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"THIS WORD SOUNDS NICER." EXPLORING FACTORS INFLUENCING CHILDREN'S PERCEPTION OF FOREIGN ADJECTIVES RELATED TO EMOTIONS

Keywords: children, emotions, linguistic intuition, acoustic cues, contextual cues.

ABSTRACT

The present study investigates the ability of five-year-old children (N=83), all of whom are native speakers of Polish, to indicate Italian adjectives expressing positive emotional states after seeing a corresponding visual representation, despite having no prior exposure to the Italian language. The participants were presented with a photograph depicting a positive emotional state (which could be roughly associated with happiness). Simultaneously, they heard a set of two Italian adjectives, one of which was positive, and one negative (e.g., *felice* – happy, and *triste* – sad). The children were then asked to choose the adjective they believed best represented the positive emotion shown in the picture. The task was repeated with eight pairs of opposites in total. It was hypothesized that certain acoustic features of the presented Italian adjectives, such as pitch, intonation, and voice quality, would allow children to associate them with specific emotional valences, especially taking into account the presence of subtle contextual cues (the visual stimulus, the experimenter's facial expression, gaze etc.). The results obtained corroborated the hypothesis, revealing that the majority of children inferred the emotional valence of unfamiliar words. However, after examining the results obtained by girls and boys separately, it turned out that while girls exhibited a significant degree of accuracy in their associations, demonstrating remarkable capacity to determine the emotional valence of unknown lexical items based on their acoustic properties and contextual cues, boys' scores were significantly lower, which may indicate that their understanding of the emotional dimensions of language develops at a later age compared to girls.

INTRODUCTION

The human capacity for language seems to be the greatest achievement of cognitive development, enabling us to construct and convey complex thoughts, emotions, and experiences. While much ground-breaking research carried out in this context has focused on the acquisition of native languages (e.g., Chomsky, 1957; Bates & MacWhinney, 1982; Tomasello, 2003), an increasing number of studies investigate how young children deal with the complexities of non-native linguistic systems (e.g., White, 2003; Singleton, 2005; Cook, 2016). The present study is devoted to a fundamental aspect of second language understanding: the perception of emotional vocabulary. Specifically, it investigated whether 5-year-old Polish children, with no prior exposure to Italian, can accurately associate Italian adjectives expressing positive emotions with the corresponding visual representation.

This article explores the relationship between children's linguistic intuition, foreign language perception, and ability to judge the valence of unfamiliar words. It is grounded in the understanding that emotional expression is a universal human experience, yet its linguistic manifestation varies significantly across cultures and languages. While basic emotions like happiness or sadness are universally recognized (Ekman, 1992), the specific lexical items used to describe them differ significantly. This raises questions about the extent to which emotional vocabulary acquisition is shaped by innate predispositions, cultural influences, and the specific characteristics of the target language. The present paper is devoted to the emotion of happiness, understood in very general terms: since the adjectives used in the experiment go beyond the most basic term "happy" (which, interestingly, can be translated into Italian in two ways, as *felice* or *allegro*).

Another theoretical perspective worth mentioning in the context of the perception of emotions is the so-called Sapir-Whorf hypothesis, which suggests that language shapes our understanding of the world (Sapir, 1921; Whorf, 1956). It has to be noted, however, that the hypothesis in its strong version, known as linguistic determinism, has been subject to considerable debate and criticism. Importantly, linguistic determinism does not have anything in common with the aforementioned universality of emotions (since according to P. Ekman, basic emotions are recognized across cultures, regardless of language), however, more nuanced interpretations of the hypothesis, known as linguistic relativism, see language as subtly influencing cognitive processes and the way in which we categorize and conceptualize experiences, including emotions. A. Wierzbicka, who undoubtedly is one of the most influential linguists related to linguistic relativism, argues for the existence of universal semantic primitives (or primes, 1996, p. 25), present in all languages, which form the foundation for expressing more complex meanings, such as emotions. Because the primitives are universal, they allow for cross-cultural understanding of emotional concepts, even if the specific words for emotions vary significantly between languages. This challenges the idea that language entirely determines our understanding of emotions, as it suggests a shared, underlying conceptual framework, and seems to go hand in hand with Ekman's universality of emotions.

