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The Child as an Observer: The Influence of Adults' Nonverbal Messages on Children's Social Attitudes

Abstract*: Previous research showed that children can exhibit preferences for social categories already at preschool age. One of the crucial factors in the development of children's attitudes toward others is children's observation and imitation of adults' nonverbal messages. The aim of our study is to examine whether children's tendency to perceive and follow nonverbally expressed attitudes toward other people is related to ingroup bias, i.e. the tendency to favor one's own group over other groups. We examined 175 preschool children (age in months: 61–87; M = 72.6, SD = 6.53) presenting them with a video of a conversation between a message sender and a message recipient. The study was conducted in a minimal group paradigm. We found that children accurately identified the message sender's attitude toward the recipient and also generalized this attitude to other members of the new group. We also found explicit ingroup bias among children from the message sender's group. However, no generalization of the sender's attitude to other ingroup members was found. The results are discussed in reference to previous findings on the role of imitation of adult's non-verbal behavior for the development of social attitudes among children.*

Keywords*: social attitudes, preschool children, imitation, nonverbal behaviors, minimal group paradigm*

Negative attitudes of children towards other children can be observed as early as in preschool age (Levy & Hughes, 2009). Research revealed the possibility of occurrence of prejudices in children aged 3 to 7 (e.g., Aboud, 2003; Dunham, Baron, & Carey, 2011). The mechanisms involved in this phenomenon were explored and discussed for several decades, but our knowledge about them is still incomplete. Some explanations are based on the social learning theory (Bandura, 1969), which postulates that children learn stereotypical attitudes by observing and imitating adults' behaviors (e.g., Castelli, Dea, & Nesdale, 2008). Allport (1954) stated that attitudes may be "caught by the child from an infected atmosphere" (p. 300), rather than via explicit, direct teaching. Skinner, Meltzoff, and Olson (2017) confirmed this statement experimentally and observed "non-verbal bias", i.e., tendency to perceive and follow nonverbally expressed attitudes toward other people in preschoolers. According to socio-cognitive approaches, such as Developmental Intergroup Theory, in addition to social learning mechanisms, the formation of attitudes is also influenced by cognitive development and intergroup mechanisms (Arthur, Bigler, Liben, Gelman, & Ruble, 2008; Bigler & Liben, 2007)). An important role plays here the tendency to divide people into categories – one's own category ("we", the ingroup) and the others ("they", the outgroup). Since belonging to valued social groups is an important source of positive self-esteem, people tend to believe that their own group is better than other groups (Tajfel & Turner, 1979). What is important, this ingroup-outgroup categorization and feelings of ingroup solidarity and superiority can arise even when the basis of determining group membership is relatively trivial – like in studies using the minimal groups paradigm (MGP – Brewer & Silver, 1978; Greenberg, Landau, Kosloff, & Solomon, 2009). This tendency can be observed in children of the age of 5 (Aboud, 2003; Dunham, Baron, & Carey, 2011) and also confirmed

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in experimental studies conducted in MGP (Patterson & Bigler, 2006). A preference for one's own group is a primary phenomenon and does not have to be associated with hostility towards members of outgroups (Brewer, 1999).

Building on this knowledge, in our research, we aimed to test, whether children perceive and imitate adults' non-verbal bias when the salient ingroup–outgroup categorization is arbitrary and artificial. Therefore, we conducted the study in MGP (Brewer & Silver, 1978; Brown, Tajfel, & Turner, 1980), using two newly created social groups – the red and the yellow group. Because arbitrary and artificial categories do not refer to any existing, significant social groups, they allow to study the basic mechanisms of shaping new social attitudes in isolation from previous experience, knowledge and evaluation of the perceived person. On the other hand, artificial categories are less salient and do not refer to the main characteristics of people, so in this case the formation of attitudes requires finding meaning in an arbitrary feature and making an inference about it, which might be more cognitively demanding for the child.

