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EMOTION KNOWLEDGE AND SOCIAL AND EMOTIONAL COMPETENCE: A PRELIMINARY STUDY OF PRESCHOOL AND FIRST GRADE GREEK STUDENTS

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Abstract: Even young children think about their own and others' behaviors, including emotions. Such cognitions and emotions about self and others convey information that is crucial to social interactions and relationships. The present study aimed at exploring young children's emotional knowledge processes, the role of gender in these processes, and their association with teacher-reported early school adjustment. It also aimed at testing the validity of a model of emotional knowledge in the Greek context. Two-hundred and fifty-two preschool and first grade primary school students were interviewed with the Affect Knowledge Test (AKT). Preschool and first grade primary teachers rated children's early school adjustment with the Social Competence and Behavior Evaluation (SCBE-30). The results highlighted the association of children's emotion knowledge with school adjustment. A theoretical model of emotion knowledge for preschool and early primary education students is proposed.

Key words: Emotion knowledge, Emotional competence, Social competence

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INTRODUCTION

Even very young children think about their own and others' emotions. Such cognitions and emotions about self and others convey information that is crucial to social interactions and relationships. Children who understand emotions respond positively to social challenges, state how they feel, and regulate emotional arousal in order not to disrupt their interactions with peers or adults (Izard et al., 2008). In contrast, children's inability to interpret emotions can turn classrooms into confusing places (Raver, Gershoff, & Aber, 2007). Research showed that children who struggle in the classroom environment actually lack emotion knowledge skills (Denham et al., 2013a). Children's emotional knowledge skills constitute essential parts of social and emotional learning (SEL) skills, which work together in children's social interactions. Decision making, emotion regulation, maintaining positive social interaction with adults and peers are among key SEL skills in early childhood (Denham et al., 2014a; Denham et al., 2012b; Denham, Bassett, Way, Zinsser, & Wyatt, 2014b). In the present study we focus on emotional knowledge, a foundational cognitive and emotional element of preschool children's skills.

Emotional knowledge is an important predictor of children's social competence and adjustment (Bierman & Domitrovich, 2008; Denham et al., 2013a; Denham et al., 2013b), concurrently and predictively (Denham et al., 2012a; Denham et al., 2014b).

Emotion knowledge in preschool

In conjunction with cognitive and social knowledge, emotion knowledge constitutes a key database of young children's social adjustment and early school success (Denham et al., 2012c). During the preschool period children gradually develop emotional knowledge, that is, the ability to understand emotions within their social interactions starting from basic emotions, their expression or the situations in which they occur with understanding of happiness to emerge earlier than negative emotions. The differentiation of negative emotions of self and others, the identification of their own and others' emotion, and the experience of simultaneous emotions further develop (Denham, 1998). Preschool children are equipped with several foundational components of emotion knowledge, with which they make sense of their social interactions. Such components include recognizing expressions, expressing emotions that are, or are not, experienced, understanding reactions to emotion-eliciting situations, decoding emotional processes in others, and regulating emotions that are age- and socially appropriate (Halberstadt, Denham, & Dunsmore, 2001).

Denham, Bassett, and Wyatt (2015b) further analyzed these components and determined the following emotional knowledge dimensions: a) *emotional expressiveness*

as, firstly, the specific emotions shown by children (e.g., happiness, sadness, anger, fear, empathy and love), and, secondly, the overall rate of such expressiveness across emotions; b) *understanding* of emotions of themselves and others, which include children's comprehension of basic emotions (e.g., happiness, sad, and anger), their expressions, causes and consequences, insight into more complicating emotions (e.g., two people can feel different emotions in the same situation), and discrimination of more complex emotions (e.g., guilt and shame); and c) *regulation* of emotions, when their experience opposes children's comfort or other's expectations.

Based on theoretical models of emotion knowledge that have been developed to depict age-related levels of emotion knowledge (see Bassett, Denham, & Mincic, 2012, for a review of emotion knowledge models), Denham (1998) proposed a theoretical model of emotion knowledge, with recognition of emotion at the first level, and understanding of situation-based emotions at the second level. These are the foundational components of emotion knowledge occurring during the preschool period (Figure 1). Recognition of emotions includes verbal (expressive) and nonverbal (receptive) recognition of emotion expression in schematic drawings. As for situation knowledge, two types of emotion-eliciting situations are included in the model, stereotypical and non-stereotypical situations. Stereotypical situations are script-like situations, in which most children feel similarly. In contrast, non-stereotypical situations require children to consider situations that elicit emotions different from their own emotions.

