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Preschool Children's Coding of Facial Expression of Emotions: Humanistic-psychological Approach

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Abstract

The aim of our research was to analyse the coding of facial expression of basic emotions by preschool children (happiness, surprise, sadness, fear) from the point of view of the humanistic-psychological approach. The coding performance was studied in the situations of «communication with peers», in «children groups», where each preschool child both was observed from the peer and decoded the facial expression of the peer himself. Following factors were treated as basic factors of successful coding: 1) long term face-to-face communication experience with peers attending to the same kindergarten group (familiar children); 2) lack of the interaction and communication experience with the target (unfamiliar children). 100 children from four different kindergartens of senior preschool took part in our research (6-7 years old; 49 boys and 51 girls).

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Keywords: facial expression coding; basic emotions; communication experience; preschool children

Introduction.

The problem of encoding-decoding of emotional expression has a long history of investigation and reflects the issues of cultural development of adults and children [1], cultural practices of behavior, learning of cultural expression patterns [2],[3],[4],[5],[6]. Authors [5] dealing with the methodology and methods of nonverbal behavior research pointed out, that the typical feature of the modern psychology of nonverbal behavior consists in using of different components of nonverbal behavior as indices, measures, attitudes registration, personality behavior styles or as a reliable assessment instrument of various abilities and skills. A lot of attention is paid to

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studies of expressive behavior in the context of interpersonal sensitivity, development of coding systems of nonverbal behavior in dyads of different types, taking into consideration the «vertical» relations: dominance, power, status [5]. Modern psychology of nonverbal expressive behavior raises the questions about the dynamics of nonverbal behavior at different stages of relations [7], discusses issues concerning the experts' ability to recognise the main characteristics of nonverbal behavior of observed targets [5], and discuss «technical approaches» to the problem of encoding and decoding of nonverbal expression and facial recognition performance. Another numerous group of researches examines the influence of socio-cultural and ethno-psychological factors on coding of emotions and relations [6], [8]. Mentioned above studies result in fundamental conclusion that nonverbal behavior fulfills various functions in different social contexts, whereas it simultaneously could be aimed on perception of other's behavior as well as on influence and regulation of other's behavior as the mean of control and the indicator of skills mastering.

In spite of considerable number of works touching upon the problem of encoding-decoding of emotional states, this issue was not enough examined in relation to developmental aspects of childhood, adolescence and youth [9]. Some authors underline that age, intellectual abilities, situational context have a great impact on the development of the emotional competence of children and, as a result, on the processes of encoding-decoding of expressive behavior. At the same time various factors such as socio-cultural, socio-psychological and personal factors influence these processes [10]. In this connection it is necessary to apply and improve the humanistic approach to the processes of encoding-decoding of expressive behavior, which is presented in the present article as the combination of humanistic and psychological assumptions (humanistic- psychological approach).

Humanistic-psychological approach to encoding-decoding of facial expression by children suggests to treat these processes from the point of view of the psychology of communication, interpersonal relations, socio-emotional development of preschool children, emotional socialisation, development of social feelings and emotions in preschool children [11],[12],[13]. The researches of this investigation field confirm that encoding and decoding of emotional states is one of the components of social intellect and emotional competence [14], [15]. Accurate encoding-decoding of facial expression and gestures has an impact on popularity of the children in peer-groups [16]. By the end of the preschool age the sensitivity towards the patterns of emotional behavior achieves a specific stage of development which is characterised through different events in the sphere of the interpersonal relations [17]. Children of the age of 6-7 years pose facial expressions deliberately with the aim to regulate relations in different situations of social interaction [18]. 5-6 years old children can clearly replicate their own facial expressions as well as the facial expression of other people by drawing faces with appropriate emotional expressions [15].

1.1. Definition of emotional expression coding in the frameworks of humanistic-psychological approach.

Our understanding of the phenomenon of coding of the emotional states based on the range of theoretical models and conclusions:

1. Fundamental particularity of expressive behavior consists in the fact that expressive behavior is one of the components of the individual behavior as whole entity and consequently it should be classified as cultural-historical, interpersonal phenomenon [1],[19]. The development of the expressive behavior and expressive repertoire refers to interplay of natural forms of expression of states, feelings, relations and socio-cultural patterns of their display [2].
2. Expressive behavior represents the entity which consists of movements characterized by different degrees of intentionality, direction and awareness. Besides the continuously repeated movements it includes also elements that reflect dynamic states of personality. They are positioned, in their turn, above the individual and group programs of expressive behavior. Due to that the individual expressive behavior does not represent a system of codes with strictly attached content, but moreover it includes a differentiated field of psychological connotations.
3. The definition of expressive codes in the frameworks of the psychology of expressive nonverbal behavior is often based on ideas of nonverbal semiotics [20], where the criteria of association between components and elements of expressive behavior with their signs and codes is precisely described. One of the disadvantages of mentioned approach towards the expressive codes refers to the fact that this approach does not take into consideration the role of individual as encoder-decoder and the situation of communication. For that reason in this study we address the semiology that studies the role of signs in communication [21]. Within the scope of semiology communicative phenomena are defined as messages built on certain codes or sign systems. Referring to semiological approach which attracts attention to humanistic-psychological aspects of sign systems we consider the expression coding as a communicative phenomenon - «constructed message» that depends from the individual ability to express own feelings adequately and adjust the code structure correctly in accordance with

