



Development of the Levels of Emotional Awareness Scale for Children (LEAS-C)

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A performance-based assessment of the structure and complexity of emotional awareness was developed, the Levels of Emotional Awareness Scale for Children (LEAS-C). A pilot study ($N = 6$, ages 9–12, $M_{\text{age}} = 10.2$ years) was conducted to construct, trial, and select scenarios suitable for the scale. A larger validity study ($N = 51$, ages 10–11, $M_{\text{age}} = 10.3$ years) examined the relationship between the LEAS-C and two emotion knowledge tasks: emotion expressions and emotion comprehension; two verbal tasks: vocabulary and verbal productivity; and a cognitive developmental measure: the Parental Descriptions Scale (PDS). Gender differences in LEAS-C performance were also examined. The LEAS-C was significantly related to emotion comprehension, and the verbal tasks. Consistent with adult studies, females reported significantly higher LEAS-C scores compared with males. Gender effects remained when controlling for the two verbal tasks. Preliminary support for the validity of the LEAS-C as an objective assessment of emotional complexity in children is found in this study. Results also suggest that gender differences in emotional awareness occur at a young age.

Emotional awareness (EA), may be the skill most fundamental to emotional intelligence (Lane, 2000). Lane and Schwartz (1987) have defined EA as the ability to identify and describe one's own emotions, and those of other people. The construct is derived from the developmental levels of emotional awareness (LEA) model, and focuses on the structure and complexity of emotion representations. That is, the capacity to differentiate emotions from one another, and the level of emotion complexity inherent in the description of emotion experiences.

EA is viewed as a cognitive skill that undergoes a developmental process similar to that described by Piaget for cognition in general (Flavell, 1963). According to the LEA model, emotional awareness is structured from cognitive schemata. The complexity of the schemata (the degree of integration and differentiation) differs between individuals,

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and reflects an individual's past experience with the language of emotion. The function of the schemata is to filter and process external and internal emotional information. An individual's conscious awareness or experience of emotions is founded on this structural organization. Five levels of experience are described in the model: bodily sensations, action tendencies, single emotions, blends of emotion, and combination of blends (Lane & Schwartz, 1987).

The Levels of Emotional Awareness Scale (LEAS) was developed to measure individual differences in the complexity of emotional awareness among adults (Lane, Quinlan, Schwartz, & Walker, 1990). Support for the LEA model has grown over the past decade. Systematic differences in the emotional awareness of adults have been identified (for normative data see Lane *et al.*, 1996). Consistent gender differences have also emerged, with females reporting higher levels of EA than males (Barrett, Lane, Sechrest, & Schwartz, 2000). EA has been found to correlate with other areas of emotional functioning, such as the ability to recognize and categorize emotional stimuli (Lane, 2000; Lane *et al.*, 1996). EA has also been found to correlate negatively with mood congruent bias, that is, individuals high in emotional awareness are more aware of their moods and are consequently more likely to prevent their mood from biasing their judgment when compared with individuals low in emotional awareness (Ciarrochi & Forgas, 2000).

Support for the claim that the LEAS taps the structure of emotion, as opposed to emotional content, has been found in several studies. For example, EA does not correlate significantly with the tendency to experience emotions intensely, nor with measures of negative affect, for example, the Taylor Manifest Anxiety Scale or the Beck Depression Inventory (Lane, 2000; Lane *et al.*, 1990, 1996). The relationship between emotional awareness and brain function has also been examined. Lane and colleagues found a strong relationship between right hemispheric dominance in the perception of facial emotion, and the ability to perceive complexity in the processing of emotional information (Lane, Kivley, Du Bois, Shamasundara, & Schwartz, 1995). Other studies have focused on the brain regions associated with emotion awareness implicating, among other areas, the anterior cingulate cortex (Lane *et al.*, 1998).

To date, examination of the LEA model has been undertaken with adult samples only. Support for the model would be enhanced if the generalizability of the construct could be extended to other populations. Given the developmental emphasis of the LEA model, establishing the validity of the construct among children is an important progression.

The development of children's emotion knowledge is an extensive and complex research field, involving numerous, and frequently overlapping, domains. A comprehensive review of this literature is not central to this paper (for more background information, see Eisenberg & Moore, 1997; Halberstadt, Crisp, & Eaton, 1999). However, a brief overview allows us to place the EA construct in context. Research domains have included children's conceptualization of emotion (Harris & Olthof, 1982), their explanations for emotional states (Carroll & Steward, 1984; De Rosnay & Harris, 2002), their understanding of the influence of emotion (Bennett & Galpert, 1992), their understanding of emotion expressions, for example, their ability to encode and/or decode facial expressions (Custrini & Feldman, 1989; De Sonneville *et al.*, 2002), and their understanding of, and ability to control, emotion expression (Garber, Braafladt, & Weiss, 1995; Kopp, 1989; Saarni, 1984; Saarni & von Salisch, 1993; Underwood, Coie, & Herbsman, 1992). The influence of broader factors on children's emotional development, such as parental socialization (Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997) and family expressiveness (Bowling, 1993; Denham & Grout, 1992; Halberstadt, 1986) have also gained increasing

attention. Explaining age- and gender-related patterns in emotion development has been the focus of many of these studies.