Previous studies have treated emotion recognition and situation-based emotion knowledge as a unidimensional construct (Downs, Strand, & Cerna, 2007). Such a uni-dimensionality, however, may disguise how different levels of emotion knowledge

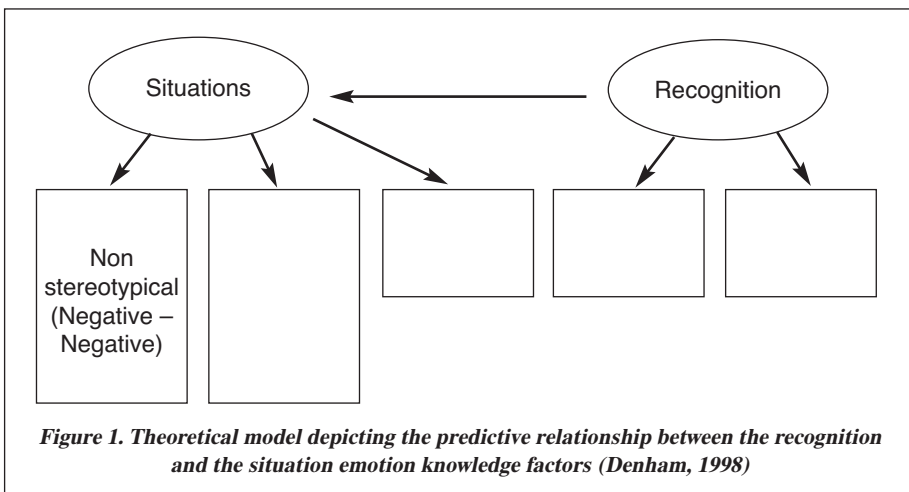


Figure 1. Theoretical model depicting the predictive relationship between the recognition and the situation emotion knowledge factors (Denham, 1998)

differentially relate to child social competence or academic achievement (Denham & Couchoud, 1990). It is therefore important to have measures of emotion knowledge with clear factor structure, given that the description of emotion knowledge state and change is a key aspect of students' social and emotional competence (Domitrovich, Cortes, & Greenberg, 2007). In the present study, we adopted Denham's (1998) emotion knowledge model to further our understanding of a theory-based structure of young children's emotion knowledge in the Greek context.

Emotion knowledge and social and emotional competence

Emotion knowledge is central to school success, and children's learning behavior (Denham et al., 2013a; Denham & Brown, 2010; Denham et al., 2012b). In fact, preschoolers' emotion knowledge has been linked to preacademic achievement (Garner & Waajid, 2008; Leerkes, Paradise, O' Brien, Calkins, & Lange, 2008), and later school success (Denham, Bassett, Brown, Way, & Steed, 2015a).

The acquisition of emotion knowledge has important implications to children's social and emotional competence and classroom adjustment. Social and emotional competence are two highly related, although distinct, constructs. According to Rose-Krasnor (1997), at the most abstract level, social competence is defined as effectiveness in interactions, with focus on self or others. Social competence in preschool period encompasses skills related to successful interaction with peers and teachers (i.e., cooperation, taking account of others' feelings, refraining from aggression to peers; Denham et al., 2015a). At the most specific level, social competence includes specific social, emotional and cognitive abilities and behaviors which primarily focus on self. It is at this level that emotional competence gets related and may contribute to social competence. To maximize social competence to preschoolers, one needs to scrutinize how the elements of emotional competence relate to preschoolers' social competence (Denham et al., 2003).

Research suggests that preschoolers equipped with emotion knowledge are more prosocial, generate nonaggressive strategies (Dodge, Laird, Lochman, & Zelli, 2002), are rated more socially skilled by teachers, and are more likable by peers (Ensor, Spencer, & Hughes, 2011; Denham et al., 2012a). Children displaying positive emotions succeed in both initiation of social exchanges and communication during social interactions. Children who understand emotions are better able to state how they feel and more likely to show concern about others' feelings, without being overwhelmed by emotional arousal at the same time (Izard et al., 2008). Conversely, preschoolers presenting negative emotions are perceived as difficult by both teachers and peers (Walker, 2009). Children's inability to interpret

emotions can make preschool classrooms confusing places (Denham et al., 2002; Trentacosta & Fine, 2010), whereas lack of emotion knowledge puts preschoolers at risk for aggression (Denham et al., 2015a). Finally, previous research revealed gender difference in emotion knowledge, with girls having higher scores on emotion knowledge than boys (Brown & Dunn, 1996; Denham et al., 2015a; McClure, 2000).

The present study

Research with young children's social functioning grounded on Denham's theoretical model of emotion knowledge is limited. Moreover, there are no similar studies exploring young children's emotion knowledge in Greece, to my knowledge. In the present study, Denham's (1986) measure was utilized to investigate Greek preschool and early primary children's emotion knowledge. The study aimed to investigate, firstly, children's emotion knowledge about four basic emotions (happy, sad, angry, afraid), and possible gender differences. Based on Bassett et al.'s (2012) claim that most children in normal populations understand happiness during early preschool years, it was predicted that children would easily discriminate between positive (happy) and negative emotions (sadness, anger, fear), but would face difficulty in discriminating between negative emotions, namely, sadness, anger or fear (Hypothesis 1).

