
Susanne A. Denham, Hideko Hamada Bassett, Sara K. Thayer, Melissa S. Mincic, Yana S. Sirotkin & Katherine Zinsser

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SUSANNE A. DENHAM
HIDEKO HAMADA BASSETT
SARA K. THAYER
MELISSA S. MINCIC
YANA S. SIROTKIN
KATHERINE ZINSSER
George Mason University

ABSTRACT. Social-emotional behavior of 352 3- and 4-year-olds attending private childcare and Head Start programs was observed using the Minnesota Preschool Affect Checklist, Revised (MPAC-R). Goals of the investigation included (a) using MPAC-R data to extract a shortened version, MPAC-R/S, comparing structure, internal consistency, test–retest reliability, and stability of both versions; and, using the shortened measure, to examine (b) age, gender, and risk status differences in social-emotional behaviors; (c) contributions of emotion knowledge and executive function to social-emotional behaviors; and (d) contributions of social-emotional behaviors to early school adjustment and kindergarten academic success. Results show that reliability of MPAC-R/S was as good, or better, than the MPAC-R. MPAC-R/S structure, at both times of observation, included emotionally negative/aggressive, emotionally regulated/prosocial, and emotionally positive/productive behaviors; MPAC-R structure was similar but less replicable over time. Age, gender, and risk differences were found. Children’s emotion knowledge contributed to later emotionally regulated/prosocial behavior. Finally, preschool emotionally negative/aggressive behaviors were associated with concurrent and kindergarten school success, and there was evidence of social-emotional behavior mediating relations between emotion knowledge or executive function, and school outcomes. The importance of portable, empirically supported observation measures of social-emotional behaviors is discussed along with possible applications, teacher utilization, and implementation barriers.

Keywords: academic readiness, emotional competence, emotions, preschoolers, school adjustment, social behavior

Address correspondence to Susanne A. Denham, George Mason University, Department of Psychology, MS3F5, Fairfax, VA 22030, USA; sdenham@gmu.edu (e-mail).
The goal of this study is to describe and evaluate an observational tool that enables researchers and early childhood educators to recognize and determine preschoolers’ social-emotional and relational strengths and weaknesses. This objective is important because, as Zins, Bloodworth, Weissberg, and Walberg (2007) asserted, “schools are social places . . . learning is a social process” (p. 191). Even preschoolers learn alongside and in collaboration with teachers and peers, and utilize their emotions to facilitate learning. Skilled social-emotional behavior and positive relationships with peers and teachers can promote classroom learning, and researchers increasingly acknowledge social-emotional and relational foundations for cognitive development during early childhood (Seifert, in press). In sum, social-emotional skills undergird young children’s success or failure at adapting to sometimes challenging preschool and kindergarten environments, and making the most of their experiences there, to learn and grow in social and academic functioning.

Such success or failure at the transition to school often sets children on a cycle of success or failure in both academic and social domains (Ryan, Fauth, & Brooks-Gunn, 2006). In this study, we operationalized early school success as children’s attitudes toward learning, persistence, competence motivation, liking of school and comfort with teacher, and preacademic tasks.

The key social-emotional skills to which we refer, and which are systematically included in our observational tool, include the ways in which (a) preschool children express and regulate positive and negative emotions, (b) become involved in the material and social milieu in a focused way, and (d) interact with peers, prosocially rather than aggressively. Therefore, we consider that the crucial aspects of such social-emotional skills can be subsumed under categories of emotional expression and regulation, productive involvement in age-appropriate activities, and relationship skills. In fact, each of these categories of social-emotional functioning are related to classroom adjustment and even to later academic success, often with important covariates held constant (e.g., Graziano, Reavis, Keane, & Calkins, 2007; Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; Trentacosta & Izard, 2007).

Key Social-Emotional Skills

Specifically, emotional expression and regulation includes an individual’s ability to express emotions appropriately and regulate them in productive ways—being aware of feelings, monitoring them, and modifying them when necessary so that they aid, rather than impede, coping in varying situations (Cole, Martin, & Dennis, 2004). Preschoolers’ expression of specific emotions relates to their peer status, teachers’ ratings of their friendliness and aggression, and school success. Positive emotions are important in initiation and regulation of social exchanges, and for communication during social interactions. Conversely, preschoolers, who show larger proportions of negative emotion, are often seen as
difficult by peers and teachers, and demonstrate less persistence and eagerness to learn (Denham et al., 2003; Denham, McKinley, Couchoud, & Holt, 1990; Miller, Seifer, Stroud, Scheinkopf, & Dickstein, 2006; Walker, 2009). Our observational tool includes items indexing both positive and negative emotions.

Children’s ability to regulate emotion has been found to be related to their school/classroom adjustment and academic achievement; children who have difficulties dealing with negative emotions may not have the personal resources to focus on learning, whereas those who can maintain a positive emotional tone might be able to remain positively engaged with classroom tasks. For example, emotion regulation evaluated early in the school year—including the flexibility, equanimity, and contextual appropriateness of emotional expression—predicted aspects of Head Start children’s later school success, as defined previously, even with age, verbal ability, emotional ability, and understanding of emotion covaried (Shields et al., 2001; see also Graziano et al., 2007, for emotion regulation, as assessed by the same teacher rating scale, contributing to kindergartners’ academic success/productivity and achievement, even with IQ controlled). Researchers have also observed preschoolers’ emotion regulation in the classroom and found that observed emotional dysregulation was negatively related to teachers’ ratings of children’s motivation to learn (Miller, Seifer, et al., 2006). Clearly, negative emotion expression and difficulties in regulating emotions are often associated with early school difficulties. Accordingly, items indexing negative reactions to frustration (i.e., inability to downregulate negative emotion, often demonstrated via aggression during the preschool years), as well as positive reactions to emotions (often indexed by using language to ameliorate the situation), are both included in the observational tool studied in this investigation.

Another aspect of self-regulation includes the ability to become productively engaged with the abundant age-appropriate play and preacademic tasks in the preschool classroom—more succinctly put, to be behaviorally regulated: to carry out complex directions, finish tasks, concentrate, ask questions and seek help when necessary, and enjoy challenging tasks. Howse et al. (2003) found that preschoolers’ emotion regulation predicted kindergarten achievement; this effect was mediated by the contribution of behavioral regulation (see also Trentacosta & Izard, 2007). Different aspects of regulation work together to contribute to academic success. Being able to regulate emotions frees up personal resources, so that an individual can be sufficiently behaviorally regulated to focus on learning tasks (Morrison, Ponitz, & McClelland, 2010). In our observational tool, productive and unproductive involvement in age-appropriate activities index behavioral regulation.

Relationship skills promote positive and effective exchanges with others, and ultimately relationships that last over time. Numerous skills are crucial at this level during early childhood, including making positive overtures to play with others, initiating and maintaining conversations, cooperation, listening, taking turns, seeking help, and friendship skills (e.g., joining another child or small group, expressing appreciation, negotiating, giving feedback).
In addition, assertion, resolving conflict, and negotiating to address the needs of all concerned all develop during the preschool-to-primary period. Bierman, Torres, Domitrovich, Welsh, and Gest’s (2009) prosocial rating aggregate (which included understanding feelings and resolving social problems, along with specifically prosocial behaviors) was related to Head Start attendees’ early literacy and mathematics skills, especially for girls. Profile analyses showed that children high in aggression and low in prosocial behavior had the biggest deficits in classroom adjustment problems (e.g., not following rules and routines, lacking enthusiasm about learning).

With slightly older children, Ladd and Burgess (2001) found that kindergartners who behaved prosocially had greater peer success than more aggressive children, and that their peer success was in turn related to increased classroom participation, and thence to academic achievement. Other researchers have found that these aspects of relationship skills longitudinally predicted grades and achievement scores for children in the primary grades (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Elias & Haynes, 2008), sometimes with earlier achievement held constant. Because of theory and empirical findings, then, a variety of prosocial behaviors and skills at leading and joining peers are included in our observational tool.

