

Drew University College of Liberal Arts

The Effect of Context Cues on Emotion Recognition

A Thesis in Psychology

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I dedicate this thesis to my family and friends who encouraged me to persevere through the challenges of writing this thesis and were there to help me celebrate when I was successful.

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Abstract

The central focus of the current experiment is to better understand what cues children use when identifying emotions. It has been established that children as young as 4 years of age can use contextual cues when identifying emotions (Kuwabara, Son, & Smith, 2011). This study had two hypotheses: 1) The first is that children and undergraduate student participants will be affected more by people context cues than by object context cues, and 2) the second is that participants will report higher levels of emotion intensity for the emotion shown in the congruent situations as compared to the incongruent situations. There was a total of 50 participants, 26 children and 24 adults. The participants were instructed to pick the appropriate facial expression for a target cartoon figure when the target was presented next to positive and negative objects, and cartoon characters who were each expressing either positive or negative emotions. The participants were then asked to rate the strength of the emotion the target character was displaying using a line scale. Both congruent and incongruent situations and positive and negative emotions were displayed. Participants completed 20 trials. The analysis indicated that the object context cues had a larger impact on participants' emotion intensity ratings than the people context cues. Further, congruency affected emotion intensity ratings, and yielded higher emotion strengths in the congruent situations as compared to the incongruent situations. These findings indicate that Object context cues were used as a context cue when determining the strength of the emotions depicted, and that People context cues were not used as a context cue. These findings indicate that Objects are important for providing context information and that in the future these cues should be incorporated in helping with successful social interactions.

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The Effect of Context Cues on Emotion Recognition

Emotional competence is the ability to appropriately express and regulate emotions. This ability includes knowledge of different emotions and being able to solve problems that occur in social situations (Curby, Brown, Bassett, & Denham, 2015). The development of this skill aids children in navigating interactions with teachers and peers: it can act as a buffer in life, redirecting stressors and helping to prevent the development of serious emotional and social difficulties (Pahl & Barrett, 2007). There are three important subcomponents of emotional competence: emotion regulation, emotion knowledge and emotion recognition (Denham et al., 2006).

Emotion regulation is concerned with managing emotions within oneself. Emotion regulation is defined as all the processes, internal and external, through which people manage their emotions to accomplish their goals (Sala, Pons & Molina, 2014). During the preschool years, children typically develop autonomous strategies to regulate their emotions. This is often accomplished by internalizing rules and regulations and building an understanding of experiencing emotions (Sala et al., 2014). For example, Denham et al. (2003) determined the techniques that were used by children to successfully regulate their emotions, including cognitive restructuring, avoidance, and active problem solving to refrain from having unrestrained emotional outbursts. When children are able to regulate their emotions using these strategies, it provides them the ability to change the way they think about emotional stimuli, and therefore to regulate successfully and respond to their emotions and those of others around them (Sala et al., 2014).

To better understand the emotions of those around us, we often look to our environments

for information. Emotional knowledge is defined as the ability to infer other's emotions from situational cues (Fine et al., 2006). After investigating the longitudinal development of emotional knowledge at three age points (1st grade, 3rd grade and 5th grade), researchers found that throughout development, emotional knowledge continues to progress. More specifically, advances are seen in the use and interpretation of cues that provide clues as to how other people are feeling (Fine et al., 2006). These clues can be found in many different situations and can provide important emotion-identifying information. For example, one of the ways that children identify, respond and regulate emotions is by using environmental clues (e.g., a puppy) to understand the source of expressed emotions. The use of these clues is especially helpful when inferring the emotions of others. Additionally, it appears that emotion knowledge and self-regulation are positively correlated with success in school and social situations (Denham, 1986; Denham et al., 2006).

The last subcomponent of emotional competence is emotion recognition. This is the ability to identify basic emotions in others such as joy, sadness, anger and fear. Emotion recognition is typically achieved by considering the facial expression of the person, and considering contextual and/or situational cues (Denham et al., 2012). This subcomponent includes interpretation of emotion expressions, in terms of needing to recognize identifiers in the face to establish a relationship with the other person. Emotional recognition also uses emotional knowledge, as our ability to recognize emotions often stems from situational clues that provide explanations for emotions.

Emotion recognition develops throughout childhood, but sensitivity to changes in facial expression has also been shown in newborns. Further, one-year-old infants are able to distinguish between positive expressions (happiness, surprise etc.) and negative expressions (sadness, anger

etc.; Bayet, Pascalis & Gentaz, 2014). Russell and Nelson (2016) reported that the ability to recognize emotion increased with age; however, the ability to recognize individual emotions, not simply the difference between positive and negative emotion, begins during the third year of life. Beginning at age three, the ability to differentiate between basic emotions such as happy, mad, sad and scared develops and continues to advance until adolescence (Denham, Zinsser & Bailey, 2011). Being able to distinguish between emotions based on facial expression alone is an important milestone for development because it impacts the development of other important social and emotional abilities.