Evidence of age-related development in emotion understanding is ubiquitous. Older children are more accurate at recognizing and labelling emotions in self and others, and viewing their emotions from the perspective of others (Carroll & Steward, 1984). Older children can provide more complex explanations for their emotions (Carroll & Steward, 1984; Casey, 1993). They demonstrate greater insight into the impact of emotion on other areas of functioning, such as motivation and performance (Bennett & Galpert, 1992). Older children are more accurate in their understanding of emotion dimensions such as intensity, multiplicity, valence, and ambivalence (Donaldson & Westerman, 1986; Harter & Buddin, 1987; Wintre & Vallance, 1994). They show greater understanding of emotion complexity (Rotenberg & Eisenberg, 1997; Terwogt, Koops, Oosterhoff, & Olthof, 1986), and are more skilled at emotional dissemblance, that is, when feelings are shown indirectly or deceptively (Denham *et al.*, 1997; Rotenberg & Eisenberg, 1997). Age-related trends such as these have also been confirmed in cross-cultural research (Koike, 1997; Markham & Wang, 1996; Smith & Walden, 1998; Tsukamoto, 1997).

Gender differences in children's emotion development have been somewhat difficult to establish, and are likely to involve a complex interplay of biological, interpersonal, and socio-cultural factors (Brody, 1985). Differences in behavioural enactment and expression of emotions have found strongest research support (Saarni, 1999). Evidence suggests that females are more emotionally expressive and more accurate in reporting initial facial expressions, compared with males (Casey, 1993). They appear more skilled at encoding and decoding facial expression (Hall, 1984). Females also appear more adept at emotional dissemblance, substituting a full positive expression to mask disappointment, compared with the neutral expression more often taken by males (Cole, 1986). Differences in other domains have also been reported, including communication of emotion (Zeman & Shipman, 1996) and expression of emotions, such as anger and sadness (Clay, Hagglund, Kashani, & Frank, 1996; Underwood *et al.*, 1992).

Evidence of gender effects in children's emotion understanding has been more equivocal. Past research has suggested there is little relationship between these variables (Terwogt & Olthof, 1989; Thompson, 1989). However, some contrary findings have emerged in recent studies; for example, gender effects in children's understanding of multiple or contradictory emotions (Wintre & Vallance, 1994), and affective labelling and affective perspective taking abilities (Brown & Dunn, 1996). Gender differences in emotion understanding also appear related to broader relational factors. Custrini and Feldman (1989) found females high in social competence were more skilled at encoding and decoding facial expressions, whereas emotion skill did not relate to social competence for males. Brown and Dunn (1996) found relations between understanding of emotions and quality of sibling relationships was stronger for females than for males. Evidence that females develop verbal language, including emotion vocabulary, earlier than males (Brody, 1993) is consistent with these findings. It also highlights the need to assess verbal skills when examining gender effects in emotion skills. This is particularly the case when assessment tasks are reliant on vocabulary, as with the LEAS-C. Support for the validity of a measure of EA would be provided if differences between males and females in EA remain when verbal abilities are controlled.

Developmental progressions in children's cognitive and emotion domains appear closely intertwined (Banerjee, 1997; Brenner & Salovey, 1997; Saarni, 1999). Models of emotion understanding, such as Donaldson and Westerman's (1986) four-stage developmental sequence in children's understanding of ambivalence, and Harter

and Buddin's (1987) developmental model of children's understanding of the simultaneity of two emotions, emphasize stage-like progressions in competence and comprehension, as found in Piaget's theory of cognitive development (Flavell, 1963). On the basis of models such as these, and including the LEA model, we would expect that development in complexity of emotion understanding would increase with increasing cognitive development (age). For instance, evidence suggests that children's understanding of the simultaneity of two or more emotions, particularly when of differing valence, occurs in mid-to-late childhood, around 10 years of age (Harter, 1980). Further, older children demonstrate a greater understanding of more differentiated emotion terms compared with younger children (Harter & Buddin, 1987). These findings are consistent with expectations arising from the LEA model. Specifically, we would expect the emotion descriptions of older children to reflect more complex experience, for example, a greater range of emotion responses and/or degrees of ambivalence. We would expect the emotion descriptions of younger children to reflect less emotion range and less complex experience, for example, somatic and action tendencies, or unidimensional emotions.