In sum, the assertion that these social-emotional skills promote school success is receiving increasing confirmation; in this study, we continue this path of investigation, evaluating a comprehensive observational system focusing on emotional expressiveness and regulation, behavior regulation, and relationship skills. We especially describe efforts to shorten our observational tool into one more manageable, especially by early childhood educators; we utilized data from the entire observational tool to isolate and evaluate a much shortened version that addresses all aforementioned aspects of social-emotional behaviors. We evaluated the shortened version for internal consistency and test–retest reliability and interpretable structure, in comparison with the longer version. Given usability of the shortened measure, the central goal of this investigation was to determine its relations with early school adjustment and academic success. However, such an observational tool can serve other research and applied goals, including studying age, gender, and risk differences in these behaviors and skills, as well as their presumptive foundations in emotion knowledge and executive function.

Effects of Age, Gender, and Socioeconomic Risk

Along with its associations with early school success, social-emotional behaviors may differ according to age, gender, and risk status, and any reliable and valid observational measure should pick up such differences. Emotion and behavior regulation are often found to increase with age during preschool (Epstein, Synhorst, Cress, & Allen, 2009; Fantuzzo et al., 2007; Olson & Kashiwagi, 2000). Consonant with increasing emotion regulation, teachers have found preschoolers’ emotional expressiveness to decrease with age (Denny, Denny, & Rust, 1982);
however, the amount of research supporting this premise is not great. Moreover, some researchers (but not all) find a relation between age and prosocial behavior during the period (Denham & Couchoud, 1991; Eisenberg & Fabes, 1998; Garner, Dunmore, & Southam-Gerrow, 2008; but cf. Howes, 1988; Radke-Yarrow et al., 1976, who found no association during the preschool years). In fact, prosocial behavior may actually decrease across the preschool period; specifically, Hay (1994) suggested that preschoolers become more discerning in exhibiting prosocial behaviors, showing them less frequently, on some but not all occasions, and toward some but not all potential recipients. However, children do become more skilled at interacting with peers (Howes, 1988). Thus, in this study we would expect emotion regulation and peer skill to increase with age; other age analyses are largely exploratory. Knowing how social-emotional behaviors change with age could be useful for researchers and early childhood educators alike.

Concerning gender differences, some research shows that preschool girls express more positive emotions than boys, as well as sad and fearful emotions (Chaplin & Aldao, 2011; Garner, Robertson, & Smith, 1997). Emotion and behavior regulation skills are greater for girls in some cultures (Epstein et al., 2009; Fantuzzo et al., 2007; Morrison et al., 2010; Olson & Kashiwagi, 2000). Girls also are found to show more prosocial and peer skills (Denham et al., 1990; Howes, 1988; Romano, Tremblay, Boulerice, & Swisher, 2005; cf. Eisenberg & Fabes, 1998). Boys are found to be more aggressive (Denham et al., 1990) and show more externalizing emotions (e.g., anger; Chaplin & Aldao, 2011). The ability to discern gender differences in social-emotional behaviors with a trustworthy observational tool can further research could assist early childhood educators in better targeting areas that would benefit from programming for what group of individuals.

Regarding poverty-related risk status, a number of studies have shown that low-income children are considered to be at risk for developmental delays in emotion and behavior regulation (Morrison et al., 2010; Sektnan, McClelland, Acock, & Morrison, 2010) and to demonstrate fewer prosocial behaviors (Phillips & Loneygan, 2010). Nonetheless, significant relations between social-emotional skills and aspects of early school success are usually found for low-income children, just as they are for their more advantaged counterparts. But research shows that emotion regulation and social play may play particularly important roles in the early school success of children at socioeconomic risk (Fantuzzo, Perry, & McDermott, 2004); thus, observational tools should sensitively capture such facets of social-emotional competence.

In sum, important age, gender, and socioeconomic risk status differences have been documented for the social-emotional behaviors defined here; we also explore their presence in the present study. In this study we examine such differences, because knowing normative information, what to expect, can assist researchers and early childhood educators alike, in their efforts to individualize programming and measure its effects.
Finally, it is also useful to explore the relations of these behaviors with more cognitive aspects of social-emotional functioning, that is, emotion knowledge and executive function; a well-functioning observational tool would allow for such important exploration. Cognitive processes may underlie (and themselves be influenced by) social-emotional behaviors. Thus, emotion knowledge is related to emotional expression, emotion and behavior regulation, and prosocial behavior contemporaneously and predictively (Denham, 1986; Denham et al., 2003; Denham & Couchoud, 1991; Eggum et al., 2011; Izard et al., 2008; Miller, Fine, et al., 2006; see also Morgan, Izard, & King, 2010). Children who understand emotions may be more able to respond emotionally positively to social overtures (Denham et al., 2003), more able to state clearly how they feel, and more likely to show concern and empathy in the face of others’ distress, not allowing emotional arousal to disrupt or overwhelm them (Izard et al., 2008; Miller et al., 2006).

Aspects of executive function have been found to be associated with emotion regulation and to prosocial behavior (Carlson & Wang, 2007). These results are unsurprising; executive function may assist children in controlling responses to salient events, including emotional ones, and allow inhibition of prepotent responses (e.g., to share rather than keep the toys for oneself).

Thus, in this study we examined patterns of correlations between social-emotional behaviors and emotion knowledge and executive function, particularly focusing on prediction of social-emotional behavior. Emotion knowledge and executive function may each form a foundation for social-emotional behavior. Of course, more skilled social-emotional behavior may also afford opportunities to develop greater emotion knowledge and hone executive function skills. Hence, we also consider (a) direction of effects in these associations and (b) whether the aforementioned prediction of school success via social-emotional behaviors may in fact be a more complex set of pathways, with social-emotional behaviors mediating the relation of emotion knowledge and executive function with later school success.

The Present Study

Thus, there is an emerging literature to suggest that emotional expressiveness and regulation, behavioral regulation, and relationship skills are important foundations for early success in school, show important demographic differences, and are contributed to be other foundational cognitive abilities. However, many investigations rely on teacher reports or analog situations for information on preschoolers’ social-emotional behaviors, instead of observing children in their ongoing interactions. Even fewer researchers have examined these social-emotional skills together (although some have tried; e.g., Miller, Gouley, Seifer, Dickstein, & Shields, 2004,
who observed preschoolers’ emotional expressiveness, emotion regulation, peer skills, prosocial behavior, and involvement in relation to classroom adjustment).

The importance of these social-emotional behaviors necessitates excellent assessment. We have adapted a comprehensive observational measure of children’s social-emotional behaviors in the preschool classroom. Such a measure would not only be valuable for researchers, but also aid early childhood educators in identifying and tracking progress in children’s social-emotional strengths and weaknesses, so that learning objectives can be tailored to the individual.

Accordingly, in this study we evaluated an observational assessment tool that holds promise for use in early childhood classrooms. To reiterate, we present findings to show the properties of our observational assessment tool, to evaluate its usability for research and applied purposes. Using a large sample, we first used data from the longer version to create a shortened version of our assessment tool that is more user-friendly for researchers and early childhood educators alike, comparing the two versions on (a) the structure of such observed behaviors at two time points and (b) internal consistency and test–retest reliability of resultant scores. Next, using the shortened version of the tool, we examined (a) short-term developmental change and stability of these observed behaviors, according to important demographic dimensions (i.e., age, gender, and risk status); (b) their concurrent and cross-time associations with emotion knowledge and executive function; and (c) contemporaneous associations with and prediction of later preschool and kindergarten success.

Method

Overview and Participants

Data for the present study are part of a larger study focused on developing a portable assessment battery for measuring the social and emotional aspects of school readiness. Participants were recruited at Head Start and private childcare centers in the greater Northern Virginia area. Among the 364 children administered at least one part of the total battery, 352 children were observed on the Minnesota Preschool Affect Checklist (MPAC) in the fall of the first year of the study (T1), and included in the present study. When data collection began, 35.2% of the children were 3-year olds and 64.8% were 4-year olds; mean age at T1 was 49.2 months ($SD = 6.96$).

