Gender Stereotyped Knowledge of Emotion in 24-Month-Old Children

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Abstract

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Previous research has shown that 3-year-old children identified drawings of angry animals as males. The present experiments tested the hypothesis that such stereotyping would be found in 24-month-olds. Children were shown two faces side-by-side on computer screens. An "emotion" (angry or happy) face was displayed on one screen, with a neutral face on the other. A male or female voice was heard simultaneously, saying "Look at me". The dependent measure was looking time at the emotion faces. We expected that gender stereotyping would be expressed by longer looking time at the angry face when the male (versus the female) voice was heard. In Experiment 1, stimuli were animal faces, and in Experiment 2 drawings of human faces were used, with no visual gender cues in Condition 1 and with visual gender cues (hair) in Condition 2. Participants were English- and French-speaking 24-month-old children. Overall, children did not look longer at the angry face when the male (versus the female) voice was heard. In Experiment 1 and Condition 1 of Experiment 2, children's looking time at the emotion faces was at chance level. With the gender-cued faces in Condition 2 of Experiment 2, children looked less at angry compared to happy faces, regardless of the gender of the voice that was heard. In addition, they looked at below-chance levels at the angry male and female faces. These

results suggest that using the preferential-looking paradigm, 24-month-olds did not exhibit gender-stereotyped knowledge of anger, though they did find an angry face aversive to look at. These findings are discussed in light of previous research on emotion understanding in toddlers.

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Despite recent societal changes toward equality of men and women, cultural stereotypes about gender remain, and are learned by children as they observe the actions and social roles of those around them (Huston, 1983). Gender is one of the most salient social categories (Maccoby, 1988), and may be the first that children acquire (Kohlberg, 1966). In all known societies the roles assigned to males and females are different (Maccoby, 1988), and in Western society, the male-female distinction is one of the most emphasized of the characteristics that differentiate us from one another (Bem, 1981).

In the past two decades, a substantial amount of research attention has been devoted to exploring what children understand about males and females and how they gain this understanding. To explain how structure and meaning are imposed onto gender-related information in children's environments, Martin and Halverson (1981) proposed a schematic processing model of sex typing and sex stereotyping. The basic unit of their model is the schema, a network of cognitive associations that guide information processing. For children gender schemas perform several functions; they regulate behaviour, influencing the kinds of activities in which children engage, and they enable children to organize and attend to information in their environments, increasing the salience of schema-consistent information. With regard to the development of gender stereotyping in children, an important function of gender schemas is to structure inferences and interpretations. Schemas guide the perceiver in making inferences in situations in

which gender-related information is unavailable or to which it is unattended (Martin & Halverson, 1987).

There is no empirical evidence outlining the aspects of gender knowledge that must be in place for children to be capable of formulating gender stereotypes. However, basic gender understanding such as comprehension of gender identity, has been related to the presence of gender stereotypic knowledge (Kuhn, Nash, & Brucken, 1978; Martin & Halverson, 1987). As such, to be capable of holding gender stereotypes, children most likely require knowledge of some basic gender concepts. Therefore, before exploring the literature on gender stereotyping in children, a review of their knowledge of more basic gender schema will first be presented. As the specific aspect of gender stereotyping to be examined in this paper relates to emotionality, children's understanding of emotional expressions will be discussed as well.

Young Children's Gender Schema

It has been suggested that the cornerstone of the child's developing gender schema may be the ability to respond to males and females as members of separate categories (Leinbach & Fagot, 1993). Before children are capable of recognizing males and females as categorically distinct, they must first be able to make discriminations between the sexes, an ability evident in infants well under 1 year of age. A common procedure for testing the ability to make discriminations is the familiarization-novelty procedure, which is based on the tendency of infants to look longer at novel visual targets than at those that are familiar (Fantz, 1963).

With this procedure, children are given a familiarization phase in which they are shown for example a man's face, and a test phase, during which they are shown a different man's face and a woman's face (the novel stimulus). In the test phase, children's visual fixation time would be expected to be longer on the woman's face if they recognize it as novel. This procedure can also be employed in a similar manner to test discrimination of auditory information such as voices. Using the familiarization-novelty procedure, researchers have shown that by 7 months of age, infants are capable of discriminating individual male and female faces (Cornell, 1974; Fagan, 1976) as well as voices (Miller, Younger, & Morse, 1982). Possessing categorical knowledge of males and females, however, requires that the infant is able to generalize the discrimination to other models, an ability which has been tested with habituation-generalization procedures. With these procedures, children are shown several faces of one gender until they demonstrate habituation by decreasing their looking time to the faces. Then, in the test phase, they are shown a different face of the same gender and a face of the opposite gender. Children are expected to generalize habituation to the novel face of the same gender by not increasing their looking time to the face. They are expected to demonstrate an awareness of the face of the opposite gender as novel by dishabituating to it (i.e. increasing their looking time to that face). As with the familiarization-novelty procedure, this procedure is based on the tendency of infants to attend to novel stimuli (Fantz, 1963), and it has been employed using voices as well as faces. Categorical responding to male and female voices has

been demonstrated by infants as young as 6 months of age (Miller, 1983). Leinbach and Fagot (1993) found that categorical perception of male and female faces is reliably evident in 9-month-old infants, and is present in some infants as young as 5 months of age. The categories formed by young infants may be based, however, on superficial cues such as hair length and sex-typical clothing rather than on gender per se (Leinbach & Fagot, 1993). Recently, researchers have examined infants' intermodal knowledge of gender as an indication of gender categories. Infants have demonstrated an ability to match dynamic displays of faces with the gender-appropriate voice by the age of 6 months (Walker-Andrews, Bahrick, Raglioni, & Diaz, 1991). The ability to match face and voice on the basis of gender using static face displays, a more demanding task (Caron, Caron, & Myers, 1985), is evident by the age of 12 months (Poulin-Dubois, Serbin, Kenyon, and Derbyshire, 1994).

The basic level of gender understanding in place by the end of the first year of life is sufficient to allow the developing child to acquire information about each gender. However, it has been suggested that for children to be capable of using this information to inform their own behaviours and interpret the behaviour and characteristics of those around them, they must possess more than a tacit knowledge of the separate categories (Fagot & Leinbach, 1993). In this view, then, gender stereotyping cannot take place without a conscious awareness of the categories of male and female; simply being capable of discriminating male and female faces or categorizing them by their gender is not sufficient. A conscious

awareness of the separate gender categories is represented in the child's ability to express, verbally or nonverbally (e.g., by pointing), a knowledge of his or her own gender as well as that of others. In a study by Weinraub et al. (1984), a majority of 26-month-olds were able to label their own gender appropriately as well as that of adult males and females. To test younger children's ability to label gender, Leinbach and Fagot (1986) used a nonverbal procedure in which children were asked to pat, touch or point to the picture of the "Mommy" or "Daddy" or the boy or girl. Using this procedure, children demonstrated an ability to label boys and girls by the age of 24 months, and to label adult men and women even earlier.

In summary, children have been shown to have some knowledge of separate gender categories before their first birthday, though these categories may be superficially-based. By their second birthdays, children have demonstrated that their knowledge of gender categories is explicit.

Infants' Concept of Emotion

It has been generally accepted that by 7 months of age infants are capable of categorizing certain facial expressions (Ludemann & Nelson, 1988). Using habituation-generalization procedures, 7-month-olds have demonstrated an ability to discriminate expressions of happy and surprise, and happy and fear and to generalize these expressions to new faces (Caron, Caron, & Myers, 1982; Nelson & Dolgin, 1985).

Infants' ability to differentiate facial expressions is an integral part of their understanding of emotion. Still it does not provide evidence that the expressions are perceived by the infant as meaningful, either as information about the emotional person's internal state or as information about the person's likely behaviour (Walker, 1982). A study by Termine and Izard (1988) demonstrated that infants as young as 9 months of age seem to be able to attribute some meaning to expressions of emotion. Infants in their study looked more at their mothers and demonstrated a higher frequency of play behaviours when mothers posed an expression of joy. When mothers posed a sad expression, infants looked less at them, and showed more anger and sadness themselves. That the infants responded "appropriately" to the affective expressions suggests that they had some understanding of the expressions posed by their mothers.

The best evidence for the presence of an understanding of emotion is infants' use of social referencing, which is based on the phenomenon that infants tend to look at caregivers' faces for emotional information in an ambiguous situation (Klinnert, Campos, Sorce, Emde, & Svejda, 1982). Klinnert (1984) studied this phenomenon with 12- and 18-month-old children. They and their mothers were placed in a room which contained some innocuous toys in one corner. The child was placed in the corner with the toys, and then three attention-eliciting toys (e.g., a remote-controlled stuffed dinosaur) were presented one at a time. The mother was instructed to look at the toy, and when her child looked at her, she was to pose either a smiling, fearful or neutral facial

expression. Children at both ages moved closest to their mothers when she posed fear and farthest from her when she posed happy, and somewhere in between when she posed neutral. In a study carried out by Sorce, Emde, Campos, and Klinnert (1985), more then one positive and one negative expression were used. Twelve-month-old infants were placed on a visual cliff which was set to a height that produced no clear avoidance in them. The children were placed on the shallow side of the cliff and mothers stood at the deep side facing them. When mothers posed expressions of fear, none of the children crossed the deep side, and only 2 (of 18) children crossed when the mother's expression was anger. One-third of children crossed when the expression was sad, and when mothers posed happy or interested expressions, almost all (three-quarters) of the children crossed. The results of these studies showed that by 12 months of age, children are not only able to distinguish a variety of expressions, but also appear to be capable of deriving meaning from these expressions. Children in the Termine and Izard (1988) study clearly responded "appropriately" to their mothers' expressions, and those in the Klinnert (1984) and Sorce et al. (1985) studies were capable of using the information provided by their mothers to guide their behaviour.

In summary, an understanding of emotional expressions seems to be in place by 1 year of age, and an ability to label adults by gender is present around the time of a child's second birthday. By the age of 24 months, then, children should have the capacity to utilize their knowledge of gender and emotion in combination, to include responding to gender stereotypes of emotion.

Gender Stereotypes in Early Childhood

Gender stereotypes may be seen as including information about physical appearance, psychological traits, activities and occupations believed to be more characteristic of one gender than the other (Ashmore, DelBoca, & Wohlers, 1986). Cross-cultural studies have demonstrated that gender stereotypes exist nearly universally. In most societies, adults associate such traits as emotional, affectionate, gentle and sensitive with women, whereas traits such as aggressive, independent, stern, and strong are associated with men (Williams, 1982).