As for all of the subcomponents of emotional competence, the development of emotional recognition progresses throughout childhood and into adolescence (Denham et al., 2012). Brenna et al. (2015) studied the way that preschool-aged children identified emotion and expression in strangers. They showed participants a target character who was expressing an emotion and then had them choose that same face from two faces (one face was different from the target face and the other was the target face). The results demonstrated that identifying emotion is easier when the expressions remained congruent across the target expression and the matching task. Further, the presence of both positive and negative emotional expressions affected a child's processing of identity information. This finding implied that children cannot refrain from processing emotional information conveyed by the face, even when it's not required for the task at hand (Brenna et al. 2015). Emotion expression provides information for the onlooker, and therefore can aid in correctly identifying the emotions of others.

The ability to accurately recognize emotions is key for successful social interactions and for understanding social situations (Matsumoto, Keltner, Shiota, O'Sullivan & Frank, 2008). If children are not able to reliably and accurately recognize the emotions of others, they will not be

able to respond appropriately in social situations. And when emotion recognition is not properly developed, developmental problems such as trouble with social interactions and learning disabilities could arise (Singh, Ellis, Winton, Singh, Leung & Oswald, 1998). For example, Singh et al. (1998) studied how the accuracy of children's ability to differentiate between emotions relates to a diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). Participants were read a two-sentence story that depicted an event and implied an appropriate emotion to be associated with that story. Participants then indicated which photo, from a group of six pictures depicting different emotions (fear, anger, sadness, disgust, happiness and surprise), matched the short story they were just read. Children with ADHD performed worse on the emotion recognition tasks than the control group of similarly aged children who did not have ADHD. Because of an overall inattention to smaller details, such as the differences between surprised and scared facial expression, those with ADHD had issues with emotion recognition. Therefore, the basis for more sophisticated use of emotion, such as gauging the strength of the emotion, never develops.

Furthermore, Conduct Disorder (CD) is an indicator that emotion recognition skills may not be developing. Researchers discovered that emotion recognition deficits are present in adolescents who are at increased risk for developing CD as a function of familial (environmental and genetic) risk factors (Sully et al., 2015). This could imply that children are frustrated because they are struggling with emotion recognition and therefore act out due to that frustration. Those who did not have strong emotion recognition skills were more likely to have conduct disorder manifest in the future, which can have serious impacts on the social and emotional development of children. Moreover, Thom et al. (2015) examined children with borderline personality disorder, and evaluated how they perceived the emotions of others, along with their overall

confidence level about their own emotion recognition skills. Confidence levels were low when identifying emotions. Successfully identifying emotions is crucial to having successful social interactions, and a failure to accurately recognize emotions leads to trouble with interacting with peers. These findings imply that poor development of emotion recognition negatively impacts social abilities.

When the emotion recognition skill develops correctly, it allows adults to rapidly identify and categorize facial expressions. Balas, Huynh, Saville, and Schmidt (2015) examined emotion recognition in adults and children between the ages of 5- and 7- years- old. They presented participants with faces that were morphed horizontally (the space between their ears), vertically (the space between their chin and forehead), or not at all (as a control). They found that adults were more sensitive to minute differences in facial expressions, which led them to more accurately identify the emotion. The adults showed a greater ability to accurately recognize the facial expressions, despite the editing done to the faces. This suggests that by adulthood, emotion recognition is rapid and accurate.

How are people so efficient in their emotion recognition? What pieces of information do children and adults rely on when determining the emotion expressed in another person? For adults and children, there are multiple modalities that give information about emotion recognition. Chronaki (2015) examined how participants evaluated different emotions (i.e., mad, happy, sad and scared) using both auditory and visual stimuli. Participants ranging in age from 3- to 45- years- old identified four emotions that were modeled in a picture by a female, and each emotion had intensity that ranged from mild to high. The participants were asked to identify the emotion that was depicted. Additionally, the participants identified the emotion of a non-word sound: “ah.” A morphing program was used to create three different stimulus intensities (mild,

moderate and high) of each emotion. The participants identified the emotion they heard. In both the visual and auditory portions of the experiment, recognition accuracy was highest with happy and angry stimuli, as compared to the sad stimuli. Further, the results indicated that accuracy improved with age for the mild intensity expressions, but not for the medium and high intensity expressions. This suggests that subtle expressions are more accurately identified later in development. Consistent with previous research, the results indicated that preschool- aged children have the capability to distinguish and recognize emotions using visual and auditory input, but visual cues are more accurately recognized as compared to auditory cues. Vocal auditory emotion recognition continues to develop beyond age eleven.

Sometimes the visual cues in our environments provide us with hints about how a situation should be perceived. For example, seeing a child cry as she stands next to a dropped ice cream cone indicates that the child is crying due to the ice cream dropping. If the child was observed without an ice cream cone, we might conclude different reasons for why the child is upset. The context, in this case the ice cream cone, provides the information to let others know why the sadness is occurring, this therefore helps the on looker appropriately identify emotions. The term “context cue” is a blanket term used to describe stimuli in the environment that can add information to the environment or change our reaction to the environment. These environmental factors can be things such as objects or physical stimuli, as well as other people. The context cues labeled for our purposes as “object context cues” are the cues that are physical objects in the environment. These objects are often associated with a feeling or emotion. For example, the sight of a spider often elicits fear or panic. These objects therefore create a context or explanation for the emotion being displayed.