Approximately half the children were boys (50.9%), with a majority of children identified by their parent as either Caucasian or African American (42.3% Caucasian, 37.2% African American). Regarding ethnicity of the sample, 14.8% were parent-reported as Hispanic.

Children came from a wide range of socioeconomic backgrounds; because confidentiality agreements with participating centers precluded our asking families about their income directly, economic risk status was broadly classified at T1 by
children’s enrollment in private childcare centers versus Head Start; a little over half of the children attended private childcare (54.3%) and the remaining children attended Head Start. About half of the mothers of children in the total sample attained high school graduation or less. Median maternal education for children in private childcare is associate degree, and for children in Head Start was high school diploma; these differences were significant, $\chi^2(5, N = 352) = 54.66, p < .001$.

Children’s emotion knowledge and executive function were assessed in the late fall to early spring (T1) and at the end of the school year (T2), and teacher measures were collected at the end of the school year (T2) and in children’s kindergarten year. For each participating child in their classroom, preschool teachers were paid $15 in compensation for their time in the completion of the questionnaires; kindergarten teachers were paid $25 per child because they completed a greater number of questionnaires, most of which are not the focus of this study. Children received stickers for their participation.

Ninety-two percent of the T1 sample (i.e., those who were observed with the MPAC at T1), or 321 children, were assessed with the MPAC at T2. Executive function assessments were completed for 321 children at T1, with 288 assessed at T2; emotion knowledge assessments were completed for 322 children at T1, and 302 at T2. Finally, we obtained 329 teacher reports at T2. Data from kindergarten teachers were collected for the subsample of children who had been observed using the MPAC at T1 ($n = 108$) and who were still enrolled in area schools that gave consent for research. Attrition analyses show that children who stayed in the study through kindergarten, and those who could not be followed over this time period, differed on none of the T1 or T2 measures, and none of the demographic characteristics except age and risk status. More original 3-year-olds were lost to the research, probably given the greater time until kindergarten testing, $\chi^2(1, N = 108) = 5.91, p < .05. More children in private day care were lost, because one of the main school systems to which their children transitioned did not give permission to collect data during kindergarten, whereas Head Start children moved into only two elementary schools, both of which granted permission, $\chi^2(1, N = 108) = 6.05, p < .05$.

**Measures**

*Observed affect and behavior.* This measure was originally created as an observational means of assessing children’s emotional expression, emotion regulation and social behavior (MPAC; Sroufe, Schork, Motti, Lawroski, & LaFreniere, 1984), and subsequently was adapted by Denham and colleagues (MPAC-R; Denham & Burton, 1996; Denham, Zahn-Waxler, Cummings, & Iannotti, 1991). In using the MPAC-R, children’s behavior is observed in differing play and interaction contexts, and coded for 5-min intervals across four different days. Coders were encouraged to observe during less structured periods (i.e., center time, outside
recess, gym., as opposed to teacher-led instructional time). The MPAC-R includes 66 items, which are organized into scales for positive and negative affect, inappropriate affect, positive and negative involvement in age-appropriate activities (e.g., negative involvement includes impulsivity, wandering), positive and negative reactions to frustration, peer skills (e.g., leading, joining), unusual behaviors (e.g., social isolation, hostility), and empathy/prosocial behaviors (e.g., sharing, cooperating with peers, taking turns). Thus, the MPAC-R taps important elements of social-emotional functioning; the variety of behaviors sampled yields a richness of the information regarding children’s social-emotional behaviors, achieved in four short observations.

All MPAC/MPAC-R scales have shown good interobserver reliability in previous studies, with the mean master coder/coder correlation for the individual scales ranging from .36 to .80, \( ps < .05 \) to .001 in one study (Denham & Burton, 1996) and kappas averaging .78 in another (Denham et al., 1991). Further, the MPAC/MPAC-R also demonstrated validity in those studies. First, concurrent validity was established by showing interpretable age changes, and associations with success in preschool and maternal affect (e.g., Denham et al., 1991, found age increases in positive emotion, productive involvement, emotion regulation, and peer skills). Second, Denham and Burton (1996) showed positive pre- to postintervention changes in negative emotion, productive involvement, and peer skills on the MPAC-R, with children who showed the greatest social-emotional deficits benefiting maximally from the intervention efforts.

**Emotion knowledge: Affect Knowledge Test.** The Affect Knowledge Test (AKT) assessed young children’s understanding of emotion using puppets with felt detachable faces that depict happy, sad, angry, and afraid expressions (Denham, 1986; Denham & Couchoud, 1990a, 1990b).

For the affective labeling portion of the measure, children were asked to identify happy, sad, angry, and afraid facial expressions on felt faces by verbally naming them (expressive knowledge) and then by nonverbally pointing to them (receptive knowledge). For the *situation knowledge* portion of the measure, 20 vignettes were enacted using the puppets. Each was accompanied by vocal and visual affective cues emitted by the puppet/experimenter. For eight of these vignettes, the puppet depicted the same emotion most people would feel (e.g., happiness in receiving an ice cream cone, fear when awakening from a nightmare; see Denham, 1986), as an index of children’s stereotypical emotion knowledge. In the remaining 12 vignettes, the puppet depicted a different emotion from what each child’s mother had reported, in a questionnaire, that the child would probably feel, as an index of children’s nonstereotypical emotion knowledge. Among the 12 nonstereotypical situations, six vignettes were positive versus negative emotion (e.g., happy or sad to come to preschool), and the remaining six vignettes were negative versus negative emotion (e.g., angry at or afraid of his or her sibling for hitting him or her). Children affixed to the puppet the felt face of their choice. Children received
two points for correct identification of emotion in any section of the measure, one point for identifying the correct valence, but not the correct emotion (e.g., sad for afraid).

Prior to the planned analyses, AKT data were checked for univariate normality (i.e., distribution, kurtosis, and skewness). Because understanding of happiness develops at an earlier age compared with negative emotions (Denham & Couchoud, 1990b), approximately 80% of children in our T1 sample correctly identified this emotion. For that reason, values for both kurtosis and skewness exceeded acceptability; therefore, these four happiness items (one each for expressive and receptive scales, two for stereotypical situations) were excluded from further analyses. Thus, negative recognition and situation knowledge aggregates were created; the recognition aggregate included expressive and receptive recognition of sad, angry, and afraid expressions (6 items, Cronbach’s \( \alpha_{T1} = .71 \) and Cronbach’s \( \alpha_{T2} = .69 \)), and the situation knowledge aggregate included unequivocal situations for sad, angry, and afraid emotions, plus all combinations equivocal positive/negative and negative/negative situations (Cronbach’s \( \alpha_{T1} = .87 \) and Cronbach’s \( \alpha_{T2} = .91 \)). Further, children’s performance on these tasks showed moderate test–retest reliability across approximately three months. The AKT also shows good concurrent validity with previously validated measures of children’s social-emotional competence reported by teachers and peers, as well as their early academic skills and school adjustment (Denham et al., 2012; Denham et al., 2003; Denham et al., 1990; Miller et al., 2004).

Preschool Self-Regulation Assessment. The Preschool Self-Regulation Assessment (PSRA; Smith-Donald, Raver, Hayes, & Richardson, 2007) was utilized to capture preschoolers’ strengths and weaknesses in executive function. Executive function can be described well within a new rubric heuristically distinguishing related constructs, cool and hot executive function. Cool executive function (CEF) is ascendant in tasks requiring attentional and behavioral inhibitory control, working memory, and ability to suppress prepotent responding. In contrast, hot executive function (HEF) comes to the fore in tasks additionally involving emotional and appetitive content (Willoughby, Kupersmidt, Voegler-Lee, & Bryant, 2011).

The PSRA consists of seven structured tasks to tap CEF and HEF. For CEF, three tasks (pencil tap, balance beam, tower turn taking) from laboratory-based work (e.g., Murray & Kochanska, 2002) were included. For HEF, four delay tasks (toy wrap, toy wait, snack delay, and tongue task) were used. Detailed descriptions are found in Smith-Donald et al. (2007).