It has been established that children's knowledge of gender stereotypes increases with age (Best et al., 1977; Cowan & Hoffman, 1986; Reis & Wright, 1982), and that these stereotypes appear to be well established by the age of 3 years (Haugh, Hoffman, & Cowan, 1980). Cowan and Hoffman (1986), for example, demonstrated that, by 3 years of age, children believed that a child drawn to be of indeterminate sex was a boy when the child was engaged in a stereotypic male activity, playing baseball or playing with a truck, but was a female when the activity was sweeping or playing with a doll. Haugh et al. found that 3-year-olds labelled an infant believed to be a girl as little, scared, slow, weak, nice, and soft. When the same infant was believed to be a boy, the infant was labelled as big, fast, strong, mean, and hard. Some of these stereotypes were found by Cowan and Hoffman (1986) to exist in children younger than 3 years. As early as 2 1/2 years of age, the children in their study labelled infants and animals believed to be male as big,

fast, strong, loud, and hard, and those believed to be female as little, slow, weak, quiet, and soft. The children also labelled the "male" infant as mean and the "female" infant as nice.

Studies of gender stereotyped knowledge in children under the age of 3 years have not yielded consistent results. Thompson (1975) found that 61% of 24-month-olds were able to "correctly" sort pictures of gender-stereotypic toys, tools, appliances and clothing into boxes labelled for each gender. In contrast, the 2-year-olds in a similar study by Blakemore, LaRue, & Olejnik (1979) were unable to sort pictures of toys into a pile for each gender. This task was "passed" by a sample of 4- and 6-year-olds. Kuhn et al. (1978) found that 30- to 40-month-olds demonstrated gender stereotypic knowledge when asked which of two paper dolls, one male and one female, had made a specific statement about activities, traits and future roles. For instance, these children believed that girls, rather than boys, like to play with dolls, never hit, say "I need some help", and, when they grow up, will clean the house, and be a nurse. They believed that boys, on the other hand, like to play with cars, like to fight, and never cry, and when boys grow up, they, rather than girls, will mow the grass, and will be boss. Because results of studies with children between 24 and 36 months of age have not been consistent, it has been suggested that this is the time during which such knowledge is acquired (Huston, 1983).

Gender Stereotypes of Emotionality. One of the most commonly held gender stereotypes is that women are more "emotional" than men (Rosenkrantz, Vogel,

Bee, Broverman, & Broverman, 1968; Shields, 1987), though a notable exception to this stereotype is anger, which is considered a typically male emotion (Shields, 1987). Very little empirical evidence exists, however, regarding the basis in reality of such stereotypes. Allen and Markiewicz Haccoun (1976) found that women reported feeling the emotions of fear, sadness and joy more often and more strongly than men, and several studies have reported a higher rate of smiling in women than in men (Brennan-Parks, Goddard, Wilson, & Kinnear, 1991; Hinsz & Tomhave, 1991). With respect to anger, there has been some evidence that men express their anger in a more direct manner, though not more often than do women (Allen & Markiewicz Haccoun, 1976). Other researchers have reported few observable gender differences in episodes of everyday anger (Fabes, Eisenberg, McCormick & Wilson, 1988).

Several studies have specifically examined children's gender stereotyping of emotions. For example, Karbon, Fabes, Carlo, and Martin (1992) presented preschool-aged children (46-74 months) with drawings of adult and child figures and asked them how frequently and intensely certain emotions were felt by the target. The children believed sadness to be felt more often by female than by male targets. In fact, nearly half of the children (46%) believed that men could not feel sad. Male targets were perceived as becoming more intensely angry than females, and there was a trend for males to be perceived as experiencing anger more often. No gender differences were found for the emotion of happiness. Similar results were found in a study of 36- to 61-month-olds (Birnbaum,

Nosanchuk, & Croll, 1980) in which children were asked to identify the gender and the expressed emotion of a puppy face. The emotion of anger was associated with males, whereas happiness, sadness, and fear were associated with females. To examine whether the emotionality stereotypes extended to humans, Birnbaum asked another sample of 36- to 61-month-old children whether the four emotions - anger, happiness, sadness, and fear - were more characteristic of boys or girls. Results were consistent with the findings for puppy faces; children associated anger with boys, and happiness, sadness, and fear with girls (Birnbaum, 1983).

Leinbach (1992) reported a study in which children were asked to identify the "mommy" and "daddy" of a pair of animals, one with an angry face and one with a happy face. She found that the animal with the angry face was identified as the "daddy" or male figure by children as young as two years old. A problem with Leinbach's study was that she was directly comparing an angry face and a happy face, and women are reported to smile more than men (Brennan-Parks et al., 1991; Hinsz & Tomhave, 1991). As such, the finding may have had to do more with children's responding to the smiling face as "mommy" rather than the angry face as "daddy". To clarify this finding, Fagot, Leinbach, and Hort (1994) carried out a study using 3, 4, and 5 year olds, comparing angry and smiling expressions to neutral expressions to reduce the confound introduced by direct comparisons of angry and smiling faces. Children, by 3 years of age, identified the angry animal of a pair as the "daddy", but did not identify the happy animal as the

"mommy". These results indicate that an association has been formed between angry faces and males by children 3 years of age.

Limitations of Previous Studies

A major question remains unanswered with respect to children's knowledge of gender stereotypes in general, and those related to emotion in particular. We still do not know the earliest age at which such stereotypes are acquired. For several studies on gender stereotyping of emotions, children of varying ages were grouped together for analyses, making it difficult to determine not only what children of each age are capable of, but also how early the stereotypes are in place. For instance, the children in the Birnbaum et al. (1980) study of gender differences in emotionality ranged from 3 to 5 years of age, as did those in Birnbaum's (1983) follow-up study. The age of the children in Karbon et al.'s (1992) study ranged from 46 to 74 months. Because of the rapid rate at which a young child's understanding about a given concept increases, it seems unreasonable to group children together when they differ in age by more than a month or two. If the question of age of acquisition of gender stereotyped knowledge is to be answered, more control is needed with respect to the age of the children being investigated.

A second limitation of previous studies involves the methodologies that have been used. The studies which have examined children's gender stereotyped knowledge have yielded quite consistent results for children 3 years of age and older. For children between 24 and 36 months of age, the findings have been less

consistent. Because of this, it has been proposed that this is the time during which gender stereotyped knowledge is acquired (Huston, 1983). However, an equally plausible explanation for the inconsistency in results is that children below the age of 3 years do not all possess sufficiently developed verbal and motor abilities to meet the demands required to "pass" the tasks. For example, whereas 61% of the 24-month-old children in Thompson's (1975) study were able to "correctly" sort cards into boxes for mothers and girls or fathers and boys, only one of the 2-year-olds in Blakemore et al.'s (1979) study "passed" a similar sorting task. This type of task requires a certain degree of motor coordination to sort the pictures, a relatively strong receptive language ability, in that children must be able to understand the instructions, as well as a willingness to cooperate, in that they must listen to and follow the instructions given to them.

The types of methodology used in some studies of gender stereotypes of emotion have been equally or more demanding, requiring a considerable amount of expressive language ability. The methodologies used in these studies would not be suitable for children 24 months of age or younger. For instance, the 46- to 74-month-olds in the Karbon et al. (1992) study were asked to use scales to indicate the frequency and intensity with which they believed an emotion to be felt by a target person. They were asked to show, using a possible total of three blocks, how many times "boys your age usually feel happy", and, using a scale of faces depicting different intensities of emotions, "How happy do boys your age usually

feel?". The 3-year-olds in Birnbaum et al.'s (1980) study were required to verbally label the gender of the puppy face, and to label the emotion depicted.

The methodology used by Fagot and her colleagues (1994) required less advanced skills than previous studies of gender stereotyping of emotion; their task required children to point to the "Mommy" or the "Daddy". Though this type of task is less demanding for children than asking them to sort pictures or to respond verbally, there has been some evidence that pointing may be nonetheless a rather difficult task for some toddlers. In Leinbach and Fagot's (1986) gender-labelling study, children were required to pat, touch, or point to the picture (e.g., boy, girl) indicated by the experimenter. A large number of children in their study (32% of boys and 17% of girls) were either unable or unwilling to complete a pretest used to determine each child's ability to perform a discrimination task in this manner. All the children who did not complete the pretest were below the median age of 26 months, suggesting that perhaps the requirements of the task were too demanding for many children under that age. It has been suggested (Murphy, 1978) that young children's ability to use pointing varies according to the situation. For example, pointing in response to a given command, such as in Leinbach and Fagot's (1986) study, may be more challenging for a young child than is pointing on his or her own initiative.

One of the major challenges in investigating the toddler's understanding of gender stereotypes, then, is finding a suitable method to test children whose motor and verbal abilities are at a relatively immature stage of development. As

Leinbach and Fagot (1986) have suggested, for children just learning to talk, if they are to demonstrate what they know, the task must be simple, and the response mode must be nonverbal.

A method which has been extremely useful in examining infant perception and cognition is the visual preference method (Fantz, 1963). The basis for this paradigm is the stable and reliable visual preferences that are present in young infants. Along with these visual preferences comes active looking, which is guided by what infants already know, and is directed toward what they seek to understand (Spelke, 1985). Spelke (1976) used this method to study infants' intermodal perception of events. She showed infants two films, projected side-by-side, accompanied by a soundtrack which corresponded to only one of the visual displays. If the infants were capable of perceiving which visual depiction corresponded to the auditory cue being played, it was expected that they would demonstrate a consistent visual preference for the film which was related to the soundtrack. Infants as young as 4 months preferred to look at the film which corresponded to the sound track.

The visual preference method has been adapted for use in the study of infancy across a variety of research domains. Recently the "preferential-looking paradigm" has been adapted from the visual preference method for the study of word comprehension (Golinkoff, Hirsh-Pasek, Cauley, & Gordon, 1987). It has been considered useful with young children because it requires the child to simply "look at" one of two simultaneously presented video displays. The child is

expected to look at the display that is consistent with the verbal prompt. Using this paradigm, children as young as 16 months have been shown to look at a screen depicting a particular noun or verb (Golinkoff et al., 1987).

The preferential-looking paradigm has recently been applied to research on children's intermodal knowledge of gender. As described above, Poulin-Dubois et al. (1994) and Walker-Andrews et al. (1991) showed that infants looked longer at the face of a male-female pair that matched the gender of an accompanying voice. As yet, the preferential-looking paradigm has not been used in any published studies of young children's knowledge of gender stereotypes.

