“I Know How You Feel”: Preschoolers’ emotion knowledge contributes to early school success

Susanne A Denham, Hideko H Bassett and Chavaughn Brown
George Mason University, USA

Erin Way
Alvernia University, USA

Jessica Steed
George Mason University, USA

Abstract
Differences in emotion knowledge by children’s age, gender, and socioeconomic risk status, as well as associations of emotion knowledge with executive control, social competence, and early classroom adjustment, were investigated. On emotion knowledge, 4- and 5-year-olds scored higher than 3-year-olds, with girls showing this effect more strongly. Socioeconomic risk status and emotion knowledge were negatively related. Furthermore, executive control was found to contribute to variance in emotion knowledge. Even with age, gender, socioeconomic risk status, and executive control covaried, emotion knowledge contributed to variance in social competence. Given these covariates, it contributed only indirectly to classroom adjustment, via its contribution to social competence. Implications are discussed for practice and policy attention to emotion knowledge within social–emotional curricula and assessment, targeting the period between ages 3 and 4 years, as well as children living in poverty.

Keywords
classroom adjustment, emotion knowledge, executive control, preschool, social competence

Children are constantly attempting to understand their own and others’ behavior, and emotions play a role in this understanding, conveying crucial interpersonal information that can guide
interaction. Thus, emotional transactions are central to social interaction and relationships and are important in supporting children’s engagement in learning. Because of its importance, preschoolers’ emotion knowledge is increasingly identified as an important predictor of their skill at navigating social and academic worlds of early schooling. Inability to interpret emotions can make classrooms confusing, overwhelming places (Raver et al., 2007). Therefore, the acquisition of emotion knowledge has important applied implications.

These applied implications must involve social competence and classroom adjustment. Social competence can be defined as skills associated with successful interactions with peers and teachers—cooperating, taking into account others’ feelings and refraining from either aggression directed at, or withdrawal from, one’s peers. Classroom adjustment can be defined as young children’s behaviors and attitudes associated with learning in the classroom environment, such as positive attitudes about school, and abilities to participate both cooperatively and self-directedly in classroom activities (Ladd et al., 1999). Hence, we chose social competence and classroom adjustment as important outcomes in the current investigation.

Research on social competence indicates that preschoolers who apply emotion knowledge in emotionally charged situations have an advantage in peer interaction: they are more prosocial, rated as more socially skilled by teachers, and identified as more likable by their peers, even longitudinally (Denham et al., 2003; Ensor et al., 2011; Izard et al., 2001). When young children can identify their own and others’ negative feelings and negatively valenced situations, they may enact more empathic actions; when they can accurately perceive positive emotion expressions and situations, they may join in the fun in the classroom more readily. In contrast, lack of age-appropriate emotion knowledge puts preschoolers at risk for aggression (Denham et al., 2002). Preschoolers who cannot understand others’ emotions may misinterpret peers’ actions, and plan actions based on this erroneous information; they may also misread their own feelings, with subsequent missteps with peers.

Similarly, links between preschoolers’ emotion knowledge and both early classroom adjustment (e.g. abilities to persist, get along with others, motivation to learn) and academic success are also being confirmed. Specifically, Head Start preschoolers’ emotion knowledge predicted later classroom adjustment, even with age, verbal ability, and emotion regulation partialled (Shields et al., 2001). Emotion knowledge is also related to preacademic achievement (Garner and Waajid, 2008; Leerkes et al., 2008). Furthermore, kindergarteners’ emotion knowledge is related to their attention to academic tasks, and predicts both first-grade achievement and age 9 social/academic competence (Izard et al., 2001; Trentacosta and Izard, 2007). Thus, preschoolers’ ability to understand emotions, especially within peer and learning classroom situations, plays an important role in concurrent and later school success. In this study, we corroborate and extend such earlier findings, focusing on associations of emotion knowledge with preschoolers’ social competence and early classroom adjustment.