Within the present sample, the PSRA task battery showed good interobserver reliability on all tasks (scale-appropriate reliability indices range from .57 to .97). Further, CEF and HEF aggregates for this sample were also internally consistent (for 19 CEF items, Cronbach’s \( \alpha_{T1} = .90 \) and Cronbach’s \( \alpha_{T2} = .94 \); for 6 HEF items, Cronbach’s \( \alpha_{T1} = .82 \) and Cronbach’s \( \alpha_{T2} = .76 \)). Finally, children’s
performance on PSRA tasks showed moderate test–retest reliability across approximately three months. The PSRA also shows good concurrent validity with measures of children’s behavior problems and competencies reported by their teachers, as well as their early academic skills and school adjustment (Bassett, Denham, Mincic, & Graling, 2012; Bassett, Denham, Wyatt, & Warren-Khot, in press; Smith-Donald et al., 2007).

School adjustment: Early learning behaviors. Teachers rated children’s approaches to learning using the Preschool Learning Behaviors Scale (PLBS; McDermott, Leigh, & Perry, 2002). The PLBS is a 29-item teacher behavior rating instrument assessing preschool children’s approaches to learning. Teachers rated children’s specific, observable behaviors that occurred during classroom learning activities over the previous two months. Item content focuses on attentiveness, responses to novelty and correction, observed problem-solving strategy, flexibility, reflectivity, initiative, self-direction, and cooperative learning. The instrument yields three reliable dimensions: (a) competence motivation (i.e., is reluctant to tackle a new activity), (b) attention/persistence (i.e., tries hard, but concentration soon fades), and (c) attitudes toward learning (i.e., doesn’t achieve anything constructive when in a sulky mood).

In the present study, the PLBS demonstrated good internal consistency (Cronbach’s $\alpha = .79–.89$). Test–retest stability across three weeks was also significant at the .0001 level for this age range on all subscales; correlation coefficients ranged from $r = .80$ to $.94$ (McDermott et al., 2002); in this study, scales were significantly correlated even across a one-year period, with different teachers rating. Multimethod, multisource validity analyses further substantiated the PLBS dimensions for preschool children, and reliability estimates were similar for both Caucasian and non-Caucasian portions of the sample (Fantuzzo et al., 2004).

School adjustment: Teacher Rating Scale of School Adjustment. The Teacher Rating Scale of School Adjustment (TRSSA; Ladd, Kochenderfer, & Coleman, 1997). This 52-item measure was designed to tap several constructs reflective of young children’s behavioral and relational adjustment to classroom settings. Teachers provided ratings on behaviors such as “follows teacher’s directions” (cooperative participation), “works independently” (self-directedness), “likes going to school” (school liking), or “initiates conversations with the teacher” (comfort with teacher) on 3-point Likert-type scales ranging from 0 to 2. In the present sample, internal consistency was high (Cronbach’s $\alpha = .83–.93$), and test–retest reliability coefficients were significant across a one-year period, with different raters. Subscales have demonstrated validity in economically diverse and mixed-race samples (see Ladd & Burgess, 2001; Ladd et al., 1997; Ladd, Birch, & Buhs, 1999).

For school adjustment aggregate scores, used in subsequent analyses, standard scores for all PLBS and TRSSA scales were summed. Alphas were .90 for both T2 and kindergarten.
Academic success: Early Childhood Longitudinal Study Academic Rating Scale. Kindergarten teachers completed the Academic Rating Scale (ARS) Childhood Longitudinal Study–Kindergarten (ECLS-K; U.S. Department of Education, National Center for Education Statistics, 2002), which includes teacher ratings of kindergartners’ academic level in (a) language and literacy (e.g., “reads simple books independently,” “demonstrates early writing behaviors”), (b) general knowledge (e.g., “forms explanations based on observations and explorations,” “understands what people do who have different kinds of jobs”), and (c) mathematical thinking (e.g., “shows an understanding of the relationship between quantities,” “solves problems involving numbers using concrete objects”). The ARS is intended to indirectly assess the process and products of children’s learning in school. Teachers compare each child to their same age peers on 1–5-point scales, in the spring of their kindergarten year. Internal consistency reliability for the three scales in this sample ranged from .85 to .92 (in the ECLS-K sample these ranged from .91 to .95); a kindergarten academic success aggregate was created by summing the standard score for each scale ($\alpha = .92$).

Results

Shortening the MPAC

Our first goal for this study was to shorten the MPAC-R to make it more accessible for research and applied usage. Examination of item score distributions and item-to-total correlations led to retention of 18 of the 66 original items, to create the MPAC Revised Shortened (MPAC-R/S; see Appendix for items included in this final measure). Scales for emotional expressiveness and regulation included positive emotion, negative emotion, negative reactions to frustration, and positive reactions to frustration. Items were retained for the MPAC-R/S only if facility indexes means were $> .125$ (out of maximum of 1.00; the lower bound of this index suggests items which add very little to a total score), and absolute values for skewness and kurtosis were less than 4.0 and 7.0, respectively (Betts & Rotenberg, 2007; West, Finch, & Curran, 1995). Six items that did not quite meet these criteria were included because they referred to aggression, prosocial behavior, or unproductive involvement, considered sufficiently theoretically important to the emotion expressiveness/regulation and relational aspects of social-emotional skill, for the items to be retained.

Reliability comparisons of the MPAC-R/S and MPAC-R. Our next goal was to examine the reliability of the MPAC-R/S, particularly in relation to the MPAC-R. These 18 items’ interobserver, internal consistency, and test–retest (T1 to T2) reliabilities were compared with the same indices for the MPAC-R to show whether the shortened measure performed similarly and as well as the original one. As can be seen in Table 1, interobserver intraclass correlations were high and virtually
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<th>Scale</th>
<th>Interobserver reliability</th>
<th>Cronbach’s α</th>
<th>Test-retest&lt;sup&gt;a&lt;/sup&gt;</th>
<th>MPAC-R&lt;sup&gt;b&lt;/sup&gt;</th>
<th>MPAC-R/S&lt;sup&gt;b&lt;/sup&gt;</th>
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<td>.84</td>
<td>.84</td>
<td>.52 (6)</td>
<td>.82 (2)</td>
<td>.54</td>
</tr>
<tr>
<td>Prosocial/peer</td>
<td>.94</td>
<td>.92</td>
<td>.63(9)</td>
<td>.69 (3)</td>
<td>.43</td>
</tr>
<tr>
<td>Positive emotion</td>
<td>.98</td>
<td>.97</td>
<td>.51(8)</td>
<td>.65 (3)</td>
<td>.36</td>
</tr>
<tr>
<td>Productive involvement</td>
<td>.96</td>
<td>.96</td>
<td>.52(8)</td>
<td>.36 (4)</td>
<td>.46</td>
</tr>
</tbody>
</table>

Note. MPAC-R = Minnesota Preschool Affect Checklist Revised; MPAC-R/S = Minnesota Preschool Affect Checklist Revised Shortened.
<sup>a</sup>Controlled for age, gender, and risk. <sup>b</sup>All significant at p < .001. <sup>c</sup>MPAC-R intraclass correlations for inappropriate affect = .97 and .03, respectively.
<sup>d</sup>Cronbach’s alpha values for inappropriate affect and unusual behaviors = .13 and .05, respectively. <sup>e</sup>Cronbach’s alpha values for inappropriate affect and unusual behaviors = .33 and .00, respectively. <sup>f</sup>Numbers of items in respective scales for MPAC-R and MPAC-R/S in parentheses.

* p ≤ .05. ** p ≤ .01. *** p ≤ .001.
identical across all scales (no items from the MPAC-R unusual behavior and inappropriate affect scales were retained in the MPAC-R/S). Cronbach’s alphas for MPAC-R/S scales were generally better than those for the MPAC-R, despite their smaller numbers of items (except for the productive involvement scale). Test–retest reliabilities were of similar magnitude across the two forms; the emotion regulation scale did not evidence good stability across the approximately three-month T1 to T2 period. Finally, scales from each of the two forms were moderately to highly correlated, without exception.

