

## ABSTRACT

### CAN CHILDREN GAIN EMOTION KNOWLEDGE USING AFFECTIVE CUES?

By Jessica L. Koepke

Emotion knowledge involves the understanding of the causes and consequences of emotion expressions. Children with high emotion knowledge tend to have better social skills and academic competence. This study investigated what minimal affective cues are necessary for children to determine the emotional valence of affective words. A female actress was videotaped while reading happy and sad word lists. The actress displayed slight affective cues based on the emotional valence of the word. Children then participated in all three conditions: (1) Video Only (VO), during which they watched only the video track of the recording; (2) Audio Only (AO), during which they heard the audio track of the recording but did not see the video track, or (3) Audio-visual (AV), during which they were presented with both the audio and video tracks. Study found that children were able to judge the emotional valence of the words significantly more often in the VO and AV conditions compared to the AO condition. These results show that children use facial affect/nonverbal behavior more than verbal expressions when making determinations of affective words.

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by

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## INTRODUCTION

Children's emotion knowledge is an important aspect of development, as it helps children build healthy social relationships and contributes to language ability. Emotion knowledge is the ability to accurately perceive emotion signals in facial and vocal expressions and behaviors, label emotion signals, identify causes of emotions in self and others, and anticipate one's own emotions in various situations (Izard, 2001). Emotion knowledge also involves the understanding of the causes and consequences of emotion expressions (Trentacosta & Izard, 2007). Cognitive ability and emotion knowledge are contributing factors in predicting children's adaptive social behavior. Children with high emotion knowledge and cognitive ability tend to show more positive adaptive social behaviors and academic competence compared to children with low emotion knowledge and cognitive ability (Izard, Schultz, Fine, Youngstrom, & Ackerman 2000; Trentacosta & Izard, 2007). Pons, Lawson, Harris, and de Rosnay (2003) found a positive correlation between children's emotional understanding, popularity with peers, prosocial behavior, and language ability. Prior research has not investigated if four- to five-year old children are able to determine the emotional valence of words from slight vocal and/or facial cues. It is the purpose of this research to determine what minimal cues are necessary for a child to determine if emotional words have positive or negative affective valence. This will provide information regarding how children gain emotion knowledge, as well as which cues are necessary for attainment of emotion knowledge.

## **Theoretical Framework**

The underlying assumption of discrete emotion theories is that “facial expressions express basic emotions through affect programs” (Scherer & Ellgring, 2007, p. 113).

Discrete emotions theory is a view of emotional development that purports that emotions are innate, are discrete from one another at an early age, and that each emotion is represented by a specific and distinctive set of nonverbal behaviors including facial expressions. Tomkins (1962 & 1963) believed that specific elicitors in the face and voice trigger a pattern of reactions. For example, a smile and upbeat tone of voice elicit a happy response. The reactions are automatic and innate. Tomkins’ theory of emotions provided the framework for this study. Children were given specific facial and vocal cues matching positive and negative affective words. The cues provided to the children were minimal, in order to determine if children could make correct emotional determinations from the positive and negative affective cues, perhaps leading to gains in emotion understanding.

## **Emotion Understanding and Knowledge**

There are three characteristics of emotion: intensity, duration, and valence (Hesse & Cicchetti, 1982; Russell & Bullock, 1985). Intensity is a reflection of the strength of an emotion. Duration is how long the emotion is felt and affects an individual (Hesse &



Cicchetti, 1982). Finally, valence is determined in terms of pleasure versus displeasure (Russell & Bullock, 1985). In addition, as children develop, their ability to identify emotion improves. First children are able to identify their own emotional state, and then the emotional states of others. Finally, children can *infer* the emotional states of others (Smiley & Huttenlocher, 1989). For example, if a child participant is given a scenario showing that another child lost her favorite stuffed animal, the participant would infer the child with the lost stuffed animal is sad.

Russell (1989) developed six different levels of emotion understanding. In level one, two-month-old infants can discriminate particular gestures and changes in another person's face and voice shown by their reactions to happy and sad facial expressions and vocal cues. Level two consists of infants aged four- to eight-months-old discriminating between different classes of emotions based on positive and negative. Infants in this stage respond differently to different valences of emotions and respond similarly to emotions of the same valence. Infants will consistently respond to smiles one way and frowns another. In level three, ten-month-old infants begin to attribute meaning to the classes of expression and group them into positive and negative interactions. Infants in this stage use social referencing and guide their own behavior based on their mother's facial expressions. Social referencing refers to infants interpreting emotional output of others and base their response on their assessment of their interpretation. Infants begin to have representations of positive and negative emotions. Levels four and five pertain to one- and two-year old children. In level four, children can associate facial expressions with vocal cues or with the context in which the expression occurs. For example,

children associate smiles with specific vocal cues or some other type of positive reinforcement such as gifts. In level five, children are able to string together emotion sequences including behaviors, expressions, situations and words. Children can distinguish differences between emotional words according to the context in which the word is used. Children use contextual cues to gain meanings of emotions. Around age three children reach level six. At this level, children can make generalizations about emotional states. For instance, children see someone happy and think they received a present. Also, at this level, children understand which emotional displays are socially appropriate and acceptable. This research shows that children use context when making determinations about emotional words. In the current study children have to incorporate all the information provided to them to determine the emotional valence of the word. The above research shows that children are developmentally ready to complete the experimental task.

Researchers also use free labeling to determine emotion knowledge in preschoolers. When children are shown pictures of individuals and asked “how is this person feeling,” three-to four-years-old children are able to label happy, sad, and angry expressions correctly (Russell 1990; Russell & Widen, 2002; Shields & Padawer, 1983; Stein & Liwag, 1997; Walden & Field, 1982; Widen & Russell, 2008; Xeromeritou, 2001). Five-year-olds are significantly better at decoding facial expressions than three-year-olds, but can only draw facial expressions of happiness better than younger preschoolers (Zuckerman & Przewuzman, 1979). Happiness is the easiest emotion for preschoolers to identify and produce; preschoolers are able to identify and express

happiness significantly more than any other emotions (Camras, Ribordy, Hill, Martino, Sachs, Spaccarelli, & Stefani, 1990; Rotenburg, Simourd, & Moore, 1989; Russell & Widen, 2002; Shields & Padawer, 1983; Sogon, 1985; Wiggers & Willems, 1983).

Nonverbal behavior can override verbal behavior. In other words, *how* something is said coupled with a facial expression is used as a determinant of situational knowledge more than what is actually stated (Castelli, Dea, & Nesdale, 2008). Castelli, Dea, and Nesdale showed children between 41- and 78-months-old videos with two individuals displaying positive or neutral verbal behavior. The individuals in the videos were not of the same ethnic background. In addition to the positive or neutral verbal behavior in the video, the individuals shook hands and sat next to each other. The hand-shake varied in terms of grip. In one condition, the individuals had a loose grip and in the other they had a tight grip. In the condition with the loose grip, the individuals sat with a chair between them. In the tight grip condition the individuals sat next to each other. Children were asked if the individuals were likely to become friends. When the verbal behavior was inconsistent with the nonverbal behavior, children based their determinations on the nonverbal behavior. For example, if the children viewed the loose grip scenario, but positive verbal behavior was displayed, children would conclude the individuals were unlikely to become friends. This research demonstrates the importance of nonverbal behavior for children. Children are significantly more likely to use nonverbal behavioral cues when making determinations.