The usual approach to the assessment of emotion understanding in children requires subjects to identify discrete emotions, for example, express a named emotion, name an expressed emotion, and receptively demonstrate a particular emotion, (e.g. 'show me the face when John feels happy'), and/or to generate emotion responses appropriate to a given context or situation. Examples of such assessments include Denham's (1986) affective labelling and affective perspective-taking tasks (Brown & Dunn, 1996; Dunn, Cutting, & Demetriou, 2000; Hughes & Dunn, 1998; McElwain & Volling, 2002), Cassidy, Parke, Butkovsky, and Braungart's (1992) assessment of the causes of emotions in self and others (Dunn *et al.*, 2000; Hughes & Dunn, 1998), and Gordis, Rosen, and Grand's (1989) storytelling interview (Brown & Dunn, 1996). In assessments such as these, level of emotion understanding is reflected in the percentage of correct responses provided. In contrast, the LEAS-C assesses individual differences in how emotion would be experienced in hypothetical situations. The LEAS-C differs from other assessments of emotion experience, for example, Children's Depression Inventory (Kovacs, 1985), and the Revised Child Manifest Anxiety Scale (Reynolds, 1980), because it requires children to generate their own descriptive responses, providing information on their ability to monitor emotion states, as well as the structural complexity of that experience (e.g. somatic response, action response, discrete emotion, blended emotions).

The Kusche Affective Interview - Revised (KAI-R; Kusche, Beilke, & Greenberg, 1988) is perhaps closest to the LEAS-C in that it distinguishes between the emotions of self and other, and acknowledges differences in the complexity of emotions. However, while the LEAS-C conceptualizes emotion complexity on five levels, and in relation to structural organization, the KAI-R conceptualizes emotion complexity on only two conceptual levels, simple and complex (e.g. angry vs jealousy). Similar to the abovementioned assessments, KAI-R scoring is also based on correct responses to predetermined prompts.

The present study involved two stages. Firstly, a pilot study was conducted to develop, trial, and select scenes suitable for the LEAS-C. The second stage examined the preliminary psychometrics and validity of the LEAS-C. Gender effects for all dependent variables and age effects in EA were also examined.

When examining the validity of the LEAS-C, measures that were the same or similar to those used in Lane's *et al.* (1990) validation study with adults were adopted. Construct validity was examined using a cognitive developmental measure, the Parental Descriptions Scale (PDS; Blatt, 1974) and two conventional measures of emotion

knowledge: emotion expressions (Izard, 1971), and emotion comprehension (Cermele, Ackerman, & Izard, 1995). The PDS examines the cognitive complexity of children's representations, based on written open-ended descriptions of their mother and father. With the inclusion of this measure, we were able to assess the developmental basis to the LEAS-C. A positive correlation was expected between the LEAS-C and PDS. The emotion expressions task assesses emotion decoding skill and requires children to recognize and label the emotion expression posed by adults. The emotion comprehension task examines children's perspective-taking abilities. This latter task also shares some similarity to the LEAS-C. In both tasks, children are presented with a series of scenarios and are required to indicate how the main character might feel in the given situation. That is, both tasks tap some dimension of emotion understanding. However, the measures differ in two key aspects. Firstly, the LEAS-C focuses on two perspectives (self, other) while the emotion comprehension task examines one perspective (other). More importantly, the LEAS-C requires subjects to generate responses to each scenario, while the emotion comprehension task requires subjects to select a suitable response from a given list of options. Furthermore, LEAS-C responses are scored on the basis of the structural complexity in emotion responses, not on the appropriateness of the response. Scoring of emotion comprehension is based on correct responses. The inclusion of the emotion expressions and emotion comprehension tasks allowed us to test the premise that the LEAS-C also taps a dimension of emotion knowledge/intelligence. A positive correlation was expected between the LEAS-C and the emotion knowledge tasks. Given that the emotion expression task is more closely oriented to emotion recognition skill, and the LEAS-C and the emotion comprehension task to emotion understanding, the relationship between the latter two measures was expected to be stronger.

Two verbal measures were also included in the battery; vocabulary (WISC-III: vocabulary subscale) and verbal productivity (VP, the total number of words used in constructing LEAS-C responses). Prior research suggests children's verbal skills are strongly related to their emotion abilities (Cutting & Dunn, 1999; De Rosnay & Harris, 2002). The inclusion of these variables allowed us to identify and control the contribution of factors such as verbosity and vocabulary skills to LEAS-C performance.

Gender effects on the dependent variables were also examined. Of primary interest were gender differences in LEAS-C performance. On the basis of adult LEAS findings, and evidence of gender effects in many domains of children's emotion skills (e.g. Casey, 1993; Wintre & Vallance, 1994; Zeman & Shipman, 1996), we predicted that females would report higher levels of emotional awareness than males. We expected gender effects in LEAS-C performance to remain when the influence of verbal skill was controlled. We also predicted females would outperform males on the emotion knowledge and verbal tasks. Past research would suggest that females outperform males in emotion expression tasks, including emotion decoding tasks (Hall, 1984). While gender effects in children's emotion understanding are far less clear, evidence that females perform better than males in perspective-taking tasks has been found (Brown & Dunn, 1996). Given prior findings (e.g. Brody, 1993), we also expected that females would report higher verbal scores than males. Gender effects in the PDS were not expected.