Structure of the MPAC-R/S. After ensuring that the MPAC-R/S scales were reliable, to an extent similar to or better than the MPAC-R, our goal was to look for an interpretable structure that conformed to our theoretical view of preschool social-emotional behavior. To this end, we examined the structure of these 18 items using principal components with promax rotation (to acknowledge possible correlation of components). As seen in Table 2, three identical principal components emerged for the MPAC-R/S across the two times of observation reported on here—emotionally negative/aggressive, emotionally regulated/prosocial, and emotionally positive/productive. These components accounted for approximately 63% of variability in their associated scales at both time points. Test–retest reliabilities were significant across the three-month T1 to T2 period for all three components (and those for the MPAC-R). In comparison, principal component analyses of the MPAC-R scales yielded four components at T1 (identical to those for the MPAC-R/S except that positive emotion and productive involvement formed separate components), but three components essentially identical to those for the MPAC-R/S at T2 (62.5%, but only 50.1%, explained variance at T1 and T2); thus, the MPAC-R/S components were more comparable across time periods, and for T2 explained more variance.

Developmental Change, Age, Gender, and Risk Status Differences

With a credibly shortened observational measure, we next determined how the MPAC-R/S components differed across age, gender, risk status, and time (T1 to T2). Three multivariate analyses of variance (MANOVAs; T1, T2, and cross-time, T1 to T2; see Table 3 for descriptive data) were performed to answer these problem questions. Age (2), sex (2), and risk (2) were between-subject variables in all three analyses. Time (2) was added as a within-subject variable in cross-time analysis; only its main effect and interaction with other between-subject factors will be considered. Main and interaction effects were interpreted, and multivariate findings were accompanied by univariate follow-up analyses. Dependent variables were the MPAC-R/S components at each time point: emotionally negative/aggressive, emotionally regulated/prosocial, and emotionally positive/productive.

Age differences were at least marginally significant, in T1 $F_{age}(3, 342) = 2.32, p < .08$; in T2 $F_{age}(3, 319) = 2.60, p < .05$. Effect sizes (partial $\eta^2$) for
### TABLE 2. Principal Component Analysis With Promax Rotation (Pattern Matrix) and Reliability of Components

<table>
<thead>
<tr>
<th>Scale</th>
<th>Emotionally negative/aggressive</th>
<th>Emotionally regulated/prosocial-peer oriented</th>
<th>Emotionally positive/productive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
</tr>
<tr>
<td>Negative emotion</td>
<td>.830</td>
<td>.844</td>
<td>.814</td>
</tr>
<tr>
<td>Aggression</td>
<td></td>
<td></td>
<td>.810</td>
</tr>
<tr>
<td>Emotion regulation</td>
<td>.730</td>
<td>.754</td>
<td>.723</td>
</tr>
<tr>
<td>Prosocial peer behavior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive emotion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productive involvement</td>
<td>.64 (.67)</td>
<td>.59 (.70)</td>
<td>.70 (.56)</td>
</tr>
<tr>
<td>Component Cronbach’s α</td>
<td>.723</td>
<td>.668</td>
<td></td>
</tr>
<tr>
<td>Component test–retest T1 to T2b</td>
<td>.22*** (.20***?)</td>
<td>.16** (.26***?)</td>
<td>.19 *** (.22***?)</td>
</tr>
<tr>
<td>Percentage variance accounted for</td>
<td>23.6 (12.0)</td>
<td>24.3 (19.4)</td>
<td>17.6 (18.7)</td>
</tr>
</tbody>
</table>

*Note.* All nondisplayed loadings < .20. Parenthetical material refers to MPAC-R.  
*Values refer to T1 MPAC-R positive and productive components, respectively; component structure at T1 for MPAC-R included four components, but at T2 was identical to the MPAC-R/S.  
*Controlled for age, gender, and risk.  
***p ≤ .001.
<table>
<thead>
<tr>
<th>Scale</th>
<th>Gender</th>
<th>Age</th>
<th>Risk Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>T1 Emotionally negative/aggressive (0–6)²</td>
<td>0.49</td>
<td>0.54</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>0.45</td>
<td>0.50</td>
<td>0.51</td>
</tr>
<tr>
<td>T2 Emotionally regulated/prosocial (0–7)</td>
<td>0.65</td>
<td>0.60</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>0.54</td>
<td>0.53</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>2.65</td>
<td>0.93</td>
<td>2.68</td>
</tr>
<tr>
<td></td>
<td>2.51</td>
<td>1.17</td>
<td>2.86</td>
</tr>
<tr>
<td></td>
<td>2.65</td>
<td>1.25</td>
<td>2.79</td>
</tr>
</tbody>
</table>

Note. Findings with MPAC-R very similar.  
²Possible range for each scale.
the age effect were .028 and 024, respectively. Follow-up analyses showed that 3-year-olds scored higher on emotionally regulated/prosocial behavior, in T1 $F_{\text{age}}(1, 344) = 5.84, p < .05$; in T2 $F_{\text{age}}(1, 321) = 5.84$, with effect sizes of .017 and .018, respectively.

Because theory and empirical findings are contradictory on this effect, exploratory univariate analyses of variance (ANOVAs) with the MPAC-R/S prosocial and emotion regulation scales as separate dependent variables were performed, $F$s (350 or 327) = 3.80 and 4.89, $p$s < .05, respectively showing greater prosocial behaviors of sharing, taking turns, and cooperating in 3-year-olds; results were not significant for the emotion regulation MPAC-R/S subscale.

Significant gender differences were found, in T1 $F_{\text{gender}}(3, 342) = 3.34, p < .05$; and in T2 $F_{\text{gender}}(3, 319) = 4.42, p < .01$; effect sizes were .028 and 040, respectively. Follow-up between-subject analyses showed that boys scored higher on emotionally negative–aggressive behavior, in T1 $F_{\text{gender}}(1, 344) = 9.88, p < .01$; in T2 $F_{\text{gender}}(1, 321) = 8.74, p < .01$; effect sizes of .028 and .027, respectively. Furthermore, boys showed more emotionally positive/productive behavior at T2, $F_{\text{gender}}(1, 321) = 4.90, p < .05$ (effect size = .015). Overall, boys were emotionally more negative (and more positive at T2) and aggressive.

Risk status differences emerged for T1, $F_{\text{risk status}}(3, 342) = 9.25, p < .001$, and T2, $F_{\text{risk status}}(3, 319) = 5.51, p < .05$. Effect sizes for risk effects were .075 and 049, respectively. This main effect of risk status at T2 was qualified by an interaction with age at T2, $F_{\text{Risk Status x Age}}(3, 319) = 3.02, p < .05$ (effect size = .028). Follow-up between-subject analyses showed that children in Head Start scored higher on emotionally positive/productive behavior, in T1 $F_{\text{risk status}}(1, 344) = 22.96, p < .001$ (effect size .063). This effect for emotionally positive/productive behavior also interacted with age, $F_{\text{Risk Status x Age}}(1, 313) = 5.61, p < .05$ (effect size = .018); this social-emotional behavior was greater for older children in private childcare, with the converse true for those in Head Start.

Further, children in Head Start scored higher on emotionally regulated/prosocial behavior, in T1 $F_{\text{risk status}}(1, 344) = 5.52, p < .05$; in T2 $F_{\text{risk status}}(1, 313) = 14.94, p < .001$; effect sizes were .016 and .061, respectively. This effect for emotionally regulated–prosocial behavior also was true especially for 3-year-olds in Head Start, in T2 $F_{\text{Risk Status x Age}}(1, 321) = 4.88, p < .05$ (effect size = .015). Subsidiary univariate ANOVAs showed that this interaction, similar to the analogous main effect for age, was true only for prosocial behavior at T1 and T2, in T1 $F_{\text{Risk Status x Age}}(1, 348) = 7.12, p < .05$; in T2 $F_{\text{Risk Status x Age}}(1, 325) = 10.71, p < .001$. Thus, 3-year-old Head Start attendees showed more emotionally positive/productive behavior (at T1), and more emotionally regulated/prosocial behavior, compared with their counterparts in private childcare.