Still, Ekman's and Wierzbicka's work only provides a strong theoretical foundation for the expectation that children should be able to recognize basic emotions in the pictures; not necessarily that they should correctly recognize the words describing them in a foreign language. In the experiment, the children's task is not to identify happiness (although each of the participants is asked to describe the emotion presented in the picture to ensure it raises no doubt), but to choose the word which sounds more like it should describe happiness: they are not processing the semantic content of the Italian words, but reacting to their phonological properties and contextual cues. Therefore, it should be made clear what they actually are.

ACOUSTIC AND CONTEXTUAL CUES AND THEIR ROLE IN EXPERIMENTS WITH CHILDREN

It goes without saying that acoustic and contextual cues are useful in the process of decoding emotions, however, the extent to which they might be helpful for children in recognizing the emotion of happiness expressed in a foreign language remains unknown. The last two decades of the 20th century brought many influential experimental studies devoted to children's ability to understand emotional expressions in their native language. Research on infant language development has demonstrated that young children are remarkably fast at acquiring new words. Some studies have investigated infants' sensitivity to emotional prosody in their native and foreign languages, demonstrating that they can discriminate between different emotional vocalizations (e.g., Fernald, 1993). P. K. Kuhl (1994, p. 815) has shown in her experiments that children as young as six months old have impressive abilities to discriminate between speech sounds. However, by the end of the first year of life, these initial abilities decline – for instance, J. F Werker and L. Polka (1993 in Kuhl, 1994, p. 812) have demonstrated that one-year-olds fail to discriminate foreign language contrasts that they once distinguished as their perception becomes increasingly turned to the specific sounds of their native language. These findings suggest that infants possess a great capacity for speech perception and extracting meaningful patterns from the linguistic environment, but the extent to which it is reduced in the first five years of life, or in childhood understood in more general, broad terms, remains unknown. Studies with older children are usually devoted to different aspects of emotion recognition. Apart from focusing on the development of emotional vocabulary, they analyze the role of social and emotional cues, which may also be significant in the case of an unknown language, especially given the fact that they often engage children at a similar age to the present study's participants (e.g., Harris, 1983 – six-year-olds and ten-year-olds; Saarni, 1999 – children between the ages of 5 and 14). It has also been confirmed that the ability of adults, whose mastery in their native language is undoubted, deteriorates greatly in reference to foreign languages, in contrast to the studies on speech perception conducted with infants. Adults have major difficulties noticing differences between sounds that are not used to distinguish words in their first language – for instance, Kuhl quotes a study in which adult native speakers of Japanese cannot differentiate between the American English sounds /ɹ/ and

/l/, as such sounds do not play an important role in word distinction in Japanese (Best, 1993 in Kuhl, 1994, p. 812).

Since the present study deals with a language unknown to the experiment participants, it can be hypothesized that, in such a situation, the role of acoustic and contextual cues will be particularly significant or even decisive in the process of recognizing and understanding emotions. As stated by Huilgol et al., "acoustic cues are physically observable patterns in the speech signal that can be extracted and interpreted to provide information about the speaker, or about the underlying message" (2019, p. 184). While information about the speaker does not seem to be a factor influencing the results of the present study, information about the underlying message certainly is. If so, it is worth exploring which acoustic cues might suggest the emotion of happiness in the underlying message. It is generally agreed that the cues expressing emotions in speech and music performance are closely related (Juslin, 2001), therefore, the list of acoustic cues suggesting happiness comes from a musical background. Based on P. N. Juslin's studies, M. Spitzer enumerates the following cues for happiness: fast mean tempo; small tempo variability; staccato articulation; large articulation variability; fairly high sound level; little sound level variability; bright timbre; fast tone attacks; small timing variations; sharp duration contrasts; and rising micro-intonation (2010, p. 152). Although a random component needs to be taken into account, especially since the experimenter vocalizes eight pairs of adjectives with each individual participant, the list above gives an idea as to what "happy words" should sound like.