The limited age range in this study restricted the potential for examining age effects within-sample. However, given the developmental basis to the LEA model, it would be expected that adults report higher levels of EA than children. While the EA scores obtained in this child study could be compared with Lane's *et al.* (1996) normative adult data, a direct comparison such as this comes with notable limitations. The instruments

used to assess EA in adults and in children are not identical. While over 80% of LEAS-C scenarios are derived from the LEAS, slight modifications have been made to all shared scenarios. In addition, the LEAS-C contains two new scenarios. The LEAS comprised 20 scenarios, while the LEAS-C has 12. However, the scenarios serve the general function of eliciting emotion descriptions and the scoring system for both adult and child versions are identical. This means that in theory, scores utilize the same metric, although derived from slightly different prompts. With these caveats in mind, EA scores were compared between adult and child data. We predicted that adults would report higher EA scores than children. Given prior evidence of significant gender differences in EA, we also explored whether age effects varied on the basis of gender.

In summary, the reports of two studies follow. The first of these involved the development and selection of LEAS-C items. The second examined the preliminary psychometric and validity testing of the LEAS-C. Given prior evidence of gender and age related patterns in children's emotion skills, we examined these factors in relation to the LEAS-C. On the basis of prior research, gender differences in emotion knowledge and verbal skills were also of interest.

Pilot study

Item development

Initial steps involved the generation of a pool of potential LEAS-C scenarios. Where possible, items from the adult-based LEAS were used; 13 of these were selected. Slight modifications, vocabulary, grammatical, or contextual, were necessary with all 13, reflecting the adaptation of an adult instrument to a measure appropriate for use with children. Some vocabulary modifications reflected cultural differences (e.g. 'fire engines' replaced 'fire trucks' in scenario #2). LEAS scenarios not selected for the pilot study were excluded on the basis of content or theme inappropriateness (e.g. loyalty to one's country, suicide), or because they were generally not amenable to minor modification. To extend the selection pool further, an additional nine scenarios were developed to reflect school/peer themes (e.g. teacher handing out test results, an accident in the playground, sharing food, getting picked for the team). Consistent with the organizing theme used in the generation of LEAS scenarios, these items were developed to pull for one of four emotions: anger, fear, happiness, or sadness. This process resulted in a pool of 22 potential LEAS-C scenarios; 60% of these were modified LEAS scenarios.

Pilot study

The pilot study was conducted with a small group of six children (3 males, age range 10–11 years, $M_{\text{age}} = 10.3$; 3 females, age range 9–12 years, $M_{\text{age}} = 10.0$).

These children were known to the first author and did not have any social/academic delay or disability. Of the six children, four completed the 22 scenarios in a 1:1 test situation with the first author. Two children completed the measure at home in their own time. The average time to complete the 22 scenarios was 1 hour. Children were encouraged to ask questions as they arose. A brief discussion followed completion of the LEAS-C, where children's responses to, and perceptions of the task, were probed (e.g. level of interest, clarity and ease of response).

Item selection

On the basis of children's written and verbal responses, items that appeared ambiguous or redundant were discarded. Other factors including children's interest and the desire

to maintain thematic balance (school vs home contexts, types of targeted emotions) were also considered. The decision to retain only 10 of the 22 scenarios was guided by the desire to preserve the maximum number of scenarios with least risk of task demands negatively impacting on children's performance (e.g. a 1 hour written task negatively impacting on motivation). On the basis of pilot study time trials, we anticipated 12 scenarios could be completed in approximately 20 minutes. This was judged a reasonable task requirement. The fact that a 10-item version of the LEAS had been used successfully in adult research (Barrett *et al.*, 2000) also suggested that a 12-item measure was feasible. Of the final 12 scenarios, 10 were modified LEAS items. Two scenarios were new and reflected school/peer issues.

Psychometric study

In this study we examined the psychometric properties of the 12-item LEAS-C among a larger group of school children.

Method

Participants

A group of 51 children between the ages of 10 and 11 participated in the project. There were 25 females (10 years, $N = 18$; 11 years $N = 7$; $M_{\text{age}} = 10.3$, $SD = 0.46$) and 26 males (10 years, $N = 17$; 11 years, $N = 9$; $M_{\text{age}} = 10.3$, $SD = 0.49$). Participants were recruited from two private schools in a regional city with a population of 180,000. The city has a mix of heavy industrial and university based employment. All children were of middle-class background and identified as competent English speakers. A letter describing the study and its aims was distributed to all students in Grades 5 and 6. Student and parental permission to participate was obtained for 49% of these children. Two children who had returned consent forms were unable to participate on the day of data collection, and the data for two children who fell outside of the targeted age range were not included (one aged 9 and another aged 12 years).