Secondly, the study aimed to investigate the contribution of children's emotion knowledge to their social and emotional competences in school, according to teachers' ratings. Based on previous research, the hypothesis was that emotion knowledge is an important predictor of children's social and emotional competencies (Hypothesis 2).

Thirdly, the study examined possible gender differences in the contribution of preschoolers' emotion knowledge to their social competence. The hypothesis derived from research was that girls present higher level on emotion knowledge than boys.

Finally, the study aimed to confirm Denham's theoretical model of emotion knowledge to Greek young students.

METHOD

Participants

The present data were part of a larger project on children's social and emotional competences and school adjustment. One hundred and twenty children were recruited

from 17 public preschools (34 boys and 36 girls), and seven primary schools in Achaia prefecture (31 boys and 20 girls from the first grade of primary school). The age of children ranged from 5 to 6 years old. Due to limited access to students' records no additional information about children's exact age could be collected. Their teachers (16 female and 1 male preschool teachers and 13 female primary teachers) also participated in the study. Teaching experience ranged from 5-34 years (11.1% had 5-9 years, 11.1% had 10-14 years, 22.2% had 15-19 years, 33.3% had 20-24 years and 22.2% had 30-34 years).

Measures

Teacher Questionnaire

This measure was administered to teachers to determine each child's unlikely response to 12 situations (e.g., Circle the emotion (happy or sad) you think your child would be most likely to display in the following situation: coming to preschool/school?). Teachers' responses were pre-coded with the 12 vignettes of the Affect Knowledge Test (AKT) indicating children's non-stereotypical emotion knowledge. Following teachers' reports, the researcher presented each child the AKT vignette depicting a different emotion from what the teacher had reported about him/her.

Affect Knowledge Test

One measure widely used to assess preschoolers' emotion knowledge is the Affect Knowledge Test (AKT; Denham, 1986). The AKT is a game-like measure with 20 age-appropriate vignettes to assess young children's emotion knowledge. It measures expressive and receptive recognition of emotions and understanding of stereotypical (most people would feel similarly) and non-stereotypical (individuals' emotions differ) situations, by using puppets with detachable faces.

The AKT makes use of puppets to measure children's expressive and receptive knowledge of the following four emotions: happy, sad, angry and afraid. Children are asked to reference the four detachable emotion faces (happy, sad, angry and afraid expressions) by verbally naming them (expressive knowledge, e.g., How does the face feel?), and by nonverbally pointing to them (receptive knowledge, e.g., "Point to the happy face"). In a following step, 20 vignettes are presented to children by the puppet/researcher, using the puppets, accompanied with vocal and visual affective cues, made by the researcher. Children affix the face of their choice to report how the puppets felt in each vignette. AKT comprises of two short versions (10 vignettes each),

which have already been validated in US (Denham et al., 2015a). In the present study, we use AKT in both versions, to test their validity in the Greek context. Eight of these vignettes are designed to address children's stereotypical emotion knowledge (two vignettes for each emotion). For these vignettes, the puppets depict the same emotion most children would feel (e.g., happiness in receiving an ice cream).

AKT further examines children's perspective-taking abilities, indicating children's non-stereotypical emotion knowledge, with the use of 12 vignettes. Non-stereotypical knowledge refers to children's ability to identify the same four emotions expressed by the puppets, but when the puppet's emotional response is different from that children would typically display in such a vignette (e.g., the puppet is sad about coming to school, for a child who is usually quite happy to do so). The puppet/researcher presents each child the vignette depicting a different emotion from what the teacher had reported about him/her in the Teacher Questionnaire. Of the 12 non-stereotypical situations, six vignettes present positive versus negative emotions (happy vs. sad to come to preschool/school; e.g., I am coming to school I like- I have so much fun, vs. I am coming to school I don't like. I miss my mommy), and six vignettes present negative versus negative emotions (two vignettes for each pair: angry vs. afraid, angry vs. sad, sad vs. afraid emotions: e.g., The class is going outside now to play on the playground but you have to stay inside with Mrs. Linda to finish your work). Children receive two points for correct identification of emotion, one point for identifying the correct valence but not the correct emotion (e.g., sad for afraid), and 0 point for the incorrect emotion. Construct and predictive validity information for the AKT has been provided by previous research with preschoolers in USA (Denham, 1986; Leerkes et al., 2008; Domitrovich et al., 2007).

AKT administration was conducted by the author who received prior training from an AKT certified trainer. Following the acquisition of certification and permission for the AKT administration, the measure was translated into Greek and back translated into English by two university students of English literature. Effort was taken to ensure that the original meaning of the AKT vignettes and questions were retained in the Greek translation. Pilot administration of the measure to five preschool and two primary children followed to ensure the accuracy of the Greek version.

