parent status (0 = at least one United States born parent; 1 = both foreign born parents), English home language (0 = primary language other than English; 1 = English as primary language), and older siblings (1 = older sibling; 0 = no older/younger siblings).

3 | RESULTS

3.1 | Analytical strategy

We performed structural equation modelling in Stata 14.0 (StataCorp, 2014) to test Models 1 and 2 to examine our key research questions: (RQ1) Do kindergarten ATL mediate the association between parental warmth and stress and first grade reading (RQ2) Does child race/ethnicity moderate the mediation pathway? All models were run with clustered *SEs* for school in order to adjust estimates for children being clustered within schools. Additionally, all models included the covariates described in the aforementioned covariates and auxiliary variables section.

3.1.1 | Model 1

In Model 1.1, we modelled the association between parental warmth and stress in the spring of kindergarten and reading achievement in spring of first grade (parental warmth and stress were entered simultaneously in the model; see Figure 1a). In Model 1.2, we then added ATL, measured in the spring of kindergarten, as a mediator between parent warmth and stress and reading achievement (RQ1). Models control for race/ethnicity as well as the aforementioned set of covariates. In the mediation model, the a_1 pathway is indicative of the association between parental warmth and reading achievement. The a_2 pathway is the association between parental stress and reading achievement. The *b* pathway is the association between ATL and reading achievement. Lastly, the c_1' *and* c_2' pathways pertain to the direct association between parental warmth and stress and reading.

3.1.2 | Model 2

We then tested RQ2, the extent to which race/ethnicity moderated the mediation model described in model 1 (see Figure 1b). To do so, we tested for moderation of the *a* and *c*′ pathways by including interaction terms for parental warmth X race/ethnicity and parental stress X race/ethnicity when predicting ATL (mediation model) and when predicting reading achievement (direct effect). In testing moderation of the direct effect, we examined the significance of the interaction term. Following Hayes' (2019) framework for conditional process analysis, we calculated conditional indirect effects for each racial/ethnic group and generated bootstrapped *SEs* running 1,000 iterations. In probing the interaction, we tested for significant differences between conditional indirect effects for each pairing of racial/ethnic groups (White and Black, White and Hispanic, White and Asian, Black and Hispanic, Black and Asian and Hispanic and Asian).

3.1.3 | Missing data

For the children in the dataset, 29.5% of the observations were missing on the parental warmth variable composite, 29.9% of observations were missing on the parental stress composite, and 16.6% of observations were missing for first grade reading scores. The race indicators for Black and Hispanic also significantly predicted missingness in the outcome. However, none of the key predictor variables significantly predicted missingness in the outcome variable. We used full information maximum likelihood methods to account for missing data, in addition to including auxiliary variables in the model that significantly predicted missingness in reading scores in spring of first grade, such as: below poverty threshold, at or above 200% of poverty threshold, highest parental education above high school but no college, highest parental education completed college or above, English as home language, foreign born parent