Children's emotion knowledge is affected by parental factors. Bennett, Bendersky, and Lewis (2005) assessed four-year-old children's emotion knowledge as

well as mother's verbal IQ and depressive symptoms. Depressive symptoms were measured to determine if there was an association between mother's depressive symptoms and children's emotion knowledge. Children's emotion knowledge was measured on three factors. First, in the labeling of expressions task, children were shown photos of different facial expressions and asked to label the expression. The second task involved recognition of expressions. In this task, children were shown six pictures at a time and asked to point to the picture that depicted the target emotion. The final task involved assessing situational knowledge. Children were provided with six photos of different facial expressions and told a story relaying emotional meaning. Children were asked to choose the photo in which the expression in the photo depicted the emotion in the story. Children's emotion knowledge was positively correlated with their mother's verbal IQ and the child's cognitive ability. Children of mothers with high verbal IQs responded with more correct answers than children of mothers with low verbal IQs.

### **Facial Expression and Emotion Understanding**

When children are shown facial expressions, they use cues from the expression of and around the eyes (Walden & Field, 1982). Three-to five-year-old children were shown drawings of an individual expressing a target emotion, and were then asked to pick another picture that depicted the same emotion. No two pictures were the same, but physical features from the target picture were used in the pictures the children could choose from. Features included the mouth, eyes, or hair. One or more features from the

individual expressing the target emotion were the same in the photographs from which the children could choose. Children used the eyes as a referent significantly more than the mouth or hair. Children were significantly more likely to choose a picture where the eyes matched rather than one in which the mouth or hair matched. (Walden & Field, 1982). This suggests children use eyes as a referent for emotional cues more than hair or the mouth.

Shields and Padawer (1983) conducted a study with children ages 3.5- to 4-years to determine the development of emotion identification and production. Children were provided with a target emotion (i.e. happy, sad, angry, or scared) and asked to reproduce the emotional expression, identify facial expressions of others, and identify facial expressions of themselves. In the first experiment children listened to a series of situations from an audio recording and were asked to pose a facial expression that was congruent with the emotional theme of the situation. In the second experiment, children were told a target emotion and asked to pose the target emotion. Each pose was photographed. For the final experiment, children were asked to identify their own facial expressions. Children were presented with their photographs from the second experiment, and asked to indicate which photo represented the target emotion. Children were also asked to label the emotions from their photographs. Ninety-six percent of children could pose at least one expression, 69% of the sample could identify the target emotion from their photographs, and 55% of the children could label the emotions depicted in their photographs. The results show children can first recognize facial

expressions of others, then produce facial expressions themselves, and then recognize their own facial expressions.

In a similar study, Castelli, Dea, and Nesdale (2008) showed that children use facial expressions as cues to emotional states more than they use verbal statements. Children ages 3-6 years were asked to determine the emotional states of individuals from their facial expressions and their verbal output. Children were shown a video of individuals making positive or negative emotional statements with consistent or inconsistent facial expressions. The video consisted of an individual being approached by a stranger. The individual displayed positive or neutral verbal expressions and displayed easiness or uneasiness in their nonverbal behavior towards the stranger. Positive expressions consisted of showing an appreciation for the individual's culture. Neutral expressions included "work talk." Easiness was displayed by hugging and uneasiness by a loose hand shake and sitting with one chair between the two individuals. Children were then asked a series of questions to decipher their opinion on the interaction between the individual and the stranger in the video. One of the questions used was, "Do you think the people in the video want to become friends?" When the verbal statements were incongruent with the nonverbal behavior, children used the nonverbal behavior for their determinations. Children were significantly more likely to base their determinations on the nonverbal behavior in the video than on what was verbally expressed.

On the other hand, another study gave three- and four-year-old children either an emotional word or a photograph depicting a facial expression portraying an emotional word (Russell & Widen, 2002). The emotions used were happiness, sadness, anger,

surprise, fear, and disgust. Children were asked to provide a situational narrative pertaining to the emotional word or expression with which they were provided. Participants performed significantly better in the word-only condition than did participants given a facial expression. The word superiority effect was most dominant for fear and disgust. This suggests children have greater difficulty distinguishing the facial expressions for fear and disgust, but understand the meaning. It is typical for children in this age range to have difficulty with facial expressions for fear and disgust, but be able to identify happy, sad, and angry facial expressions (Russell & Widen 2002; Widen & Russell, 2008). Considering the inconsistencies in the two above mentioned studies, the current experiment is important to determine the importance of nonverbal behavior for children. The current study investigates if children use nonverbal behavioral cues when determining the emotional valence of words.

### **Facial Expressions and Affect**

Nonverbal behaviors, such as facial expressions, are an important component of communication. How individuals make determinations regarding facial expressions is a key factor in this research. The classification of facial expressions is an essential process in gaining emotion knowledge.

Children classify facial expressions into positive and negative emotion categories, but categorize all positive expressions as happy (Widen & Russell, 2008). Widen and Russell (2008) conducted a free labeling and categorization task with children with a

mean age 41.2 months. In the free labeling task, children were shown a picture of an individual and asked, “How is this person feeling?” Children got happy, sad, and angry correct more often than surprise, fear and disgust. In the categorization task, children were shown pictures of facial expressions, asked if the picture depicted a target emotion, and instructed to sort the pictures into positive and negative expressions. Children stated that all positive expressions depicted happy. Negative expressions took longer for the children to decipher, but the children could differentiate between negative emotions. For example, children were able to tell the difference between a sad expression and an angry expression. At this age, children can determine if an emotion has a positive or negative affective loading.

Russell (1990) presented 4- to 5-year-old children with a picture of a facial expression, an emotion word, or both. They were then asked to make up a story that corresponded to the stimuli provided. Children were able to differentiate the causes of specific emotions and could also distinguish negative from neutral and positive emotions. They were able to reason that negative emotions are the result of negative occurrences.

Children can identify affect in facial expressions using facial expression cards or video clips (Rotenburg, Simourd, & Moore, 1989). In this study, kindergarten, second, and fourth graders watched video clips with positive (i.e., I like your shirt), neutral (i.e., my house is white), and negative (i.e., I don't like your shirt) statements; individuals in the video displayed positive, neutral, or negative affect when making the statements. Affective cues from facial expressions were congruent with the statements 33% of the time. In other words, the positive statement, “I like your shirt,” was matched with a smile



33% of the time, a frown 33% of the time, and a straight (i.e. neutral) face 33% of the time. Children were then asked if the individual in the video was lying. All children were significantly more likely to report the individual in the video was lying when the statement was incongruent with the facial expression. These results shows children are aware of facial affect and use facial affect when making determinations of affective situations.