different context variables and situation of communication. Our understanding of expressive coding is closely connected with the definition of coding as «nonverbal production - *nonverbal production* for encoding», and decoding as perception and recognition - *nonverbal perception* for decoding [4].

4. Based on the humanistic-psychological approach we determine accuracy of emotional expression coding not only as a correspondence between expressive codes and elaborated schemes and models of expressions, but as a result of observer's communication experience included into different interaction practices, for instance, interaction experience of preschool children with their peers in kindergarten.

1.2. Research hypotheses.

Therefore, the above formulated theoretical considerations about the coding of facial expression of emotional states from the perspective of humanistic- psychological approach shape the framework of our empirical research which is aimed to test the hypotheses that preschool children's communication experience with peers impact the facial expression coding accuracy.

1.3. Research subjects.

100 children of senior preschool age (6-7 years old; 49 boys and 51 girls) attending four different kindergartens took part in our research.

1.4. Procedure and research methods.

One of the issues studied in the psychology of expressive behavior relates to children's intentional control of face movements. Therefore children's facial display of emotions [22] was applied to develop a research instrument. At the first stage we asked children to create codes of facial expression of four emotional states: happiness, surprise, sadness, fear. The experiment took place in a specially equipped room with each preschool child individually. Children were seated in front of the camera. The experimenter asked each preschool child to portray one of the following emotions: happiness, surprise, fear, sadness. As far as children were ready to display an appropriate code and informed about it the experimenter the photo was taken. Thus, 400 photos with expressive codes of basic emotions portrayed by children were photographed: 204 expressive codes produced by girls and 196 codes produced by boys. At the second stage of the research children, who took part in the first part of the research, were disposed to photo codes of facial expressions. At this research stage children were asked to play the role of an observer (decoder) and to determine the emotion depicted on the photo. Totally 20 experimental sessions were held at the second stage of the research: each participant of the research (observer) decoded during one experimental session 20 photo codes of various emotional expressions.

The accuracy index of children's coding of facial expressions was scored based on the responses of children-decoders. The responses of the children-decoders were compared with the list of the emotions which children were ask to portray at the first stage of the research. If the decoder could name the emotion correctly in accordance to the encoded emotional states, then the answer was recorded into 1. The index of emotional coding accuracy was scored using the following formula: $K = \frac{N}{\sum} \times 100$, where K is the index of coding accuracy; N is the number of the correct answers, given by observers; \sum is the sum of all responses received. The highest score of coding accuracy could be achieved equals 10. Following indices were scored in our study: 1) accuracy index of happiness coding; 2) accuracy index of surprise coding; 3) accuracy index of fear coding; 4) accuracy index of sadness coding; 5) integral accuracy index of emotional states coding; 6) accuracy index of emotional states coding of familiar and unfamiliar children (boys and girls); 7) accuracy index of coding of own facial expression. The collected data were computed using the methods of descriptive statistics and the method of comparison of paired samples.

Results

Considering the figures in the Table 1 it could be concluded that the accuracy of facial expression coding by preschool children varies in relation to the following factors: 1) emotion modality (happiness, surprise, sadness, fear); 2) coders' gender (boys, girls); 3) observers' communication experience (familiar-unfamiliar children); 4) interplay of target's gender and acquaintance degree (familiar –unfamiliar); 5) weather the code of the facial emotional expression belongs to «self-code». Results prove that preschool children code mostly accurate the facial expressions of happiness (M=7.74) and sadness (M=6.25); facial expression belonging to the category of «self-code» (M=5.97); facial expression of familiar boys (M=5.55); facial expression of emotions produced by boys.

Table 2 addresses the data demonstrating the impact of the above mentioned factors on accuracy of facial expression coding. The results of the comparison of paired samples (*t* test) testify that the coding accuracy of happiness and sadness is considerably higher than the coding accuracy of surprise and fear, whereas the coding accuracy of surprise is significantly higher than the coding accuracy of fear. Boys are more successful in coding facial expressions than girls ($t = -3.023, p < 0.05$).