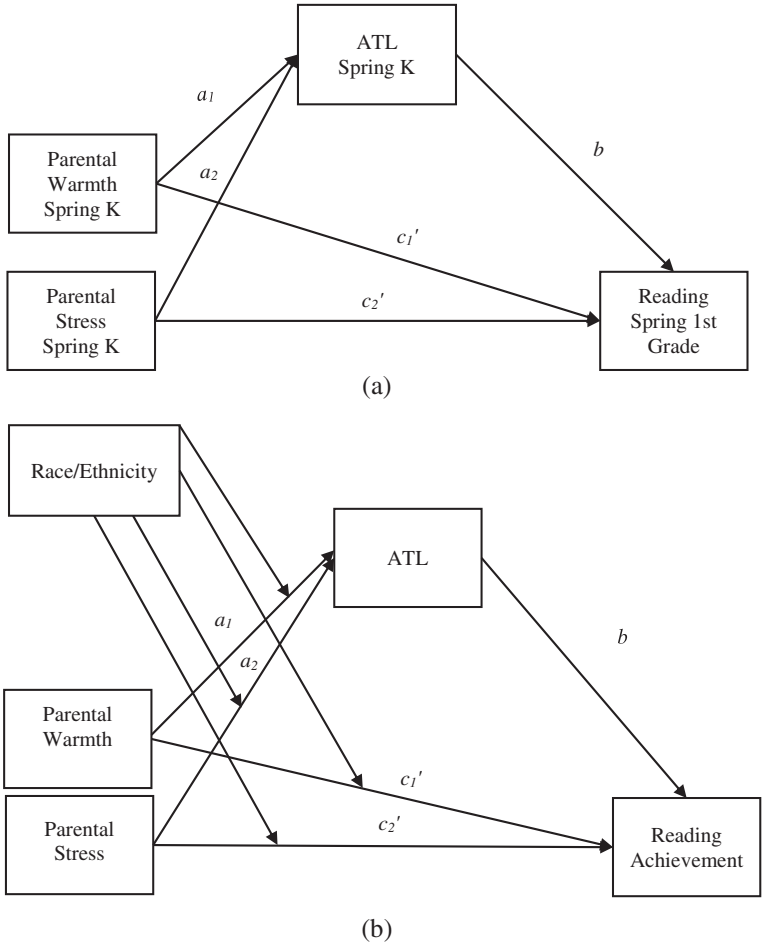

FIGURE 1 (a) Model 1: approaches to learning (ATL) mediate association of parenting inputs and reading achievement. (b) Model 2: child race/ethnicity moderates *a* and *c*′ pathways of mediation model. *Source:* ECLS-K: 2011 kindergarten-second grade restricted-use data from the National Center for Education Statistics

status, and previous reading achievement (Collins, Schafer, & Kam, 2001; Enders, 2010). FIML procedures rely on available observations for estimation of parameters of the data, ultimately generating less biased and more precise parameter estimates under the assumption of Missing at Random (Enders & Bandalos, 2001).

3.2 | Descriptive analysis

See Tables 1 and 2 for descriptive statistics on key variables included in the analytical model both for the overall sample and by child race/ethnicity, and see Data S1 for bivariate correlations by race/ethnicity. Overall, reading achievement was normally distributed, increasing from 61.19 (*SD* = 13.53) in spring of kindergarten to 84.05 (*SD* = 15.59) in spring of first grade. Scores on parental warmth for the overall sample were high on average (Overall: *M* = 15.03, *SD* = 1.45; 4–16), and parental stress scores were low on average (Overall: *M* = 1.95, *SD* = .63; 1–4). See Table 1 for pairwise comparisons between racial/ethnic groups of parental warmth and stress. There were significant differences between average parental warmth scores of Black children compared to White children, Hispanic children compared to White children, Asian children compared to White children, Hispanic children compared to Black children, and Asian children compared to Black children, but not between Asian children and Hispanic children (see Table 1). Differences in average parental stress scores were significant between Hispanic compared to White children, Asian children compared to White children, Asian children compared to Black children, and Asian children

TABLE 1 Correlation matrix and descriptive statistics for continuous key variables

	Parental warmth	Parental stress	Home environment	ATL	Reading (Spring K)	Reading (Spring first)
Parental warmth	1					
Parental stress	−0.11***	1				
Home environment	0.21***	−0.09***	1			
ATL	0.25***	−0.15***	0.30***	1		
Reading (Spring K)	0.02*	−0.03***	0.07***	0.22***	1	
Reading (Spring first)	0.03***	−0.05***	0.07***	0.24***	0.79***	1
Overall *M(SD)*	15.03(1.45)	1.95(0.63)	26.17(4.28)	3.13(0.49)	61.19(13.53)	84.04(15.59)
White *M(SD)*	15.09(1.32)	1.92(0.61)	26.73(3.93)	3.18(0.45)	63.44(12.77)	87.22(14.70)
Black *M(SD)*	15.25(1.39)	1.95(0.66)	26.30(4.40)	3.14(0.51)	58.14(12.81)	79.86(15.29)
Hispanic *M(SD)*	14.88(1.65)	1.96(0.64)	25.27(4.62)	3.03(0.53)	56.83(12.79)	78.57(15.65)
Asian *M(SD)*	14.81(1.59)	2.07(0.64)	24.67(4.52)	3.03(0.53)	66.51(15.95)	89.31(14.13)