Regarding change from T1 to T2, results from repeated measures MANOVAs indicated that scores did not change over time. However, interactions with risk status indicated change for children attending Head Start, $F_{\text{Time x Risk Status}}(3, 311) = 2.82 p < .05$ (effect size = .026), such that emotionally positive–productive scores...
decreased particularly for children in Head Start, $F_{\text{Time} \times \text{Risk Status}}(1, 313) = 6.16 \ p < .05 \ (\text{effect size} = .019)$.

**Prediction by Emotion Knowledge and Executive Function**

Our next goals were to examine how emotion knowledge and executive function might be associated with social-emotional behaviors assessed by the MPAC-R/S. Even more than this, we sought to examine whether these cognitive abilities could be seen as undergirding, or foundational to, preschoolers’ social-emotional behaviors.

**Relations of social-emotional behavior with emotion knowledge.** Table 4 shows partial correlations, with age, gender, and risk status controlled, of T1 and 2 MPAC-R/S scores with negative recognition and situation knowledge of emotions (the pattern of associations with MPAC-R component scores was basically the same). As can be seen in the table, emotionally negative/aggressive scores at T1 were negatively associated with negative recognition at both times of assessment, whereas the emotionally regulated/prosocial MPAC-R/S scores at both time periods were positively related to situation knowledge at both time periods.

To examine the cross-time dependencies among MPAC-R/S scores and AKT scores, regression equations were calculated with age, gender, risk status, and the T1 premeasure of the criterion variable in step 1, and the corresponding T1 MPAC-R/S scores (for AKT criterion variables) or AKT scores (for MPAC-R/S criterion variables) entered together, to account for unique contributions. Beta values are

<table>
<thead>
<tr>
<th>TABLE 4. Correlations Between MPAC-R/S Components and AKT Scales, Controlled for Sex, Age, and Risk Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>AKT</td>
</tr>
<tr>
<td>T1 negative recognition</td>
</tr>
<tr>
<td>T1 situation knowledge</td>
</tr>
<tr>
<td>T2 negative recognition</td>
</tr>
<tr>
<td>T2 situation knowledge</td>
</tr>
</tbody>
</table>

*Note. AKT = Affect Knowledge Test. Patterns of correlations with MPAC-R components very similar.  
†p ≤ .10. *p ≤ .05.
reported only where models and total $R^2$ are significant. In these analyses, T1 situation knowledge predicted T2 emotionally regulated/prosocial scores ($\beta = .127, p < .05$), even with age, gender, risk status and T1 emotionally regulated/prosocial scores partialled, squared semipartial correlation = .011. However, no such contribution was found for T1 lack of negative recognition scores contributing to T2 emotionally negative/aggressive scores.

In regression equations predicting T2 AKT scores, no MPAC-R/S scores reached significance on step 2, suggesting that the direction of contribution is from emotion knowledge to emotionally regulated/prosocial scores, as hypothesized.

**Relations of social-emotional behavior with executive function.** Pertaining to executive function, emotionally negative/aggressive MPAC-R/S scores were at least marginally negatively related to six of eight indices of executive function at both time periods, and T2 emotionally positive/productive behavior was concurrently positively related to HEF (see Table 5). Thus, both deficits in CEF and HEF were related to emotionally negative/aggressive behavior, but HEF and emotionally positive/productive behavior were contemporaneously associated. Again, patterns of association with the MPAC-R were very similar.

As with emotion knowledge, regression equations, predicting T2 MPAC-R/S scores with T1 scores partialled, were calculated to explore directions of contributions. Step 2 of these equations included T1 CEF, and T1 HEF, to isolate unique contributions of each. In predicting T2 MPAC-R/S scores, T1 PSRA HEF scores negatively contributed to T2 emotionally negative/aggressive scores ($\beta = -.128, p < .07$; squared semipartial correlation = .01). In regression equations predicting T2 PSRA scores, one of 12 possible predictions by MPAC-R/S scales reached

<table>
<thead>
<tr>
<th>TABLE 5. Correlations Between MPAC-R/S Components and PSRA Aggregates, Controlled for Sex, Age, and Risk Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSRA</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>T1 CEF</td>
</tr>
<tr>
<td>T1 HEF</td>
</tr>
<tr>
<td>T2 CEF</td>
</tr>
<tr>
<td>T2 HEF</td>
</tr>
</tbody>
</table>

*Note. CEF = cool executive function; HEF = hot executive function; PSRA = Preschool Self-Regulation Assessment. Patterns of correlations with MPAC-R components very similar.

$^\dagger p \leq .10. ^{*} p \leq .05. ^{**} p \leq .01.$
significance; T1 emotionally negative/aggressive scores predicted T2 CEF ($\beta = -0.147$, $p < .01$; squared semipartial correlation = .01). Taken together, findings from this series of regression equations suggest that, more than for emotion knowledge, the relation between social-emotional behavior and executive function appears bidirectional.

**Prediction of School Adjustment and Kindergarten Academic Success**

Our final goal was to ascertain the relation of preschoolers’ social-emotional behaviors to early childhood school adjustment and academic success. Results of correlational analyses can be seen in Table 6. As for school adjustment, T1 emotionally negative/aggressive scores were generally associated with less school adjustment at later time points and kindergarten academic success, with age, gender, and risk status partialled; the same general pattern held true, although less strongly, for T2 emotionally negative/aggressive scores. That is, the significant associations between only T1 emotionally negative/aggressive scores and kindergarten indices remained when T2 school adjustment aggregates were also partialled. As has been the case, patterns of association were very similar with the MPAC-R. In sum, emotionally negative/aggressive social-emotional behavior was contemporaneously and predictively related to early childhood school success and kindergarten academic indicators.

<table>
<thead>
<tr>
<th>Teacher rating</th>
<th>Emotionally negative/aggressive</th>
<th>Emotionally regulated/prosocial</th>
<th>Emotionally positive/productive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T1</td>
</tr>
<tr>
<td>T2 school adjustment</td>
<td>$-0.17^*$</td>
<td>$-0.27^*$</td>
<td>$0.08$</td>
</tr>
<tr>
<td>Kindergarten school adjustment</td>
<td>$-0.36^*$</td>
<td>$-0.19^*$</td>
<td>$-0.05$</td>
</tr>
<tr>
<td>(−.32**)</td>
<td>(−.10)</td>
<td>(−.09)</td>
<td>(−.09)</td>
</tr>
<tr>
<td>Kindergarten academic success</td>
<td>$-0.23^*$</td>
<td>$-0.06$</td>
<td>$0.01$</td>
</tr>
<tr>
<td>(−.19*)</td>
<td>(0.02)</td>
<td>(−.01)</td>
<td>(−.17†)</td>
</tr>
</tbody>
</table>

**Note.** Parenthesized partial correlations have sex, age, risk status, and T2 teacher ratings partialled. Patterns of correlations with MPAC-R components very similar.  
†$p \leq .10$. *$p \leq .05$. 

Downloaded by [George Mason University] at 10:01 13 August 2012
**Regression results: MPAC-R/S Predicting School Success.** We also performed hierarchical multiple regressions with each aspect of school success and each MPAC-R/S scale separately, in which age, gender, and risk status were controlled on step 1, T1 and T2 MPAC-R/S scales were entered on step 2, and interactions of each specific T1 and T2 MPAC-R/S scale with age, gender, and risk status entered on step 3. All variables were centered to minimize issues with multicollinearity. Results reported here include only those from steps 1 and 2 that add to the information from Tables 3 and 6, and those involving moderation of findings; beta values are reported only where models and total $R^2$ are significant.

Specific MPAC scores that made unique contributions to variance in school success were isolated. Consonant with zero-order corrections in Table 6, T1 and T2 emotionally negative/aggressive scores predicted T2 teacher-reported school adjustment ($T1 \beta = -0.108, p < .05; T2 \beta = -0.226, p < .001$; squared semipartial correlation $= .011$ and $.048$, respectively). T1 emotionally negative–aggressive scores also predicted teacher-reported school adjustment in kindergarten ($\beta = -.278, p < .01$; squared semipartial correlation $= .064$). Finally, kindergarten academic success was predicted by T1 emotionally negative/aggressive scores ($\beta = -.184, p < .07$; squared semipartial correlation $= .028$). To summarize, T1 and T2 emotionally negative/aggressive behavior contributed uniquely, additively, and negatively, to T2 school adjustment, but only T1 emotionally negative/aggressive behavior contributed negatively to kindergarten school adjustment and academic success.