The Present Studies

Preschool-aged children have been shown to reliably hold gender-stereotypes about emotions similar to those held by adults (Birnbaum, 1983 Birnbaum et al., 1980; Fagot, Leinbach, & Hort, 1994; Karbon et al., 1992). No studies have examined gender stereotypes of emotions in children below the age of 3 years. Those studies that have investigated more general gender stereotypes in children under 3 years of age have not yielded consistent results, perhaps due to high task demands of the methodologies used with these young children. The aim of the present experiments was to investigate the presence of gender stereotyped knowledge of emotion in 24-month-old children, using more age-appropriate methods.

The first of the following two experiments is an age extension of the study carried out by Fagot, Leinbach, and Hort (1994) in which children, by 3 years of

age, associated an angry animal face with the "daddy". The stimuli as well as the paradigm were altered to be more appropriate for the testing of 24-month-old children. It was hypothesized that the gender stereotypes held by children about animals may be less well developed in 24-month-olds than are their gender stereotypes about humans. Specifically, the lack of ecological validity of animals' emotional expressions may make the task too challenging for these young children. A further extension of Fagot and Leinbach's study was thus carried out, using human faces, a more ecologically valid task.

Experiment 1 consisted of the presentation of schematic animal faces with either male or female voices. In Experiment 2, schematic human faces were used. In one condition of Experiment 2, faces were gender-neutral; a gender cue was provided by voices which were paired with the faces. In the other condition, visual gender cues were added to the stimuli. Although the greatest actual differences between male and female faces are in the nose and chin regions, with men's features more protuberant than women's (Bruce et al., 1993), when young children are judging a person's gender, the most salient gender cue seems to be hair length (Leinbach, 1990; Leinbach & Fagot, 1993; Thompson & Bentler, 1971). Because the participants in the present study were toddlers, it was reasonable to assume that hair length would serve as an adequate gender cue. An additional benefit to manipulating only hair length was that the facial features could be controlled

across stimuli. The faces in the present study were therefore made distinctly male or female by the addition of long hair for females and short hair for males.

Hypotheses. It was expected that children would associate an angry face with males in both experiments. With the preferential-looking paradigm, children should look longer at the display that is consistent with a verbal prompt (Golinkoff et al., 1987). An association between an angry face and males, then, would be shown by longer looking time at the angry face when a man's voice was heard compared to when a woman's voice was heard. Based on previous research (Fagot, Leinbach, & Hort, 1994), no such predictions were made regarding the female face. A developmental trend was expected. Specifically, children were expected to exhibit gender stereotyped knowledge of emotion most robustly when visual gender cues were present, that is, in Condition 2 of Experiment 2. The animal stimuli were expected to be least likely to elicit gender stereotyped responding in children, and the gender neutral faces in Condition 1 of Experiment 2 were expected to fall between the animal and gender-cued faces in terms of robustness of gender stereotyped responding.

Experiment 1

Method

Participants

A total of 86 children, 40 boys and 46 girls, participated in the study. They were recruited from birth lists provided by the Régie régionale de la santé et des services sociaux de Montréal-centre. Participants were required to have no visual or hearing impairments and to come from a household in which either French or English is the primary language spoken. For the majority (84%) of participants, English was the primary language spoken in the home. Most of the children (86%) were white, and the remaining children were black (12%) or Asian (2%). A total of 86 children participated in the study, and 27 were eliminated from the final analyses due to side-bias (n = 20), losing too many trials (n = 3), or fussing (n = 4). The final sample consisted of 59 children, 32 boys and 27 girls. Their average age was 23.8 months (Range = 23 months 13 days to 25 months 27 days).

Stimuli

Stimuli were schematic bear and monkey faces taken from a children's picture book. To increase the salience of the facial expression, only the head portion of the animal pictures were used as stimuli. Pictures of a bear and a monkey were scanned onto a MacIntosh IIVX computer, using a Hewlett Packard ScanJet IICcx scanner, and Adobe Photoshop software was used to draw in or alter eyebrows and mouths to depict happy, angry, or neutral facial expressions. Specifically, consistent with previous work with emotion expressed on schematic

faces (Birnbaum et al., 1980; Walden & Field, 1982), for anger the eyebrows were drawn so that they were angled downward and together and the mouth was closed and curved downward at the outer corners. To depict happiness the eyebrows were raised slightly and the corners of the mouth were curved upward. For the neutral expression, the eyebrows and the mouth appeared as a straight line. All drawings appeared as black lines on a light yellow background. As part of a rating study on a larger set of twelve stimuli, the monkey and bear faces were presented to ten (eight women and two men) naive adult raters in a randomized order with the constraints that no emotional expression was shown twice in a row. Half of the raters received the faces in a reversed order. Raters were given a form on which to rate each animal's expression on a scale from 1 to 7, with 1 indicating happy, 4 indicating neutral, and 7 indicating angry. The angry faces (M = 6.80, SD = 0.24) were rated as significantly different from the neutral faces (M = 4.20, SD = 0.39), $t(9) = 25.12$, $p < .001$. Happy faces (M = 1.47, SD = 1.15) were also rated as significantly different from the neutral faces, $t(9) = -7.17$, $p < .001$. Thus, the emotional expressions of the animals were believed to be distinguishable (Rating form and stimuli presented in Appendix A).

Emotion-neutral voice recordings were also used. The MacRecorder Sound System Pro software package was used to record male and female voices saying "Look at me. Look at me, here I am, look at me" for the English participants, and "Regarde-moi. Regarde-moi, je suis là, regarde-moi", for the French. A group of ten adult judges (eight women and two men) rated the masculinity/femininity

of a total of twelve voices. The voices were presented in a randomized order with the constraints that male and female voices alternated. Six English voices were presented first, followed by six French voices. A rating of 1 represented a male voice, 7 represented a female voice, and 4 represented a gender-neutral voice (a rating of "can't tell"). Four voices were chosen in total, one male and one female for each language (French and English) of the study. The average rating for the male voices was 1.28. A t-test revealed that this rating was significantly lower than a rating of four (gender-neutral); $t(9) = -22.3, p < .001$. For the female voices, the average rating was 6.72, which was significantly higher than a rating of four, $t(9) = 38.54, p < .001$. The results indicated that the voices were distinctly recognizable as male and female voices.

Next, the voices were rated for emotion-neutrality. The men and women whose voices were used in the above ratings were asked to recite the same line as above, in an emotion-neutral voice. Voices were presented to the same ten adult raters in a randomized order so that no emotion was presented twice in a row. The emotion of the voices was rated on a scale of 1 to 7, with 1 representing happy, 7 representing angry, and 4 representing neutral. The average emotion rating for the English voices was 4.35, which was not significantly different from four (emotion-neutral), $t(9) = 1.21$, ns. The average emotion rating for the French voices was 3.95, which was not significantly different from a rating of four, $t(9) = -.32$, ns. The results of the t-tests indicated that the voices sounded

emotion-neutral, that is, neither happy nor angry (Rating forms are presented in Appendix B).

For the sake of simplicity, the stimuli are referred to in this paper by the gender of voice that accompanies the faces. That is, an angry face paired with a female voice will be termed "angry female", and an angry face paired with a male voice will be termed "angry male".

Apparatus

Children were seated in a booster seat at a table, with the parent or caretaker seated in a chair directly behind the child. The child and parent faced the front panel of a three-sided black wooden partition, which comprised the testing chamber (See Appendix C). The front panel of the partition was 1.5 m from the child, and contained two spaces for the 35 cm colour MacIntosh computer screens on which stimuli were displayed. There was 60 cm between the screens and the screens were equidistant from where the child was seated. The bottom of the screens was located 1 m from the bottom of the panel. Between the screens, there were two holes, one where the speakers were situated, and one for the lens of the camera, a Sony Handycam video camera recorder (CCD-FX40 NTSC 8). A 40-watt blue light bulb, located ten cm above the camera lens, was used to redirect the child's attention away from any particular screen during inter-trial intervals.

The equipment used for the experiment was located behind the front panel, out of view of the child. Two Power MacIntosh 6100 computers were used

to control the presentation of the audio and video stimuli. Two Macspeakers were used to reproduce the auditory stimuli. A Panasonic Color Pilot TV monitor (Model number CT-7711) was used to allow the experimenter to monitor the recording of the child's eye movements during the experiment. The experiment was run using a custom-designed computer program, which was developed using MacIntosh Hypercard software.

Procedure and Design

Parents were sent letters explaining the experiment, and were subsequently telephoned to ask if they would like to participate with their child. When the child and caretaker, usually the mother, arrived at the university, they were greeted by the experimenter and escorted to a waiting room. There, the child was given a "warming up" period to play with the toys in the room and to get comfortable with the experimenter. In the meantime, the experimenter further explained the experimental procedure to the parent and gave him or her the opportunity to ask questions. The parent was then given a consent form to sign (Consent form and initial contact letter in Appendix D), and was given a $15.00 honorarium. Before leaving the waiting room, the experimenter explained to the parent that to avoid biasing the child's responses, he or she should avoid touching and talking to the child, and should not direct the child to look at any one screen in particular, but may redirect the child to "look at the pictures" in general. The child and caretaker were then taken to the testing room, and were seated, the

child was seated in the booster seat, and the parent sitting directly behind the child. In total, the experiment lasted approximately 4 minutes.

The experiment began with a familiarization trial during which toys (dolls and vehicles) were presented on the screens for 2.5 seconds, accompanied by a female voice saying "Look at the toys!". For the experimental trials, a blue light flashed while a voice, either male or female, said, "Look at me". Immediately following the light, a pair of faces appeared on the screens and the voice continued, "Look at me, here I am, look at me". The stimuli remained on the screen for 4.5 seconds. For each of the 16 test trials, an angry or happy face was presented on one screen, with a neutral face on the other. Each emotional facial expression appeared eight times, four times as a monkey and four times as a bear. Each animal-emotion presentation was accompanied twice with a female voice and twice with a male voice. The trials were counterbalanced so that the emotion faces appeared an equal number of times on the right and left screens and so that the bear and monkey presentations were alternated. After the fourth, eighth, and twelfth trials, a 2.5-second "toy trial" was presented to help maintain the child's attention.

Measures

From videotapes of the testing sessions, children's looking time at each screen was coded using Events software (Ground Zero). With this program, an observer can record a child's total looking time at the right screen, left screen and off-screen by pressing designated keys on a computer keyboard. Cumulative

looking time is available for each variable at the end of each trial. The coder was blind as to which screen a particular stimulus appeared on, as only the child's face is shown on the video. The dependent measure was looking time, in seconds, to each of the two screens.