Another type of context cue that provides information for how a situation can or should

be perceived is the other people in our environment. These are called “people context cues,” and they are determined by the facial expressions displayed on people around us. For example, if you walked into a room and everyone there was crying, that would then indicate a context for the situation. Other people’s emotions allow us to learn how to properly react in new situations, and also provide us with reassurance when their reactions match our own. Context cues are important, and can cause emotions and affect how they are perceived.

Theurel et al. (2016) investigated how visual contextual information created a relationship with emotional expressions. Congruency occurs when the presented stimuli match each other on the basis of emotion. For example, a happy scene (e.g., a beach) presented with a person displaying what is considered to be a happy facial expression (e.g., a smile) would be considered a congruent stimulus. Participants, children between 5 and 18, were shown pictures of a child portraying one of five different facial expressions in conjunction with a scene: happiness, anger, sadness, disgust and fear. The control group for this study was shown pictures of a child portraying one of the five different facial expressions without a scene. The scenes either had a context indicator, a dog running across the street to a person making a happy expression, or simply showed a person on the sidewalk making a happy expression. Note that these cards created a relationship between the target character and the environment around the target character. The participants chose an emotion based on the scene they saw and what they thought would be appropriate in that specific situation. The results showed that congruent contextual and expressive information allowed more accurate judgment than emotional expressive cues alone. The more similar the context cues and the emotion, the easier it was for emotion to be accurately recognized. This is due to the fact that context cues provide more information regarding the environment, and therefore lead to more accurate judgment than without context cues. This

improvement effect was seen in participants as young as five years old, indicating that this age group utilizes context cues. Facial expressions can be considered ambiguous at times, and as are they rarely presented in an isolated way, the addition of context heightens the understanding of those expressions.

Kuwabara et al. (2011) further explored context cues. The participants in this study were children ages 3- to 5- years- old. Half of the participants were Japanese and the other half were American. The participants were presented with stimulus cards: one card with a picture of a cartoon child displaying an emotion next to a non-neutral object and one card with a picture of a child with a blank face next to a neutral object. The neutral objects were things like a pencil or chair. The non-neutral objects were either positive (e.g., an ice cream cone) or scary (e.g., a lion). The experimenters asked the children to look at a card; for example, the card might contain a cartoon image of a child with a happy facial expression next to an ice cream cone. A second card would display a blank-faced child next to a chair and the children were tasked with filling in the blank face with a choice of four expressive faces. These faces ranged in emotion and matched the emotion shown in the initial picture; for example, for the happy condition, the faces ranged from “sort of happy” expressions to “very happy” expressions. The measure of emotion was created using a pre- established scale for participants to choose from, and did not allow the participants to create unique emotion strength faces. The researchers measured the extent to which participants changed the strength of the depicted emotion from non-neutral to the neutral object. For example, it is possible that when an ice cream cone was the first stimulus presented and the chair the second stimulus, participants would respond by decreasing the strength of happiness because the first object is more positive than the neutral object. Participants were affected by the context changes. The visual stimuli presented affected the way in which the

emotions presented were seen by the participants, implying that visual indicators are strong cues used to correctly identify emotions.

In addition to using objects in our environment to help us determine emotion, we also reference the other people in our immediate surroundings. Masuda et al. (2008) examined adults to see how cartoon characters expressing emotions were interpreted by the participants based on the cartoon character's environment. The participants, half of whom were American and half of whom were Japanese, saw a series of pictures that depicted groups of people, all of whom were displaying an emotion. Half of the participants saw a group in which all the members displayed the same facial expression. The other half of the participants saw a group in which the central person (the target) displayed a different emotion from the rest of the group. The task was to see how the facial expressions of the non-central group members affected the perception of the depicted emotion of the target character. Participants looked at the group of people, and then rated the intensity of the emotion of the target character. The results of the study showed that the participants were more likely to rate the target's face as happier when the background characters were also expressing happy expressions. This was replicated with angry and sad expressions as well. As compared to the other stimuli changes, such as changes in the clothing of the characters, participants were more accurate in rating the emotion correctly when the change was in the central figure's facial expression. These findings indicate that environmental context cues have an impact on how emotions are perceived and that based on those environmental cues, the identification of the perceived emotion can change.

As a whole, past work on emotion recognition suggests that children as young as 3 years of age can use objects as context cues when identifying emotions (Kuwabara et al., 2010). Similarly, adults are able to use people as context cues when identifying emotions (Masuda et al.,

2008). It has also been established that congruent situations result in more accurate emotion recognition (Masuda et al., 2008; Theurel et al., 2016). However, no study has ever systematically varied these important factors (objects, people, and congruency), so we do not yet know precisely how the three variables interact.