In terms of moderation, T1 emotionally negative/aggressive scores negatively predicted teacher-reported school adjustment at T2 especially for boys ($\beta = .126, p < .05$). Further, T2 emotionally positive/productive scores predicted concurrent teacher-reported school adjustment ($\beta = -.106, p < .06$), but positively for 3-year-olds and negatively for 4-year-olds (see Figure 1). Follow-up subsidiary analyses showed that 4-year-olds showed significantly more positive emotion than 3-year-olds, $F(1, 327) = 4.25, p < .05$.

T1 emotionally negative/aggressive scores also negatively predicted teacher-reported school adjustment in kindergarten especially for children who had been among the older children (4-year-olds) in the original T1 sample ($\beta = -.268, p < .05$). In short, T1 emotionally negative/aggressive social-emotional behaviors were particularly negative predictors for boys’ school adjustment at T2, and for relatively older children in kindergarten. Emotionally positive/productive behaviors at were contemporaneous positive correlates of relatively younger children’s T2 school adjustment.

**Mediation pathways: From emotion knowledge and executive function to social-emotional behavior, to school success.** Our final analysis was to examine whether social-emotional behavior actually mediated relations between emotion knowledge and executive function and early school success. Sobel’s $z$ test was run for all significant paths (as adjudged by correlations coefficients in Tables 4, 5, and...
FIGURE 1. Interaction of age and Minnesota Preschool Affect Checklist, Revised Shortened (MPAC-R/S) at T2 predicting concurrent teacher-reported school adjustment.
6) from emotion knowledge or executive function and social-emotional behaviors, and social-emotional behaviors with school success. Results showed that the T1 negative recognition aspect of emotion knowledge path to school adjustment was mediated by emotionally negative/aggressive behavior, \( z_{\text{NREG1}\rightarrow\text{T1 MPACNEG}} = -1.89, p < .10 \), for T2 school adjustment, and \( z_{\text{NREG1}\rightarrow\text{T1 MPACNEG}} = -1.99, p < .05 \) for kindergarten school adjustment. Thus, the positive relation between negative recognition and school adjustment (Denham et al., 2012) is negatively mediated by emotionally negative/aggressive behavior.

Regarding executive function, the path from T1 HEF to T2 school adjustment was mediated by emotionally negative/aggressive behavior at both time points, \( z_{\text{HEF1}\rightarrow\text{T1 MPACNEG}} = -1.74, p < .10 \), and \( z_{\text{HEF1}\rightarrow\text{T2 MPACNEG}} = -2.26, p < .05 \). One path from T2 HEF to kindergarten school adjustment was also mediated by emotionally negative/aggressive behavior, \( z_{\text{HEF1}\rightarrow\text{T1 MPACNEG}} = -1.82, p < .10 \). Similar findings held true for one path from T2 HEF to kindergarten school adjustment, \( z_{\text{HEF2}\rightarrow\text{T2 MPACNEG}} = -2.90, p < .01 \). In short, HEF at both time points showed four of six possible mediation pathways with emotionally negative/aggressive behavior. No mediation of the highly significant relation between CEF and school success was found (Bassett et al., in press).

**Discussion**

Our goal for this study was to address a comprehensive observational assessment tool of preschoolers’ social-emotional behaviors. We aimed to shorten the original tool, which was very long (but still reliable and valid), to make it more user-friendly for researchers and early childhood educators alike. Efforts in this regard were largely successful—intercorrelations, as well as comparisons of interobserver, test–retest, and internal consistency reliabilities showed the MPAC-R/S to be highly related to the MPAC-R, and as reliable or better on all dimensions.

Our next goal was to determine whether the MPAC-R/S had an interpretable structure. The distributional item criteria and theoretically based item inclusions that we used to shorten the measure yielded scales that grouped into three identical factors at each of the times of assessment (and as well, at a third time of assessment, one year later, not reported on here due to lowered \( n \)), which explained adequate amounts of variance. Moreover, the component structure was more similar across time than that for the MPAC-R.

The MPAC-R/S components showed internal consistencies that were generally somewhat shy of the customary .70. However, given significant item intercorrelations for each, the relative heterogeneity of items and, especially, the day-to-day vicissitudes of the varying contexts in which their data were collected (Izard et al., 2001; Spiliotopoulou, 2009), we consider these values adequate. Test–retest reliabilities for each component (and scale) of the MPAC-R/S were...
statistically significant and, although not large, still practically useful in magnitude, again given the dynamic behavioral nature of their items. However, repeated measures MANOVAs showed no difference in the level of MPAC-R/S components across assessment periods, suggesting that individual children were stable across time in their personal social-emotional styles.

We next examined differences in these component scores, according to important demographic dimensions (i.e., age, gender, and risk status). Some differences were in expected directions. For example, boys were more emotionally negative/aggressive than girls. This difference is likely driven by physical aggression, rather than temperamental negativity (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006). Further, Else-Quest et al.’s findings help explain the T2 difference in emotionally positive/productive behavior favoring boys—these meta-analysts found a significant effect of gender on high intensity pleasure, a key aspect of preschool boys’ rough and tumble play.

Three-year-olds, and especially those attending Head Start, showed more prosocial behavior (as part of the emotionally regulated/prosocial component) at both time points; they were also more emotionally positive/productive than their counterparts attending private childcare. What could explain these effects? We have already noted that age differences in prosocial behavior have been hard to pin down historically, perhaps especially within the preschool period. However, Hay (1994) convincingly asserted and showed empirical data that toddlers show emerging prosocial behaviors, as evidence of their interest in and emotional response to social partners. However, as toddlers grow into preschoolers, their understanding of the social world blossoms, and they become more discerning in their bestowal of prosocial behavior: Is their social partner of the same gender? Is prosocial behavior appropriate in this specific situation? Would their social partner reciprocate? Is it really the child’s responsibility to be prosocial now? Does the partner deserve prosocial behavior? Hence, our data may be in line with Hay’s tenets and findings.

Further, the Head Start classes at which we observed appeared more structured, and sometimes less chaotic, than the private childcare sites, which may help to explain the greater emotionally positive/productive behaviors seen there. These centers’ emphasis on social-emotional programming, including carefully monitored implantation of the prevention program “Al’s Pals,” which is effective in promoting social-emotional skills and preventing aggression (Lynch, Geller, & Schmidt, 2004), may help explain at least some of this effect. The quality of this programming may have afforded these children advantages that partially outweighed socioeconomic risk, at least during the period of MPAC-R/S observation.

We then broadened our investigation to seek answers on the cognitive underpinnings of social-emotional behavior, using the MPAC-R/S. First, we considered how emotion knowledge, or its lack, might lay the groundwork for social-emotional behavior. T1 MPAC-R/S scores were associated with indices of emotion
knowledge far more than would be expected by chance. Furthermore, for T2 emotionally regulated/prosocial behavior, the direction of prediction was from T1 emotion knowledge to social-emotional behavior, and not vice versa.

Second, we examined whether executive function, or its relative deficit, was an underpinning for aspects of social-emotional behavior. In this case, executive function was often negatively related to emotionally negative/aggressive behavior in zero-order correlations. Similar negative relations between self-regulation and aggression were found for children attending Head Start in Bierman et al. (2009), especially in combination with lack of prosocial skills. Executive function as measured here may tap cognitive processes enabling remission from aggression and regulation of anger (Espy, Sheffield, Wiebe, Clark, & Moehr, 2011)

However, the relations between social-emotional behavior and executive function were more clearly termed bidirectional in our stringent tests of the question. This finding makes sense; lack of executive function may underlie emotionally negative/aggressive behavior, as already noted. But it is important to consider whether such behavior then thwarts the very development of later executive function (Séguin, Zelazo, Tremblay, & Hartup, 2005).