	Parental warmth			Parental stress		
Comparison	**Contrast**	***SE***	***t***	**Contrast**	***SE***	***t***
Black versus White	0.16	0.04	3.68***	0.02	0.02	1.30
Hispanic versus White	−0.21	0.03	−6.74***	0.04	0.01	2.60*
Asian versus White	−0.28	0.05	−5.93***	0.15	0.02	7.07***
Hispanic versus Black	−0.37	0.05	−7.96***	0.01	0.02	0.59
Asian versus Black	−0.44	0.06	−7.49***	0.12	0.03	4.86***
Asian versus Hispanic	−0.07	0.05	−1.36	0.11	0.02	4.98***

Abbreviation: ATL, approaches to learning.
*$p \leq .05$.
***$p \leq .001$.
Source: ECLS-K: 2011 kindergarten-second grade restricted-use data from the National Center for Education Statistics.

compared to Hispanic children, but not for Black children compared to White children or Hispanic children compared to Black children (see Table 1).

3.2.1 | Model 1: Mediating role of ATL in association of parental factors to reading

Model 1.1 tested the direct association between parental warmth and stress and reading achievement, and Model 1.2 tested the indirect effect mediated by ATL (RQ1).

Direct effect: Association between parental warmth and stress and reading

In addressing our first research question, we assessed the direct association between parental warmth and stress in spring of kindergarten and reading achievement in spring of first grade in Model 1.1. Pathway coefficients demonstrate standardized beta coefficients and *p*-values. Controlling for race/ethnicity as well as covariates, the association

TABLE 2 Family demographics by child race/ethnicity

	White	Black	Hispanic	Asian
N = 17,020	%	%	%	%
Below poverty threshold	12.8	45.2	46.2	18.0
At or above poverty threshold below 200%	19.5	26.8	26.3	19.9
At or above 200% of poverty threshold	67.7	27.9	27.5	62.1
Highest parental education: Less than high school degree	8.5	16.8	46.9	14.9
Highest parental education: Above high school but no college	61.2	69.2	45.2	38.3
Highest parental education completed college or above	30.3	14.0	7.9	46.8
Both foreign born parents	1.8	8.8	62.2	91.4
Home language (1 = English)	97.7	95.8	49.2	37.8
Has at least one older sibling	57.7	62.6	61.8	51.9

Note: All sample sizes are rounded to the nearest 10 in order to comply with the ECLS-K: 2011 restricted-use data licence agreement with the NCES. Percentages are also rounded to the nearest 10 and may not sum to 100%. The variables at or above 200% of poverty threshold and highest parental education: completed college or above were identified as reference groups and omitted from analyses.
Source: ECLS-K: 2011 kindergarten-second grade restricted-use data from the National Center for Education Statistics (NCES).

between parental warmth and reading achievement in spring of first grade was not significant (β = .01, p = n.s.). Controlling for race/ethnicity as well as covariates, only parental stress in spring of kindergarten was significantly and negatively associated with reading achievement in the spring of first grade (β = −.02, p < .001), such that higher parental stress in kindergarten contributed to slightly lower first grade reading achievement. Therefore, there was only a direct association between parental stress and reading achievement.

In testing other direct effect pathways, we found that parental warmth was positively associated with ATL (β = .17, p < .001). Parental stress was negatively associated with ATL (β = −.10, p < .001). Lastly, ATL was positively associated with reading (β = .07, p < .001), though the association was surprisingly small.

In a separate model (1.2), we then assessed the association between parental warmth and stress and reading achievement when mediated by ATL (see Figure 2). While the addition of ATL as mediator did not change the direct association between parental warmth and reading achievement, the addition of ATL reduced the direct effect of parental stress on reading achievement by 30%, also reducing its level of significance [β = −.02 (rounded to two decimal places), p < .01].

Indirect effect

Conditional indirect effects reflect unstandardized beta coefficients and *p*-values. Examination of the indirect effects suggests that kindergarten parental warmth and stress are associated with first grade reading achievement through kindergarten ATL (see Figure 2). Greater parental warmth contributed to higher reading achievement through higher ATL behaviour in kindergarten ($B_{indirectW}$ = .13, p < .001; CI = 0.10–0.16). Greater parental stress contributed to lower levels of reading achievement through lower ATL competence ($B_{indirectS}$ = −.16, p < .001; CI = −0.21to −0.12). Thus, ATL mediated the association between both parental warmth and stress and reading achievement.