Therefore, the present study extended upon past work in three important ways: 1) instead of only using objects as contextual cues, we also use people (i.e., two cartoon characters with facial expressions) as contextual cues; 2) we asked participants to indicate the strength of that emotion on a horizontal line; and 3) preschool-aged children and adults participated. The purpose of this study was to examine how different kinds of contextual cues affect intensity of emotion being perceived in preschool- aged children and adults. This study aims to examine the degree to which people or objects as context cues alter the perception of emotion in children and adults.

There are two main hypotheses. First, Kuwabara et al. (2010) reported that American children did not consider both the objects they were presented, and as a result, did not change the strength of the emotion of the target character. This implies that object cues were not considered and did not have a strong effect on emotion intensity. Therefore, the hypothesis of the present study is that children and undergraduate student participants will notice the people context cues more than the object cues. The results of Masuda et al. (2008) suggest that the participants will report the most intense emotion in response to context cues when they are presented congruently compared to incongruently. Thus, the second hypothesis of the present study is that participants will respond more intensely to the congruent situations as compared to the incongruent situations.

Method

Participants

Children: Twenty-six children aged 3-to 5- years-old ($M=3.5$ years, range = 3.0 - 5.5 years- old) participated in this study. The children were recruited from, and participated in, local preschools. The guardians of these children read and signed an informed consent document before their children participated in the study. Both males ($n= 11$) and females ($n=15$) participated.

Adults: Twenty-four participants enrolled in undergraduate studies participated in the study. The participants received credit for their introductory psychology course. The participants were both male ($n=6$) and female ($n=17$).

Stimuli

Emotion Line. An emotion line was used to measure the dependent variable, the strength of the emotion featured. There were two emotion lines: a positive line that was used during positive emotion trials and a negative emotion line that was used during negative emotion trials. In both cases, the length of the line was 10 centimeters. The negative emotion line had one neutral face on the left side, and on the right side there was a negative emotion face. The positive line had one neutral face on the left and on the right side of the line there was a positive emotion face (see Figure 1).

Scenario Cards. The scenario cards depicted a child cartoon character on the left side of the card. This character was called the target character, and participants identified the emotion that the target character depicted. On the right side of the card there was an object (Object Cards) or two cartoon characters (People Cards), depending upon the trial. The cards depicted five ‘positive’ cues (one per each card), and five ‘negative’ cues (one per each card).

Object Cards. The positive objects were: balloons, cake, a present, rainbow, ice cream, playground, beach, candy, puppy, and a teddy bear. The negative objects were: shark, tornado, witch, scorpion, needle, spider, lion, snake, alien and ghost. The top half of Figure 2 provides examples of the Object Cards.

People Cards. On the right side of the card, there were two cartoon characters expressing an emotion; they are considered the ‘people cue’. One half of the cards depicted positive emotions. The bottom half of Figure 2 provides examples of People Cards.

Congruency. We also varied whether the target cartoon character’s facial expression matched the object cue (i.e., a congruent situation) or did not match (i.e., an incongruent situation). For example, one congruent card that displayed a positive emotion being expressed by the target cartoon character also depicted an ice cream cone. An example of an incongruent card would be a card that displayed a positive emotion being expressed by the target cartoon character and a scorpion. Half of the cards were congruent and half of the cards were incongruent.

The People Cards also varied in congruency. Half of the cards were congruent, and displayed a person expressing an emotion that was consistent with the emotion that was depicted by the other two faces on the card. For example, the target cartoon character expressed a negative expression next to the cartoon character cues who also displayed negative expressions. The other half of the cards were incongruent, and displayed a target character expressing an emotion that is inconsistent with the emotion that the other two faces on the card expressed. An example of an incongruent card would be when the target character demonstrated a negative emotion next to two cartoon characters expressing positive emotions.

Procedure

Adult and child participants were randomly assigned to one of two conditions, the object condition (congruent and incongruent situations were included), or the people condition (congruent and incongruent situations were included).

Practice trials. Before the test trials, the participants participated in the practice trials to help them to better understand the experiment. The experimenter presented the participant with the emotion line (see stimuli section), and instructed the participant to look at the entirety of the line. The experimenter explained that the participant could point at any point on the line to indicate the strength of the emotion that they were looking at. The experimenter explained that the far-left side of the line indicated a neutral strength of the emotion, and that the far-right side of the line indicated an intense strength of the emotion. The participants practiced using the line with examples given by the experimenter. Once the experimenter was confident that the participant understood the concept of the ‘emotion line’ by correctly identifying the degree of emotion on the line, the experimenter moved onto the test trials.

Test trials. The participants were presented twenty cards, one at a time, and the experimenter asked two questions about the emotion of the target character on the card. The participants were asked to identify the emotion the target character displayed, and were then asked to use the emotion line to indicate the strength of the emotion of the target character. During the experiment, a research assistant had the emotion line on her clipboard, as well as the recording sheet. As the participant pointed to the line for each trial, the assistant measured the line and recorded the number of centimeters to one decimal place. They also recorded the emotion the participant identified, as well as the card number in each condition. The participants

completed a total of 20 trials. After every five trials the child participants were given a sticker as a reward. The adults did not receive a reward during the experiment.