The experimental design was inspired by a paradigm developed by Castelli and colleagues (2008). They studied the influence of adults' nonverbal behaviors on preschool children's racial attitudes. In two experiments they showed children (age 3–6) a video of a conversation between two actors from two racial groups: a black one (target) and a white one (model). In the first experiment, they manipulated the valence of a model's verbal (positive vs. neutral) and nonverbal behavior (easiness vs. distance). The results showed that children easily perceived the nonverbal behaviors of the white model. Moreover, independently of what was conveyed verbally, their attitudes toward the black actor were strongly affected by a negative nonverbal message (i.e., uneasiness, distance, avoiding eye contact). In the second experiment, the researchers additionally examined whether children generalize their attitudes based on a nonverbal negative message to a new black target. In the negative message condition, children's attitudes toward the new (not present in the video) black race target were significantly less positive than in the positive message condition. Castelli et al. (2008) concluded that social attitudes may be transmitted to children through adults' behavior during interaction. Nevertheless, this study did not take into account that processes related to ingroup–outgroup categorization may also play significant roles in children's acquisition of attitudes toward groups. Like we suggested earlier, we believe that to find the mechanism of social attitudes development in children, their ability to perceive nonverbal messages and to use these messages to regulate their own behavior should not be considered independently from group identification processes. In our study, drawing on the developmental intergroup theory (Arthur et al., 2008; Bigler & Liben, 2007), we aimed to test the influence of ingroup bias on attitudes developed by children. We activated the intergroup context (i.e., ingroup vs. outgroup distinction) using the MGP (Brewer & Silver, 1978; Brown, Tajfel, & Turner, 1980) by creating two novel groups.

Perception of Adults' Behaviors and the Development of Attitudes in Children

Nonverbal communication may be more important than verbal communication in the development of attitudes in children (Castelli, Dea, & Nesdale, 2008; Weisbuch & Ambady, 2008). This observation stems from the fact that nonverbal behaviors, as opposed to verbal ones, are displayed continually, during every interaction with the child, and appear ontogenetically earlier in development, being the basis of communication with adults, which precedes language communication (Weisbuch & Ambady, 2008). Children, even infants and toddlers, use adults' nonverbal behavior (glances, gestures, facial expressions) not only as signals about how to react but also as feedback about how to regulate their behavior and influence the adult's behavior (for a review, see Stephens & Matthews, 2014). Sensitivity to adults' nonverbal messages does not diminish with age because learning by imitating adults' behaviors is a universal phenomenon or, as some researchers claim, an innate and basic mechanism underlying cultural transmission (Meltzoff & Williamson, 2013; Tomasello, 2002).

Although the claim that imitation is innate is sometimes challenged (see Heyes, 2016), and although researchers still differ in their opinions about what psychological mechanism underlies the process of imitation (Paulus, Hunnius, Vissers, & Bekkering, 2011; Heyes, 2013), or even overimitation (e.g., Lyons, Young, & Keil, 2007; Fridland & Moore, 2015), there is no doubt that imitation is a powerful process – children observe and imitate adults, mimicking expressions, gestures, and behaviors in general. Research also shows that even in 1-year-old children, imitation is modified by numerous factors, e.g., toddlers refrain from imitating an adult's actions if the person performing those actions encounters a negative emotional reaction from a third party (Repacholi & Meltzoff, 2007). Thus, it is reasonable to expect that adults' nonverbal behaviors, especially the emotions expressed nonverbally, will constitute an important guideline for children in the assessment of other people's behaviors and, consequently, also in the development of their social attitudes.