3.2.2 | Model 2: Conditional process analysis

To answer whether race/ethnicity moderated the mediation model (RQ2), we implemented conditional process analysis to test for moderation of the pathways involving parenting mechanisms (see Figure 1b). Therefore, we tested for moderation of the direct effect and the indirect effect in the same model.

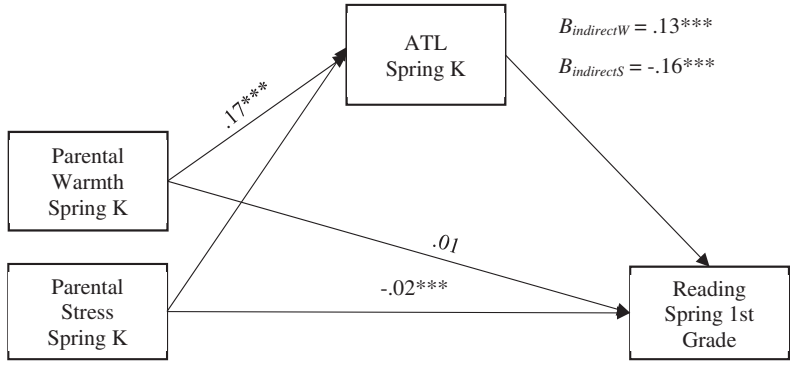

FIGURE 2 Model 1: mediation of association between parenting inputs and reading achievement through approaches to learning (ATL), controlling for race/ethnicity and set of covariates (RQ1). *Source:* ECLS-K: 2011 kindergarten-second grade restricted-use data from the National Center for Education Statistics

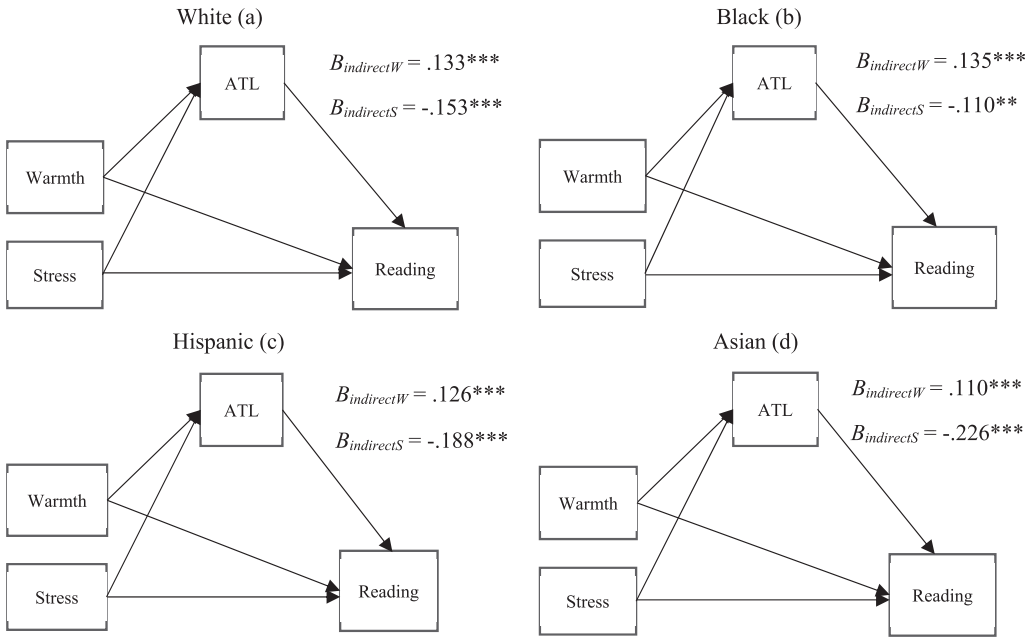

FIGURE 3 Model 2: moderated mediation results (RQ2) for White (a), Black (b), Hispanic (c) and Asian (d) families, controlling for covariates. *Source:* ECLS-K: 2011 kindergarten-second grade restricted-use data from the National Center for Education Statistics

Moderation of direct effect

Model 2 revealed that race/ethnicity did not moderate the direct association between kindergarten parental warmth and stress and first grade reading achievement.