Results

A correct trial was when the participant correctly identified the emotion being displayed on the card, whereas an incorrect trial was when the participant incorrectly identified the emotion being displayed on the card. For example, if the emotion on the card was positive and the participant identified it as a negative emotion, that was deemed an incorrect response. The overall percentages of trials done correctly across age and conditions was above ninety percent. If the participant identified the incorrect emotion, then the correlating emotion line was presented, the trial continued, and the researcher indicated that the emotion was identified incorrectly on the trial sheet. See Table 1 for those numbers.

The average intensity responses for each of the four conditions (i.e., Congruent/Positive, Congruent/Negative, Incongruent/Positive, and Incongruent/Negative) were calculated for the object context cues and people context cues, for both the children and adult participants. See Table 2 for those means.

To determine the effect of the congruency and cues on the strength of emotion identified, a 2 Gender (male, female) X 2 Age (children, adults) X 2 Cues (objects, people) X 4 Category (congruent/positive, congruent/negative, incongruent/positive, incongruent/negative) repeated measures ANOVA on the means of the identified emotion strength was performed.

The repeated measures ANOVA yielded two main effects for the between subjects factors. A main effect of Age, $F(1, 49) = 5.76, p = 0.022$, indicated that the mean emotion strength reported by adults ($M = 6.83, SD = 1.85$) was lower than that reported by children ($M = 7.69, SD = 1.64$). This suggests that children responded with higher intensity to the cues than

adults. The second main effect was of Gender, $F(1,49) = 8.10, p = 0.007$. Specifically, males ($M = 6.78, SD = 2.30$) reported lower overall emotion strength than females ($M = 7.54, SD = 1.79$). Additionally, the within subject factors yielded a main effect of Category, $F(1,49) = 40.88, p = 0.001$. To find where the significant differences were, a series of paired sample t-tests were performed. There was a significant difference between the congruent positive ($M = 8.19, SD = 1.65$) and the congruent negative ($M = 6.88, SD = 2.14$) conditions, $t(49) = 4.20, p = 0.000$. There was a significant difference between the congruent positive and the incongruent positive ($M = 7.48, SD = 2.02$) conditions, $t(49) = 2.54, p = 0.001$. There was a significant difference between the congruent positive and the incongruent negative ($M = 6.52, SD = 2.44$) conditions, $t(49) = 4.14, p = 0.000$. Lastly, there was a significant difference between the incongruent positive and the incongruent negative conditions, $t(49) = 2.31, p = 0.03$.

However, the main effect of Category was subsumed by a Category by Cue interaction, $F(1,49) = 24.19, p = 0.006$. To find the source of this interaction, a series of paired sample t-tests were conducted on the pairs of the means within the Category variable, separated by Cue type. This analysis indicated that the main effect of category was only significant for the object cue. The following cues were only statistically significant for the object context cue. Specifically, there was a significant difference between the congruent positive ($M = 8.65, SD = 1.28$) and the congruent negative ($M = 7.15, SD = 2.43$) conditions, $t(23) = 3.23, p = .004$. There was a significant difference between the congruent positive condition ($M = 8.65, SD = 1.28$) and the incongruent positive ($M = 7.35, SD = 2.14$) conditions, $t(23) = 3.27, p = 0.003$. There was a significant difference shown between congruent positive ($M = 8.65, SD = 1.28$) and the incongruent negative ($M = 6.16, SD = 2.85$) conditions, $t(23) = 4.26, p = 0.00$. There was a

significant difference between the congruent negative ($M = 7.15$, $SD = 2.43$) and the incongruent negative ($M = 6.16$, $SD = 2.85$) conditions, $t(23) = 2.38$, $p = 0.026$.

Discussion

The present experiment addressed how emotion intensity was affected by three important factors: objects cues, people cues, and congruency between a target and the cues. Additionally, the present study examined the degree to which those factors affected emotion intensity in two age groups: preschool-aged children and adults. There were two main hypotheses: (1) participants would have higher emotion strength means for the people context cues compared to object cues, and (2) participants would provide more intense emotional ratings in the congruent situation as compared to the incongruent situation.

The results do not support the first hypothesis, as the analyses revealed that people context cues did not yield a significant reaction whereas the object context cues did. This is not to imply that facial expressions of others are not used to help with emotion recognition. However, the current study found object context cues had a larger impact on the participants than the people context cues. This finding is in accordance with Kuwabara et al. (2010), who found that visual stimuli affected the way in which the emotions presented were seen by the participants; this implies that visual indicators (objects) are strong cues used to correctly identify the strength of the emotions. This is not true for all visual cues, only object cues. The findings of the present study are not in accordance with Kuwabara et al. (2010) in terms of the cultural differences that Kuwabara found. The Kuwabara study found that American children were not affected by object cues, however in the current study, it was found that the participants were affected by object context cues.