Perez-Edgar and Fox (2007) presented seven-year-old children with a word list via headphones. Half of the list was spoken by a female presenter and the other half by a male. The words used were socially/affectively positive or negative, nonsocially/affectively positive or negative, and neutral. Words with high social content consisted of peer relationships and friendship. For example, “happy friends” is a social positive phrase and “sad dog” is a nonsocial negative phrase. Neutral words did not have social or affective loadings (i.e. rolling pin). After each word was read, children were asked if the word was spoken by a male or female. Children responded significantly more slowly to affective words than neutral words, and responded the slowest to negative affective words. Also, participants responded significantly slower to words that had meaningful social content, especially social-negative words. The gender of the speaker did not influence the results. (Perez-Edgar & Fox, 2007). The results of this study show that children require more processing time with words that have social and affective content, and that the gender of the speaker does not impact the results. For this reason, the current study used a female speaker.

Russell and Bullock (1985) report that children see emotion in terms of pleasure versus displeasure. They gave 4- and 5-year-old children 20 pictures with facial expressions of different affective valence. Children were asked to sort the cards into two different groups based on how they thought the individual in the picture was feeling. Children grouped positive expressions together and negative expressions together. This research demonstrates that emotions have valence for children.

Nonverbal and verbal behaviors are both considered by children when making determinations about situations. How something is said is as important, if not more important, than what is said. The manner in which adults interact with children affects children's language development and schemas for classifying emotions. Much of what is verbally expressed to children is saturated with affect, so children's language acquisition is developed by what is expressed to them verbally and paralinguistically. Children incorporate the emotional tone and the sound pattern of the words they hear when determining the meaning of what is said (Hart & Risley, 1995).

Walden and Baxter (1989) conducted a study with 41 six- to forty-month-old children on social referencing. Each child participated in the study with one parent. Parents were trained to produce happy and fearful expressions as well as verbal messages to accompany affective displays. Positive messages included, "Oh, look at that! What a nice toy! Oh boy, oh boy! Look at that toy!" and negative messages included, "Oh, look at that scary toy! What a scary toy!" Parents sat behind their child on the floor and then the children were presented with a toy. Each child was presented with seven different toys, and their parents were instructed before the presentation which positive or negative

verbal and facial expressions to display. Parents were instructed not to say or express anything to their child until the child looked back at them. Children were divided into three different age groups: 6-12 months, 13-23 months, and 24-40 months. Nineteen percent of the children in the youngest age group referenced their parent before interacting with the toy, 56% of the middle age group referenced their parent, and 81% of the oldest age group referenced their parent before interacting with the toy. Children touched toys that accompanied positive facial and verbal expressions significantly more than toys that accompanied negative facial and verbal expressions. The results of this study demonstrate that children use social referencing cues when presented with an unfamiliar toy and that they tend to react according to their parents' behavior. Children of this age group are able to determine affect from their parents.

Children's decoding of facial expressions is related to how their mothers display facial expressions. The better the mother can encode a facial expression, the better the child is at decoding it (Daly, Abramovitch, & Pliner, 1980). In this study, mothers of five-year-old children were videotaped while watching slides designed to elicit pleasant, disgusted, and neutral expressions. Undergraduates watched the tapes and attempted to determine which slide the mothers were watching. Mothers were then classified as good encoders or bad encoders based on the score they received from the undergraduates. Mothers above the median were classified as good encoders while mothers below were classified as bad encoders. Children watched their mother's tape and were asked their opinion on the type of slide they thought their mother was viewing. The results showed a positive correlation between the mother and child's coding abilities. Children were better

able to identify the type of slide their mothers watched when the mother was classified as a good encoder.

### **Gaining Word Meanings of Unfamiliar Words**

Children use context to gain word meaning. Nurmsoo (2006) gave four-year-old children a pseudo name (i.e. nurmy) for an object that consisted of tubing and coffee filters. The object was created for the specific purpose of the experiment. Children used referents provided by the teacher and environment to determine to which target object the teacher was referring. Two objects were placed in the classroom, one being the nurmy, and the teacher asked the children, “Where’s the nurmy?” while maintaining eye contact with the other object. The children named the correct object as the nurmy significantly more than the other object. They were able to reason that the unfamiliar object the teacher was staring at was not the object she was asking about, because the teacher was asking the location of the nurmy, and the teacher knew the location of the other object. This research shows children are able incorporate the teacher’s perspective when drawing their own conclusions, and use cues when making judgments. In the current study, children have to make judgments on the emotional valence of words using the stimuli provided.

Children can gain word meanings of unfamiliar words when someone reads to them. They can pick up on the context of unfamiliar words and are able to conjure the meaning of the unfamiliar word through the context in which the word is presented.

Children with lower word knowledge are able to understand new words that are read to them the same as, if not better than, children with higher word knowledge (Elley, 1988). When seven- to eight-year-old children were read a story containing unfamiliar words, they were able to decipher the meanings of some unfamiliar words. Children were tested before and after the story was read. Children's scores on the post-test were 15% higher than their scores on the pre-test. Another group of children had a story with unfamiliar words read to them. In addition, this group discussed the word meanings after the words were presented in the story. The children in the second group showed a 32% improvement from pre- to post-test. Children classified as "bright" showed less improvement than children not classified as bright. How children were classified as bright was not discussed. Bright children averaged 15.4% improvement from pre- to post-test and the other children averaged 22% improvement. This study demonstrates that all children are able to learn word meanings of unfamiliar words. In the current study children will not be classified based upon their previous word knowledge because the above study demonstrates that all children have the ability to learn word meanings of unfamiliar words.

Children of all language abilities are able to learn meanings of unfamiliar words through listening to stories. Children who actively participate in the story they are being read to perform better on tests involving new vocabulary from the story better than children who do not actively participate (Ewers & Brownson, 1999). In this study, children with a mean age of six were read a story containing unfamiliar words. After an unfamiliar word was presented in the story, children in the active participation condition

were asked questions about the unfamiliar word and the meaning of the word was provided. Children in the passive condition were just read the story; no discussion took place. Children in the active participation condition performed significantly better than children in the passive condition, regardless of the extent of the child's vocabulary. Children in the active participation condition learned the meanings of the unfamiliar words in the story significantly better than children in the passive condition. This study shows that the more information provided with a word, the better children can decipher the meaning of the word. This is the reason the current study hypothesizes that the more information provided to the children, the better they will perform. When children are given audio and visual information based on the valence of the word, it is expected they will be more likely to make a correct determination on the emotional valence of the word.