Measures

Emotional awareness

The LEAS-C comprises 12 evocative interpersonal scenarios. Each scenario is described in two to four sentences, and involves two people. Subjects are asked to describe the feelings of self and of the other person for each scenario. Two scenarios are presented per page, each scenario followed by two questions: 'How would you feel?', and, 'How would the other person feel?'

The scoring procedure for the LEAS-C is identical to that followed by the LEAS. Scoring is aimed at determining the degree of differentiation or specificity in the emotions described, and the range of emotions reported. Each scenario is designed to elicit one of four types of emotion (happiness, anger, sadness, or fear; three samples each). In departure from other emotion knowledge assessments (e.g. Denham's affective labelling and affective perspective-taking tasks, 1986), this format serves an organizational purpose only, and the particular emotions targeted in the scenarios are not relevant to the scoring of the LEAS-C. The primary purpose of the LEAS-C is to examine the emotion complexity inherent in the responses children generate to each of the scenarios, therefore the correctness of their response is not relevant to the scoring.

Complexity of emotional awareness is assessed on five levels (see Table 1). A low awareness Level 1 response may stress somatic features (e.g. 'I would feel sick'), or may directly state a lack of emotional response (e.g. 'I would feel nothing'). A Level 2 response reflects action (e.g. 'I would feel like smashing the wall'), or a more global and generalized state not indicative of a specific emotion (e.g. 'I would feel good'). Level 3 responses reflect specific unidimensional emotions (e.g. 'I would feel happy'), Level 4 and 5 responses show greater complexity in awareness with emotion blends evident (e.g. 'I would feel angry but maybe a little bit sad as well'). Where there is no response, or the response reflects cognition (e.g. 'I would feel like she did it deliberately'), a score of 0 is given.

For each scenario, 3 scores are allocated: a score for self-awareness, other-awareness, and for total-awareness. The total-awareness score is taken as the higher of the self- and other-awareness scores.¹ Self- and other-awareness scores range from 0 to 4. Where both self- and other-awareness are scored 4, and there is differentiation between the emotion terms used for self and other, a Level 5 score is allocated (see Table 1). Total self-awareness scores and total other-awareness scores range from 0 to 48 (e.g. for each scenario a range from 0 to 4). However, the maximum possible total awareness score is 60 (e.g. a total awareness score for one scenario can be scored 5). The glossary of emotion words used for scoring the LEAS was also used to guide the scoring of the LEAS-C. A copy of the measure and scoring criteria are available from the first author.

Parental Descriptions Scale

Investigation of children's cognitive developmental level was provided by the Assessment of Qualitative and Structural Dimensions of Object Representation Scales (Blatt, Chevron, Quinlan, Schaffer, & Wein, 1992). Of interest to this research were children's open-ended descriptions of their parents, referred to as the Parental Descriptions Scale (PDS; Blatt, 1974). The PDS has several assessment components including qualitative characteristics evident in descriptions, verbal fluency, degree of ambivalence, and conceptual level. The conceptual dimension only was assessed here, as our interest lay in examining the developmental relationship between the PDS and LEAS-C.

Subjects were asked to 'describe your mother' and half-way down the page 'describe your father'. At the request of the University Human Ethics Committee, these instructions were modified with the inclusion that another significant adult in the child's life could be described (e.g. grandmother), if describing one's mother or father was not appropriate to the child's home situation. Students were asked to indicate whom they were describing. A 9-point scale is used to guide scoring, ranging from a Level 1 response, a concrete description lacking self-other differentiation, to a Level 9 response, where complex and differentiated psychological characteristics are used to convey the uniqueness of the individual. A somewhat truncated range of PDS scores was expected in children's responses, compared with that found in adult studies (Priel, Myodovnik, & Rivlin-Beniaminy, 1995). In adult studies, inter-rater

¹While there were some indications that children's self-EA was higher than other-EA, the difference between self- and other-awareness scores was ns, especially when considered gender separate (gender combined: $t(50) = 1.54$, $p = .06$; males: $t(25) = 1.40$, $p = .09$, females: $t(24) = .81$, $p = .21$, one-tailed). In addition, we sought to maintain the scoring procedures used with the LEAS to facilitate comparisons between adult and child emotional awareness research.

Table 1. The 5 levels of emotional awareness with response examples: LEAS-C Scenario #7. The dentist tells you that you have some problems with your teeth that need to be fixed immediately. The dentist makes an appointment for you to come back the next day. How would you feel? How would the dentist feel?