The reason for this finding may be that children and adults receive more emotion

information from object cues than they do from people cues. Most object cues are inherently valenced, and often an object has a straightforward message or emotion with which it is associated. As a result, it may not be surprising to see the influence of object cues in this study. However, there are exceptions because people may have different attitudes towards different objects based on their experiences and preferences. Facial expressions are more complicated, and are inconsistent in real-world applications. Even in similar situations, different people react in different ways. Facial expressions will provide emotion recognition information to younger children as they develop, but the variability of strength of emotion and situations that specific emotions are found in can create inconsistency. Further, there is a possibility of deception in emotion. In other words, humans are capable of masking emotions or displaying emotion disingenuously. This may contribute to the inconsistency and therefore the unclear perception of the emotion displayed by a facial expression. This implies that object or constant environmental cues may be more reliable than people cues, and when development occurs, children may be more prone to notice the object cues as they stay constant. As an adult, it is easy to be skeptical of emotions being expressed, as we participate and are aware of possible deception; therefore, we may rely heavily on environmental cues over those we are getting from people around us.

The second hypothesis was supported, as the congruent conditions yielded stronger emotion scores than the incongruent conditions. These findings are in agreement with current literature. Masuda et al. (2008) found that participants were more likely to rate the target's face as happier when the background characters were also expressing happiness. This reflects real life: when the situations we come across are congruent, it is much easier for us to successfully determine the emotion being demonstrated, and possibly the strength, depending on if any environmental clues are present that could be the causes for the emotion. When incongruent

situations are presented, the lack of consensus across cues and people cause the need for further investigation to determine what the proper emotional response is. Not only does this require more thought and time, it may also cause insecurity about making the correct determination of emotion. Emotion recognition is made more challenging by the fact that emotion expressions and environmental cues may give different messages. Congruency across expressions and environmental cues can be used as another tool for accurate emotion recognition, and can help both children and adults navigate potentially unclear situations. This study reveals that for both adults and children, congruency impacted the way that emotions are perceived: the intensity of the emotion is enhanced by consistent cues in the environment.

By presenting the emotions with cues in the same environment, a relationship was created between the emotion and the cues. This is in accordance with Theurel et al. (2016), who found that congruent contextual and expressive information allowed for more accurate emotional judgment. The more similar the context cues and the emotion, the easier it is for emotion to be accurately recognized. Theurel et al. (2016) presented these congruent or incongruent situations using the cues as explanations for the emotion. In the current study, however, the target character and the cues are not presented in a way that assumes a relationship between the two. The objects in the cards either increased or decreased the intensity of the emotion being shown, and in that regard, the object creates a context to the emotion. This present study created an interesting perspective on cues and how large of an impact they have on emotion. In the Theurel et al. (2016) study, the situations are presented with a clear relationship and therefore the cues provide clear context for emotion recognition. This study did not provide a clear relationship between the target character and cue, except that the target character and cue are presented on the same card. It is a significant finding that despite no relationship, the cues had an impact on the way the

emotion of the target character is perceived. It implies that even the presence of the object or person can have an effect on the situation, despite the perceived insignificance it provides in the context. Perhaps this is how children begin to create contextual relationships so early in their development: it begins as more of an association than a direct relationship. This style of perceiving might continue to be present through adulthood. Perhaps a new awareness for cues in the environment is developed, an association is built, and then the perception of the context cue and the emotion turns into a relationship.

In the current study, we also examined both children and adults. Interestingly, the children in the present experiment reported overall higher emotion strengths compared to the adult participants. Further, these results agree with those of Russell and Nelson (2016), as the child participants were able to successfully differentiate between basic emotions (happy, mad, scared and sad). It was anticipated that the adults would perform at a higher level of emotion recognition than the children, as adults show a greater ability to accurately recognize facial expressions (Balas et al., 2015). Although it seems that children were more accurate in their recognition due to the higher intensity means they reported, however it is important to keep in mind that high mean scores do not always imply high emotion recognition in this study. There is a difference between correctly identifying the emotion displayed and indicating an awareness of the context cue which should affect the intensity of the perceived emotion of the target character. Lower scores may indicate a greater attention to the cues, as in the incongruent situations presented should be scored lower if the cue is incongruent. That is, a lower score in emotion intensity in an incongruent situation indicates that the cue is causing the emotion to be perceived as lower, due to the cue creating a contrasting emotion. Because the adults reported lower emotion strength scores in the incongruent sections, it could suggest that they the adults were

more aware of the incongruent situations. It could be argued that adults are more likely to notice smaller nuances in emotion recognition, such as congruency.

The development of emotion recognition is crucial for successful social interactions, and when it isn't developed properly, it can have negative implications on social ability. The participants did not have known atypical development, and both the children and adult participants demonstrated that they were able to adequately identify and measure the intensity of the emotions being displayed. If atypical development had been present, it might manifest in a difficulty with emotion recognition, or the subtleties of the emotions being displayed. Both groups demonstrated the ability to accurately identify and recognize emotions successfully.