Intercoder agreement

A primary coder coded all the data, and a second coder coded 20% of the sample (n = 16), chosen randomly. Pearson product-moment correlations were computed between the coders' ratings of total time the subject looked to the left and right screens. An intercoder reliability of .93 was obtained.

Participant elimination

Children who spent 65% or more of the total time looking at one screen in particular were considered side-biased and were eliminated from the final analyses. Children were also not included in the final analyses if they missed at least one of the two presentations of each pair/voice combination (e.g. angry vs neutral face with female voice). Trials during which a subject did not spend at least 25% of time (1.1 seconds out of 4.5 seconds) looking at any screen were eliminated for that subject. Too much time looking off-screen was believed to make the looking times on the screens unreliable. Trials were also eliminated for a subject if he or she did not look at both screens during the trial. To demonstrate gender-stereotyped knowledge based on the stimuli being presented, children were required to spend at least some time scanning both pictures. As

described in the Participants section, 27 children were not included in the final sample, 20 for side bias, 3 for losing too many trials, and 4 for fussing.

Results

Overview of Analyses

After subject and trial elimination were completed, the data were screened for univariate and multivariate outliers. The data met all univariate and multivariate assumptions as well as those for Analysis of Variance. First, the data were examined for group patterns, and t-tests against chance were performed on each variable. An alpha level of .05 (two-tailed) was chosen as the criterion for statistical significance. To determine the proportion of children who responded consistently with the hypotheses, individual response patterns were also examined, using a Binomial Test.

Group Patterns

A 2(Gender of Voice) x 2(Emotion) x 2(Sex of Subject) ANOVA was performed, with gender of voice and emotion as within factors, and sex of subject as a between factor. The dependent variable was percentage looking time at the emotion faces. As the percentage of visual fixation time to the neutral faces and emotion faces within a given trial added to 100%, looking times to the neutral faces provided redundant information, and were not used in the analyses. Mean percentage looking times at each face are presented in Table 1. If children were exhibiting gender stereotyping of emotion, a significant Gender of Voice x Emotion interaction would be expected. There were no significant main effects or interactions (Source Table in Appendix E).

Table 1
Mean percentage looking time and standard deviations for Experiment 1.

Gender of Voice		Emotion	
		Angry	Happy
Male			
	M	51.4	48.6
	SD	10.3	8.4
Female			
	M	51.6	48.8
	SD	9.5	9.4

Comparisons to Chance. To determine if children were looking at faces at a level significantly different from chance, planned t-tests were performed comparing each variable to chance (50%). Children's looking time to all faces did not differ from chance levels.

Individual Patterns

To more closely examine the individual patterns of responding, the number of children who reacted to the emotional expressions consistently with the hypothesis versus those who did not was calculated. The criterion for responding consistently with the hypothesis was longer looking time (by 1% or more) at the angry male than at the angry female. Alternatively, the criterion for responding inconsistently with the hypothesis was equal looking time to both the angry male and the angry female, or longer looking time (by 1% or more) at the angry female. Thirty-three children (54%) reacted consistently with the hypothesis, and 28 (46%) did not. A two-tailed Binomial Test revealed that the number of children who reacted consistently with the hypothesis did not differ significantly from those who did not, $Z = 0.91$, ns.

Summary

The hypothesis that gender stereotyped knowledge would be found in 24-month-olds was not supported in Experiment 1. Perhaps the null results were related to a lack of ecological validity of animal stimuli for children of this age. Experiment 2 was conducted to examine whether gender stereotyping of emotions

would be more clearly observed in 24-month-olds using human rather than animal faces.

Experiment 2

Method

Participants

A total of 62 children, 35 boys and 27 girls, participated in Experiment 2. The recruitment procedure and subject participation requirements were identical to those for Experiment 1. For the majority of children (61%), English was the primary language used in the home. Nearly all the children (96%) were White; the remaining children (4%) were either Black or Native Canadian. Of the 62 children who participated in the study, 15 were eliminated from the final analyses in Condition 1 due to side-bias (n = 11), losing too many trials (n = 1), or fussing (n = 3). The final sample for Condition 1 consisted of 47 children, 26 boys and 21 girls. For Condition 2, 22 children were eliminated from the final analyses due to side-bias (n = 11), losing too many trials (n = 8), or fussing (n = 3). The final sample for Condition 2 consisted of 40 children, 22 boys and 18 girls. Their average age was 24.6 months (Range = 23 months 28 days to 26 months).

Stimuli

Condition 1. The first condition required gender-neutral faces as stimuli. Ten independent adult raters were shown 4 different schematic faces, in a counterbalanced order. The faces all depicted neutral expressions. The raters were asked to rate the masculinity/femininity of the faces on a scale from 1 to 5, with 5 indicating that the face appeared female and 1 indicating that it appeared male. A 3 indicated that the face appeared androgynous. The face chosen for

the study, originally used in a paper by Goren, Sarty, and Wu (1975), was the one rated as most gender-neutral, having received a mean rating of 3.38. The drawing was scanned onto a MacIntosh IIVX computer, using a Hewlett Packard ScanJet IIcx scanner. All drawings appeared as black lines on a white background. The same basic drawing was used for all three stimuli, which differed only in their facial expression - happy, angry, or neutral. To create different facial expressions, the mouth and eyebrows were altered in the same manner in which they had been altered for the stimuli in Experiment 1 (Rating form and stimuli presented in Appendix F).

The emotion-neutral voice recordings were the same as those used in Experiment 1. For the sake of simplicity, the stimuli are referred to by the gender of the accompanying voice. For instance, when the angry face is paired with a female voice, the term "angry female" is used.

Condition 2. For the second condition, the drawings used for Condition 1 were modified by the addition of short, straight hair for males and shoulder-length, curly hair for females (Appendix G). Adobe Photoshop software was used to draw the hair. Ten adult judges, 5 males and 5 females, who had not been used as judges of the stimuli used in Condition 1 were asked to rate the maleness/femaleness of each drawing using the same scale. To avoid the possible bias created by gender stereotyping of emotional expressions, the face displayed a neutral facial expression. The faces were presented in a reversed order for half of the raters. The mean rating for the "male" face was 4.8 (a rating of 5 indicates a

male appearance), which was significantly higher than a rating of three (androgynous), $t(9) = 13.5, p < .001$. The mean rating for the "female" face was 1.3 (a rating of 1 indicated a female appearance), which was significantly lower than a rating of three, $t(9) = -7.96, p < .001$.

The emotion-neutral voice recordings were the same as those used in Experiment 1. The stimuli are referred to by the gender of the face and accompanying voice. For instance, when the angry female face is paired with a female voice, the term "Angry Female" is used.

Procedure and Design

Except for the actual presentation of the stimuli, the procedure for Experiment 2 was identical to that of Experiment 1. The consent form for Experiment 2 was slightly different, however, and is presented in Appendix H. Conditions 1 and 2 of Experiment 2 were presented consecutively, with Condition 1 always presented first, to avoid the bias that could occur if children were shown faces with gender cues before the gender-neutral faces. In total, the experiment lasted approximately 4 minutes, with no break between the two conditions. The experiment began with a familiarization trial during which toys were presented on the screen for 4 seconds, accompanied by a female voice saying "Look at the toys!". For the experimental trials, a blue light flashed, and a voice, either male or female, said "Look at me". Immediately following the light, a pair of faces appeared on the screens and the voice continued, "Here I am, look at me". The stimuli remained on the screen for 5.5 seconds.

For each of the 8 experimental trials in Condition 1, an emotion face (angry or happy) was presented on one screen, with a neutral face on the other. Each emotion face appeared four times, twice with an accompanying female voice and twice with an accompanying male voice. The trials were counterbalanced so that the emotion faces appeared an equal number of times on the right and left screens. After the fourth and eighth trials, a four-second "toy trial" was presented to retain the child's attention.

For each of the 8 experimental trials in Condition 2, an emotion face (angry or happy) was presented on one screen, with a neutral face on the other. The neutral face was always the same gender as the emotion face with which it was being paired. Each emotion face appeared four times, twice as a female with an accompanying female voice and twice as a male with an accompanying male voice. The trials were counterbalanced so that each emotion face appeared an equal number of times on the right and left screens. After the fourth trial, a four-second "toy trial" was presented to retain the child's attention.

Intercoder agreement

A primary coder coded all the data, and a second coder coded 20% of the sample (n = 12), chosen randomly. Pearson product-moment correlations were computed between the coders' ratings of total time the subject looked to the left and right screens. An intercoder reliability of .95 was obtained.

Participant Elimination

Children who spent 65% or more of the total time looking at one screen in particular were considered side-biased and were eliminated from the final analyses, as were those who missed at least one of the two presentations of each pair/voice combination (e.g. angry vs neutral face with female voice). Trials during which a subject did not spend at least 25% of time (1.4 seconds out of 5.5 seconds) looking at any screen were eliminated for that subject. Trials were also eliminated for a subject if he or she did not look at both screens during the trial. As described in the Participants section, 15 children were not included in the final sample for Condition 1, 11 for side bias, 1 for losing too many trials, and 3 for fussing. For Condition 2, 22 children were not included in the final sample, 11 for side bias, 8 for losing too many trials, and 3 for fussing.

Results

Overview of Analyses

After subject and trial elimination were completed, the data were screened for univariate and multivariate outliers. One outlying case existed, and its influence was reduced by assigning it a value one percentage point higher than the next highest value in the distribution. The data met all assumptions for Analysis of Variance. The data were examined for group and for individual patterns, as in Experiment 1.

Group Patterns

To determine if children were associating gender and emotion, a 2(Gender of Voice) x 2(Emotion) x 2(Condition: gender-neutral versus gender-cued) x 2(Sex of Subject) ANOVA was performed, with Gender of Voice, Emotion and Condition as within factors, and Sex of Subject as a between factor. The dependent variable was percentage looking time on emotion faces. If children were exhibiting gender stereotyping of emotion, a significant Gender of Voice x Emotion interaction would be expected. Analyses revealed a significant main effect for Emotion, F (1,38) = 12.74, $p < .001$. There was also a significant Emotion x Condition interaction, F (1,38) = 6.95, $p < .01$ (ANOVA Source Table in Appendix I, Table I-1).

Because of the significant Emotion x Condition interaction, data were analyzed separately for each condition. Mean percentage looking times are presented in Table 2. No significant main effects or interactions were found for the gender-neutral faces in Condition 1 (Table I-2). In Condition 2, with gender-cued faces (Table I-3), there was a significant main effect for Emotion, F (1,38) = 24.73, $p < .001$. A t-test revealed that children looked significantly longer at happy faces (M = 53.0, SD = 11.2) than at angry faces (M = 44.0, SD = 10.8; $t(47) = 5.22, p < .001$) regardless of gender.