Some researchers dealing with the psychological aspects of understanding emotions note the importance of vocal cues as well. For instance, K. R. Scherer (2003) argues that emotional valence is inherently linked to certain acoustic features of speech, such as pitch, intonation, and voice quality. Consequently, words associated with positive emotions may tend to have higher pitch and greater melodic variety, while words expressing negative emotions may exhibit lower pitch and more sudden changes in intonation. This confirms Juslin's findings related to the musical aspects of expressing positive emotions mentioned above. Given the fact that scientists working in different fields discuss the link between emotional states and specific acoustic features of speech and come to similar conclusions, the consequent hypothesis for the present study is that children participating in the experiment might use subtle phonetic or prosodic cues to make judgments on the valence of the heard words, even without understanding their meaning. However, taking into account their young age, to ensure that their acoustic intuition is properly supported, the experiment needs some additional context.

There are numerous studies devoted to understanding emotions in context, many of which refer to children. They most often rely on the assumption that changes in facial behaviors and the gaze direction of the parent allow children to better understand the social situation they are in. For instance, Klinnert et al. (1983) describe the phenomenon of social referencing, through which children acquire knowledge on how to use emotional expression and attention-directing cues displayed by a parent to determine whether a new person or object is safe to approach. Similarly, contextual cues play

a crucial role in word learning. According to M. Tomasello (2001, p. 118), children use contextual information, such as the speaker's facial expression, gestures, and the social context effortlessly and accurately, being able to infer the meaning of new words. It can, therefore, be hypothesized that if children hear the word "happy", even in an unknown language, while observing a smiling face and playful interactions, they are more likely to associate it with positive emotions. Tomasello's study referred to young children (between 18 and 24 months old) learning new words, and proved that the speed of the process is dependent on their ability to perceive and comprehend adult intentions through a wide array of social-pragmatic cues. Similarly to the aforementioned findings of Scherer, the results of Tomasello's study greatly influenced the design of the experiment. It can be assumed that a happy facial expression suggests a positive emotional context. On the one hand, such context may be provided by the experimenter; however, since it requires maintaining constant eye-contact with the participants, which may be a challenge with five-year-old children, it is worth exploring other contextual alternatives. Experiments requiring effortless recognition of the emotion of happiness often refer to visual stimuli. Apart from pictures or videos presenting smiling people, they may include, for instance, puppies, kittens, or newborns (as in the case of Calbi et al., 2017). However, in the present study, the closest possible context for preschool children was introduced, namely, a picture of smiling children playing with blocks and toy cars, as will be discussed further in the section devoted to the methodology.

Research on children's understanding of emotional vocabulary in a foreign language is relatively limited. However, the abovementioned studies are undoubtedly helpful in forming hypotheses for the experiment described in the following section. It attempts to determine the factors influencing the ability of five-year-olds to understand emotional meanings in an unknown linguistic system, assuming that – based on their linguistic intuition and language perception, and with the help of subtle cues – they might be capable of making accurate assessments.

METHODOLOGY

The present study investigates the ability of five-year-old children to accurately select Italian adjectives describing positive emotional states despite having no prior exposure to the Italian language. The age group of preschool participants is often chosen for linguistic experiments, as such children are still developing their first language skills, yet their cognitive abilities make them open to learning new ones. It is hypothesized that the results of the study will be influenced by such factors as innate predispositions, acoustic cues, or contextual information, but also the participants' gender, young age, and their general ability to focus throughout the experiment. By presenting five-year-old children with pairs of Italian adjectives expressing positive and negative emotions and asking them to choose the one which better describes the picture presenting a happy and playful situation, the experiment aimed to provide insights into the extent to which certain features of emotional expression may facilitate cross-linguistic understanding.