When emotion recognition is accurate, it allows for other aspects of emotion development to be successful. When all aspects of emotion development are successful, one is deemed emotionally competent. Emotion competence is the ability to appropriately express and regulate emotions (Curby, Brown, Bassett, & Denham, 2015). The regulation of emotion is defined as all the processes, internal and external, through which people manage their emotions to accomplish their goals (Sala et al., 2014). The participants in the current study were required to regulate their emotions to successfully complete the task in the experiment. The children especially demonstrated the ability to regulate their emotions, as they were given an emotional stimulus (the card) that might have elicited an emotional response. None of the participants demonstrated seemingly uncontrollable emotional reactions, and they were successful in accomplishing the goal of the experiment. Emotion knowledge was shown in the experiment as the participants used environmental cues to gain information about emotions. Although the objects were not presented with an established relation to the face that was presented on the cards, the object next to the target did provide a clue to the onlooker, and changed the strength of

the emotion perceived accordingly. This demonstrates that the cue had an impact directly on the target and therefore implies that the participant took the entire card into account before making their evaluation. Overall, emotional competence was demonstrated within the experiment, as ability to appropriately express and regulate emotions was shown.

This study investigated the relationship between emotion recognition, emotion intensity and the types of cues that influence it, along with the addition of incongruent and congruent situations. Moving forward, measuring the emotion strength could be revised. This may include asking the adults to verbalize the strength of the emotion they were perceiving, which may create a different way in analyzing the ability of adults to accurately recognize emotions. This might reveal a more specific response from the adults and if allowed to verbalize what they are thinking, participants may reveal more about how they were evaluating the emotions they were perceiving. Further, it might be valuable to separate the emotion categories from positive and negative to more specific emotions such as “upset” or “surprised”. This would also provide specific information about which individual emotions are affected by which cues, and could fill in specific developmental information about which cues affect which emotions as development occurs.

Additionally, the stimuli cards could be created with more realistic depictions of people and objects to improve the real-world application of the results. These additions are important in moving this research forward as it attempts to capture data in a more realistic way, and therefore provides more accurate information about how children and adults perceive, recognize, and understand emotions. Due to the complicated nature of emotion recognition, it is unclear from the current study why the people context cues were less effective. It would be beneficial to somehow create a study examining emotion deception, and how children use context cues to

detect emotion deception in adults. Further, how does the ability to detect emotion deception influence the context cues they rely on to fill in the blanks in the situation, and which cues are most effective in helping children navigate emotion deception? However, despite the fact that the stimuli cards in the current study were not realistic, the present experiment provides important insight into the factors that influence emotion recognition and perceived emotion intensity in preschool-aged children and adults, and the overall status of emotional competence.

The current study has provided evidence that objects are used when evaluating the strength of emotions being expressed by others. This finding has large implications for social situations, as we now know that object cues are taken into account. In the education for preschool aged children, object cues could be incorporated in a way that allows children to use objects to their benefit when identifying the strength of an emotion. These findings also have implications for atypical development. Knowing that object cues can be used as a tool for children to accurately identify and measure the intensity of emotions, then objects as context cues can then help in social situations. Once emotion recognition, and therefore emotion competency, becomes stronger, social interactions will improve. This could help with confidence in social situations and improve children's interactions with others overall.

References

- Balas, B., Huynh, C., Saville, A., & Schmidt, J. (2015). Orientation biases for facial emotion recognition during childhood and adulthood. *Journal of Experimental Child Psychology*, 140, 171-183.
- Brenna, V., Turati, C., Montiroso, R., & Cassia, V. M. (2015). The interference effect of emotional expressions on facial identity recognition in preschool aged children. *European Journal of Developmental Psychology*, 12 (4), 443- 458.
- Castro, V.L, Halberstadt, A.G, Lozada, F.T, & Craig, A.B. (2015). Parent's-emotion related beliefs, behaviors, and skills predict children's recognition of emotion. *Infant and Child Development*, 24, 1-22.
- Chronaki, G., Hadwin, JA, Garner, M., Maurage P., & Sonuga- Barke, E. (2015). The development of emotion recognition from facial expressions and non-linguistic vocalizations during childhood. *British Journal of Developmental Psychology*, 33, 218-236.
- Curby, T. W., Brown, C. A., Bassett, H. H., & Denham, S. A. (2015). Associations between preschoolers' social- emotional competence and preliteracy skills. *Infant and Child Development*, 24, 549-570.
- Denham, S.A., Blair, K.A., DeMulder, E., Levitas, J., Sawyer, K., Auerbach- Major, S., & Queenan, P. (2003). Preschool emotional competence: pathway to social competence? *Child Development*, 74 (1), 238- 256.
- Denham, S.A., Zinsser K, & Bailey CS. (2011). Emotional intelligence in the first five years of life. *Encyclopedia of Early Childhood Development*, 1, 1-5.