Moderation of indirect effect

Though there was slight variation by race/ethnicity in the conditional indirect effect of kindergarten parental warmth on first grade reading achievement through kindergarten ATL, the differences in the conditional indirect effect

between racial ethnic groups were insignificant. Therefore, we found that race/ethnicity did not moderate the effect of the indirect association between parental warmth and reading achievement through ATL (Black: $B_{indirectW}$ = .135, p < .001; CI = 0.082–0.188; White: $B_{indirectW}$ = .133, p < .001; CI = 0.102–0.164; Hispanic: $B_{indirectW}$ = .126, p < .001; CI = 0.093–0.158; Asian: $B_{indirectW}$ = .110, p < .001; CI = 0.057–0.163; see Figure 3).

Though there was some variation by race/ethnicity in the conditional indirect effect of parental stress on reading through ATL, between-group differences were also insignificant (Asian: $B_{indirectS}$ = −.226, p < .001; CI = −0.342 to −0.110; Hispanic: $B_{indirectS}$ = −.188, p < .001; CI = −0.257 to −0.118; White: $B_{indirectS}$ = −.153, p < .001; CI = −0.202 to −0.104; Black: $B_{indirectS}$ = −.110, p = .01; CI = −0.196 to −0.023). Thus, we found that race/ethnicity also did not moderate the effect of the indirect association between parental stress and reading achievement through ATL.

Findings ultimately revealed that the direction of the indirect effects for parental warmth (positive) and stress (negative) were the same across race/ethnicity for White, Black, Hispanic and Asian Children. There were small, yet not statistically significant variations in the magnitude of the indirect effect by race/ethnicity.

4 | DISCUSSION

The aim of our study was to examine whether ATL was a mechanism through which parental warmth and stress influenced reading achievement. Furthermore, we wished to investigate the degree to which race/ethnicity moderated the mediation of warmth and stress on reading through ATL. Findings revealed support for one of the major hypotheses. We found evidence that the association between parental warmth and stress and reading achievement was mediated by ATL. Yet when testing whether race/ethnicity moderated the mediation, there was no evidence of moderated mediation by race/ethnicity. Therefore, parental warmth, a parenting construct theorized as important for self-regulation and academic development (Karreman et al., 2006; Nordling et al., 2016) appears to contribute to reading achievement through having a protective influence on ATL skills. On the other hand, parental stress is a parenting construct that was theorized as a risk factor for self-regulation and academic development (Conger et al., 2002), and in fact seems to be detrimental to reading achievement by exerting a harmful influence on ATL. Given that race/ethnicity did not moderate these associations, our findings reinforce the importance of ATL as a potential target for intervention when children's relationships and interactions with parents are characterized by parental warmth and stress. It is possible that the null moderated mediation findings pertain to the generalized parenting constructs in the current study, which may not reflect culturally specific dimensions of parenting. In this case, findings highlight the importance of research that examines culturally specific parenting practices that are related to children's self-regulation. Self-regulation constructs of interest for Hispanic populations might be consistent with values of cooperation and family (Contreras, Kerns, & Neal-Barnett, 2002). In Asian American families, children may be socialized to self-regulate with the goal of maintaining communal honour and well-being and performing academically (Chen & Rubin, 2011). For Black children, constructs of self-regulation may be focused on socialization of racial identity, religious beliefs, and standards of moral development (Harris & Graham, 2014). Consideration should also be given to self-regulation skills that have communal applications and are employed in interpersonal interactions amongst family members (Li-Grining, 2012; Mistry et al., 2016).

4.1 | ATL as mediator of parental warmth and stress and reading achievement

We examined the direct association between parental factors, such as parental warmth and stress in kindergarten and reading achievement in first grade. In contrast to the previous literature (Merlo et al., 2007; Shelleby & Ogg, 2019), parental warmth was not a significant predictor of reading achievement. However, parental stress was negatively associated with reading achievement, even after controlling for covariates such as home environment. The significant finding for parental stress builds on literature indicating that parental stress coincided with parents

placing less value on reading competence (Respler-Herman, Mowder, Yasik, & Shamah, 2012). Notably, the direct associations between parenting factors and reading were both small and similar in magnitude, indicating that neither of the parenting factors were strong inputs to reading in general.