The study involves a sample of five-year-old children (N=83, 32 boys and 51 girls) recruited from three Polish kindergartens. All of them are native speakers of Polish with no prior exposure to the Italian language, diagnosed language impairments or hearing deficiencies. To the extent it was possible, children were selected to represent a diverse range of socioeconomic backgrounds – two of the participating kindergartens were public, and one was private. The study consists of short one-on-one sessions with each child participant. The experimenter begins by establishing rapport with the child and explaining the task in simple and age-appropriate language. Then, the experimenter shows an AI-generated photograph depicting children involved in a playful situation (the visual stimulus), expressing a clear and unambiguous positive emotion, which can be broadly understood as happiness (see Fig. 1) and talks with each child about it, asking about the feelings it arouses. After that, the experimenter offers eight pairs of opposite adjectives in Italian, one of which is positive and can describe the picture, while the second one, being negative, is unrelated to the picture. The child is then asked to indicate the Italian adjective that best describes the emotion expressed in the photograph.

Fig. 1. The visual stimulus used in the experiment

There are several reasons behind choosing the Italian language for the experiment. Firstly, according to phonesthetic judgement based purely on the sound of the language, Italian is universally attractive to the human ear (cf., Anikin et al., 2023, Kogan & Reiterer, 2021), which may suggest that the positive adjectives possess some additional qualities which make them particularly pleasant; however, there is hardly any research confirming this belief. Secondly, the experimenter's fluency in Italian provides an ideal experimental condition, where there is no doubt about the correctness of transferring the subtle vocal cues mentioned previously. Finally, Italian is not a particularly popular language to be taught to preschool children in Poland, which facilitated the selection of kindergartens participating in the study. Still, all the children were asked at the beginning of the experiment whether they had any knowledge of the Italian language, had Italian relatives etc., and although all the answers were negative, unclear cases (e.g., children who admitted going to Italy yearly or whose grandparents worked in Italy) were excluded from the data analysis. Additionally, the consents signed by the children's parents prior to participation included information about the usage of the Italian language in the experiment, and those parents who had doubts concerning the reasonableness of their children's participation were asked to express it beforehand.

The adjectives selected for the study are eight pairs of opposites (see Fig. 2), with one positive adjective in each pair which can be used to describe the emotional state presented in the picture. The specific adjectives were chosen due to the fact that they do not generate obvious references to the Polish and/or English language (since the native language of all participants is Polish, and the declared learned language is English), and therefore are completely novel with no connotations with previously known linguistic systems. Apart from that, where possible, the negative adjectives were matched for length and acoustic complexity to the positive ones to avoid the effect of choosing "the easier one to repeat" (despite the fact that children were not asked to repeat the chosen adjective, a vast majority of them did so). Finally, it needs to be mentioned that the pairs of adjectives were presented in a random order, but half of the pairs always started with a positive adjective.

Positive adjective	**Negative adjective**
allegro – happy, cheerful	*triste* – sad
buono – good	*cattivo* – bad
divertente – amusing, entertaining	*noioso* – boring
felice – happy	*arrabbiato* – angry
dolce – sweet, cute	*amaro* – bitter
gioioso – joyful	*disperato* – hopeless
incantevole – enchanting	*repellente* – disgusting
meraviglioso – marvellous	*fastidioso* – annoying

Fig. 2. Positive and negative adjectives used in the experiment

As mentioned in the previous sections, it is hypothesized that five-year-old children participating in the experiment will demonstrate a significant degree of accuracy in selecting Italian adjectives expressing positive emotions, corresponding with a photograph presenting a cheerful situation involving children. Additionally, it is expected that children will be more accurate in their associations for more basic adjectives expressing emotions (i.e. *allegro*, *buono*, *felice, dolce*) compared to those describing more complex emotional states (i.e. *divertente, gioioso, incantevole*, *meraviglioso*), which also happen to be more complicated in terms of their structure. Finally, it is also hypothesized that apart from subtle acoustic and contextual cues facilitating process of recognizing and understanding emotions, participants' gender, young age, and general innate or learned abilities will also not be without significance.