In terms of extending previous research with an eye on applied considerations, when discovering how emotion knowledge predicts important aspects of preschool functioning, we must also discern how this developing skill varies across specific child characteristics. Age is one such characteristic; pinpointing trajectories of age change could assist early childhood educators and preventionists in determining the best age to target learning activities in this area. Another child characteristic potentially related to emotion knowledge is gender. Girls often, but not always, have an advantage in emotion knowledge (McClure, 2000). Knowing whether boys or girls need programming aimed to increase emotion knowledge could be useful in practice, as well.

The importance of elucidating differences in preschoolers’ emotion knowledge attributable to socioeconomic risk is clear. Emotion knowledge can be enhanced for children at socioeconomic
risk, and such change is related to their positive behavioral and academic adjustment (Izard et al., 2001, 2008; Shields et al., 2001). Program development could benefit from better understanding the emotion knowledge needs of children at risk for socioeconomic reasons.

Finally, examining foundations of emotion knowledge is also important, if we are to promote it. Recent research has suggested that executive control underlies change in emotion knowledge (Denham et al., 2012). Putting aside one’s own pressing needs to perceive the emotions of others, as well as being able to focus attention, for example, would be important scaffolds for the development of a larger emotion knowledge base. Specifically, aspects of both emotional *expressions* and *situations* may require attentional control to correctly distinguish among emotions, and reflecting upon emotional situations may arouse some emotion, necessitating aspects of executive control.

At the same time, a growing body of work has emphasized the impact of executive control on preschoolers’ social competence and classroom adjustment (Bierman et al., 2008, 2009). Thus, a stronger test of the contribution of emotion knowledge to both social competence and classroom adjustment would be to include its potential foundation, executive control, in any such tests of prediction, and this is the stance that we take here.

In sum, we aim to corroborate and extend earlier findings on differences in emotion knowledge according to preschoolers’ age, gender, and socioeconomic risk status, as well as the association of emotion knowledge with executive control. Finally, the relations of preschoolers’ emotion knowledge to their social competence and early classroom adjustment are examined, both directly and with concurrent contributions of executive control partialled.

**Method**

*Participants and procedure*

Preschoolers enrolled in Head Start and private childcare centers in the greater Northern Virginia area participated. The 293 participating children (189 in private childcare and 104 attending Head Start) included 64 three-year-olds: $M = 42.3$ months, standard deviation ($SD$) = 3.2 months; 142 four-year-olds: $M = 54.0$ months, $SD = 3.4$ months; and 87 five-year-olds: $M = 62.6$ months, $SD = 1.8$. Approximately half the participants were male, with a majority of children parent-identified as either Caucasian or African-American (57.4% self-reported as Caucasian and 32.4% as African-American). About 14 percent of parents self-reported as Hispanic/Latino. Approximately half of mothers attained high school graduation or less; ordinal values of maternal education were used as a proxy for socioeconomic risk status in regression analyses; and for group comparisons, mothers’ education was grouped as low (i.e. high school or less) or high (i.e. associates’ degree or better). Assessments were conducted in centers’ quiet areas during winter and early spring. Teacher measures were collected at the academic year’s end.

*Measures*

Direct assessments of emotion knowledge and self-regulation were administered. Teachers supplied survey information on children’s social competence and classroom adjustment.

*Emotion knowledge: the Affect Knowledge Test–Shortened*

This measure, a shortened adaptation of the Affect Knowledge Test–Shortened (AKT-S), assessed preschoolers’ understanding of emotion using puppets with detachable faces that depict happy, sad,
angry, and afraid expressions. For the **labeling** portion of the measure (six items), children were asked to identify sad, angry, and afraid facial expressions by verbally naming them (expressive knowledge), and then by nonverbally pointing to them (receptive knowledge). For the **situation knowledge** portion, nine vignettes were enacted using the puppets, accompanied by vocal and visual affective cues emitted by the puppet/experimenter. For three children’s stereotypical emotion knowledge vignettes, the puppet depicted the same emotion most people would feel (e.g. fear during a nightmare). In the remaining six nonstereotypical emotion knowledge vignettes, the puppet depicted emotions different from each mother’s reports of her child’s likely feelings. Among nonstereotypical situations, three vignettes pitted positive versus negative emotion (e.g. happy or sad to come to preschool); the rest pitted negative versus negative emotion (e.g. angry at or afraid of a sibling’s aggression). Children affixed the felt face of their choice to report the puppet’s emotion.