### **Overview of the Current Study and Hypotheses**

To summarize, children's emotion knowledge affects their development, including their language ability- their ability to recognize and label emotional expressions. Children gain emotion knowledge from vocal, facial, and behavioral signals. Children can gain an understanding of unfamiliar words through cues in nonverbal communication, storybooks, and incorporating the context in which the unfamiliar word was presented. It is unclear how much nonverbal communication must be displayed in order for children to gain the meaning of unfamiliar words, or if the nonverbal behavior has to be coupled with verbal behavior for children to detect the

meaning of unfamiliar words. This study provides children with nonverbal, verbal, nonverbal and verbal behavior to determine which cues are necessary for children to gain meaning of unfamiliar words. It is already documented that storybooks provide meaningful context for words that contribute to language development (McCarthy, 1995), and that the context in which words are presented also helps children understand unfamiliar words. It is unclear, due to inconsistent research findings, what cues children use to determine the meaning of unfamiliar emotional words. The current study provides children with minimal affective cues to determine how children make determinations of unfamiliar emotional words. In making determinations of unfamiliar emotional words children may gain emotion knowledge by using the cues provided to them and incorporating the cue in their decision making process.

The purpose of this study is to investigate the relationship between minimal emotion cues provided by an adult and emotion knowledge in children. Specifically, when children are provided with minimal affective cues, will they be able to determine if a word has positive or negative affective valence? Also, which nonverbal channels do they use to detect affect? The aspect of emotion knowledge measured in this study is the child's ability to recognize and label emotion expressions. This will demonstrate what minimal cues are needed to gain emotion knowledge from affective words. This study will show if children base determinations on nonverbal and/or verbal information when making determinations on positive and negative affective words. In a within-subjects design, children will see and hear an individual reading a list of affective words (audio-visual condition), will hear the audio portion of that recording (audio only condition), and

in a third condition, will view the visual portion of the recording (video only condition). After each word is presented, children will circle a happy face if they believe the word represents a positive emotion, or a sad face if they believe the word represents a negative emotion. In addition, parents and teachers will complete a questionnaire for each child.

. Hypothesis 1: The audio-visual condition will have more correct responses on the Happy and Sad Face Form (HSFF) than in the audio only condition.

Hypothesis 2: The audio-visual condition will have more correct responses on the HSFF than in the video only condition.

Hypothesis 3: The video only condition will have more correct responses on the HSFF than in the audio only condition.

Hypothesis 4: Children will have more correct responses for positive affective words than for negative affective words.

Hypothesis 5: There will be a positive correlation between mother's education level and children's scores on the HSFF.

Hypothesis 6: There will be a positive correlation between time parents spend reading to their child and scores on HSFF.

Hypothesis 7: There will be a positive correlation between scores on the Teacher's Questionnaire and scores on HSFF.



## METHODS

### Participants

Thirty 4- to 5-year-old children, 14 boys and 16 girls, with the mean age of 4.99 (SD = .62) years participated. All parents/guardians signed an informed consent document prior to their child's participation (Appendix E). Children also verbally agreed to participate in the study. Data were collected from four different Wisconsin schools or day care centers. Eleven children were enrolled at the University of Wisconsin Oshkosh Children's Learning and Care Center, eight children were enrolled in the day care center affiliated with St. Agnes Hospital in Fond du Lac Wisconsin, five children were enrolled in the Wright Care day care center also in Fond du Lac, and six children were enrolled in 4-year-old kindergarten at Pier Elementary School in Fond du Lac. Parents/guardians reported reading to participants in this study nearly five days per week ( $M=4.92$ ,  $SD = 2.13$ ). The mean education level of the mothers indicated that mothers were exposed to some college courses. Twenty-six of the children were of European-American descent, two were Hispanic, and two were classified as Other. Twenty-five of the 30 participants have never received speech therapy; at the time of the study, none of the participants were receiving speech therapy.

## **Materials**

Children's parents completed a questionnaire asking about parental education, the number of siblings the child has, and the amount of time parents read to their child (Appendix A). Teachers filled out a rating form for each child that participated in the experiment. Ratings included measures of peer acceptance, different aspects of linguistic competence, emotional expression, and emotion knowledge (Appendix B). This questionnaire was developed for this study and reflects items that are linked to emotion knowledge. It is therefore hypothesized this measure will correlate with the children's scores on the HSFF. Prior research has documented several characteristics and behaviors that are linked to emotion knowledge and this questionnaire represents those factors. The Happy/Sad Face Form (HSFF) was developed for this study to record the participants' responses (Appendix D).

Three word lists were constructed consisting of 10 happy words and 10 sad words, totaling 20 words per list. It was expected that at least seven of the synonyms for happy and sad (14 total) would be unfamiliar to the children. The word lists were piloted on five children prior to the onset of the study, to ensure they were equally difficult. There were no significant differences between difficulty of the word lists or difficulty of the happy and sad words. The complete list of words can be found in Appendix C.

The recordings of the word lists were presented on a Gateway laptop model MX6955 model number MA7. The audio and/or video recordings were played using

RealPlayer SP. The reading of the word lists were recorded with a video recorder provided by the University of Wisconsin Oshkosh.

## **Procedure**

Participants were taken individually to a separate area of the classroom or to another room to minimize distractions. Each child participated in three conditions: audio-visual (AV), audio only (AO), and video only (VO). The conditions were presented in the following order: (AO, VO, AV), (VO, AV, AO), and (AV, AO, VO). In the AV condition, children viewed a recording of a female actress reading a word list containing 10 happy and 10 sad words. Both auditory and visual information were provided. The actress was blind to the experimental hypotheses and conditions. She was instructed to read the list and portray slight affective cues based on the affective valence of the word. For example, for the word “happy,” she said the word, with a slight smile, and provided a happy tone of voice. There was a five second interval between the reading of each word. The recordings were approximately three minutes long. Children watched and heard the video on a lap top computer during experimental testing. They were instructed to circle a happy or sad face on the HSFF depending upon whether they believed the word represented positive or negative feelings. To ensure that the children understood the task, they were first asked “What face would you circle for a happy word?” The word list began with easier words and progressed to more difficult words. The recording was paused if a child needed more time. For the AO condition,

participants listened to the actress read a new list of 10 happy and 10 sad words in the same manner as before. The video portion of the recording was turned off, so that only the audio portions are provided, and again record their responses on the HSFF. Finally, for the VO condition children were presented with a third list of happy and sad words, read as before. For this condition, however, they only saw the video portion of the recording and, after each word presentation, used the HSFF to record their responses.

### **Scoring**

The participants' responses on the HSFF were scored by giving the children one point for each correct response. The conditions were scored separately giving the children a total of three scores, one for each condition. For the typically unfamiliar words, children were given one point for every correct response. The number correct for each condition were added together and divided by the total number of typically unfamiliar words for each condition. This gave each child a percentage for the number of correct responses for typically unfamiliar words. Each child received a separate score for each condition, totaling three scores for typically unfamiliar words.

## RESULTS

### Pilot Data

Five 4- to 5-year-old children were piloted to determine if the three word lists (see Appendix C) were of similar difficulty. The children's parent(s) were socially acquainted with the researcher. Children were also asked if they knew the words to determine which words were unfamiliar to the children. In order for a word to be considered familiar to children, four children had to know the word. Children knew 2.8 happy words per list and 3.06 sad words per list. Children knew 5.81 words in the AV condition, 6.1 words in the AO condition, and 6.23 words in the VO condition. These results show that participants should be equally familiar with the word lists and the happy and sad words.