One of our primary aims was to examine whether kindergarten ATL functioned as a mediator between kindergarten parental warmth and stress and first grade reading achievement. Indeed, we find that ATL mediated the longitudinal association between both parenting factors and reading achievement. Considering these patterns of direct and indirect effects, we suggest that the absence of a direct effect between parental warmth and reading achievement may be related to the importance of ATL as a mediator. Our findings indicate that parental warmth was a significant predictor of ATL. It may be that parental warmth supports reading achievement in early childhood primarily through other mechanisms such as self-regulation (Gurdal et al., 2016). Given that there was an indirect effect of warmth despite there being no direct effect of parental warmth, it is possible that an additional variable apart from ATL is driving the longitudinal association between parental warmth and reading. It could be that parental warmth is implemented as part of an authoritative parenting style (Grolnick & Ryan, 1989; Shen, Cheah, & Yu, 2018), meaning that a combination of warmth and control is supporting elementary reading achievement via self-regulation skills.

As expected from prior evidence (Conger et al., 2002; Oxford & Lee, 2011), parental stress was negatively associated with reading, an association that was mediated by ATL. Parental stress may deprive the child of opportunities for rich parent child interactions that would support the development of both ATL and reading achievement. Previous evidence points to ATL as relevant predictors of reading achievement (Li-Grining et al., 2010). Our findings add to this body of work by demonstrating the importance of parental warmth and stress for supporting ATL upon starting elementary school. Parental warmth may boost ATL and allow the child to learn and thrive in the home and the classroom, which eventually translates to higher reading achievement in first grade, while parental stress may contribute to the destabilization of this system.

4.2 | Conditional process analysis: Does the mediation model vary by race/ethnicity?

Our second aim was to examine whether ATL functioned similarly as a mediator of parental warmth and stress and reading achievement across Asian, Black, Hispanic and White children and families. In contrast to prior evidence of racial/ethnic variation in the association between parental warmth and children's reading achievement (Bae et al., 2014), we found no evidence of racial/ethnic moderation for the direct association between parental warmth and stress and children's reading achievement. Differences in findings could be attributed to the significantly smaller sample size and the difference in constructs for parenting behaviour, such as hostility/coercion and scaffolding, used in the previous study (Bae et al., 2014). Contrary to hypotheses that the association between warmth and stress and ATL would be moderated by race/ethnicity, we found that race/ethnicity did not moderate these pathways. We speculate that these null patterns may point to a lack of cultural specificity in the parental warmth and stress measures available in the ECLS-K. In other words, the source of variation by race/ethnicity may be in more nuanced expressions of parental warmth or experiences of parental stress. Moreover, there may be variation in parental warmth and stress within a racial/ethnic group based on contextual factors (Harris & Graham, 2014; Hou et al., 2016), cultural orientation (Chen, Zhou, Main, & Lee, 2015), or ethnic subgroup that remains to be explored, as much of the previous literature on warmth and stress in racial/ethnic minority families were conducted primarily in one ethnic subgroup (Cheah, Leung, Tahseen, & Schultz, 2009; Chen et al., 2015; Hou et al., 2016; Lugo-Candelas et al., 2015).

The indirect effect of parental warmth on reading achievement through ATL was positive across race/ethnicity. This suggests that warm interactions seemed to facilitate ATL behaviours, which increased children's success in first grade reading. Despite descriptive differences in magnitude between racial/ethnic groups, differences in indirect effects were not statistically significant. Our findings reiterate that parental warmth is integral to self-regulation in Black (Bae et al., 2014; LeCuyer & Swanson, 2017) Chinese American, (Cheah et al., 2009; Chen et al., 2015), and

Hispanic (McCabe et al., 2016; Pintar Breen et al., 2018) children and youth. Importantly, there were significant mean differences in parental warmth between Black and White, Hispanic and White, Asian and White, Hispanic and Black and Asian and Black parents, suggesting some variation in the degree to which racial/ethnic minority families leverage parental warmth.

Similar to parental warmth, the indirect effect of parental stress on reading achievement through ATL was negative across race/ethnicity. This suggest that parental stress limits opportunities for cultivating ATL, which may have negative implications for children's first grade reading achievement. Though there were descriptive contrasts between racial/ethnic groups in magnitude of the indirect effect, contrasts in the indirect effect were not statistically significant. Findings support previous literature denoting the maladaptiveness of parental stress for children's adjustment (Conger et al., 2002; Hou et al., 2016; Raver et al., 2007). Given the significant mean differences in parental stress between Hispanic and White, Asian and White, Asian and Black and Asian and Hispanic parents, there may be variation in the degree to which racial/ethnic minority families experience parental stress. Notably, Asian children in the current sample came from families with relatively higher socioeconomic status and higher levels of parental education. At the same time, a much higher percentage of Asian children came from families with both foreign born parents and families who spoke a language other than English at home, suggesting that children would be in a process of acculturating and manoeuvring multiple cultures. Therefore, it could be that the parental stress items are capturing stress on the parent child relationship that are attributed to sources other than economic hardship (Hou et al., 2016).