Children received two points for correct identification of emotion in any AKT section, one point for identifying the correct (positive or negative) valence but not the correct emotion (e.g. sad for afraid). The score used in subsequent analyses was the average of standard scores for all subtests. Internal consistency reliability $\alpha$ was .77. The AKT has demonstrated reliability and validity (Denham and Couchoud, 1990a, 1990b; Denham et al., 2003; Miller et al., 2004) and is useful for assessment of status and change in emotion knowledge (Shields et al., 2001).

**Preschool Self-Regulation Assessment**

Two Preschool Self-Regulation Assessment (PSRA) tasks (Smith-Donald et al., 2007) were used to capture executive control; choice of these two tasks was based on Bassett et al.’s (2012b) findings of lack of ceiling effects for these two tasks, and their high standardized factor loadings in confirmatory factor analyses of the structure of the PSRA: Pencil Tap and Toy Peek. For Pencil Tap, the child is asked to tap an unsharpened pencil after the assessor: once after the assessor taps twice, and twice after the assessor taps once; scores equal the percentage of correct trials over a total of 16 trials. For Toy Peek, the child is asked not to peek while the assessor wraps a toy in tissue paper and a gift bag, for 1 minute; scores equal latency in seconds to the first peek up to the maximum of 60 seconds.

Tasks were administered by trained and certified research assistants who live-coded latencies or performance levels for each task. Intra-class correlations for assessor reliability were good for both Pencil Tap (.97) and Toy Peek (.79). Internal consistency $\alpha$ for 16 trials of Pencil Tap equaled .79, and for Toy Peek, across scores for presence of peeking, number of peeks, and time to peeking, Cronbach’s alpha equaled .96. Scores used were the percentage of correct pencil taps across trials and latency to peeking (up to 60 seconds allotted time). $Z$-scores for the two tasks were summed; resulting executive control aggregate’s $\alpha = .60$.

**Social competence: Social Competence and Behavior Evaluation**

For the Social Competence and Behavior Evaluation (SCBE)-30 (LaFreniere and Dumas, 1996), teachers rate children on 10-item scales, including Angry/Aggressive (e.g. “easily frustrated”), Sensitive/Cooperative (e.g. “comforts or assists children in difficulty”), and Anxious/Withdrawn (e.g. “avoids new situations). For this study, the Sensitive/Cooperative scale is used as an index of social competence; its internal consistency $\alpha$ was .82. Validity of the SCBE has been shown with normative, clinical, and cross-cultural samples (Denham et al., 2003; LaFreniere and Dumas, 1996).
Classroom adjustment: Preschool Learning Behaviors Scale

The Preschool Learning Behaviors Scale (PLBS) is a 29-item measure on which teachers rate children’s approaches to learning (McDermott et al., 2002). It has been shown to be valid in previous research and is reliable in three dimensions within our data: Competence Motivation (11 items, for example, reluctant to tackle a new activity; \( \alpha = .87 \)), Attention/Persistence (9 items, for example, tries hard, but concentration soon fades and performance deteriorates; \( \alpha = .88 \)), and Attitudes toward Learning (7 items, for example, does not achieve anything constructive when in a sulky mood; \( \alpha = .78 \)).