In our final goal, we scrutinized the relations of social-emotional behavior with school success during preschool and kindergarten, and found that social-emotional behavior, especially emotionally negative/aggressive, did predict later and concurrent school adjustment and academic skill, for kindergarten usually with earlier indicators held constant. This aspect of social-emotional behavior predicted lack of success especially for boys, and for relatively older children in kindergarten. Moreover, mediation analyses showed that emotionally negative/aggressive behavior mediated the contributions of HEF and negative emotion knowledge to school adjustment. This final set of analyses made clear a broader picture of the context in which emotionally negative/aggressive behavior plays out its contribution to school adjustment. Children who are unable to handle the tasks of hot executive function—delaying gratification, suppressing prepotent responses when motivations and emotions run high—may be especially at risk for difficult social-emotional behavior, and inability to read the social cues of age mates may exacerbates these difficulties. The preschool classroom, because of these cognitively rooted differences, becomes more of a battleground than a forum for learning.

However, several questions about these results bear further scrutiny. Why was emotionally positive/productive behavior related to teachers’ views of lower school adjustment for 4-year-olds? Perhaps some of this behavior is explained by the subsidiary analysis showing that teachers rating school adjustment were confronted with more highly emotionally positive 4-year-olds, as compared with 3-year-olds. Maybe they saw the more boisterous 4-year-olds as having trouble with school tasks, whereas happier 3-year-olds seemed to be adjusting to school tasks more comfortably. It is more difficult to see why kindergarten teachers might particularly view emotionally negative/aggressive behavior as especially troubling.
for children who were 4-year-olds in our original sample; after all, the 3- and 4-year-olds from time did not enter the same kindergarten classes. Perhaps the longer time interval between MPAC-R/S observations and kindergarten allowed the originally younger children to catch up—the more recent MPAC-R/S observations for the originally older children may have been closer to present behavior.

Further, why did mostly emotionally negative/aggressive behavior predict concurrent and later school and early academic success? Why didn’t emotionally positive/productive and emotionally regulated/prosocial behavior show parallel contributions? Obviously, negative behaviors are the easiest to see and the most worrisome for teachers (Buscemi, Bennett, Thomas, & Deluca, 1996; Rimm-Kaufman, Pianta, & Cox, 2000), and they are definite roadblocks to early school success, be it in terms of learning behaviors, classroom adjustment, or preacademic achievement. Perhaps our findings point out that early childhood teachers need to be trained to be even more attuned to the positive, productive, emotionally regulated, and prosocial aspects of their pupils’ social-emotional behavior, and their potential impact on school success.

The idea of training teachers brings us to consideration of the MPAC-R/S’s utility. Will early childhood educators really use it? As Strain and Joseph (2004) reminded, early childhood teachers are stressed and stretched by the challenging behaviors of the children in their charge—they may cry, “Not one more thing!!” when asked to observe social-emotional behavior, even to help calibrate and individual curricula and track student process. As well, it takes engaged, reflective supervision to lead teachers to be able to observe the ramifications of positive aspects of social-emotional behavior.

There is a long history asserting that early childhood teachers’ observing their pupils for assessment purposes is truly a best practice (Hyson, 2003) as part of multimethod assessment that also could include teacher ratings. Rather than asking, “Why should we observe, when rating scales are so much easier and cheaper?” it is necessary to acknowledge that teachers’ rating scales and observations are not veridical, that each provides a unique perspective, a part of the description of the whole child (Cost & Simpson, 2004; Thomas, Shapiro, DuPaul, Lutz, & Kern, 2011). Further, there is emerging evidence that observations can be efficaciously gathered using present technology (LeDoux, Yoder, & Hanes, 2010). Coupling engaged supervision with new technology, to meet the long-time standard of watching children’s vitally important social and emotional behavior, could be a useful application of the MPAC-R/S.

In sum, in the present study we focused on confirming empirical support for the use of a shortened version of an observational measure of social-emotional behaviors in preschoolers. Specifically, the results confirm the important links between such behaviors and emotion knowledge, executive function, and early childhood school success, even after controlling for several demographic characteristics. Although additional questions are raised about teacher’s use of social-emotional
information, the results of this study support the use of this tool in both research and applied classroom settings.

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AUTHOR NOTES

Susanne A. Denham is University Professor of Psychology at George Mason University, director of the Applied Developmental Psychology program, and editor of Early Education and Development. She has written on early childhood social-emotional development for over 25 years. She is the principal investigator of the AESSSR project. Hideko Hamada Bassett is a research assistant professor and PhD graduate in the Applied Developmental program, George Mason University. Her work has supported the AESSSR project well and continuously. Sara K. Thayer is a doctoral student at George Mason University who contributed instrumentally, as did all the following authors, to the AESSSR project. Melissa S. Mincic is a graduate of the Applied Developmental Psychology program at George Mason University, who is now at University of North Carolina Chapel Hill. Yana S. Sirotkin is a graduate of the Applied Developmental Psychology program at George Mason University, and now works as a Child Development Specialist in Florida. Katherine Zinsser is a present doctoral student in the Applied Developmental Psychology program at George Mason University.

REFERENCES


APPENDIX

Minnesota Preschool Affect Checklist–Revised/Shortened: MPAC-R/S

**Emotionally Negative/Aggressive**

**NEGATIVE EMOTION**

1. The child displays negative emotion in any manner (i.e., facial, vocal, or bodily emotion). The child’s behaviors must match the context of a given situation.
2. The child directs negative emotion specifically at a particular person when already in contact with them. Emotion is directed at a specific person.

**AGGRESSIVE BEHAVIORS, ESPECIALLY IN RESPONSE TO EMOTIONALLY AROUSING PROBLEM SITUATIONS**

3. *The child displays context-related interpersonal aggression (verbal or physical). Someone does something to which the child responds with aggression (emotionally arousing preceding event must be observed).
4. *The child hits, kicks, shoves, knocks over, or throws objects (emotionally arousing preceding event must be observed).
5. *The child displays unprovoked physical interpersonal aggression.

Emotionally Regulated/Prosocial

**POSITIVE REACTIONS TO EMOTIONALLY AROUSING PROBLEM SITUATIONS**

1. The child promptly verbally expresses feelings arising from a problem situation, then moves on to the same or a new activity (versus withdrawing, displacing the emotion onto others or objects, or staying upset).
2. The child shows primarily neutral or positive emotion.

**SKILLS IN LEADING AND JOINING**

3. The child smoothly approaches an already ongoing activity and gets actively involved. The child does not disrupt or antagonize other children as he/she approaches the activity.

**PROSOCIAL BEHAVIOR**

4. *Taking turns: The child plays with a toy or participates in an activity and then allows another to do the same.
5. Cooperating: The child jointly works with a peer or group of peers to achieve a common goal.
6. *The child shares toys or other materials (e.g., crayon, pencil, play dough, etc.).

**Emotionally Positive/Productive**

**POSITIVE EMOTION**

1. The child displays positive emotion in any manner (i.e., facial, vocal, or bodily emotion). The child’s behaviors must match the context of a given situation. Examples: Smiling, laughing, singing, dancing, etc.
2. The child directs positive emotion specifically at a particular person when already in contact with them. Emotion is directed at a specific person.

3. The child displays positive emotion when in a social situation but does not direct it to anyone in particular.

**INVolVEMENT: PRODucTIVE, FOcuSED, USE OF PERSONAL ENERGY**

4. The child is engrossed, absorbed, intensely involved in activity. The child is emotionally invested in creative, productive, thematically organized, or other activity that has a positive emotional function.

5. The child is involved in an activity that he/she organizes for himself/herself; s/he is independent.

**INVolVEMENT: uNPRODucTIVE, uNFOCUSED USE OF PERSONAL ENERGY (all items reversed)**

6. *Vacant: The child displays a very flat, unexpressive, detached face; shows no involvement in an activity; and looks “emotionally absent.”

7. Listless: The child looks fidgety and uninvolved in the activity but still “emotionally present;” the child stays in one area but shows little/no involvement in activities or social interaction.

*Items included for theoretical reasons.