Level	Ability to describe emotions	Example of response
0	No response/cognitions	I would feel like I should have brushed my teeth more often than I did. The dentist would feel like I didn't brush my teeth enough.
1	Bodily sensation	I would feel it would hurt. I don't know how the dentist would feel.
2	Global hedonic state	I would feel alright because we had it done before. He would feel good.
3	Unidimensional emotion	We would both feel angry of course!
4	Differentiated emotions	I would feel scared and worried. The dentist would probably feel worried and happy to fix me and get money.
5	More complex & differentiated states	I would feel a bit worried for my teeth but excited because I don't know what will happen. The dentist would feel hopeful and sorry.

reliability for the PDS has been reported between .83 and .88 (Blatt, Wein, Chevron, & Quinlan, 1979; Blatt, Wiseman, Prince-Gibson, & Gatt, 1991; Bornstein, Galley, & Leone, 1986). In Priel's *et al.* (1995) child study, inter-rater reliability for the PDS ranged from .76 to .89. For the conceptual component alone, inter-rater reliability was $r = .89$ and test-retest reliability for the conceptual component was .90. Data for inter-rater reliability was not available in the present study. Mother and father scores were significantly correlated, $r = .94$, $p < .001$, providing some support for the internal consistency of the PDS.

Verbal skills

Vocabulary

The vocabulary subtest of the Weschler Intelligence Scale for Children (WISC-III) provides an index of verbal intelligence (Barrett *et al.*, 2000). For the purposes of this study, the measure was group administered (Barrett *et al.*, 2000; Subic-Wrana, Thomas, Huber, & Koehle, 2001). A series of 15 words were read aloud to the students. The starting-point for the word list was taken using the lowest age of the participating students as a guide (Sattler & Dumont, 2004). Students were directed to write down the meaning of each word. Total vocabulary scores ranged from 0 to a maximum possible of 30. The internal consistency of the vocabulary subtest was Cronbach's $\alpha = .71$.

Verbal productivity

Replicating Lane's *et al.* (1990) validation study of the LEAS, the total number of words used to respond to all LEAS-C scenarios were summed to provide a VP score for each subject.

Emotion knowledge

The emotion expressions and emotion comprehension tasks have been used in prior research as conventional measures of emotion knowledge (Garner, Jones, & Miner, 1994; Ribordy, Camras, Stefani, & Spaccarelli, 1988). They assess recognition of emotion cues, in faces and situations, respectively. In the present study, the emotion expression measure (Izard, 1971) was presented as a production task, requiring children to recognize emotion cues in faces, and to generate their own responses. Internal consistency of the emotion expressions task has been reported at $\alpha = .52$ (Schultz & Izard, 1998a), and in combination with the emotion comprehension task, $\alpha = .65$ (Schultz, Izard, Ackerman, & Youngstrom, 2001; Schultz, 2001). In this study, the internal consistency of the emotion expression task was $\alpha = .52$ and in combination with the emotion comprehension task, $\alpha = .54$. The emotion comprehension task required students to recognize emotion cues in different situations and following certain behaviours, and to select a suitable response from a given list of choices (Cermele *et al.*, 1995). Internal consistency of the emotion comprehension task has been reported at $\alpha = .58$ (Schultz & Izard, 1998b), with a similar result in the present study, $\alpha = .59$.

Emotion expressions

Students were presented with photos of adults posing one of six emotions (anger, surprise, sadness, disgust, joy, or fear; Glenn, 1974). These photos were presented to the group in sequence. Following each photo presentation, students were asked to generate a response to the question, 'How is this person feeling?'. Responses were scored according to the following format: score 2 = correct answer or synonym, score 1 = incorrect answer but correct valence, and score 0 = incorrect answer and incorrect valence.

Emotion comprehension

This task was divided into two parts. Part I comprised 18 scenes, and students were asked to identify how the protagonist felt in each situation (happy, sad, mad, scared, interested, or ashamed). Part II comprised nine scenes and students were asked to identify how the protagonist felt after behaving in a particular manner (happy, mad, proud, guilty, ashamed, or looking down on someone). Responses were scored using the same procedure as that for the emotion expression task.

Procedure

All measures were administered in a group setting during regular class time. Data was collected from two separate groups of children; the protocol followed for the two groups was the same. Children completed the LEAS-C, PDS and emotion expressions task before taking a short break. The vocabulary and the emotion comprehension task followed. All administration was carried out by the first author. Students participated anonymously.

Results

Consistent with adult-based LEAS research, EA results are reported in terms of total-LEAS-C scores (see Method for scoring details). However, in departure from convention,

we also reported self- and other- LEAS-C scores. This decision was guided by developmental research suggesting that differences in self- and other-emotional awareness may themselves be informative (Carlo, Knight, Eisenberg, & Rotenberg, 1991; Carroll & Steward, 1984; Denham, 1986). Comments in relation to overall emotional awareness, or LEAS-C scores, will refer to total- LEAS-C scores, unless specific reference to LEAS-C subscales is made.