### Main Experiment Data

Means and standard deviations on the HSFF for each condition are presented in Table 1.

Table 1.

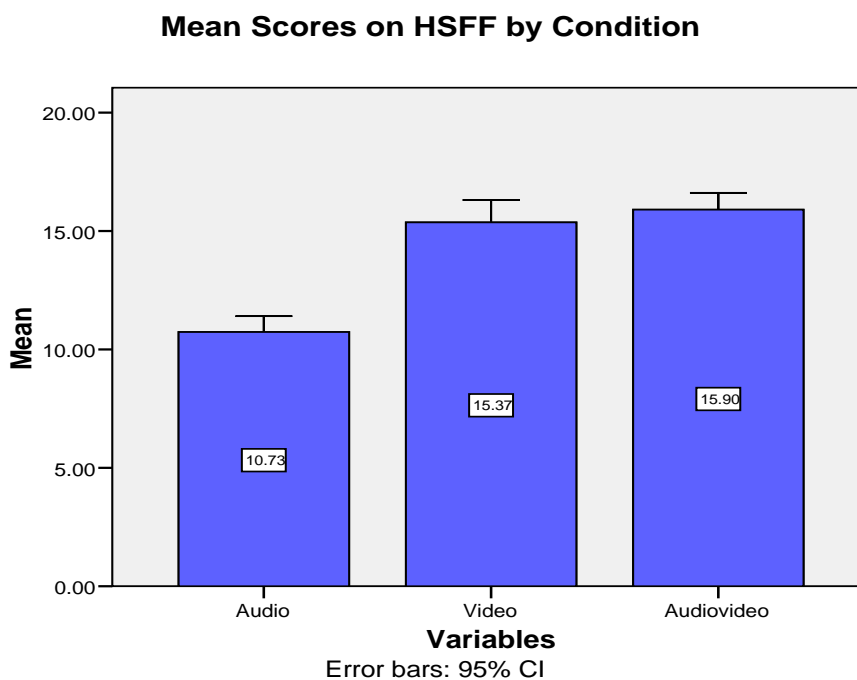
*Means and Standard Deviations of HSFF Scores for Audio, Video, and Audio-Visual Conditions*

<i>Condition</i>	<i>M</i>	<i>SD</i>
Audio	10.73	1.80
Video	15.37	2.53
Audio-Visual	15.90	1.90

Note. *M* = mean, *SD* = standard deviation.

In order to determine if there was a significant difference between the number of correct responses for each condition, a one-factor (Condition: AO, VO, AV) between-subjects analysis of variance (ANOVA) found a main effect for Condition,  $F(2, 90) = 54.95$ ,  $p = .00$ ,  $\eta^2 = .56$ . In the Audio condition children responded correctly  $M = 10.73$  times, in the Video condition children responded  $M = 15.37$  correctly, and in the Audio-Visual condition children responded correctly  $M = 15.90$  times. Fisher's LSD found that children in the audio only condition had significantly fewer correct responses than children in both the video only condition ( $p=.00$ ,  $d=2.11$ ) and the audio-visual condition ( $p=.00$ ,  $d=2.79$ ). HSFF scores for children in the video only and audio-visual conditions did not significantly differ from each other ( $p = .33$ ). The results are graphed in Figure 1.

Figure 1. Mean Scores on the HSFF for AO, VO, and AV conditions. Error bars represent +1/-1 SEM.



Means and standard deviations on the HSFF for typically unfamiliar words for each condition are presented in Table 2, and are graphed in Figure 2.

Table 2.

*Means and Standard Deviations of Percent of Correct Responses on HSFF for Typically Unfamiliar Words.*

<i>Condition</i>	<i>M</i>	<i>SD</i>
Audio	47.56	15.88
Video	81.81	13.59
Audio-Visual	75.00	10.11

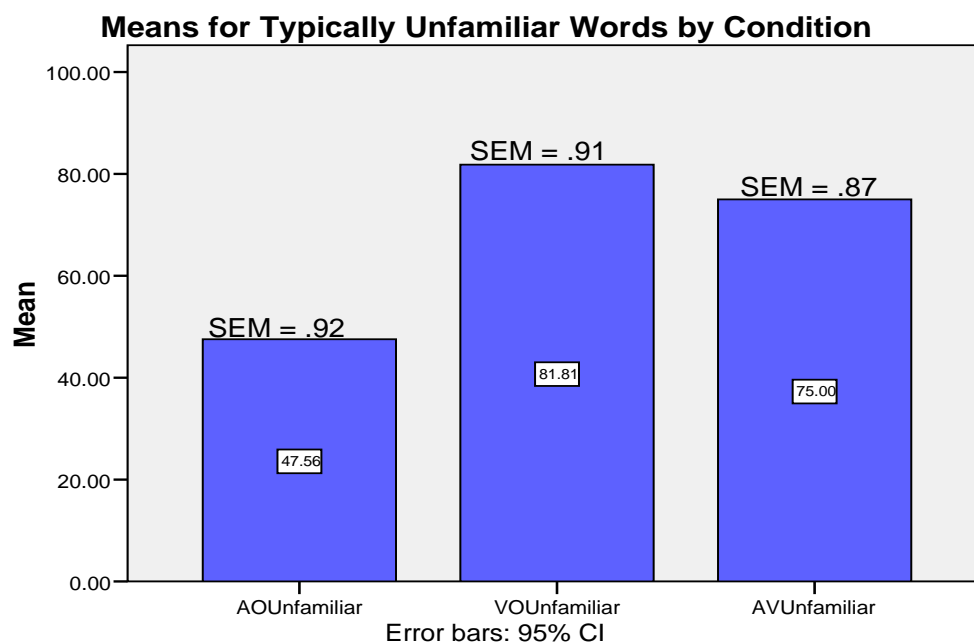
Note. *M* = mean, *SD* = standard deviation.

In order to determine if there is a significant difference between conditions for the typically unfamiliar words, one-factor (Condition: AO, VO, AV) between-subjects ANOVA found

a main effect for condition,  $F(2, 90) = 397.12, p = .00, \eta^2 = .56$ . Children responded correctly  $M = 47.56$  percent of the time in the Audio condition,  $M = 81.81$  percent in the Video condition, and  $M = 75.00$  percent in the Audio-Visual condition. Fisher's LSD found that children had a significantly higher percentage of correct responses on the HSFF for typically unfamiliar words in the video only condition compared to the audio only and audio-visual conditions,  $p = .00, d = 2.32$  and  $p = .00, d = .57$  respectively. Children also had a significantly higher percentage of correct responses for typically unfamiliar words in the audio-visual condition compared to the audio only condition,  $p = .00, d = 2.06$ .

Figure 2. Means for Typically Unfamiliar Words for AO, VO, and AV Conditions.

Error bars represent  $+1/-1$  SEM.