Classroom adjustment: Teacher Rating Scale of School Adjustment

The Teacher Rating Scale of School Adjustment (TRSSA) includes 52 items rated on a 3-point scale, across four scales: School Liking, Cooperative Participation, Self-Directiveness, and Comfort with Teacher (Ladd et al., 1997). Adequate reliability was found in this study for Self-Directiveness (9 items, for example, “works independently”; \( \alpha = .87 \)), Cooperative Participation (8 items, for example, “follows teacher’s directions”; \( \alpha = .91 \)), School Liking (5 items, for example, “likes going to school”; \( \alpha = .75 \)), and Comfort with Teacher (5 items, for example, “initiates conversations with the teacher”; \( \alpha = .70 \)). The TRSSA is valid across socioeconomic status and ethnicity (Ladd et al., 1997). For this study’s classroom adjustment score, a summed aggregate of z-scores for each PLBS and TRSSA scale was created, \( \alpha = .88 \).

Results

The study’s first goal was to examine differences in emotion knowledge due to age, socioeconomic risk status, and gender. To meet this goal, a 3 (3-year old, 4-year old, and 5-year old) × 2 (low maternal education vs high maternal education) × 2 (boy and girl) analysis of variance (ANOVA) was run using the total emotion knowledge aggregate as dependent variable. See Table 1 for \( F \)s, effect sizes, and adjusted means and standard errors (SEs). Older children demonstrated greater emotion knowledge. Bonferroni multiple comparisons for age differences showed 3-year-olds scoring lower than both 4- and 5-year-olds, \( p < .001 \); there were no differences between the two older groups. This main effect was moderated by an age × gender interaction, and girls showed this effect more markedly than boys; put another way, girls improved markedly between 3 and 4 years of age, and maintained this gain, whereas boys’ improvement was more linear, and their emotion knowledge did not attain the level of girls. Differences attributable to socioeconomic risk status (i.e. maternal education) showed that children of mothers who had less education scored lower. No other group comparisons (i.e. that for gender) or interactions reached significance.

The study’s second goal was to examine executive control’s contributions to variance in total emotion knowledge. Regression analyses were used to address this goal, with age, maternal education, and gender entered in the first block of the equation, and the executive control aggregate entered in the second. As seen in Table 2, after controlling for significant positive contributions of age, maternal education, and gender (girls), executive control did make a significant positive contribution to variance in total emotion knowledge.

The study’s third goal was to discern contributions of emotion knowledge to variance in later teacher-rated social competence and classroom adjustment. Regression analyses were again used to address this goal, with age, maternal education, and gender entered in the first block of the
equation, executive control entered in the second, and the total emotion knowledge aggregate entered in the third. As seen in Table 2, after controlling for significant contributions of age, gender, and executive control, emotion knowledge explained a significant increment in variance for social competence, but not for classroom adjustment. However, it should be noted that without executive control in the equations, $\beta$s for total emotion knowledge was .126 and .134 for social competence and classroom adjustment, respectively, $ps < .05$. 

### Table 1. Emotion knowledge descriptive data by age, maternal education, and age by gender.

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Maternal education</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 years</td>
<td>4 years</td>
</tr>
<tr>
<td><strong>Total emotion knowledge</strong></td>
<td>0.63 (.03)</td>
<td>0.79 (.012)</td>
</tr>
<tr>
<td><strong>Age by gender</strong></td>
<td>0.67 (.037)</td>
<td>0.76 (.024)</td>
</tr>
</tbody>
</table>

Total emotion knowledge = mean of standard scores for negative expressions. $Fs$ evaluated by Pillai’s Trace. Standard errors in parentheses. 

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

### Table 2. Prediction of emotion knowledge and classroom adjustment, given age, maternal education, and gender.

<table>
<thead>
<tr>
<th></th>
<th>Total emotion knowledge</th>
<th>Social competence</th>
<th>Classroom adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Block 1</strong></td>
<td>B           SE B  $\beta$  $\Delta R^2$</td>
<td>B           SE B  $\beta$  $\Delta R^2$</td>
<td>B           SE B  $\beta$  $\Delta R^2$</td>
</tr>
<tr>
<td>Age</td>
<td>.029        .004  .423***  .207***</td>
<td>.013        .005  .141**  .153***</td>
<td>.012        .004  .166**  .125***</td>
</tr>
<tr>
<td>Maternal education</td>
<td>.087        .023  .200***</td>
<td>-.048        .032  -.081</td>
<td>-.029        .024  -.065</td>
</tr>
<tr>
<td>Gender</td>
<td>.105        .057  .097+</td>
<td>.507        .079  .348***</td>
<td>.325        .060  .298***</td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td>B           SE B  $\beta$  $\Delta R^2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive control</td>
<td>.216        .039  .333***</td>
<td>.159        .056  .181**</td>
<td>.129        .043  .196**</td>
</tr>
<tr>
<td><strong>Block 3</strong></td>
<td>B           SE B  $\beta$  $\Delta R^2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotion knowledge</td>
<td>–          –     –</td>
<td>.226        .085  .167**</td>
<td>.086        .065  .085</td>
</tr>
</tbody>
</table>