This argument was confirmed by the results provided by Castelli, Dea, and Nesdale (2008), which were described earlier. However, as only attitudes toward members of racial groups, in which children function from birth, were tested, one may suggest these results refer only to the children's attitudes that were already acquired and not newly developed attitudes. Bearing this fact in mind, Skinner, Meltzoff, and Olson (2017) designed two experiments in which children watched a video recording of an actress interacting with two adult targets of novel groups (identified by T-shirts colors). The actor sent positive nonverbal signals to one of these targets and negative signals to the other. The children were asked which target they liked more and which of them should be given a toy (measurement of explicit and implicit attitudes). Researchers also checked which target the children were

more eager to imitate and whose neologisms they more readily used. In the second experiment, the researchers measured the children's ability to generalize the attitude to the other targets of the groups not presented in the videos. It turned out that the children liked the target of a positive message significantly more than the target of a negative message and that they used the words used by that person more readily. They were also more eager to imitate the person belonging to the group receiving a positive message (Skinner, Meltzoff, & Olson, 2017). Concluding, the authors stated that exposure to nonverbal bias could be a mechanism for the spread of social bias. Nevertheless, we must add that when we aim to find the mechanism of social attitudes development in children, their ability to perceive nonverbal messages and to use these messages to regulate their own behavior should not be considered independently from the existing ingroup–outgroup categorization.

The Role of Intergroup Processes in the Development of Attitudes in Children

An important factor that accounts for the development of stereotypes and prejudice is ingroup bias (Arthur et al., 2008; Bigler & Liben, 2007). It can be observed in children of the age of 5 (Aboud, 2003; Dunham, Baron, & Carey, 2011) and also confirmed in experimental studies conducted in MGP (Brewer & Silver, 1978; Brown, Tajfel, & Turner, 1980). For example, Patterson and Bigler (2006) designed an experiment in which children (aged 3–5) were assigned to novel groups defined by a trivial quality, such as T-shirt color. During the experiment, teachers addressed the children in the experimental group using these new labels and organized work in a manner that emphasized the existence of these two groups. In the control group, by contrast, they ignored the division of children according to color. After three weeks, the experiment revealed the existence of ingroup bias in both groups – significantly higher in the experimental group. Ingroup bias can also modify children's tendency to imitate. For example, Over and Carpenter (2012) found that children are more willing to imitate representatives of the ingroup than representatives of the outgroup; this makes it reasonable to expect that children will also be more willing to adopt the model's social attitude (also one conveyed via nonverbal communication) when the model belongs to their group.

Still, it is worth noting that in the previously discussed studies on the influence of nonverbal communication on the development of attitudes in children, researchers did not manipulate children's membership in novel groups. Thus, we decided to address this important issue in our research by manipulating children's membership in novel social groups, by pseudorandomly assigning them to an artificial "yellow" or to a "red" group.

The Present Study

The aim of our study is to examine whether children's tendency to perceive and follow nonverbally expressed attitudes toward other people is related to ingroup bias, i.e., the tendency to favor one's own group over other groups. As in Castelli and colleagues (2008), we played two videos to preschool children: a critical (one of two versions of it) and a debriefing. The critical videos presented interactions between two men (both 25 years old) – members of sports teams: a red one and a yellow one. Two actors took part in the videos: a message sender (the person sending the nonverbal signals) and a message recipient (the person receiving the nonverbal signals). The actor from the red team was the message sender, and the actor from the yellow team was the message recipient. The examined children were observers of the interaction between the message sender and message recipient. We manipulated the two variables: the nonverbal message (positive vs. negative) that was presented by the message sender and the children's membership in particular groups (children were pseudorandomly assigned to a "red" or to a "yellow" group). We assumed that the children would be sensitive to nonverbal manipulation – that they would assess the message sender's attitude (the red group member) to the message recipient (the yellow group member) as more negative in the case of a negative message compared to the positive message condition. Moreover, we assumed that the children would develop a more negative personal attitude toward the message recipient in the case of a negative message compared to the positive message condition. We also expected that the attitude developed toward one representative of a particular group would be generalized to its other members. Importantly, we aimed to find whether children's tendency to perceive and follow nonverbally expressed attitudes toward other people, was affected by ingroup bias (more positive evaluation of one's own group than the outgroup). We assumed that the children would exhibit ingroup bias, manifesting this bias both explicitly and implicitly. To check it we used both – explicit attitude scales and an implicit attitude measure (choosing a yellow or a red sticker). We expected that children will choose stickers in the color of their own group. Due to the fact, that gender differences in sensitivity to non-verbal communication (especially in emotions communication) and knowledge about nonverbal cues have been the subject of a number of studies, many of which pointed to the predominance of women in this area (e.g., Hall, 1978; Noller, 1986; Rosip & Hall, 2004), we also decided to perform an exploratory analysis of data in terms of the possible relationship between the children's gender and the attitudes they developed.