Social competence and behavior evaluation

Children's social and emotional competence was measured with teachers' ratings on Social Competence and Behavior Evaluation (SCBE-30). The SCBE-30 (LaFreniere & Dumas, 1996) measures social and emotional competencies of 3-6 years old. It

comprises of three subscales, with ten items each: Angry/Aggressive scale (e.g., easily frustrated), Anxious/Withdrawn scale (e.g., avoids new situations), and Sensitive/Cooperative scale (e.g., comforts or assists children in difficulty). Responses are on a scale ranging from 1 (not much like this child) to 5 (very much like this child). SCBE has been validated in different populations (LaFreniere & Dumas, 1996). SCBE was translated into Greek and back-translated into English by two university students of English literature. Pilot administration of the SCBE-30 to four preschool teachers and two first grade primary school teachers ensured the accuracy of the Greek version. Cronbach's alpha reliability coefficients in this study were .84 for the Angry/Aggressive, .87 for the Anxious/Withdrawn, and .89 for the Sensitive/Cooperative scales.

Procedure

The measures were administered after the consent of parents and teachers had been obtained. The interviews with children were conducted during regular school hours in a quiet room in school, and lasted 20-25 min. Teachers had to assign pseudonyms to the questionnaires they completed for their students, to link their questionnaires with their students' interview data, so that participants were assured of the confidentiality and anonymity of the information they provided.

RESULTS

Children's emotion knowledge

AKT data were firstly checked for univariate normality. Since understanding of happiness develops earlier compared to other emotions (Denham & Couchoud, 1990), > 88% of participants correctly identified happiness emotion. Because of this distribution, values for kurtosis and skewness exceeded acceptability (West, Finch, & Curran, 1995), and therefore happiness items (one for each expressive and receptive and two for stereotypical knowledge) were removed from further analysis.

Table 1 presents the frequencies of children's responses in terms of expressive and receptive emotion knowledge and the two versions of stereotypical knowledge. When "sad" response was the expected answer almost all children responded correctly, with some children also responding with the non-expected responses of "angry" and "afraid" emotions. Similarly, when "angry" was the expected response, "sad" (4% for expressive knowledge, 6% for receptive knowledge, 13% and 8% for

both versions of stereotypical knowledge, respectively), and “afraid” responses were also given by a small number of children (2% for expressive knowledge, 1% for receptive knowledge, 4% and 4% for both versions of stereotypical knowledge, respectively). When “afraid” was the expected response, there was a percentage of children who also gave “angry” (5% for expressive knowledge, 7% for receptive knowledge, 4% and 3% for both versions of stereotypical knowledge, respectively), and “sad” responses (29% for expressive knowledge, 12% for receptive knowledge, 12% and 15% for both versions of stereotypical knowledge, respectively). It is evident that although most of the children correctly discriminated between “sad”, “angry” and “afraid” emotions, there was also a percentage of children who faced difficulties in discriminating between angry or afraid and sad and afraid emotions. And, as shown in Table 1, this is the case for expressive, receptive and both versions of stereotypical emotion knowledge.

Table 1: Frequencies and means of children’s expressive, receptive and stereotypical emotion knowledge of the emotions: sad, angry and afraid

	Expressive knowledge	Receptive knowledge	Stereotypical knowledge	
			A version	B version
	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)	<i>f</i> (%)
Sad	94 (77.7)	92 (79.3)	97 (92.4)	102 (98.1)
angry	2 (1.7)	8 (6.9)	7 (6.7)	2 (1.9)
afraid	3 (2.5)	16 (13.8)	1 (1.0)	
<i>Mean (SD)</i>	1.98 (.27)	1.95 (.27)	1.89 (.44)	1.96 (.25)
			<i>Total Mean (SD) = 1.92 (.28)</i>	
Sad	4 (3.3)	6 (5.2)	13 (12.1)	8 (7.5)
angry	112 (92.6)	109 (94.0)	90 (84.1)	95 (88.8)
afraid	2 (1.7)	1 (0.8)	4 (3.7)	4 (3.7)
<i>Mean (SD)</i>	1.91 (.39)	1.90 (.43)	1.71 (.69)	1.80 (.60)
			<i>Total Mean (SD) = 1.76 (.54)</i>	
Sad	29 (32.6)	12 (10.4)	12 (10.9)	15 (13.9)
angry	5 (5.6)	7 (6.1)	4 (3.6)	3 (2.8)
afraid	53 (59.6)	96 (83.5)	94 (85.5)	91 (83.5)
<i>Mean (SD)</i>	1.67 (.55)	1.86 (.40)	1.83 (.45)	1.83 (.43)
			<i>Total Mean (SD) = 1.84 (.34)</i>	

Note: Children receive 2 points for correct identification of emotion, 1 point for identifying the correct valence, and 0 point for the incorrect emotion

Table 2 presents the frequency of responses of preschool children on twelve non-stereotypical vignettes, which presented two versions of positive vs. negative emotion pairs (e.g., happy vs. sad), and two versions of negative vs. negative emotion pairs (e.g., angry vs. sad). Table 2 shows that children could discriminate between positive and

negative emotions (happy vs. sad, happy vs. angry, and happy vs. afraid, respectively), as well as between negative emotions referring to “angry” and “sad” emotions. However, when children were asked to discriminate between negative emotions such as “angry” and “afraid”, or “sad” and “afraid”, they responded with the non- anticipated responses of “sad” and “angry” emotions, respectively. This finding was common in both versions of non-stereotypical scenarios, and in agreement with children’s responses on expressive, receptive and stereotypical emotion knowledge vignettes (see Table 1).