SE: standard error. 
Total $R^2$ significant, $p < .001$, through final step for all equations. 
* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$. 

Denham et al.
Because we consider social competence and classroom adjustment to be theoretically related (with classroom adjustment supported by social competence), and because the two constructs are empirically related in our dataset, \( r(289) = .58, p < .001 \), we wanted to explore the indirect/mediating effect of socially competent behavior choices on the relation between emotion knowledge and classroom adjustment. To test these possible effects, we created models with the aforesaid variables, along with age, gender, and socioeconomic risk. We utilized Mplus 4.1 (Muthén and Muthén, 2006) because this program directly estimates specific indirect effects. The results revealed that there was a significant indirect effect between emotion knowledge and classroom adjustment, mediated by social competence \( (b = .12, SE = .03, \beta = .12, p < .001) \). The direct path between emotion knowledge and school adjustment was nonsignificant in this model, so the effect was indirect only.

In addition, we were interested in whether the contributions of both executive control and emotion knowledge to social competence and classroom adjustment could be described by an indirect/mediational model, with executive control promoting emotion knowledge, which then predicts school outcomes. We found a significant indirect effect between executive control and social competence \( (b = .07, SE = .03, \beta = .08, p < .01) \). Given the already-established significant relations between emotion knowledge and both executive control and social competence (see Table 2), this indirect effect was one of mediation. However, a parallel analysis examining the contributions of executive control to classroom adjustment via emotion knowledge did not show any indirect or mediational relation.

**Discussion**

We examined how (a) preschoolers’ emotion knowledge varies according to child characteristics, (b) executive control may be associated with emotion knowledge, and (c) emotion knowledge predicts teachers’ later views children’s social competence and academic-related classroom adjustment. Findings are discussed in terms of contributions to early childhood practice and policy and the usefulness of the AKT as part of an assessment battery for social–emotional school readiness.

**Differences according to child characteristics**

**Age and gender.** Age differences in emotion knowledge have been found before with the AKT. Although Denham and Couchoud (1990b) found that stereotypical situation knowledge was not related to age when expression recognition (which was related to age) was partialled, they (Denham and Couchoud 1990a) also found that nonstereotypical situation knowledge was related to age, with a similar trajectory of increasing scores as that found here. Others have also found large increases between ages of 3 and 5 years on these aspects of emotion knowledge (Pons et al., 2004). Thus, converging evidence suggests that important advances are made between ages 3 and 4 years in emotion knowledge; perhaps the 3- to 4-year-old period is ripe for training and augmenting these naturally emerging abilities.

The twist in our data is that girls seem to be especially showing this pattern of age change; hurdles in acquiring developmentally appropriate emotion knowledge, met by girls, are not as easily met by boys. McClure (2000) suggests that by age 3 years, any neurobehavioral advantage for girls has dissipated, so differential socialization of emotion may more readily account for differences such as these. Parents tend to talk more about emotions with daughters than sons at this age (Denham et al., 2010). Thus, especially if this finding is born out in future research, and because
we see linkages between emotion knowledge and important outcomes, it could be advantageous to target 3-year-old boys in particular for emotion knowledge programming.