DATA ANALYSIS

The present section is devoted to the presentation of the results of the experiment, and can be divided into two subsections: a quantitative and a qualitative data analysis. The former involves calculating the percentage of correct responses for each child, each gender, and the group as a whole, as well as for each word. The latter analyses children's verbal and non-verbal behavior during the task, including facial expressions and verbalizations to gain insights into their cognitive processes and emotional reactions during the task.

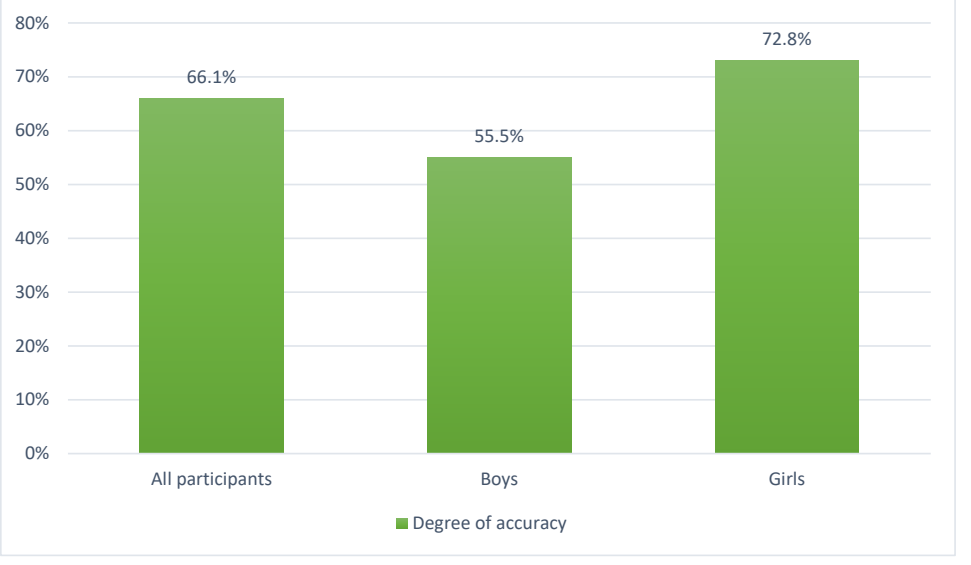

Fig. 3. General accuracy scores.

Children's accuracy scores throughout the whole experiment are presented in Fig. 3. While the percentage of correct responses is 66.1% on average, the difference between boys and girls is striking. It turns out that only 55.5% of boys' answers were accurate, while it was 72.8% in the case of girls. Such a result came as a surprise, especially bearing in mind studies in which no gender differences in understanding emotions in children were found (e.g., Fidalgo et al., 2018, p. 1065). On the one hand, it may be due to the fact that this experiment is purely linguistic, while the studies devoted to emotional comprehension in children are psychologically-oriented; however, on the other, it clearly shows that the ability of five-year-old boys participating in the study to use subtle, but present, acoustic and contextual cues to determine the emotional valence of unknown words in a foreign language is either generally limited in comparison to girls or develops in a different manner or at a later time (cf. Aznar and Tenenbaum's, 2013 study with four- and six-year-olds demonstrating that girls and boys might differ from each other in different types of emotional understanding at particular ages).