A Chi-square test was performed to determine if children had more correct responses with positive affective words than with negative affective words. The results were not significant ( $\chi^2 (1, N = 30) = 32.10, p = .32$ ).

Pearson product-moment correlation coefficients were calculated to determine if there was a relationship between mother's education level and HSFF scores. The correlation was not significant ( $r(28) = -.16, p = .41$ ). The correlation between time spent reading to children and HSFF scores was also not significant ( $r(28) = .09, p = .64$ ).

An independent sample t-test was performed to determine if the HSFF scores for children whose mothers had a Bachelor's degree or more were higher than those of children whose mothers had less than a Bachelor's degree. There was no significant difference between groups,  $t(28) = -1.04, p = .31, d = .38$ .

In order to determine if any of the measures on the Teacher's Questionnaire could combine into composite variable, an exploratory factor analysis with orthogonal rotation was performed on the eight Teacher's Questionnaire items. The principle components factor analysis procedure extracted two factors with eigenvalues greater than 1 that accounted for 83.7% of the total variance. Table 3 shows the eigenvalues and variance accounted for by each factor.

Table 3.

*The Eigenvalues, Percent of Variance, and Cumulative Percent for Each Factor.*

	Eigenvalue	Percent of Variance	Cumulative Percent
1	5.5	68.91	68.91
2	1.18	14.79	83.70

Six items on the Teacher's Questionnaire were highly loaded on factor one. The items included: the child's vocabulary is more advanced than his/her peers, the child's language ability is more advanced than his/her peers, the child is one of the brightest children in the class, the child communicates when he/she is upset, the child verbally expresses his/her emotions effectively, and the child can distinguish other's emotional states. Two items were highly loaded on factor two, including: the child is well liked by peers, and the child follows instructions well. High loadings were values greater than .6 and low loadings were values less than .4. There is a cross loading among factors; each variable had high values for one factor and low values for the other factor. Table 4 shows the rotated component matrix and the values for each variable on each factor.

Table 4.

*The Load of Each Item on the Teacher's Questionnaire on Each Component*

	1	2
Vocabulary is more advanced than peers	.94	.19
Language ability is more advanced than peers	.93	.21
One of the brightest children in class	.93	.17
Child communicates when upset	.88	.14
Child verbally expressed emotions effectively	.85	.25
Child can distinguish other's emotional states	.84	.41
Child follows instruction well	.20	.86
Child is well liked by peers	.19	.86

Cronbach's alpha was calculated for each factor to determine if a composite variable could be created and then correlated with HSFF scores. The Cronbach's alpha value for the items comprising factor 1 was .96. Because a reliability coefficient of .70 or

higher is considered acceptable, the composite score was correlated with HSFF scores.

The correlation was not significant ( $r(28) = .28, p = .13$ ).

One of the teachers (Teacher A) gave all the children in her room the highest scores possible (i.e., 2 and 3) while the teachers at the remaining three locations used the full range of the scale on the Teacher's Questionnaire. After removing Teacher A's scores, the correlation was significant,  $r(17) = .47, p = .04$  for the remaining 19 children.

## DISCUSSION

The findings of this study suggest that children base their determinations of affective word valence using visual cues only. Children made significantly more correct determinations in the VO and AV conditions than in the AO condition. Children are significantly more likely to correctly determine if a word has positive or negative affect if they can use nonverbal cues. In addition, children made significantly more correct determinations with typically unfamiliar words in the VO condition compared to the AV and AO conditions. In particular, when a word is unfamiliar to the child, the child uses nonverbal information to make determinations regarding the affective loading of the word. These data may support the discrete emotions theory in that there may be automatic responses to specific nonverbal behaviors. These automatic responses may have helped the children determine if the affective words with affective cues were happy or sad. These results show that it is easier for children to make correct decisions about typically unfamiliar words when they are provided with affective information even if the affective cues are minimal, as in this study.

The results of this study support hypotheses 1 and 3 stating, respectively, that (1) children would produce significantly more correct responses in the AV condition than the AO condition, and (3) children would have significantly more correct responses in the VO condition than the AO condition. Hypothesis 2 was not confirmed. Participants did not perform significantly better in the AV condition than the VO condition, although the trend was in the expected direction. Taken together, these results suggest that nonverbal

cues contribute significantly more information than paralinguistic cues, such as tone of voice, when determining valence of affective words. The lack of a significant difference between the AV and VO conditions implies that paralinguistic cues do not supply children with enough information to determine the affective valence of words, and therefore probably do little to help them gain emotion knowledge.

With typically unfamiliar words, participants scored significantly higher on the HSFF in the VO condition compared to the AV and AO conditions. It is the opinion of the researcher that this occurred because children use nonverbal behavior as a determinant more than verbal behavior. The significant difference between the VO and AV conditions suggests that children did not need the audio information and that it made it more difficult for the children to make determinations on the emotional valence of the words, perhaps because the audio information was distracting. These results further highlight the importance of affective cues when determining the affective loadings of emotional words. Children used nonverbal behavior as a referent significantly more than verbal behavior, suggesting that the verbal information provided by the speaker did not significantly contribute to the conclusions the children made regarding the affective valence of unfamiliar words.

The results of this study are consistent with Castelli, Dea, and Nesdale (2008), who demonstrated that children use situational knowledge as a determinant more than verbal information. These researchers demonstrated that children use affective cues more than verbal cues when making determinations about situations or context of words.

Rotenburg, Simourd, and Moore (1989) also found that children use facial expressions

more than verbal information when making determinations of affective situations. Both of these studies used facial affect and verbal statements, and asked children to draw conclusions about the situations they were provided. When facial affect was inconsistent with verbal statements, children used facial affect as their basis for drawing conclusions. These results, combined with the results of this study, show that nonverbal cues are used more than verbal cues when making determinations of affective situations.

Hypothesis 4 stated that children will have more correct responses for positive affective words than negative affective words. This hypothesis was not supported. Researchers have found that happiness is the easiest emotion for preschoolers to identify and produce (Camras et al., 1990; Rotenburg et al., 1989; Russell & Widen, 2002; Shields & Padawer, 1983; Sogon, 1985; Wiggers & Willems, 1983). These studies formed the basis for hypothesis four, and the lack of support for this hypothesis was surprising. This finding may be due to the age group of children in which happy and sad expressions are equally identifiable. Younger children tend to have a more difficult time than older children. The mean age of participants in this study was close to five-years-old. At this age children may be able to identify happy and sad expressions equally well. In a similar study using four- to five-year-old children, Russell (1990) provided children with a target emotion via facial or verbal expression, and children had to relate to the researcher what would cause someone to feel the target emotion. There was no significant difference between correct responses on happy and sad emotions. These findings indicate that children in this age group may have a near equal representation of

happy and sad emotions, thereby explaining the lack of a significant difference in the current study.