Table 2: Frequencies and means of children’s non-stereotypical emotion knowledge of the emotions: sad, angry and afraid

	A version	B version
	<i>f</i> (%)	<i>f</i> (%)
Happy-sad		
happy	40 (97.6)	39 (95.1)
sad	1 (2.4)	1 (1.24)
<i>Mean (SD)</i>	1.97 (.56)	1.95 (.31)
Total <i>Mean (SD)</i> = 1.96 (.40)		
Happy-angry		
happy	2 (5.4)	1 (2.4)
angry	35 (94.6)	39 (95.7)
<i>Mean (SD)</i>	1.90 (.43)	2.00
Total <i>Mean (SD)</i> = 1.95 (.21)		
Happy-afraid		
happy	1 (2.4)	9 (22.0)
afraid	37 (90.2)	20 (48.8)
angry	2 (4.9)	
<i>Mean (SD)</i>	1.87 (.45)	2.00
Total <i>Mean (SD)</i> = 1.93 (.22)		
Angry-sad		
sad	22 (53.7)	11 (26.8)
angry	18 (43.9)	30 (73.2)
<i>Mean (SD)</i>	1.97 (.15)	2.00
Total <i>Mean (SD)</i> = 1.98 (.07)		
Angry-afraid		
angry	15 (36.6)	15 (12.4)
afraid	23 (56.1)	25 (20.7)
sad	3 (7.3)	1 (0.8)
<i>Mean (SD)</i>	1.85 (.52)	1.92 (.34)
Total <i>Mean (SD)</i> = 1.89 (.30)		
Sad-afraid		
sad	9 (22.0)	4 (3.3)
afraid	8 (19.5)	35 (28.9)
angry	24 (58.5)	
<i>Mean (SD)</i>	.68 (1.97)	1.97 (.15)
Total <i>Mean (SD)</i> = 1.32 (.42)		

Gender effects

One way ANOVAs testing the effect of gender on emotional expressive, receptive, stereotypical and non-stereotypical emotion knowledge revealed significant gender differences in two cases: The expression of “afraid” responses, $F(1, 119) = 17.83$, $p < .001$, partial $\eta^2 = .13$, with boys giving higher scores ($M = 1.86$, $SD = .39$) than girls ($M = 1.46$, $SD = .63$), and the stereotypical “angry” response, $F(1, 119) = 4.19$, $p = .04$, partial $\eta^2 = .03$, with girls ($M = 1.85$, $SD = .51$) giving higher scores than boys ($M = 1.60$, $SD = .80$). Overall, gender differences in students’ emotion knowledge were limited, similarly to Pons and Harris (2005) findings.

The contribution of children’s emotion knowledge to social and emotional competence

A main aim of the study was to investigate the contribution of children’s emotion knowledge to their social and emotional competences in school, according to teachers’ ratings. Correlations among variables included in the analyses can be seen in Table 3.

Table 3: Descriptive statistics and intercorrelations among children’s emotion knowledge responses on the AKT, and social and emotional competence on the SCBE-30

	Mean (SD)	1	2	3	4	5	6	7	8
1. Expressive negative	1.85 (.29)								
2. Receptive negative	1.83 (.34)	.19*							
3 Negative stereotypical (6 items)	1.84 (.26)	.26**	.23**						
4. Non-stereotypical (positive-negative)	1.95 (.13)	.06	.08	.45**					
5. Non-stereotypical (negative-negative)	1.73 (.18)	.13	.32*	.06	.13				
6. Angry/aggressive	1.73 (.67)	.03	-.12	.03	.02	-.15	.02		
7. Anxious/withdrawn	1.89 (.76)	-.04	.02	-.17	-.20	-.08	-.18*	.115	
8. Sensitive/cooperative	3.68 (.74)	-.14	.14	.04	.05	.21	.02	-.33**	-.26**

Note: ** $p < .01$, * $p < .05$.

The variables of emotion knowledge showed small to medium intercorrelations. Teachers' ratings on students' social and emotional competence scales were also significantly correlated with one another. At this step of analysis, there were no significant correlations between the emotion knowledge variables (expressive, receptive, stereotypical, and non-stereotypical) and the three subscales of the SCBE-30. These findings can be explained in terms of overlapping variance between expressive/receptive and stereotypical/non-stereotypical emotion knowledge variables, which might restrict their unique correlation with social and emotional competence variables. For this reason, considering the hierarchical nature of emotion knowledge (Bassett et al., 2012), in which emotion recognition precedes the situations understanding of emotion knowledge, the scales were revised. The variables expressive and receptive knowledge were revised to reflect the recognition of emotion knowledge, and stereotypical and non-stereotypical situations to reflect the situations understanding emotion knowledge. Correlations of the computed variables are presented in Table 4. Table 4 shows significant correlations between recognition of emotions and situation emotion knowledge, and negative correlations between situation emotion knowledge (stereotypical and non-stereotypical) with teachers' ratings of anxious/withdrawn behavior in students, suggesting that students' understanding of situation-based emotions is related with less anxious/withdrawn children's behavior as rated by teachers.