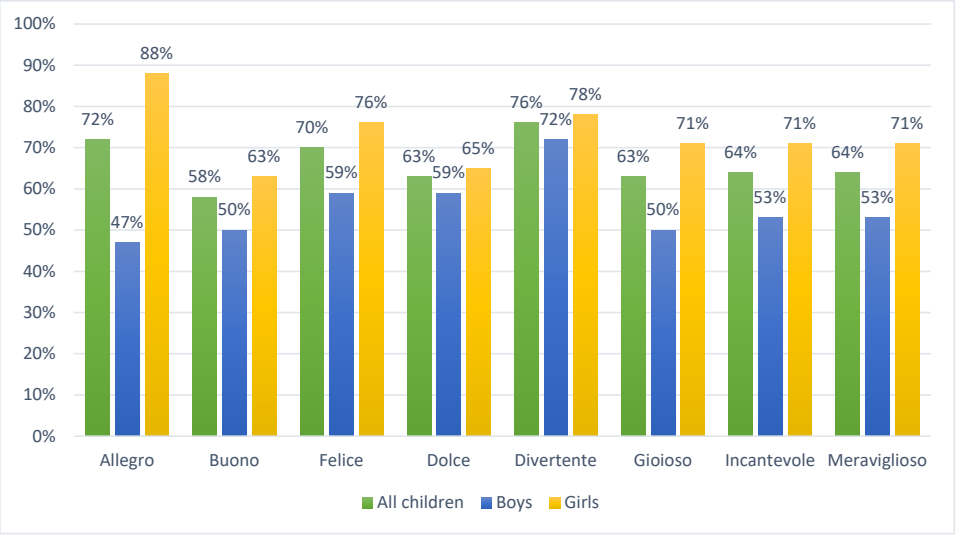

Fig. 4. Accuracy scores for each adjective

Results for specific adjectives are shown in Fig. 4. It was hypothesized that children would be more accurate in their associations for more basic adjectives expressing emotions (i.e., *allegro*, *buono*, *felice*, *dolce*) compared to those describing more complex emotional states and being more structurally complicated (i.e., *divertente*, *gioioso*, *incantevole*, *meraviglioso*). Both with and without gender differentiation, such a hypothesis is not supported. What is more, the lowest accuracy rates can be observed in the case of the most basic Italian positive adjective – *buono* (good), which further

proves that neither the simplicity of semantics nor of structure influences the judgement of the word's emotional valence. Interestingly, the greatest gender difference concerns the adjective *allegro* (happy). While it obtained the highest accuracy rate in girls (88%), it turned out to be the most difficult one for boys (47%, the only adjective where they scored below 50% of correct responses).

When it comes to the qualitative analysis of the participants' behavior during the experiment, it should be noted that neither maintaining eye-contact with the experimenter, nor constantly looking at the visual stimulus, greatly influenced the general results, which may be an indicator of a more significant role of acoustic cues (pitch, intonation, etc.) versus contextual ones (the experimenter's smiling face, the playful situation depicted in the photograph). However, the role of eye-contact is definitely more crucial than the role of the visual stimulus in the case of children who obtained the best scores. Among those who selected all of the adjectives correctly (13 girls and 1 boy, 16.9% of all children), only one girl was not looking at the experimenter's face at all during the study, while in those who made one mistake only, three-quarters maintained eye-contact. On the other hand, two of the lowest scores (25% of correct answers obtained by 3 children in total, all boys) were found in children maintaining eye-contact. In total, 65% of all children taking part in the experiment maintained eye-contact while responding; yet it was more common in boys (69%) than in girls (63%), whose overall results were better. Still, the gender difference here is rather small. Looking constantly at the visual stimulus (and not maintaining eye-contact with the experimenter at all) seems to be a factor contributing to incorrect judgements of emotional valence – only 7 children (8.4% of all participants) chose this technique while taking part in the experiment and only two of them scored more than 50% of correct answers. In general, the majority of children looked at the experimenter with quick glances at the visual stimulus from time to time, which seems to confirm the purposefulness of the presence of visual cues – the goal was to allow children to disambiguate the meaning of unfamiliar words and to confirm or revise their initial acoustic interpretations. Interestingly, children who responded quickly, and seemingly intuitively, obtained the best results – in the group of children who were able to indicate all positive Italian adjectives correctly, only two girls repeated the adjectives aloud several times, while the rest did that once or not at all. On the other hand, children who could not make the final decision usually eventually selected the incorrect answer for problematic adjectives. Importantly, most of the participants repeated the adjectives provided by the experimenter once, which in most cases was followed by an immediate answer. It is also worth mentioning that the majority of children participating in the experiment were very open and talkative – they often commented on their choices, and the sentence from the article's title was definitely the one they used most often. Since by saying that a given word sounded nicer, children referred to the acoustic quality of the presented words, it seems to confirm that certain phonetic features of the Italian adjectives, expressed through pitch, intonation, and voice quality, can be associated with specific emotional valences.