The results of this study did not support hypothesis 5, i.e., there will be a positive correlation between mother's education level and children's scores on the HSFF. Harris, Olthif, and Tergot (1981) found a positive correlation between children's emotion knowledge and mother's verbal IQ. Mother's education level may not reflect verbal IQ, which could be why this hypothesis was not supported. Further evidence of this is demonstrated by a lack of a significant difference on HSFF scores between children whose mothers graduated from college and those who did not graduate from college. These results suggest that mother's educational level does not significantly predict children's emotion understanding, but do not eliminate the possibility that verbal IQ may do so.

Hypothesis 6 was also not confirmed. There was not a positive correlation between time spent reading to children and scores on the HSFF. Prior research suggests that children who are read a story with unfamiliar words are significantly more likely to retain the word meanings of unfamiliar words if the words are presented in context and/or the meanings are discussed (Coyne, McCoach, & Kapp, 2007). It was believed that children who are read to more will be better at deciphering word meanings through the situational knowledge the story provides, which will help them perform better on the experimental task. Shu, Anderson, and Zhang (1995) showed that language ability does not affect learning word meanings through context. Elley (1988) had similar results, but in this instance children with lower word knowledge learned significantly more words

than children with higher word knowledge. These results show that having higher lexical knowledge did not provide an advantage to gaining word meaning through context for the children in this study, and further-more, time spent reading to children may not be an effective predictor of emotion knowledge. It is also possible that parents failed to accurately report the frequency they read to their child, or the range of the reading scale was not large enough to show an effect.

It was also hypothesized that there would be a positive correlation between the teachers' ratings of the children on the Teacher's Questionnaire and scores on the HSFF (Hypothesis 7). The Teacher's Questionnaire reflected items pertaining to emotional understanding, popularity with peers, prosocial behaviors, and language ability, all of which are factors contributing to emotion knowledge (Pons et al., 2003). When all the teacher's scores were included in the analysis, this hypothesis was not supported. However, the lack of significance in this analysis may be attributed to the variance in teachers' responses. As presented in the Results section, one teacher at one of the locations (Teacher A) gave the children the two highest scores possible (i.e., 2 and 3) on all of the items. The teachers at the three remaining locations used the full range of the scale. It is believed that these teachers' responses were more representative of the children than Teacher A's responses, and therefore the results of the Teacher's Questionnaire when all the teachers were included may be skewed and not representative of some children's social abilities. When the scores of the children of Teacher A were eliminated from the analysis, which eliminated 11 children, the correlation was significant, supporting Hypothesis 7. These data are thus consistent with Pons et al.'s



(2003) finding that there is a positive correlation between children's emotional understanding, popularity with peers, prosocial behavior, and language ability.

The results of this research demonstrate that facial affective behavior is useful for deciding the affective valence of affective words. Emotion knowledge can be gained by providing children with affective information congruent with emotional words. The data from this study demonstrated that minimal affective cues can be an important contributor to determining the affective valence of words. The children in this study may have used the affective cues provided by the female actress to successfully determine if words reflect positive or negative affect. This may help children make these same determinations when provided with unfamiliar words in their everyday lives. Children can use the nonverbal affective information provided by the speaker when attempting to gain word meanings of unfamiliar affect-laden words.

One weakness of this study is that mother's verbal IQs were not measured directly. Prior research has shown a positive correlation between mother's verbal IQ and emotion knowledge. Considering the lack of a positive correlation between mother's education level and scores on the HSFF in this study, mother's education level is probably not a valid measure of verbal IQ. Also, the study would have benefited if the teachers had been encouraged to use the entire range of the ratings on the Teacher's Questionnaire. This may have prevented Teacher A from giving all the children in her class the highest possible scores.

A future direction for research may be to replicate this study, using a language that is unfamiliar to participants. The individual reading the word lists could, for example,

read the word lists in French, and the participants would then determine if the word is a positive or negative affective word. Using an unfamiliar language would eliminate the need to pilot the familiar/unfamiliar words, and would ensure that all of the words were indeed unfamiliar to children. Another direction would be to have the nonverbal affect that accompanies the affective words be incongruent with the true meaning of the words. Both of these techniques would help establish whether participants are indeed using the nonverbal cues to make their determinations.

To conclude, this study is the first to investigate whether four- to five-year-old children are able to use minimal vocal or facial cues to determine the emotional valence of affective words. It thus contributes to the literature on whether nonverbal behavior might influence emotion knowledge. In particular, this study demonstrated that nonverbal cues are more important than paralinguistic cues for determining the affective valence of unfamiliar words. Children in this study may have gained emotion knowledge by using the affective cues of the actress to make their determinations of the emotional valence of the words. Because emotion knowledge contributes to children's adaptive social behavior, the information gained from this study may lead to educational interventions geared toward improving children's positive social behaviors and academic competence. Parents and teachers should utilize this research by using nonverbal behavior when interacting with children. This will help children label and recognize emotions, which are a key aspect in building emotion knowledge. When reading to children, parents and teachers should display facial expressions consistent with the emotional content of the story. This will help the children recognize and label emotional

expressions. This research also suggests that audio books may not be as good as expressively reading to children because the children are not exposed to the emotional expressions.

Appendix A  
Parental Questionnaire

Please fill out the following questionnaire *for each child you have participating in this study*. If you feel uncomfortable answering any of the questions, feel free to leave the questions blank. Try to be as accurate as possible. Thank you for your time.

1. What is your relationship to the child participating in the survey?

- Mother  
 Father  
 Grandparent  
 Other relative  
 Unrelated; please

explain: \_\_\_\_\_

2. What is the sex of the child participating in the study?

- Male  
 Female

3. How old is the child participating in the study?

\_\_\_\_\_ years \_\_\_\_\_ months

4. How many days per week do you read to this child?

- Seven days/week  
 Five to six days/week  
 Three to four days/week  
 One to two days/week  
 Zero days/week  
 Don't know

5. How many siblings does this child  
have? \_\_\_\_\_

What are their  
ages? \_\_\_\_\_

6. What is the child's ethnicity?

- European-American
- Asian-American/Pacific Islander
- Hispanic
- African American
- Native American
- Other

7. What is the education level of the child's mother?

- Did not finish high school
- High School Equivalency Diploma
- High School Diploma
- Associate/Vocational Degree
- Some College
- Graduated College
- Some Graduate School
- Graduate Degree

8. Has the child ever received speech therapy?

- Yes
- No

If so, when and what  
for? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Thank you for your participation.

Appendix B  
Teacher's Questionnaire

Please fill out the following form pertaining to \_\_\_\_\_ as honestly as possible. Read the following statements and circle the answer that best fits the child. Thank you for your time.