The results are reported in four sections. We present the reliability analysis for the LEAS-C first. To examine the validity of the LEAS-C, Pearson correlations are reported between the LEAS-C, the emotion knowledge tasks, the verbal tasks and the PDS. Gender differences in the LEAS-C, the emotion knowledge tasks, the verbal tasks and the PDS are then examined with a one-way ANOVA. A one-way ANCOVA explores gender effects on LEAS-C scores controlling for verbal skill. We then report age effects in EA, comparing the child data obtained in this study to Lane's *et al.* (1996) adult normative data. An alpha level of .05 and directional testing was used throughout.

Reliability

Each LEAS-C scenario was coded and scored independently of the remaining scenarios. Two raters scored 22 of the protocols. Inter-rater reliability using Pearson's correlation was, for self-LEAS-C scores, $r = .93$, for other-LEAS-C scores, $r = .86$, and for total-LEAS-C scores, $r = .89$. Internal consistency using Cronbach's alpha was $\alpha = .71$ for self scores, $\alpha = .64$ for other-scores, and $\alpha = .66$ for total scores ($N = 51$). Given that the LEAS-C comprises 12 items, a slight attenuation of reliability was expected when compared with the 20-item version for adults.

Correlations with the LEAS-C

Relations between the LEAS-C (self-, other-, and total-scores), and the emotion knowledge tasks, the verbal tasks, and the PDS, were then examined (see Table 2). The Pearson product-moment correlation was used. Total-LEAS-C scores were significantly correlated with emotion comprehension, and vocabulary and VP. Other-LEAS-C scores were significantly related with emotion expression and emotion comprehension. Self-LEAS-C scores were not significantly related to any of the variables ($p > .1$).

Gender effects

A one-way ANOVA was conducted to examine gender effects for the three emotion tasks, the two verbal tasks, and the cognitive developmental task (see Table 3). Females reported significantly higher scores for the LEAS-C: self-, other-, and total-scores, the emotion comprehension task, vocabulary and VP. Gender effects on the emotion expression task were weaker, and were *ns* ($p = .06$). Gender differences for the PDS were also *ns*. A one-way analysis of covariance (ANCOVA) examined whether the gender effects on LEAS-C performance were maintained with the contributions of vocabulary and VP removed. The relationship between both covariates and the LEAS-C were *ns* ($p > .05$). The main effect of gender was significant for total LEAS-C scores, $F(1, 47) = 8.44$, $p = .01$, and for other-LEAS-C scores, $F(1, 47) = 5.12$, $p = .03$. Gender effects on self-LEAS-C scores were *ns*, $F(1, 47) = 3.10$, $p = .09$.

Table 2. Pearson correlations between the LEAS-C, emotion knowledge tasks, verbal skills and the PDS

	LEAS-C			Express ^b	Compreh. ^c	Vocab. ^d	VP ^e	PDS ^a	
	Self	Other	Total					Mother	Father
LEAS-C									
Self	–								
Other	.55**	–							
Total	.76**	.79**	–						
Expression	–.03	.30*	.15	–					
Compreh.	.17	.25*	.28*	.01	–				
Vocab.	.17	.19	.31*	.22	.41**	–			
VP	.13	.05	.30*	.23*	.34**	.32*	–		
PDS									
Mother	–.10	–.04	.02	–.05	–.08	.18	–.06	–	
Father	–.07	.04	.04	–.01	–.11	.08	–.08	.94**	–

* $p < .05$, ** $p < .001$.^aParental Descriptions Scale.^bEmotion expressions.^cEmotion comprehension.^dVerbal subtest, WISC-III.^eVerbal productivity.**Table 3.** Gender differences in emotion skills, verbal skills and cognitive development

Measures	Males		Females		<i>F</i>
	Mean	<i>SD</i>	Mean	<i>SD</i>	
LEAS-C					
Self	30.65	6.20	33.88	4.53	4.48*
Other	29.31	6.10	32.96	4.00	6.35**
Total	34.15	4.32	38.20	3.60	13.15**
Emotion expressions	24.92	4.24	26.68	3.48	2.60
Emotion comprehension	43.38	3.56	45.16	3.02	3.68*
Vocabulary	16.46	4.84	19.08	5.10	3.54*
Verbal productivity	207.54	63.83	240.96	72.60	3.06*
PDS					
Mother	3.60	1.58	3.92	1.29	0.62
Father	3.64	1.78	3.88	1.24	0.31

* $p < .05$, ** $p < .001$.

Age effects

As noted earlier, the restricted age range available in this study did not allow us to examine age effects within sample. However, preliminary steps were taken in this direction by examining the EA scores from this child sample, and EA scores from Lane's *et al.*, normative adult data. LEAS-C scores were pro-rated to facilitate comparisons. The descriptives for child and adult EA data are presented in Table 4. We used contrast analysis using Welch's procedure (Welch, 1947), which provides

Table 4. Within gender comparisons of child and adult EA data: means and standard deviations

	Males				Females			
	Boys (N = 26)		Men (N = 190)		Girls (N = 25)		Women (N = 197)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
EA ^a	56.9	4.3	58.5	11.0	63.7	4.4	64.3	10.2

^aTotal LEAS-C scores for child data (mean scores prorated); Total LEAS scores for adult data

reasonable protection against Type I error when variances are heterogeneous and sample sizes are unequal (Kirk, 1982). Both age and the interaction of age and gender were *ns* ($p > .1$).