Table 2

Mean percentage looking time and standard deviations for gender-neutral faces (Condition 1) and gender-cued faces (Condition 2).

Gender of Voice		Emotion: Angry	Emotion: Happy
		Gender-neutral faces	
Male			
	M	49.7	49.4
	SD	12.6	11.3
Female			
	M	48.4	52.6
	SD	10.5	14.5
		Gender-cued faces	
Male			
	M	45.9	54.6
	SD	12.1	14.5
Female			
	M	39.9	51.4
	SD	12.9	13.5

Comparisons to Chance. Planned t-tests were performed against chance (50%) to determine if children were looking at faces at a level significantly different from chance. None of the looking times in Condition 1 was different from chance.

In Condition 2, children looked at both the angry male and angry female at below-chance levels, t (42) = -2.21, $p < .05$ and t (45) = -5.32, $p < .001$, respectively, and at the happy male at an above-chance level, t (46) = 2.17, $p < .05$. Looking time to the happy female was not significantly different from chance levels, t (45) = .72, ns.

Individual Patterns

To more closely examine the individual patterns of responding, the number of children who responded in accord with the hypothesis versus those who did not were calculated. The criterion for behaving in accord with the hypothesis was longer looking time (by 1% or more) at the angry male than at the angry female. Alternatively, the criterion for responding inconsistently with the hypothesis was equal looking time to both the angry male and the angry female, or longer looking time (by 1% or more) at the angry female. Of the 47 children analyzed in Condition 1, 28 (60%) responded consistently with the hypothesis, and 19 (40%) did not. A two-tailed Binomial test revealed that the proportion of children who responded consistently with the hypothesis was not significantly different from the proportion of those who did not, $Z = 1.31$, ns.

Of the 40 children analyzed in Condition 2, 25 (61%) responded consistently with the hypothesis, and 16 (39%) did not. A two-tailed Binomial test

revealed that these proportions were not significantly different from one another, $\underline{Z}$ = 1.58, ns.

Combined with the results of Experiment 1, the present findings suggest that children have not formed an association between anger and males by the age of 24 months.

General Discussion

Fagot, Leinbach and Hort (1994) recently reported that 3-year-old children identified drawings of angry animals as male. The hypothesis that younger children would also make this gender-stereotyped association was not supported. The 24-month-olds in the present studies did not look more at angry faces when a male voice was presented than when a female voice was presented. This lack of preference was found whether or not gender cues such as hair were added to the faces. Although children did not respond according to the hypothesis, an interesting finding did emerge when gender cues (hair) were added to the stimuli. Specifically, children looked less at the angry faces than at the happy faces, regardless of the gender of the faces. Moreover, their looking time at the angry faces was at below-chance levels, suggesting that the children were exhibiting an avoidance of angry faces. The finding of an angry face avoidance will be discussed after the findings which pertain more directly to the hypotheses of gender-stereotyping.

As stated above, children did not demonstrate any gender-stereotyped knowledge of emotion in the present experiments. It was expected that gender-stereotyped knowledge would be exhibited most robustly with the gender-cued human faces, less-so with the gender-neutral human faces, and least with the animal faces. Though children were expected to respond less systematically to the animal and gender-neutral human faces, their chance level responding to these faces was unexpected. Fagot et al. (1994) employed animal stimuli in their study

with 3-, 4-, and 5-year-olds in order to avoid providing information about gender. In the present studies, the animal faces and the gender-neutral human faces were used to give children only voice cues as to the gender of the face, with the gender-neutral human face presumed to be a more ecologically-valid stimulus for toddlers. As stated previously, one function of children's gender schemas is to provide an information base which serves to guide the perceiver in making inferences in situations in which gender-related information is unavailable (Martin & Halverson, 1987). Children have been shown to use their gender schema to make stereotypic inferences based only on knowledge of a person's gender. For example, Haugh et al. (1980) reported that 3-year-olds assigned different characteristics to the same infants depending on whether they thought the infant was a boy or a girl. In other words, children in the Haugh et al. study were asked to infer the properties that were associated with the infant when the infant's gender category was known. According to Gelman, Collman, and Maccoby (1986), it is easier for young children to infer properties about a person when the person's gender category is known than it is for them to infer an individual's gender category when properties about the person are known. In their study, significantly fewer of the 4-year-olds who participated were capable of making property-to-category inferences than were capable of making category-to-property inferences. It is likely, then, in the Haugh et al. study that children would have had difficulty deciding whether an infant was a boy or a girl (category inference) based on a given property, such as that the baby was nice or mean. In the present

experiments, when animal faces and gender-neutral human faces were used, children were required to make a property-to-category inference, which may have simply rendered the task too difficult for 24-month-olds. First, they were required to infer that the low-pitched (property) voice saying "Look at me" belonged to the male gender category. Even this inference may have been too advanced for the age group in these experiments. If they were able to make this first inference, then they might expect to see a male face on the screens. Because the gender information in the faces was lacking, they would have difficulty making the next level of inference, which was the gender category of the face. The children's chance level of responding to the animal and gender-neutral human faces suggests that their responses to the stimuli were not meaningful; they may have been simply searching the two facial displays for the one that was consistent with the verbal prompt, instead of relating the gender category to the emotion expressed.

In the present studies, emotion-neutral voices were deliberately used so that associations between the voices and the facial expressions could be made on the basis of the gender of the voice and not on the emotion conveyed by it. This use of affectively-inappropriate voices could have contributed to the lack of responding to the emotions in the animal and gender-neutral conditions. For infants as young as 7 months, voice has been shown to be an even more important vehicle for the communication of affect than the face (Caron, Caron, & MacLean, 1988). Though the children in the present studies were at a more advanced stage of emotional understanding than the 7-month-olds in the Caron et al. study, it is

possible that the use of an affectively-inappropriate voice only added confusion to a task that already required a great deal of information processing in a short period of time. When visual gender cues were added to the faces, the emotion-neutral voice was the only ambiguous stimulus remaining. Indeed, with the addition of visual gender cues, voice may have been less attended to as it added no new information; gender information was available visually, unlike in the previous conditions.

Another plausible explanation for the lack of gender stereotyping in the animal and gender-neutral human face conditions is that children did not understand that the faces represented living animals and human beings, and thus could not attribute emotion to them. Perhaps a follow-up study examining children's ability to match a vocal emotional expression to a facial expression using gender-neutral faces would clarify the issue. Using a preferential-looking method, Walker-Andrews (1986) found that 7-month-olds increased their looking time to a filmed happy or angry facial expression when it was accompanied by an affectively-appropriate soundtrack compared to when an affectively-inappropriate soundtrack was played. Perhaps a future study could examine whether 24-month-olds would show a visual preference for a facial expression that affectively matched a vocal expression using animal or gender-neutral human faces. If an inability to match the facial and vocal expressions could be demonstrated, then it might be that emotion is not understood by this age group using schematic faces which have no hair cues.

It is certainly plausible as well that the lack of observed gender-stereotyping in the present samples is due to a lack of gender-stereotyped knowledge of emotion in 24-month-olds. Children at 24 months have likely had very little exposure to parental anger (Malatesta & Izard, 1984). Though they may have experienced some anger in the home, it is possible that their exposure may not be sufficient to provide them with the information on which to base a gender stereotype.

Although they did not demonstrate gender-stereotyped knowledge of emotions, with the hair cues, children seemed able to understand that the face represented a person expressing an emotion, since they found the angry face aversive and avoided looking at it. This avoidance of angry human faces is inconsistent with research on reactions to negative emotional expressions with much younger children. For instance, 5- and 7-month-olds have been reported to show no avoidance of angry faces (Walker-Andrews, 1986), and 7-month-olds have been reported to have a preference for fear faces over happy faces (Ludemann & Nelson, 1988; Nelson and Dolgin, 1985). Nelson and Dolgin (1985) speculated that the preference for fear faces may have been due to the novelty of the emotion to very young children. These findings suggest that emotional facial expressions are not understood by infants that young. Studies on social referencing (Klinnert, 1984; Sorce, Emde, Campos, & Klinnert, 1985) have indicated that by 12 months of age, children have an understanding of the emotions of fear and anger, however, no such understanding has been shown by

infants as young as those in the Walker-Andrews (1986) and Nelson and Dolgin (1985) studies. The children in the present study were well beyond the age at which social referencing is demonstrated. Therefore, their avoidance of angry faces may be considered to be consistent with the hypothesis that they showed an understanding of what an angry face represents.

Malatesta and Izard (1984) have suggested that children may be exposed for the first time to parental anger during the third year of life, also known as the "terrible twos". The avoidance of angry faces shown by the 24-month-olds in our study might reflect the degree of aversion associated with the experience of parental anger. A natural response for children of this age, when presented with an angry face, may be to avoid looking at it. Several studies have investigated toddlers' reactions to anger in others, using either parent report of reactions to actual episodes of anger in the home or observed reactions to actual or simulated anger. According to parent reports, by approximately 1 year of age, the most common reaction to naturally occurring anger is distress, most often in the form of crying and occasionally in the form of "shutting out" the incident, for example by covering the head with a blanket (Cummings, Zahn-Waxler, & Radke-Yarrow, 1981; Cummings, Zahn-Waxler, & Radke-Yarrow, 1984). "Shutting out" or avoidance reactions have been reported in response to peer expressions of anger, with 2- and 3-year-old children observed to move away from peers who were expressing anger (Denham, 1986). To examine the reactions of 27-month-old children to simulated episodes of anger, Cummings, Ianotti, and Zahn-Waxler

(1985) exposed children to a sequence of angry interactions between two actors. As with the reactions to naturally occurring anger, the most common response was distress in the children, a response which became more pronounced with repeated exposure to anger episodes. Attempting to shut out the incident by covering the face or the ears became more common with repeated exposure to anger episodes.

The displays of anger in the above studies included much more information about the emotion than was available in the stimuli used in the present experiments. Children in the naturalistic and observational studies were exposed not only to angry facial expressions but also to the angry vocal expressions and bodily gestures that accompany a naturally occurring episode of anger. In the present experiments, minimal information about the emotion was given in the faces; only the position of the eyebrows and the mouth were manipulated to connote anger. Nevertheless, enough information was available in this impoverished display to convey anger to the children in the gender-cued condition to the extent to which they found it visually aversive. This finding suggests, then, that for 24-month-olds, who may be newly experiencing actual episodes of anger in the home, even a static visual display of anger is aversive.