Table 1
An analysis of the children's answers, including response correctness and accompanying actions

Result	All children (% of all children)	Boys (M)	Girls (F)	Maintaining eye-contact (M/F)	Looking only at the visual stimulus (M/F)	Vocalizing the adjectives (M/F)	Responding quickly (M/F)
8/8 (100%)	14 (16.9%)	1	13	13 (1/12)	0	14 (1/13)	12 (1/11)
7/8 (87.5%)	12 (14.4%)	4	8	9 (3/6)	0 (0/0)	11 (4/7)	12 (4/8)
6/8 (75%)	7 (8.4%)	3	4	4 (3/1)	1 (1/0)	6 (3/3)	5 (2/3)
5/8 (62.5)	18 (21.7%)	5	13	12 (4/8)	3 (1/2)	15 (5/10)	13 (3/10)
4/8 (50%)	18 (21.7%)	11	7	10 (6/4)	3 (1/2)	14 (8/6)	10 (8/2)
3/8 (37.5%)	11 (13.3%)	6	5	4 (3/1)	0	7 (3/4)	5 (3/2)
2/8 (25%)	3 (3.6%)	3	0	2 (2/0)	0	0	0
1/8 (0%)	0	0	0	N/A	N/A	N/A	N/A
TOTAL:				54 (22/32)	7 (3/4)	67 (24/43)	57 (21/36)

CONCLUSION

The present study investigated the capacity of 5-year-old children with no prior exposure to Italian to indicate Italian adjectives describing positive emotions, using their intuition and perception influenced by subtle acoustic and contextual cues. The majority of positive adjectives were selected accurately (66.1%), which supports the most important hypothesis of the experiment, namely that children can infer the emotional valence of unfamiliar words. An interesting outcome is related to gender differences at play in the process. In the case of girls, the percentage of correct answers was 72.8%, while in boys in was only 55.5%. The results also revealed that the highest scores were obtained by children who maintained constant eye-contact with the experimenter and demonstrated faster response times, suggesting that in the context of understanding emotional meanings, the ability to read acoustic and contextual cues combined with immediate and intuitive answers gives the best results. Such children may have more readily perceived the inherent emotional valence of the words, leading to quicker and more accurate associations. The connection between faster response times and greater accuracy could also mean that they more efficiently processed the sounds of the Italian words, extracting certain acoustic cues that signal emotional meaning. However, the reason may also lie in basic notions for any experiment with human subjects, such as their higher level of engagement; being more attentive to the stimuli, they could have processed information more quickly, and, in consequence, responded more decisively and accurately. Still, while faster response times were associated with better performance in the experiment, further research is needed to establish a definitive causal relationship.

This study has several limitations that should be acknowledged. Firstly, the use of a limited set of stimuli may not fully capture the range of emotional expressions and the complexity of emotional vocabulary in the Italian language. Secondly, the present cross-sectional study does not examine developmental progress in children's understanding of emotional vocabulary in a foreign language. A longitudinal study tracking changes in the same group of participants would definitely contribute greatly to our knowledge on how children perceive emotions. Furthermore, the study focuses solely on the understanding of emotional adjectives. Future research should, therefore, investigate children's ability to produce and use emotional vocabulary in a foreign language, but also, explore another vital aspect, which seems to be the potential role of other parts of speech, including their particular features, such as the grammatical gender or verb conjugations, in children's understanding of emotional language. It is worth noting, however, that the present study, with a sample size of 83 children, allows us to draw some universal conclusions representative of a broader population of five-year-old children. Still, further research could include larger samples and investigate individual differences in children's ability to understand emotional language, such as general contrasts in language skills, their emotional intelligence and cognitive abilities.