Table 1. Means of coding accuracy of facial expression in preschool children

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
N	100	100	100	100	100	100	100	100	100	100	100	100	100	100
M	7,74	3,10	6,25	2,42	4,75	4,88	5,16	5,97	5,02	5,05	5,55	4,66	4,72	4,77

1. coding accuracy of happiness ; 2. coding accuracy of surprise; 3. coding accuracy of sadness; 4. coding accuracy of fear; 5. coding accuracy of four investigated basic emotions; 6. coding accuracy in the four investigated basic emotions by girls; 7. coding accuracy of four investigated basic emotions by boys; 8. coding accuracy for own emotions; 9. coding accuracy of four investigated basic emotions produced by familiar children; 10. coding accuracy of four investigated basic emotions produced by unfamiliar children; 11. coding accuracy of four investigated basic emotions produced by familiar boys; 12. coding accuracy of four investigated basic emotions produced by unfamiliar boys; 13. coding accuracy of four investigated basic emotions produced by familiar girls; 14. coding accuracy of four investigated basic emotions produced by unfamiliar girls.

The preschool children are much more accurate in coding their own facial expressions («self-code») in comparison with the coding of facial expression of other children ($t = -4.774, p < 0.01$). There are no significant differences in coding of facial expressions of familiar and unfamiliar children ($t = -.274, p > 0.05$) when the observer’s gender is controlled. The coding of the facial expressions of familiar boys is significantly higher than of unfamiliar ones ($t = 4.910, p < 0.01$), as well as familiar girls ($t = 5.756, p < 0.01$). At the same time there is no difference in coding of facial expression produced by familiar and unfamiliar girls ($t = -.508, p > 0.05$).

Table 2. Coding accuracy of facial expressions in preschool children in relation to emotion modality, communication experience and target’s gender

Stems of indicators		Mean	t	Sig. 2-tailed)
Pair 1	coding girls + boys happiness - coding girls + boys surprise	4,63	5,59	,000
Pair 2	coding girls + boys happiness - coding girls + boys sadness	1,49	1,88	,062
Pair 3	coding girls + boys happiness - coding girls + boys fear	5,3190	6,56	,000
Pair 4	coding girls + boys surprise - coding girls + boys sadness	-3,1390	-11,42	,000
Pair 5	coding girls + boys surprise - coding girls + boys fear	,6850	3,689	,000
Pair 6	coding girls + boys sadness - coding girls + boys fear	3,8240	14,774	,000
Pair 7	coding boys + girls four emotions - coding girls four emotions	-,1250	-1,299	,197
Pair 8	coding boys + girls four emotions - coding boys four emotions	-,4030	-4,372	,000
Pair 9	coding girls four emotions - coding boys four emotions	-,2780	-3,023	,003
Pair 10	coding boys + girls four emotions - coding girls + boys «self-code»	-1,2180	-4,774	,000
Pair 11	coding familiar child - coding unfamiliar child	-,0310	-,274	,784
Pair 12	coding familiar boys - coding unfamiliar boys	,8899	4,910	,000
Pair 13	coding familiar boys - coding familiar girls	,8320	5,756	,000
Pair 14	coding unfamiliar boys - coding unfamiliar girls	-,1079	-,865	,389
Pair 15	coding familiar girls - coding unfamiliar girls	-,0500	-,508	,612

Discussion

The carried out research supports the conclusions of a number of the works that preschool children have different techniques of facial expression coding [23]. The results of our research also confirm the tendency highlighted in some another researches, that preschool children can code facial expressions of fear and surprise in comparison to other emotions with higher accuracy [24]. Our data also contribute to the conclusion that children are able to control successfully and intentionally their face movements, displaying sad and happy expressions [22]. Our results do not provide an evidence for highly differentiated impact of gender and age factors on coding of the basic emotions. This assumption corresponds with the results of the other works that suppose that gender and age factors influence to a great extent the accuracy of the recognition of weak and ambiguous facial expressions [25]. However we discovered that the communication experience of preschool children with peers intensifies the influence of the gender on the processes of facial coding.

Conclusion

Our research was carried out in the frameworks of humanistic-psychological approach towards the problem of coding of facial expression in preschool children (6-7 years old). We considered the characteristics of expression coding of preschool children while communicating with peers, in «children groups», where the same preschool child both plays the role of target and observer. Our study differs from other researches in this field by applying observer's response, who acts both as encoder and decoder involved into interaction circle with others, as an indicator for the accuracy of facial expression coding. With the aim to determine the impact of the communication experience on expression coding accuracy we included the variable «familiar – unfamiliar» distinguishing between the preschool children who have a long term face-to-face communication experience with each other, going to the same kindergarten group (familiar), and preschool children who have no experience of the cooperative activity, going to different kindergarten groups (unfamiliar). Additionally to verifying our main hypothesis about the influence of the communication experience of preschool children with peers we also examined the influence of gender and emotion modality on facial expression coding accuracy. Summing up we received results which provide the evidence for stated hypotheses and simultaneously specify it in the way that communication experience mostly influences the processes of coding of facial expressions in boys if compared with girls.

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