An avoidance reaction to a static visual display of anger has not been shown previously in the literature. The 5-month-olds in the Walker-Andrews (1986) study showed no avoidance of dynamic angry facial and vocal expressions, and the 7-month-olds in the Ludemann and Nelson (1988) and Nelson and Dolgin (1985) studies showed a visual preference for static displays of fear, another

negative emotion. In Experiment 2 of the present studies, 24-month-olds showed a clear avoidance of angry faces, suggesting that the age of acquisition of an avoidance reaction to static visual displays of anger may be below 24 months of age. The present study contributes to the knowledge of young children's reactions to emotional expressions in that it clarifies the earliest age at which children have been shown to avoid static visual displays of anger.

Even though no gender-stereotyped knowledge of emotion was demonstrated in the present studies, we cannot conclude from them that 24-month-olds do not possess a knowledge of gender stereotypes of emotion. In Experiment 1 and Condition 1 of Experiment 2, it is likely that the task demands were too high for children of this age. When the task was made easier by the addition of visual gender cues, children avoided looking at the angry faces regardless of gender, suggesting that the children understood the emotions. Their aversion to any angry face may have competed with their knowledge of gender stereotypes of emotion. That such a competing response can occur using the preferential-looking paradigm may be one of its limitations. The paradigm is susceptible to salience effects, that is, children's responses may become biased toward a display that they find particularly interesting, thus masking the effect under investigation. As found in the present experiments, children's responses can also be biased against a particular display that they find aversive to look at, again preventing the testing of the hypothesis under investigation.

The above-mentioned limitation of the preferential-looking paradigm does not make it ineffectual for the investigation of gender stereotyping of anger, however its limitation must be taken into consideration for future studies in this area. Using the preferential-looking paradigm, a research design which does not pit angry faces against neutral faces would tease apart the potentially competing responses found in the present experiments. A study currently under-way in our laboratory may help to interpret the avoidance response that was observed in Condition 2 of Experiment 2. In the gender-cued condition of the present studies, children saw, for example, an angry male face paired with a neutral male face with an accompanying male voice. Thus they had the opportunity to avoid the angry face and focus on the neutral face. In the follow-up study which is in progress children are shown, for instance, an angry male on one screen and an angry female on the other screen, with no voice prompt. As such, they must choose an angry face, and the tendency to avoid looking at angry faces would not be in competition with their tendency to make a gender stereotyped association, if one exists. It is expected that children's knowledge of gender stereotypes of anger will be demonstrated by a differential degree of avoidance of the male and female angry faces.

The only evidence of children's association between gender and emotion in the present studies was an above chance level looking time to the happy male when hair cues were present. Previous research on young children's gender stereotyping of emotions has found either no gender association with happiness

(Fagot et al., 1994; Karbon et al., 1992) or an association between happiness and females (Birnbaum, 1983; Birnbaum et al., 1980). The association between happiness and males found in the present studies was unexpected as it has no basis in previous research; as such it requires further exploration.

In summary, the results of the present studies with 24-month-olds do not replicate those of Fagot et al. (1994) in which 3-year-olds demonstrated an association between the emotion of anger and males. As stated above, it should not be concluded from these studies that gender stereotyping of emotions is not present in 24-month-olds. The lack of findings may be due to the particular research design used, which has been improved in a follow-up study currently under-way in our laboratory.

Though the hypotheses of the present studies were not supported, the tendency of the children in the second condition of Experiment 2 to avoid looking at the angry faces was interesting, if unexpected. Children as young as 1 year of age have been reported to avoid looking at live episodes of anger, though children much younger than those in the present study have exhibited no avoidance of visual displays of angry facial expressions. The present results add to the literature on children's reactions to emotional expressions in that they suggest that children begin to understand by the end of the second year that even static visual displays of angry facial expressions are aversive. An extension of the present study to a younger population would provide further information on the

development of avoidance reactions to negative emotional expressions in static displays.

References

Allen, J. G., & Markiewicz Haccoun, D. (1976). Sex differences in emotionality: A multidimensional approach. Human Relations, 29, 771-722.

Ashmore, R. D., DelBoca, F. K., & Wohlers, A. J. (1986). Gender stereotypes. In R. D. Ashmore & F. D. DelBoca (Eds.), The social psychology of female-male relations: A critical analysis of central concepts (pp. 69-119). New York: Academic Press.

Bem, S. L. (1981). Gender schema theory: A cognitive account of sex typing. Psychological Review, 88, 354-364.

Best, D. L., Williams, J. E., Cloud, J. M., Davis, S. W., Robertson, L. S., Edwards, J. R., Giles, H., & Fowles, J. (1977). Development of sex-trait stereotypes among young children in the United States, England, and Ireland. Child Development, 48, 1375-1384.

Birnbaum, D. W. (1983). Preschoolers' stereotypes about sex differences in emotionality: A reaffirmation. The Journal of Genetic Psychology, 143, 139-140.

Birnbaum, D. W., Nosanchuk, T. A., & Croll, W. L. (1980). Children's stereotypes about sex differences in emotionality. Sex Roles, 6, 435-443.

Blakemore, J. E. O., LaRue, A. A., & Olejnik, A. B. (1979). Sex-appropriate toy preference and the ability to conceptualize toys as sex-role related. Developmental Psychology, 1, 339-340.

Brennan-Parks, K., Goddard, M., Wilson, A.E., & Kinnear, L. (1991). Sex differences in smiling as measured in a picture taking task. Sex Roles, 24, 375-382.

Bruce, V., Burton, A.M., Hanna, E., Healey, P., Mason, O., Coombes, A., Fright, R., & Linney, A. (1993). Sex discrimination: How do we tell the difference between male and female faces? Perception, 22, 131-152.

Caron, A. J., Caron, R. F., & MacLean, D. J. (1988). Infant discrimination of naturalistic emotional expressions: The role of face and voice. Child Development, 59, 604-616.

Caron, R., Caron, A. J., & Myers, R. S. (1982). Abstraction of invariant face expressions in infancy. Child Development, 53, 1008-1015.

Caron, R. F., Caron, A. J., & Myers, R. S. (1985). Do infants see emotional expression in static faces? Child Development, 56, 1552-1560.

Cornell, E. H. (1974). Infants' discrimination of photographs of faces following redundant presentations. Journal of Experimental Child Psychology, 18, 98-106.

Cowan, G., & Hoffman, C. D. (1986). Gender stereotyping in young children: Evidence to support a concept-learning approach. Sex Roles, 14, 211-224.

Cummings, E.M., Ianotti, R.J., & Zahn-Waxler, C. (1985). Influence of conflict between adults on the emotions and aggression of young children. Developmental Psychology, 21, 495-507.

Cummings, E.M., Zahn-Waxler, C., & Radke-Yarrow, M. (1981). Young children's responses to expressions of anger and affection by others in the family. Child Development, 52, 1274-1282.

Cummings, E.M., Zahn-Waxler, C., & Radke-Yarrow, M. (1984). Developmental changes in children's reactions to anger in the home. Journal of Child Psychology and Psychiatry, 25, 63-74.

Denham, S. A. (1986). Social cognition, prosocial behavior, and emotion in preschoolers: Contextual validation. Child Development, 57, 194-201.

Fabes, R.A., Eisenberg, N., McCormick, S.E., & Wilson, M.S. (1988). Preschoolers' attributions of the situational determinants of others' naturally occurring emotions. Developmental Psychology, 24, 376-385.

Fagan, J. F. (1976). Infants' recognition of invariant features of faces. Child Development, 47, 627-638.

Fagot, B. I., & Leinbach, M. D. (1993). Gender-role development in young children: From discrimination to labelling. Developmental Review, 13, 205-224.

Fagot, B. I., Leinbach, M. D., & Hort, B. E. (1994, July). Gender and aggression. Poster session presented at the Biennial Meeting of the Society for Research in Child Development, Amsterdam.

Fantz, R. L. (1963). Pattern vision in newborn infants. Science, 140, 296-297.

Gelman, S. A., Collman, P., & Maccoby, E. E. (1986). Inferring properties from categories versus inferring categories from properties: The case of gender. Child Development, 57, 396-404.

Golinkoff, R. M., Hirsh-Pasek, K., Cauley, K. M., & Gordon, L. (1987). The eyes have it: Lexical and syntactic comprehension in a new paradigm. Journal of Child Language, 14, 23-45.

Goren, C. C., Sarty, M., & Wu, P. Y. K. (1975). Visual following and pattern discrimination of face-like stimuli by newborn infants. Pediatrics, 56, 544-549.

Haugh, S. S., Hoffman, C. D., & Cowan, G. (1980). The eye of the very young beholder: Sex typing of infants by young children. Child Development, 51, 598-600.

Hinsz, V.B., & Tomhave, J.A. (1991). Smile and (half) the world smiles with you, frown and you frown alone. Personality and Social Psychology Bulletin, 17, 586-592.

Huston, A. C. (1983). Sex typing. In E. M. Hetherington (Ed.), Socialization, personality, and social development (pp. 387-467). New York: Wiley.

Karbon, M., Fabes, R. A., Carlo, G., & Martin, C. L. (1992). Preschoolers' beliefs about sex and age differences in emotionality. Sex Roles, 27, 377-390.

Klinnert, M. D. (1984). The regulation of infant behavior by maternal facial expression. Infant Behavior and Development, 7, 447-465.

Klinnert, M. D., Campos, J. J., Sorce, J. F., Emde, R. N., & Svejda, M. (1982). Emotions as behavior regulators: Social referencing in infancy. In R. Plutchik & H. Kellerman (Eds.), Emotion: Theory, research, and experience (pp. 57-86). New York: Academic Press.

Kohlberg, L. (1966). A cognitive-developmental analysis of children's sex-role concepts and attitudes. In E. E. Maccoby (Ed.), The development of sex differences (pp. 82-173). Stanford, CA: Stanford University Press.

Kuhn, D., Nash, S., & Brucken, L. (1978). Sex role concepts of two- and three-year-olds. Child Development, 49, 445-451.

Leinbach, M. D. (1990, April). Infants' use of hair and clothing cues to discriminate pictures of men and women. Poster session presented at the seventh International Conference on Infant Studies, Montreal, QC:

Leinbach, M.D. (1992, May). Conventionally and metaphorically gendered parameters in children's gender judgements. In B. Hort (Chair), Cognitive factors in the acquisition of gender. Symposium conducted at the annual convention of the Western Psychological Association, Portland, OR.