Despite its limitations, the present study contributes to our understanding of linguistic intuitions and the role of acoustic and conceptual cues in perceiving emotional language. The findings suggest that children may possess an innate predisposition to understand and process emotional information. However, by analyzing the extent to which the aforementioned factors influence children's ability to infer the emotional meaning of unfamiliar words, this research emphasizes the importance of cross-cultural understanding of emotional expression. Being able to decipher how emotions are expressed across different languages and cultures can improve intercultural communication. The study also highlights the remarkable capacity of young children to extract meaning from novel linguistic input, which gives it the potential to be useful for foreign language teachers of children (especially in terms of emotional vocabulary acquisition). Emphasizing children's sensitivity to acoustic cues in the context of emotions, the present study may contribute to the understanding of the mechanisms underlying children's ability to grasp the emotional connotations of unfamiliar words, thanks to which more effective and engaging language learning methods can be developed in order to that maximally utilize children's natural learning abilities and foster a deeper understanding of the emotional dimensions of language.

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„To słowo brzmi ładniej". W stronę zrozumienia czynników wpływających na percepcję obcojęzycznych przymiotników określających emocje u dzieci

Słowa kluczowe: dzieci, emocje, intuicja językowa, sygnały akustyczne, wskazówki kontekstowe.

STRESZCZENIE

W niniejszym artykule opisano zdolność pięcioletnich dzieci (N=83), z których wszystkie są rodzimymi użytkownikami języka polskiego, do łączenia włoskich przymiotników wyrażających pozytywne lub negatywne stany emocjonalne z odpowiadającą im wizualną reprezentacją pozytywnych emocji, pomimo braku wcześniejszego kontaktu z językiem włoskim. Uczestnikom pokazano fotografię przedstawiającą pozytywny stan emocjonalny (który można powiązać ze szczęściem). Jednocześnie usłyszeli zestaw dwóch włoskich przymiotników, z których jeden był pozytywny, a drugi negatywny (np. *felice* – szczęśliwy i *triste* – smutny). Następnie dzieci poproszono o wybranie przymiotnika, który ich zdaniem najlepiej oddawał pozytywną emocję przedstawioną na obrazku. Zadanie powtórzono łącznie z ośmioma parami przeciwieństw. Postawiono hipotezę, że pewne cechy akustyczne prezentowanych włoskich przymiotników, takie jak wysokość dźwięku, intonacja i jakość głosu, pozwolą dzieciom skojarzyć je z określonymi walencjami emocjonalnymi, zwłaszcza biorąc pod uwagę obecność subtelnych wskazówek kontekstowych (bodziec wizualny, wyraz twarzy eksperymentatora, spojrzenie itp.). Uzyskane wyniki potwierdziły hipotezę, że większość dzieci będzie w stanie odgadnąć wartość emocjonalną nieznanych słów. Jednak po skonfrontowaniu wyników uzyskanych osobno przez dziewczynki i chłopców okazało się, że podczas gdy dziewczynki wykazywały znaczny stopień dokładności w swoich skojarzeniach, co może wskazywać na wrodzoną i/lub nabytą zdolność do określania wartości emocjonalnej nieznanych słów pochodzących z języka obcego na podstawie ich właściwości akustycznych i wskazówek kontekstowych, wyniki chłopców były znacznie niższe, co z kolei może dowodzić, że ich rozumienie wymiarów emocjonalnych języka rozwija się w późniejszym wieku w porównaniu z dziewczynkami.