Table 4: Descriptive statistics and intercorrelations among children's revised emotion knowledge responses on the AKT, and social and emotional competence on the SCBE-30

	<i>Mean (SD)</i>	1	2	3	4	alpha
1. Recognition (expressive and receptive)	1.84 (.24)					.53
2. Situations	1.82 (.25)	.35**				.40
3. Angry/ aggressive	1.73 (.66)	-.06	.02			.84
4. Anxious/ withdrawn	1.89 (.76)	-.00	-.18*	.115		.87
5. Sensitive/ cooperative	3.68 (.74)	.01	.02	-.33**	-.26**	.89

Note: ** $p < .01$, * $p < .05$.

Students' gender, emotion knowledge and social and emotional competences

To examine whether children's emotion knowledge in hypothetical vignettes predicts their social and emotional competences according to teachers' ratings, hierarchical regression analysis for each outcome variable was carried out. In each model,

students' gender was entered in Model 1, students' recognition knowledge was entered in Model 2, and students' situation knowledge was entered in Model 3. Recognition was entered prior to situation knowledge in the regression analyses, given that recognition of emotion precedes situations knowledge (Basset et al., 2012). Table 5 presents the results from the hierarchical regression analysis of teachers' perceptions of students' social and emotional competencies as predicted by students' gender, recognition and situational knowledge.

Table 5: Hierarchical regression analysis for SCBE-30 angry/aggressive, sensitive/cooperative and anxious/withdrawn as dependent variables

Dependent variables Independent variables	Angry/Aggressive			Sensitive/Cooperative			Anxious/Withdrawn		
	<i>b</i>	<i>t</i>	Sig(<i>p</i>)	<i>b</i>	<i>t</i>	Sig(<i>p</i>)	<i>b</i>	<i>t</i>	Sig(<i>p</i>)
Model 1									
(Constant)		10.36	.00		16.58	.00		9.59	.00
Gender	-.09	-1.01	.31	.09	1.01	.31	-.06	-.68	.49
adjR ²	.00	.00	.00						
Model 2									
(Constant)		4.56	.00		5.58	.00		3.58	.00
Gender	-.10	-1.15	.25	.09	1.05	.29	-.06	-.70	.48
Recognition	-.08	-.91	.36	.03	.36	.71	-.01	-.17	.86
adjR ²	-.01		.00	-.01					
Model 3									
(Constant)		3.70	.00		4.94	.00		4.20	.00
Gender	-.11	-1.26	.20	.09	1.03	.30	-.03	-.36	.71
Recognition	-.11	-1.15	.25	.03	.32	.74	.06	.62	.53
Situations	.08	.81	.41	.00	.03	.97	-.20	-2.12	.03*
adjR ²	.00	-.01	.01						

Note: * $p < .05$.

As shown in Table 5, students' gender did not turn out to be a significant predictor of teachers' perceptions of students' social and emotional competences. The entry of recognition in the model did not make any significant difference in teachers' perceptions of students' angry/aggressive, sensitive/cooperative and anxious/withdrawn behavior too. However, the entry of situational knowledge in the model significantly predict teachers' rating on children's anxious/withdrawn behavior ($\beta = -.20, p < .05$); that is, students who were more likely to provide the expected answers in the situational knowledge test, were judged as less anxious/withdrawn by their teachers. This finding suggests that children who understand their own emotions as well the emotions of others which might be different from their own emotions, are perceived by their teachers with less anxiety/withdrawn behaviors.

Validity of Denham's theoretical model of emotion knowledge

The final aim of this study was to test the validity of Denham's (1986) theoretical model of emotion knowledge in the Greek context. A structural equation modelling (SEM) analysis was run on the data of this study. The "R" v.3.2.1 program together with "Rstudio" v0.99 (2015) were used for this analysis. The model was built with the assumption that negative receptive and negative expressive variables are regressed on the negative recognition variable, and negative stereotypical, non-stereotypical negative-negative and non-stereotypical positive-negative are regressed on the situations variable. As mentioned earlier, the happiness items (one for each expressive and receptive and two for stereotypical knowledge) were removed from the analysis, since > 88% of participants correctly identified happiness emotion. Figure 2, and Table 6 display information on the standardized solution of the SEM data. The fit indices of the model tested were: $\chi^2(4) = 5.298$, $p > .05$, $\chi^2/df = 1.325$, CFI/IFI/RNI/MFI = > 0.89, GFI = ~0.95, RMSEA = 0.089, RMR = .005, and SRMR = .098, which show a marginal fit of the model to our data (see Kline, 2005).