Leinbach, M. D., & Fagot, B. I. (1986). Acquisition of gender labels: A test for toddlers. Sex Roles, 15, 655-666.

Leinbach, M. D., & Fagot, B. I. (1993). Categorical habituation to male and female faces: Gender schematic processing in infancy. Infant Behavior and Development, 16, 317-332.

Ludemann, P. M., & Nelson, C. A. (1988). Categorical representation of facial expressions by 7-month-old infants. Developmental Psychology, 24, 492-501.

Maccoby, E. E. (1988). Gender as a social category. Developmental Psychology, 24, 755-765.

Malatesta, C. Z., & Izard, C. E. (1984). Social signals: From biological imperative to symbol utilization. In N. A. Fox & R. J. Davidson (Eds.), The psychology of affective development (pp. 161-206). Hillsdale, NJ: Erlbaum.

Martin, C. L., & Halverson, C. F., Jr. (1981). A schematic processing model of sex typing and stereotyping in children. Child Development, 52, 1119-1134.

Martin, C. L., & Halverson, C. F. (1987). The roles of cognition in sex role acquisition. In D. B. Carter (Ed.), Current conceptions of sex roles and sex-typing: Theory and research (pp. 123-137).

Miller, C.L. (1983). Developmental changes in male/female voice classification by infants. Infant Behavior and Development, 6, 313-330.

Miller, C. L., Younger, B. A., & Morse, P. A. (1982). The categorization of male and female voices in infancy. Infant Behavior and Development, 5, 143-159.

Murphy, C. M. (1978). Pointing in the context of a shared activity. Child Development, 49, 371-380.

Nelson, C. A., & Dolgin, K. G. (1985). The generalized discrimination of facial expressions by seven-month-old infants. Child Development, 56, 58-61.

Poulin-Dubois, D., Serbin, L. A., Kenyon, B., & Derbyshire, A. (1994). Infants' intermodal knowledge about gender. Developmental Psychology, 30, 436-442.

Reis, H. T., & Wright, S. (1982). Knowledge of sex role stereotypes in children aged 3 to 5. Sex Roles, 8, 1049-1056.

Rosenkrantz, P., Vogel, S., Bee, H., Broverman, I., & Broverman, D. (1968). Sex-role stereotypes and self-concepts in college students. Journal of Consulting and Clinical Psychology, 32, 287-295.

Shields, S. A. (1987). Women, men, and the dilemma of emotion. In P. Shaver & C. Hendrick (Eds.), Sex and gender (pp. 229-250). Beverly Hills: Sage Publications.

Sorce, J. F., Emde, R. N., Campos, J., & Klinnert, M. D. (1985). Maternal emotional signaling: Its effect on the visual cliff behavior of 1-year-olds. Developmental Psychology, 21, 195-200.

Spelke, E. (1976). Infants' intermodal perception of events. Cognitive Psychology, 8, 553-560.

Spelke, E. S. (1985). Preferential-looking methods as tools for the study of cognition in infancy. In G. Gottlieb & N. A. Krasnegor (Eds.), Measurement of audition and vision in the first year of postnatal life: A methodological overview (pp. 323-363). Norwood, NJ: Ablex.

Termine, N. T., & Izard, C. E. (1988). Infants' responses to their mothers' expressions of joy and sadness. Developmental Psychology, 24, 223-229.

Thompson, S. K. (1975). Gender labels and early sex role development. Child Development, 46, 339-347.

Thompson, S.K., & Bentler, P.M. (1971). The priority of cues in sex discrimination by children and adults. Developmental Psychology, 5, 181-185.

Walden, T. A., & Field, T. M. (1982). Discrimination of facial expressions by preschool children. Child Development, 53, 1312-1319.

Walker, A. S. (1982). Intermodal perception of expressive behaviors by human infants. Journal of Experimental Child Psychology, 33, 514-535.

Walker-Andrews, A. S. (1986). Intermodal perception of expressive behaviors: Relation of eye and voice. Developmental Psychology, 22, 3&3-377.

Walker-Andrews, A. S., Bahrick, L. E., Raglioni, S. S., & Diaz, I. (1991). Infants' bimodal perception of gender. Ecological Psychology, 3, 55-75.

Weinraub, M., Clemens, L. P., Sockloff, A., Ethridge, T., Gracely, E., & Myers, B. (1984). The development of sex role stereotypes in the third year: Relationships to gender labelling, gender identity, sex-typed toy preference, and family characteristic. Child Development, 55, 1493-1503.

Williams, J.E. (1982). An overview of findings from adult sex stereotype studies in 25 countries. In R. Rath, H.S. Asthana, J.B. Sinha (Eds.), Diversity and unity in cross-cultural psychology. Lisse. Netherlands: Swets and Zeitlinger.

Appendix A

Emotion Rating Form and Stimuli - Experiment 1

EMOTION RATINGS: E/G-2 STUDY FALL '94

INSTRUCTIONS: Please look at each picture and rate the emotion that you recognize in the face on a continuum from 1 to 7.

If you are certain the face looks happy, circle the 1.

1 2 3 4 5 6 7
happy neutral angry

If the voice face looks neither happy nor angry, circle the 4.

1 2 3 4 5 6 7
happy neutral angry

If you are certain the face looks angry, circle the 7.

1 2 3 4 5 6 7
happy neutral angry

Thank you very much for your help!

1) Face 1: 1 2 3 4 5 6 7
happy neutral angry

2) Face 2: 1 2 3 4 5 6 7
happy neutral angry

3) Face 3: 1 2 3 4 5 6 7
happy neutral angry

4) Face 4: 1 2 3 4 5 6 7
happy neutral angry

5) Face 5: 1 2 3 4 5 6 7
happy neutral angry

6) Face 6: 1 2 3 4 5 6 7
happy neutral angry

7) Face 7: 1 2 3 4 5 6 7
happy neutral angry

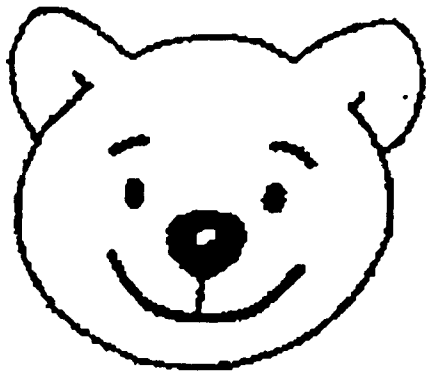
8) Face 8: 1 2 3 4 5 6 7
happy neutral angry

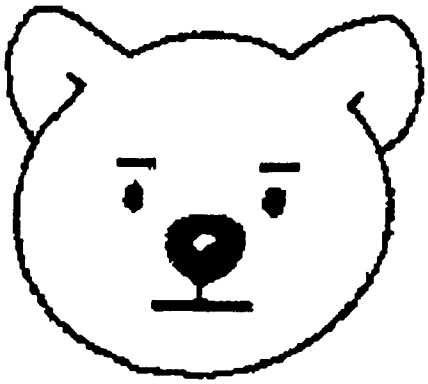
9) Face 9: 1 2 3 4 5 6 7
happy neutral angry

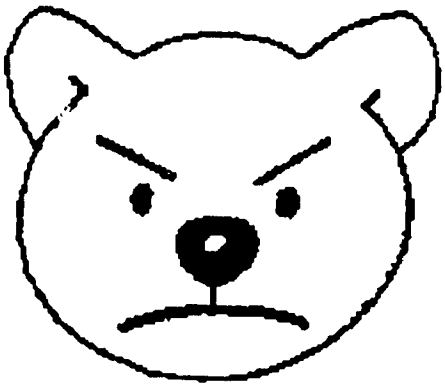
10) Face 10: 1 2 3 4 5 6 7
happy neutral angry

11) Face 11: 1 2 3 4 5 6 7
happy neutral angry

12) Face 12: 1 2 3 4 5 6 7
happy neutral angry







Appendix B

Masculinity/Femininity and Emotion Rating Forms for Voices - Experiment 1

VOICE RATINGS: E/G STUDY FALL '94

INSTRUCTIONS: Each time you hear the phrase,"Look at me, here I am ..." OR "Regarde moi je suis là..." circle, on the scale of 1 to 7, how much the speaker sounded like an adult female or male.

If you are certain it is a male's voice then circle the 1.

(1) 2 3 4 5 6 7
male can't tell female

If you can't tell the difference then circle the 4.

1 2 3 (4) 5 6 7
male can't tell female

If you are certain it is a female's voice then circle the 7.

1 2 3 4 5 6 (7)
male can't tell female

Thank you very much for your help!

1) Voice 1: 1 2 3 4 5 6 7
male can't tell female

2) Voice 2: 1 2 3 4 5 6 7
male can't tell female

3) Voice 3: 1 2 3 4 5 6 7
male can't tell female

4) Voice 4: 1 2 3 4 5 6 7
male can't tell female

5) Voice 5: 1 2 3 4 5 6 7
male can't tell female

6) Voice 6: 1 2 3 4 5 6 7
male can't tell female

7) Voice 7: 1 2 3 4 5 6 7
male can't tell female

8) Voice 8: 1 2 3 4 5 6 7
male can't tell female

9) Voice 9:

1	2	3	4	5	6	7
male			can't tell			female

10) Voice 10:

1	2	3	4	5	6	7
male			can't tell			female

11) Voice 11:

1	2	3	4	5	6	7
male			can't tell			female

12) Voice 12:

1	2	3	4	5	6	7
male			can't tell			female

VOICE RATINGS: E/G-2 STUDY FALL '94

INSTRUCTIONS: Each time you hear the phrase,"Look at me, here I am..." OR "Regarde moi, je suis là..." circle, on the scale of 1 to 7, whether the speaker sounds happy, angry or neutral.

If you are certain the voice sounds happy,then circle the 1.

(1) 2 3 4 5 6 7
happy neutral angry

If the voice sounds neither happy nor angry, then circle the 4.

1 2 3 (4) 5 6 7
happy neutral angry

If you are certain the voice sounds angry,then circle the 7.

1 2 3 4 5 6 (7)
happy neutral angry

Thank you very much for your help!