Method

Participants

The study was conducted in six nursery schools in Cracow, Poland. The participants included 184 children ages 61–87 months ($M = 72.6$, $SD = 6.53$). The scores of nine children were rejected due to their refusal to wear a T-shirt (five children), refusal to answer the questions (three children), and age (one child was significantly younger). In the analyses, we took into account the scores of 175 children (100 boys and 75 girls). Prior to the study, we collected parents' written consent for each child to take part in it and asked the children to express their consent

orally. We pseudorandomly assigned each of the children to one of six groups, based on the configuration of two variables: nonverbal message valence (positive, negative) and the child's membership in a particular group (message sender's group, message recipient's group, no group membership). During the process of collecting data we controlled for the number of valid cases in each of the six groups to avoid unequal group sizes.

Materials and Procedure

Nonverbal message manipulation

We used three videos in the study (two versions of the experimental video (26 sec) and a debriefing video (20 sec)). The experimental videos differed in terms of nonverbal message valence (negative vs. positive), accompanied by a uniform, neutral verbal message (which was, however, a labeling message stressing the fact of belonging to a group – see Appendix 1). In the nonverbal positive video, the message sender shook the message recipient's hand firmly; during the conversation, his voice had a pleasant tone; he stood close to the yellow actor, facing him, leaning toward him, and maintaining eye contact with him. In the nonverbal negative video, the message sender shook the yellow actor's hand loosely; during the conversation, his voice had an unpleasant tone; he stood at a distance from the message recipient, sideways, with his arms folded, leaning away from the recipient, and he avoided eye contact with him. We applied the same type of nonverbal cues as used by Castelli and colleagues (2008). In the debriefing video presented to all children at the end of the study, the actors explained that they had just pretended not to know each other and that, in reality, they were good friends.

Measures

We used a scale measuring how children assessed the actors' mutual attitudes and their own attitudes toward the message sender (a representative of the red group in the video), the message recipient (a representative of the yellow group in the video), and another member of the message recipient's group (yellow). This measure consisted of 22 questions. The children answered them on a 4-point scale presented to them by the researcher in a graphic form. The reliabilities of all scales are depicted in Table 1. All questions are presented in Appendix 2.

We also used an additional measure of the children's assessment of the actors' attitudes toward each other. The children were asked to decide how many out of 15 candies one of the actors would like to give to the other one. We also introduced a measure of implicit ingroup bias – at the end of the study, the children were asked to choose one of four stickers for themselves. We used two yellow stickers (the star and the heart) and two red stickers (the star and the heart). All stickers were about 1 cm and were different only in shape and/or color.

Table 1. Study Variables, their Definitions, Measures, and the Reliability of the Scales

Variable	Definition	Measures	*Reliability of the scales**
perception of interaction	children's assessment of the actors' attitudes toward each other depending on message valence	answers to 2 questions (question number: 1, 3) concerning the message sender's attitude toward the message recipient	$r = .70$, $p < .001$
		answers to 2 questions (questions numbers: 2, 4) concerning the message recipient's attitude toward the message sender	$r = .56$, $p < .001$
perceived attitude generalization	children's assessment of the message sender's attitude toward different member of the message recipient's group depending on message valence	answers to 3 questions (questions numbers: 5, 6, 7) concerning the message sender's attitude toward the different member of the message recipient's group	Cronbach's $\alpha = .79$
children's perception of the actors' attitude toward each other	prediction of the actors' sharing behavior toward each other	Candy task: The child decided how many out of 15 candies the message sender would want to give the message recipient (and the other way around)	
personal attitude to message sender	children's declared attitude toward the actors depending on message valence	answers to 5 questions numbers: 13–17) questions concerning the child's attitudes toward the message sender	Cronbach's $\alpha = .88$
personal attitude to message recipient		answers to 5 questions (questions numbers: 8–12) concerning the child's attitudes toward the message recipient	Cronbach's $\alpha = .79$