Discussion

This study reports the development, and preliminary psychometric and validity testing of the LEAS-C. Results suggest that reliability of the LEAS-C is acceptable. Inter-rater reliability was high, while preliminary evidence for internal consistency of the LEAS-C was fair in view of the small sample size and the fact only 12 items comprise the LEAS-C. Validity testing results were promising, and gender effects were generally supported.

We predicted that the LEAS-C would be related to the emotion knowledge tasks and specifically, that the LEAS-C would be more strongly related to emotion comprehension than to emotion expression. The relationship between the LEAS-C and emotion comprehension was stronger, the latter measure being significantly correlated to both other- and total-LEAS-C scores. The predicted relationship between the LEAS-C and emotion expressions was only partially supported. The relationship between emotion expressions and total-LEAS-C scores was not significant, however emotion expressions was significantly related to other-LEAS-C scores. This relationship is intuitively appealing. While presentation formats between the two tasks differ, children are required to identify the emotions felt by others with both measures. They are also required to generate their responses in both tasks.

Prior research suggests children's verbal abilities relate strongly to their emotion skills (Cutting & Dunn, 1999; De Rosnay & Harris, 2002). The findings from this study were consistent with these expectations. Both vocabulary and VP were significantly related to the LEAS-C. The strength of the relationship between each verbal skill and the LEAS-C were comparable, suggesting both volume and specificity of words contribute to LEAS-C performance.

Contrary to expectations, there was no relationship between the LEAS-C and the PDS. Given that the two measures are based on cognitive models which emphasize developmental stage progressions, the relationship between the two measures may be better demonstrated with a greater age range and larger sample size. However, these results do raise the question of the development time course of object representation and emotional awareness. Perhaps by adulthood these domains are stably related, while in childhood, in this age group there may be significant time lags in the development of these domains that is not yet well understood. These results do appear to suggest that these different domains develop at different rates in different children (horizontal *décalage*).

Consistent with adult findings, we found strong gender differences in EA using the LEAS-C. Females outperformed males on self-, other-, and total-LEAS-C scores. Most importantly, with the contribution of vocabulary and VP removed, gender effects in EA remained. These results provide support for the claim that the LEAS-C taps the structure and complexity of emotions, independent of language. As predicted, females outperformed males on the emotion comprehension task, vocabulary and VP. While evidence of gender differences in children's emotion understanding has been equivocal, these results support previous findings of gender effects in children's perspective-taking ability (Brown & Dunn, 1996). From a broader perspective, these results also support gender differences in some dimension of children's emotion understanding. On the basis of previous results (e.g. Casey & Schlosser, 1994; Hall, 1984) we predicted females would achieve significantly higher emotion decoding scores compared with males. Our results were weaker than predicted with this task with gender effects not reaching significance ($p = .06$). Consistent with expectations, gender effects in cognitive development were not evident.

Preliminary steps to examine age effects were also taken. Within-gender means were in the expected direction, with both male and female children reporting lower EA scores compared with adult males and females. Contrary to expectations, age effects were *ns*. Methodological limitations in the comparison between child and adult EA data were noted earlier, and may have had some bearing on these results. Developmental progressions in EA may be more clearly demonstrated with the involvement of younger age groups. Evidence suggests children as young as 3 years of age understand the terms sad, mad, happy, and scared, and can relate events and experiences that may evoke such emotions (Harter, 1982). Future research involving age groups such as 3–5 years and 6–8 years will be necessary to thoroughly investigate developmental progressions in EA. While the discrepancy between child and adult scores was greater for males than for females, the Age \times Gender interaction was also *ns*. The child data was based on a relatively small sample size, especially when considered within gender. Further research using larger samples may more adequately test the extent to which rates of developmental progression in EA differ between males and females.

In conclusion, the findings of the present study are encouraging and suggest that individual differences in complexity of emotional awareness may be meaningfully measured in children. Importantly, we found that the sex differences that have been observed in EA among adults also emerge in children as young as 10 years old. In addition to the above, several directions for future research are recommended. A larger sample size would increase the stability of many of the coefficients (e.g. internal consistency). Test-retesting and/or the inclusion of self-reports of emotion experiences measures would provide opportunities to test that the LEAS-C taps the structure, not experience, of emotion. Evidence of gender differences in relations between emotion and social variables (e.g. Brown & Dunn, 1996; Custrini & Feldman, 1989) may be further explored with the LEAS-C. For example, it would be of value to examine with larger samples if the LEAS-C relates to other indices of children's social/emotional functioning, such as social competence and social behaviour.

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