1) Voice 1: 1 2 3 4 5 6 7
happy neutral angry

2) Voice 2: 1 2 3 4 5 6 7
happy neutral angry

3) Voice 3: 1 2 3 4 5 6 7
happy neutral angry

4) Voice 4: 1 2 3 4 5 6 7
happy neutral angry

5) Voice 5: 1 2 3 4 5 6 7
happy neutral angry

6) Voice 6: 1 2 3 4 5 6 7
happy neutral angry

7) Voice 7: 1 2 3 4 5 6 7
happy neutral angry

8) Voice 8: 1 2 3 4 5 6 7
happy neutral angry

9) Voice 9: 1 2 3 4 5 6 7
happy neutral angry

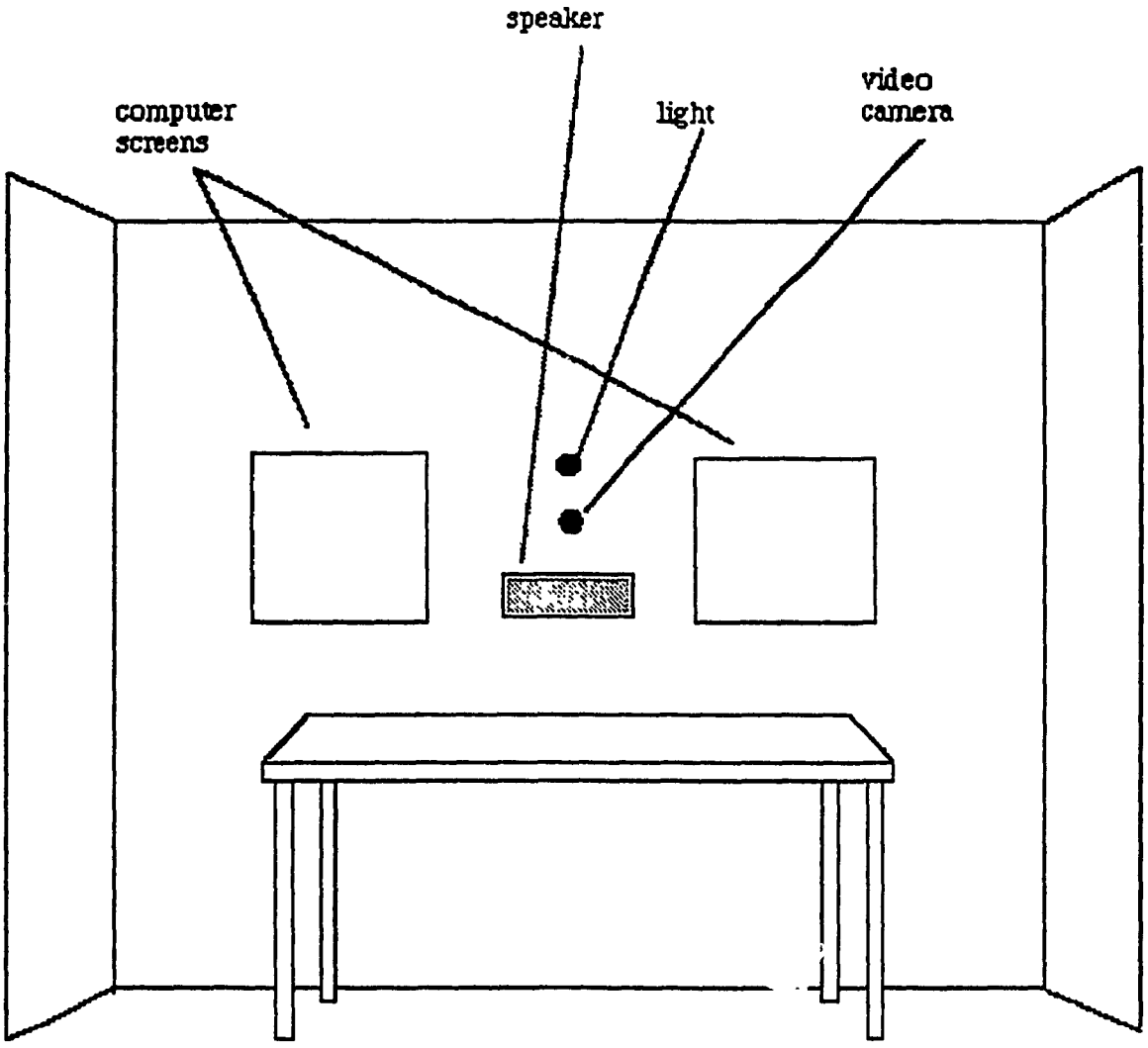
10) Voice 10: 1 2 3 4 5 6 7
happy neutral angry

11) Voice 11: 1 2 3 4 5 6 7
happy neutral angry

12) Voice 12: 1 2 3 4 5 6 7
happy neutral angry

Appendix C

Testing Chamber


speaker
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Appendix D

Initial Contact Letter and Consent Form - Experiment 1

Appendix E

ANOVA Source Table - Experiment 1

Table E-1. Analysis of Variance for Experiment 1

Source	df	F
	Between Subjects	
Sex (S)	1	0 11
Within-group error	57	(0.01)
	Within subjects	
Voice (V)	1	0.01
Emotion (E)	1	2.61
S x V	1	0.62
S x E	1	0.31
V x E	1	0.07
S x V x E	1	0.01
Within group error	57	(0.01)

Note. Values in parentheses represent mean square errors.

$^{t}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Appendix F

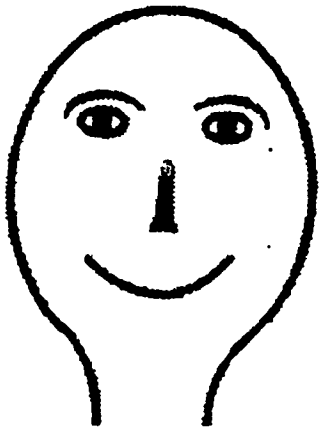
Gender Rating Form and Stimuli - Experiment 2, Condition 1

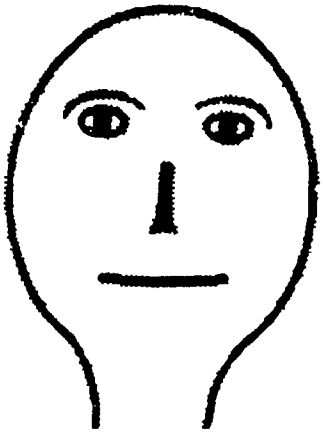
Rater: male_____, female_____, (please mark your gender)

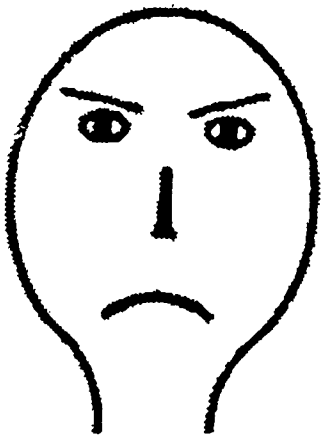
Instructions:
Please look at each of the following faces and indentify, based on your first impression, whether the face you are seeing is female (mark 1), male (mark 5) or androgenous (mark 3).

1.	1 female	2	3 androgenous	4	5 male
2.	1 female	2	3 androgenous	4	5 male
3.	1 female	2	3 androgenous	4	5 male
4.	1 female	2	3 androgenous	4	5 male

Thank you!

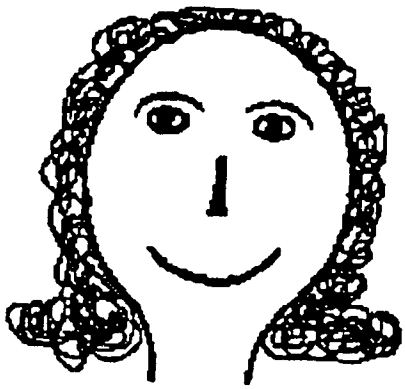


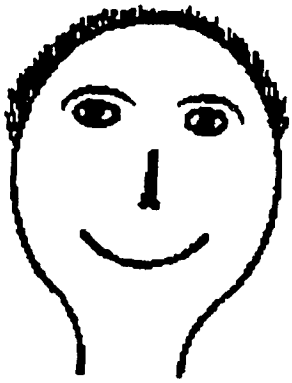


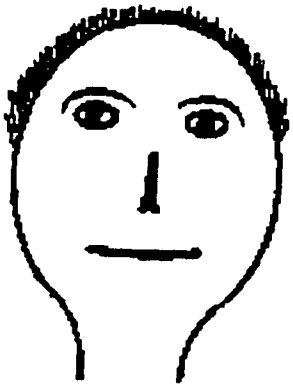


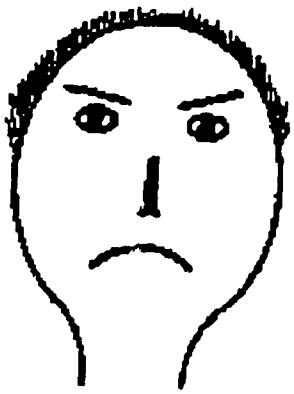
Appendix G

Stimuli - Experiment 2, Condition 2









Appendix H

Consent Form - Experiment 2

Appendix I

ANOVA Source Tables - Experiment 2

Table I-1. Analysis of Variance for Experiment 2

Source	df	F
	Between Subjects	
Sex (S)	1	1.57
Within-group error	38	(0.02)
	Within subjects	
Gender of Voice (GV)	1	0.49
Emotion (E)	1	12.74***
Condition (C)	1	2.91'
S x GV	1	0.03
S x E	1	1.14
S x C	1	2.08
GV x E	1	2.85'
GV x C	1	2.34
E x C	1	6.95**
S x GV x E	1	0.51
S x GV x C	1	0.03
S x E x C	1	1.27
C x E x GV	1	0.10
S x C x E x GV	1	0.15
Within group error	38	(0.01)

Note. Values in parentheses represent mean square errors.

'$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table I-2. Analysis of Variance for Condition 1

Source	df	F
	Between Subjects	
Sex (S)	1	0.86
Within-group error	45	(0.02)
	Within subjects	
Gender of Voice (GV)	1	0.18
Emotion (E)	1	0.99
S x GV	1	0.65
S x E	1	0.70
GV x E	1	1.85
S x GV x E	1	0.05
Within group error	45	(0.02)

Note. Values in parentheses represent mean square errors.

$^{t}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Table I-3. Analysis of Variance for Condition 2

Source	df	F
	Between Subjects	
Sex (S)	1	3.48$^{\prime}$
Within-group error	38	(0.02)
	Within subjects	
Gender of Voice (GV)	1	1.96
Emotion (E)	1	24.73***
S x GV	1	0.05
S x E	1	0.00
GV x E	1	1.03
S x GV x E	1	0.07
Within group error	38	(0.02)

Note. Values in parentheses represent mean square errors.

$^{\prime}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.