- Denham, S.A., Bassett, H.H., Way, E., Mincic, M., Zinsser, K., & Graling K. (2012). Preschoolers' emotion knowledge: self-regulatory foundations, and predictions of early school success. *Cognition and Emotion*, 26(4), 3-16.
- Fine, S. E., Izard, C. E. & Trentacosta, C. J. (2006). Emotion situation knowledge in elementary school: models of longitudinal growth and preschool correlates. *Social Development*, 15 (4), 731- 751.
- Kitayama, S., Duffy, S., Kawamura, T. & Larson, J.T. (2003). Perceiving an object and its context in different cultures: a cultural look at new look. *Psychological Science*, 14(3), 201-206.
- Kuwabara, M., Son, J.Y., & Smith, L.B. (2011). Attention to context: U.S. and Japanese children's emotional judgments. *Journal of Cognitive Development*, 12(4), 502-517.
- Masuda, T., Mesquita, B., Tanida, S., Ellsworth, P. C., Leu, J., & Veerdonk, E. (2008). Placing the face in context: cultural differences in the perception of facial emotion. *Journal of Personality and Social Psychology*, 94(3), 365-381.
- Matsumoto, D., Keltner, D., Shiota, M. N., O'Sullivan, M., & Frank, M. (2008). Facial expressions of emotion. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions* (3rd ed., pp. 211–234). New York: Guilford.
- Nelson, R. & Russell, J. (2016). A facial expression of pax: assessing children's 'recognition' of emotion from faces. *Journal of Experimental Child Psychology*, 141, 49-64.
- Pahl, K. M. and Barrett, P. M. (2007). The development of social-emotional competence in preschool aged children: an introduction to the Fun FRIENDS program. *Australian Journal of Guidance & Counseling*, 17 (1), 81-90.

Sala, M. N., Pons, F. & Molina, P. (2014) Emotion regulation strategies in preschool children.

British Journal of Developmental Psychology, 32, 440-453.

Singh, S. D., Ellis, C. R., Winton, A. S. W., Singh, N. N., Leung, J. P., Oswald, D. P. (1998).

Recognition of facial expressions of emotion by children with attention-deficit

hyperactivity disorder. *Behavior Modification*, 22 (2), 128-142.

Sully, K., Sonuga-Barke, E. J., & Fairchild, G. (2015). The familiar basis of facial emotion

recognition deficits in adolescents with conduct disorder and their unaffected relatives.

Psychological Medicine, 45, 1965-1975.

Theurel, A., Witt, A., Malsert, J., Lejeune, F., Fiorentini, C., Barisnikov., & Gentaz, E. (2016).

The integration of visual context information in facial emotion recognition in 5-15 year

olds. *Journal of Experimental Child Psychology*, 150, 252- 271.

Thome, J., Liebke, L., Bungert, M., Schmahl, C., Domes, G., Bohus, M., & Lis, S. (2015).

Confidence in facial emotion recognition in borderline personality disorder. *Personality*

Disorders; Theory, Research and Treatment, 7(2), 159-168.

Wright, K., Dubois, D.P., & Kelley, E. (2015). The animate-inanimate distinction in preschool

children. *British Journal of Developmental Psychology*, 33, 73-91.

Yan, K., Andrews, T.J., & Young, A. W. (2015). Cultural similarities and differences in

perceiving and recognizing facial expression of basic emotions. *Journal of Experimental*

Psychology: Human Perception and Performance, 42(3), 423-440.

Figure 1. Positive and Negative Emotion Lines



Negative Emotion Line



Positive Emotion Line



Figure 2. Congruent and Incongruent (Positive and Negative Emotions) Sample Stimuli Cards



Congruent Object (Positive)



Congruent Object (Negative)



Incongruent Object (Positive)



Incongruent Object (Negative)



Congruent People (Positive)



Congruent People (Negative)



Incongruent People (Negative)



Incongruent People (Positive)

Table 1

Number of Trials Where The Emotion Presented Was Correctly Identified

Conditions	Correct Number of Trials	Incorrect Number of Trials	Percent Correct of Trials
Congruent (Children)	254	6	97.60%
Incongruent (Children)	256	4	98.40%
Congruent (Adults)	237	3	98.75%
Incongruent (Adults)	232	8	96.60%

Table 2

Means of Cues Across Congruency and Age; the standard deviations are presented in parenthesis.

Cues	Congruency & Valence	Children	Adults
Objects	Congruent/Positive	8.93 (1.18)	8.32 (1.36)
	Congruent/Negative	6.75 (3.06)	7.61 (1.42)
	Incongruent/Positive	8.22 (1.96)	6.32 (1.95)
	Incongruent/Negative	5.93 (3.38)	6.43 (2.21)
People	Congruent/Positive	8.42 (1.83)	7.11 (1.70)
	Congruent/Negative	7.37 (2.01)	5.89 (1.39)
	Incongruent/Positive	8.71 (1.76)	6.49 (1.46)
	Incongruent/Negative	7.20 (2.61)	6.51 (1.06)