1. The child verbally expresses his/her emotions effectively

-3	-2	-1	0	1	2	3
Never True			True			Always True

---

2. The child communicates when he/she is upset

-3	-2	-1	0	1	2	3
Never True			True			Always True

---

3. The child is well liked by peers

-3	-2	-1	0	1	2	3
Never True			True			Always True

---

4. The child can distinguish other's emotional states

-3	-2	-1	0	1	2	3
Never True			True			Always True

---

5. The child's language ability is more advanced than his/her peers

-3	-2	-1	0	1	2	3
Never True			True			Always True

---

6. The child's vocabulary is more advanced than his/her peers

-3	-2	-1	0	1	2	3
Never True			True			Always True

---

7. The child is one of the brightest children in the class



Appendix C  
Visual Only Condition

Happy\*  
Peppy\*  
Gleeful\*  
Ecstatic  
Chipper  
Euphoric  
Jubilant  
Mirthful  
Convivial  
Sprightly

Sad\*  
Mopey\*  
Somber\*  
Bleak  
Sorrowful  
Desolate  
Morose  
Bereaved  
Lugubrious  
Calamitous

Audio-Visual Condition

Perky\*  
Merry\*  
Cheerful\*  
Thrilled  
Elated  
Whimsical  
Exuberant  
Felicitous  
Genial  
Sanguine

Glum\*  
Troubled\*  
Grieved\*  
Dismal  
Wretched  
Melancholy  
Forlorn  
Despondent  
Wistful  
Sullen

Audio Only Condition

Jolly\*  
Joyful\*  
Delighted\*  
Blissful  
Invigorated  
Frolicsome  
Exultant  
Effervescent  
Jovial  
Blithe

Gloomy\*  
Dreary\*  
Miserable\*  
Mournful  
Despairing  
Dejected  
Lamentable  
Doleful  
Woebegone  
Tenebrific



\*\*Indicates words children should know

Appendix D  
Happy/Sad Face Form

1. ☺ ☹
2. ☺ ☹
3. ☺ ☹
4. ☺ ☹
5. ☺ ☹
6. ☺ ☹
7. ☺ ☹
8. ☺ ☹
9. ☺ ☹
10. ☺ ☹
11. ☺ ☹
12. ☺ ☹
13. ☺ ☹

14. 😊 ☹️
15. 😊 ☹️
16. 😊 ☹️
17. 😊 ☹️
18. 😊 ☹️
19. 😊 ☹️
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22. 😊 ☹️
23. 😊 ☹️
24. 😊 ☹️
25. 😊 ☹️
26. 😊 ☹️
27. 😊 ☹️
28. 😊 ☹️

29. 😊 ☹️

30. 😊 ☹️

Appendix E  
Informed Consent Form

Dear Parents or Guardians,

My name is Jessica Koepke, and I am a psychology graduate student at the University of Wisconsin Oshkosh working under the supervision of Dr. Frances Rauscher. My thesis is on emotion knowledge in children. Emotion knowledge is the ability to accurately perceive emotion signals in facial and vocal expressions. This construct is positively correlated with social ability and academic competence. The higher children's emotion knowledge, the better children do in social situations and school. It is therefore important to determine how children gain emotion knowledge. I would like your permission for your child to participate in this study.

The purpose of the study is to determine if children can learn emotion knowledge from minimal nonverbal cues, such as facial expressions and tone of voice. Children will be presented three lists of 20 words including 10 happy words and 10 sad words. Seven of the ten words in each category are expected to be unfamiliar to the children. For example, happy words will include Happy, Perky, Delighted, Ecstatic, Euphoric, Jubilant, Exuberant, Mirthful, and Exultant. Children will be read the word lists under three conditions: audio-visual, audio only, and visual only. When children are given a word, they will be asked to circle a happy or sad face depending on if the child believes the word is associated with positive or negative emotions.

Children will be familiar with some of the words used, but what is of most interest is how children respond to the unfamiliar words. This study was designed to determine if children can gain emotion knowledge through seeing and hearing, only hearing, or only seeing how a word is said.

In addition to the experiment, we are asking all parents/guardians and teachers of each child to fill out a questionnaire. The first questionnaire is completed by the child's parent or guardian and is attached to this form. The other questionnaire is completed by your child's teacher. It asks questions relating to your child's social skills. If you agree to allow your child to participate, please sign below, fill out the questionnaire, and return it to your child's teacher.

Although there are other similar experimental designs we could use to study this topic, we feel that this experiment is the best way to determine the influence of nonverbal cues on children's emotion knowledge.

We do not anticipate that this study will present any medical, social, or psychological risks to your child. Although the study may not benefit you directly, the data gathered will generate important and novel insights into the role of emotion knowledge in children's lives.

The data we collect from your child will be kept in confidence. No information regarding you or your child's identity will be released to anyone at any time.

Your participation is entirely voluntary, and you may withdraw your child from the study at any time without penalty. The information collected from your child up to that point will be destroyed if you so desire.

Once the study is completed we would be glad to share the results with you. In the meantime, if you have any questions or concerns regarding the study please contact:

Ms. Jessica Koepke  
920-904-2758  
[koepkj89@uwosh.edu](mailto:koepkj89@uwosh.edu)

or

Dr. Frances Rauscher  
Department of Psychology  
University of Wisconsin Oshkosh  
800 Algoma Boulevard  
Oshkosh, WI 54901  
920-424-7172  
[rauscher@uwosh.edu](mailto:rauscher@uwosh.edu)

If you have any complaints about your treatment as a participant in this study, please contact:

Linda Freed  
C/O Grants Office  
University of Wisconsin Oshkosh  
800 Algoma Boulevard  
Oshkosh, WI 54901  
920-424-1415  
[freed@uwosh.edu](mailto:freed@uwosh.edu)

Although someone may ask your name, all complaints are kept in confidence.

I have received an explanation of this study and agree for my child to participate. I understand the participation is strictly voluntary.

CHILD/CHILDREN'S NAME(S) PLEASE PRINT

---

PARENT/GUARDIAN SIGNATURE

DATE

---

---

This research has been approved by the University of Wisconsin Oshkosh IRB for the Protection of Human Participants for a period of one year, valid until

## Appendix F Debriefing Statement

Thank you for participating in this study. This form will provide you with more in-depth information about the study your child participated in.

This study was designed to investigate if children can gain emotion knowledge through minimal cues provided by hearing emotional words or seeing an individual say emotional words. Other studies have documented that children can distinguish between happy, sad, and angry facial expressions, but no study has investigated if children can distinguish between positive and negative emotions using minimal cues from spoken words.

Your child participated in three experimental conditions. In the auditory condition, children listen to an individual read the word list. In the audio-visual condition, children watched and heard an individual read the word list. In the visual condition, children watched the video portion of the audio-visual recording. In the audio condition, children heard the audio portion of the recording. After hearing a word, your child circled either a happy or sad face depending on if they believed the word depicted positive or negative emotions.

The results from the word test will be statistically analyzed along with the questionnaire you filled out when you signed the informed consent. We will also analyze the form filled out by your child's teacher, consisting of questions pertaining to your child's social ability.

No individual data will ever be presented or published. All data will be presented or published as group data only.

Again, thank you for allowing your child to participate in this study. The data your child provided will help us to better understand how emotion knowledge develops in children. If you have any questions, please feel free to contact Jessica Koepke at (920)904-2758 or email [koepkj89@uwosh.edu](mailto:koepkj89@uwosh.edu).

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