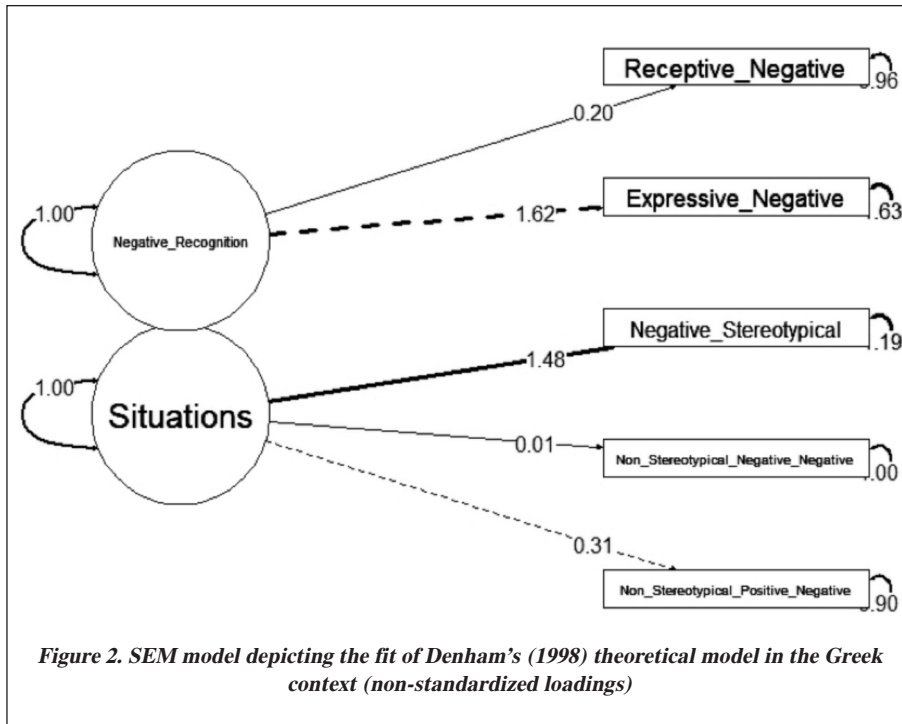


Table 6: The standardized values of the SEM model

	lhs op	rhs	est.std	se	z	p value
1	situations =~	nonst_pos_neg	0.309	0.425	0.726	0.468
2	situations =~	nonst_neg_neg	0.013	0.102	0.130	0.897
3	situations =~	negative_st	1.481	1.933	0.766	0.444
4	negative_recognition =~	expressive_negative	1.621	3.692	0.439	0.661
5	negative_recognition =~	receptive_negative	0.201	0.480	0.418	0.676
6	situations ~~	negative_recognition	0.105	0.301	0.349	0.727
7	nonst_pos_neg ~~	nonst_pos_neg	0.905	0.263	3.444	0.001*
8	nonst_neg_neg ~~	nonst_neg_neg	1.000	0.003	367.617	0.000*
9	negative_st ~~	negative_st	-1.192	5.723	-0.208	0.835
10	expressive_negative ~~	expressive_negative	-1.629	11.973	-0.136	0.892
11	receptive_negative ~~	receptive_negative	0.960	0.193	4.981	0.000*
12	situations ~~	situations	1.000	0.000	NA	NA
13	negative_recognition ~~	negative_recognition	1.000	0.000	55411506.260	0.000*

Note: * $p < .05$.

DISCUSSION

Emotion knowledge has increasingly been identified as an important predictor of preschool children's social and emotional competence and school adjustment. Inability to interpret emotions can make social transactions difficult. The present study contributes to the research on aspects of emotional knowledge in early childhood, and, to my knowledge, is the first to assess aspects of emotion knowledge and links with social and emotional competencies in Greek preschool and first grade primary children. Children's self-report information with the use of AKT and teachers' reports on the SCBE-30, further provide evidence for the use of AKT and SCBE-30 in the Greek context.

The findings of the study revealed that children acknowledge emotions to themselves and others. Identifying emotions in self and others is important in preschoolers' social interactions (Arsenio, Cooperman, & Lover, 2000). Some exceptions were found with children having difficulties in differentiating emotions of sadness, anger or fear between them, implying that some children face difficulties in differentiating between negative emotions. Previous research suggested that older preschoolers recognize the distinctions between the causes of anger and sadness (Denham & Couchoud, 1990). The present finding may imply that some children have not developed skills to deal with negative emotions evoked by AKT. Understanding the areas of students' difficulties holds important implications for classroom teachers in the design of classroom intervention strategies. Given that limited gender differences in emotion knowledge were found, these classroom interventions could be implemented to address the whole classroom.