**Socioeconomic risk.** We found that children at greater socioeconomic risk scored lower on emotion knowledge. Others have found aspects of preschoolers’ social cognition to be related to SES (e.g. Garner et al., 2005). Because part of this effect may be due to the lower language ability of children at socioeconomic risk (Nelson et al., 2011), it is important to replicate this finding with the addition of a measure of language ability. However, considering accumulating evidence, continued practice and policy efforts aimed at bolstering social–emotional development in general, and emotion knowledge in particular, may be in order for children living in poverty.

**Prediction by executive control**

Our results corroborate other recent findings that executive control is an important support for developing emotion knowledge. Furthermore, emotion knowledge mediates the executive control–social competence linkage, pointing to yet another benefit of age-appropriate executive control. Executive control’s support of emotion knowledge, over and above its direct relations with both social competence and classroom adjustment, could be an entry point for increased practice and policy attention.

**Prediction of social competence and classroom adjustment**

Emotion knowledge predicted teachers’ later views of preschoolers’ social competence, and classroom adjustment (albeit only in analyses not including executive control, or indirectly via social competence). These results corroborate other recent findings using a longer longitudinal period (Bassett et al., 2012a; Denham et al., 2012; executive control was not partialled in these reports’ analyses), as well as those of Denham et al. (2003). For both social competence and classroom adjustment, then, we must teach children about emotions, whether through specific lessons or more informal interactions with teachers or parents. Thus, our results suggest a fruitful method of, and several reasons for, assessing emotion knowledge during preschool.

But by what processes might emotion knowledge lead to classroom adjustment—the cooperative, persistent, motivated self-directedness captured by our classroom adjustment index? Our mediation results shed light on this question. Thus, age-appropriate emotion knowledge bolsters mutually satisfying experiences with peers and adults in the classroom (i.e. social competence), which in turn supports classroom adjustment. Such prosocial interchanges, supported by emotion knowledge, can elevate mood, which facilitates learning (Eggum et al., 2011; Izard et al., 2001). A socially competent child, supported by adequate emotion knowledge, may be able to pay more attention to academic tasks, plan better, and devote more resources to learning than a less socially competent one because they can benefit more from teachers’ instructions, giving and getting academic information from peers, sharing academic resources with peers, and modeling peers’ learning skills. Future research could obtain social competence and classroom adjustment ratings from more than one reporter to replicate this effect.

In sum, preschoolers’ emotion knowledge varies with age, gender, and socioeconomic risk, and is supported by concurrent executive control. Moreover, it is related to later social competence and indirectly to classroom adjustment. Thus, emotion knowledge should be acknowledged as a precursor to such success, with a corresponding emphasis in research, policy, and practice informed by the important within- and between-child characteristics emphasized here.
In particular, emotion knowledge deserves even greater attention in classrooms, in terms of everyday practice (such as conversations between teacher and child), specific curricula, and assessment. Programs that focus on emotion knowledge have already been created and evaluated, showing positive effects on preschoolers’ emotion knowledge over time periods of one academic year (Domitrovich et al., 2007; Izard et al., 2008; Webster-Stratton et al., 2008). Taken together with both formal and informal programming, the AKT-S is an excellent assessment tool with which early childhood educators can come to understand the crucial individual differences in young children’s emotion knowledge. Armed with this understanding, individualized learning support and class-wide learning opportunities for learning about emotions can be undertaken, as well as monitoring of program effects. Understanding individual differences in young children’s emotion knowledge and teaching them about emotions can yield important rewards in their school and social success.

Acknowledgements

We are grateful to the many children, families, and teachers who participated in this study, and the directors of the facilities who so cooperatively worked with us. We also thank Amanda Mahoney, Carol Morris, So Ri Mun, Alyssa Perna, Yana Segal Sirotkin, Erin Tarpey, Sara Kalb Thayer, and Jessy Zadrazil Newman for their unstinting assistance in study organization and data collection.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The present study was funded by NICHD grant #R01HD51514.

Note

1. Age differences do also exist for negative expressions, and both situations measure in this cohort. As in Denham and Couchoud (1990a, 1990b), 3-year-olds obtained lower scores than either 4- or 5-year-olds.

References