4.3 | Limitations and future directions

We make a unique contribution to the literature by examining ATL as a mediator of parental warmth and stress and reading achievement, as well as by examining moderated mediation by race/ethnicity. However, there are several limitations to consider. The current study advances on previous work that examines associations between parenting, self-regulation, and reading achievement constructs by investigating and finding evidence for the mediating role of self-regulation. However, mediation is not equivalent to causation, so causal inferences cannot be made. Additionally, parental warmth and stress were only measured based on select questionnaire responses in a nationally representative dataset, meaning that culturally specific constructs of parenting were not used in the study. Future work on parenting and self-regulation should include more comprehensive parenting measures that reflect the cultural diversity of the sample, which could consist of observational measures of parental warmth and stress. Moreover, since ATL was parent-reported rather than directly assessed, parents may have under or overestimated children's ATL capacity based on perception.

The current study sought to consider ATL as a construct for self-regulation in the classroom learning context, which makes a contribution beyond studies of direct assessments of executive functioning or singular domains of self-regulation that may not be as directly translatable. Moreover, we leveraged parent reports of ATL, as parent perceptions of ATL may be more aligned with parenting behaviours of warmth and stress used in cultivating ATL. Yet differences in the significant roles of parental warmth, stress, and ATL behaviours may also be due to variation in the self-regulatory competencies that certain ethnic groups prioritize. The present study importantly explores whether the ATL mechanism functions similarly or differently across racial/ethnic groups. However, the study approach is limited in that it relies on the assumption that the measurement constructs are similar across racial/ethnic groups. Thus, research on self-regulation development should implement a measurement invariance approach in order to build on the limited body of studies available that examine measurement invariance of parenting constructs by race/ethnicity (Crockett, Veed, & Russell, 2010; Luk, King, McCarty, Vander Stoep, & McCauley, 2016). Furthermore, future work that addresses culturally specific constructs of parenting should occur in tandem with research on self-regulation development of Black, Hispanic and Asian children, in order to develop culturally specific constructs of self-regulation in the unique context of the United States. Lastly, as an initial investigation of the influence of parenting on academic achievement through ATL, we used measures of parenting and ATL in the spring of kindergarten and

reading achievement in the spring of first grade. Further research might consider whether parental warmth and stress contribute to growth trajectories of reading achievement through ATL.

5 | CONCLUSION

In the current study, we investigated the potential for ATL, a set of self-regulatory competencies, to mediate the association between parental warmth and stress and reading achievement. In an effort to advance current understanding of racial/ethnic variation in parental socialization of self-regulation for reading achievement, we were also interested in testing for moderated mediation by race/ethnicity. We find that in fact, ATL do mediate the association such that parental warmth functions as a benefit for reading achievement through supporting ATL, and parental stress functions as a detriment to reading through hindering ATL. Moreover, we find evidence that the positive role of parental warmth and the negative role of stress in contributing to children's achievement through ATL might be similar across race/ethnicity. For interventions targeting children's development of self-regulation skills for success in critical academic domains such as reading, parental warmth and should be heeded as catalyst and stress as an inhibitor of developmental processes. Yet in alignment with these considerations, research and interventions on parenting must include the diverse voices of ethnic minority parents and families, with specific regard for their cultural values around self-regulation and their experiences of parental warmth and stress.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

ENDNOTE

[1] Labels for racial/ethnic groups are consistent with those used in the Early Childhood Longitudinal Study (National Center for Education Statistics).

DATA AVAILABILITY STATEMENT

The data for the current study may be accessed by obtaining a restricted-use data license from the National Center for Education Statistics. Information for accessing either the public-use dataset or the restricted-use dataset can be found here: https://nces.ed.gov/ecls/kinderdatainformation.asp

ORCID

Tatiana Hill https://orcid.org/0000-0001-6751-4434

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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