Access to emotion knowledge is beneficial when wondering how to get along with others; in alignment with this theorizing, emotion knowledge reliably relates to socially competent behavioral choices (Poulou & Bassett, in press). The present study specified which elements of emotion knowledge contribute to children's social and emotional competence, as perceived by teachers. It turned out that emotion knowledge was not a significant predictor of children's angry/aggressive behavior, in contrast with previous developmental research (Burgess, Rose-Krasnor, Wojslawowicz, Rubin, & Booth-LaForce, 2006; Ladd & Burgess, 2001; Orobio de Castro, 2004). In addition, in terms of sensitive/cooperative competencies teachers were found to disregard the role of children's emotion responses, a finding which was also found in a previous study of Greek students (Poulou & Bassett, 2018). However, low understanding of situation-based emotions shows unique prediction of children's anxious/withdrawn behavior. This finding partly corroborates research that children's emotion knowledge predicts their social and emotional competence. Children who understand their own and other's emotions enter social interactions equipped with emotion knowledge structures, which further facilitate their classroom social interactions. These children are more likely to have friends, receive useful teacher feedback and maximize school readiness, compared to peers who lack age-appropriate emotion knowledge (Denham et al., 2012c).

Finally, the implementation of Denham's theoretical model in the Greek context, provides empirical support for the distinction between recognition and situational understanding of emotions in the measurement of emotion knowledge during early childhood, with implications for theory and practice. In theory, the expressive and receptive knowledge skills could be treated as one dimension of emotion knowledge, namely recognition. Similarly, although stereotypical situation knowledge develops earlier and requires less inference than non-stereotypical knowledge (Denham & Couchoud, 1990), one could treat them as representing one factor, namely, situational understanding. In practice, early childhood educators can benefit from knowing that recognition and knowledge of situations in which emotions are elicited, with emphasis in negative emotions, could be taught in this age group (Bassett et al., 2012).

Limitations

Even though preschoolers can report their own emotions (Durbin, 2010), the present study is limited to students' self-reports. Students' age consists of an important parameter which also needs to be addressed in further studies. Overall, the CFA standardized solution was not good enough, due to missing data or small sample size, which raises questions about the generalizability of these results. In addition, although

the use of hypothetical scenarios allows children to provide unbiased responses without consideration of friendship or familiarity ties, which could generate social relational responses (Lemerise & Arsenio, 2000), our study is restricted to the use of hypothetical scenarios. Future research needs to address children's emotion recognition and understanding in real life challenging situations. For example, following studies could use observational methodologies of children in their everyday contexts, allowing children to give expressive rather than receptive responses, and collect responses from teachers regarding children's emotion knowledge in a variety of everyday situations. In real life everyday school situations, maladaptive cognitive style and emotions might have greater effect on children's behavior responses (Burgess et al., 2006).

Implications for future research and practice

This study extends previous work examining young children's emotion knowledge in hypothetical situations, and further highlights the need to put under microscope those emotion knowledge structures that guide children's behavior when interacting with peers. Emotion knowledge encompasses some of the important social emotional learning skills that young children need to develop. A socially competent child equipped with emotion knowledge may be able to pay more attention to academic tasks, just because (s)he can benefit from teachers' and peer's learning interactions (Denham et al., 2015a). Emotion knowledge deserves great attention in classrooms in everyday practice (conversations between teacher and children, specific curricula and assessment). AKT is an assessment tool with which early childhood teachers can assess children's emotion knowledge. Understanding and teaching young children emotion knowledge can provide foundational competences for school and social adjustment.

Our study further provides evidence for the use of AKT to solicit children's emotion knowledge in hypothetical situations. The study presented similar results by using both versions of AKT, suggesting that further studies could make use of a shorter version of the measure. Our study is the first to implement AKT outside the USA context, and has implications for early school children's education. AKT and SCBE-30 can be used by teachers or consultants to inform their practice about children's individual strengths and weaknesses.

In practical terms, the present study emphasizes the need to cultivate skills to young children to accurately recognize and understand emotions of self and others, as a first step towards their social and emotional competence, through specific lessons or more informal interactions with teachers. Programs that focus on problem solving,

systematic curricular activities, learning opportunities, closer teacher-child relationships and effective classroom management (Bierman et al., 2008; Denham et al., 2015a; Durlak, Domitrovich, Weissberg, & Gullotta, 2015; Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Ladd & Burgess, 2001), are some example activities for teachers to help children cultivate social and emotional skills.

Finally, the present study has implications for teacher training. Early childhood teachers may need to be trained to observe individual students' emotion responses and be alert to children's emotional as well as social behaviors. We suggest that early childhood teacher's role is to facilitate children's emotion knowledge, and build a prosocial climate in schools in order to teach children social and emotional skills. Emotion knowledge is of paramount importance, strongly related with students' social and emotional competence (Denham et al, 2003), and consists of a precursor to school success (Denham et al, 2015a). Although additional research is needed to explore the links between emotional knowledge and behavior, the current study is a first step towards this direction.

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