Table 1 cont.

Variable	Definition	Measures	*Reliability of the scales**
attitude generalization	children's declared attitude toward the different member of the message recipient's group depending on message valence	answers to 5 questions (questions numbers: 18–22) concerning the child's attitudes toward a different member of the message recipient's group	Cronbach's α = .90
explicit intergroup attitude	children's declared attitude toward the characters depending on group membership	answers to 5 questions questions numbers: 13–17) concerning the child's attitudes toward the message sender (red group)	Cronbach's α = .88
		answers to 5 questions (questions numbers: 8–12) concerning the child's attitudes toward the message recipient (yellow group)	Cronbach's α = .79
implicit intergroup attitude	the color of the chosen sticker depending on group membership	Sticker task: the child chose 1 sticker out of 4 (red heart, red star, yellow heart, yellow star)	

Note. * In the case of all scales, the analysis revealed the existence of only one factor (the percentage of explained variance >50%, factor loadings of all questions > .60).

Procedure

Each child was examined individually. At the beginning, the child was given an instruction (see Appendix 3); then they were shown one experimental video. When the video was over, the child was asked the first four questions. Next, the candy task was administered. After this task, the children were asked the remaining questions (see all questions in Appendix 2). All answers were marked by the researcher on the test sheet immediately after a child answered (verbally, by pointing on the scale or both) to a question. When all answers had been given, the experimenter thanked the child and asked him or her to choose one of the stickers. Finally, the child was shown a debriefing video, and it was explained that the whole game had just been pretending and that there would be no more division into teams.

Results

Before commencing the main analyses, we checked whether the fact that the children had attended various nursery schools affected the results; because we found no significant effect of this variable, we did not include it in further analyses.

Perception of Interaction

In order to check the influence of nonverbal message valence and the children's membership in particular groups on their assessment of the characters' attitudes toward one another, we performed a two-factor ANOVA: 2 (Nonverbal Message Valence: positive vs. negative) x 3 (Group Membership: message sender's group vs. message recipient's group vs. none).

Children's perception of the message sender's attitude toward the message recipient. For the dependent variable of the assessment of the sender's attitude toward the recipient, we found a statistically significant main effect of the message valence variable, $F(1, 169) = 20.70$, $p < .001$, $\eta^2 = .109$. In the groups with a positive message, the sender's attitude toward the recipient ($M = 3.43$, $SD = .71$) was rated as significantly more positive than in the groups with a negative message ($M = 2.83$, $SD = 1.02$). For the other measure of the children's assessment of the message sender's attitude toward the message recipient—prediction of the actors' behavior toward one another—we also found a statistically significant main effect of the message valence variable, $F(1, 169) = 4.49$, $p = .036$, $\eta^2 = .026$. In the groups with a positive message, the number of candies given to the message recipient ($M = 6.24$, $SD = 2.12$) was significantly higher than in the groups with a negative message ($M = 5.46$, $SD = 2.65$).

Children's perception of the message recipient's attitude toward the message sender. For the assessment of the message recipient's attitude toward the sender, we found no statistically significant main effects of message valence (attitude rated on the scale: $F(1, 169) = 2.11$, $p = .148$, $\eta^2 = .012$; behavioral measure: $F(1, 169) = .26$, $p = .614$, $\eta^2 = .002$).

Children's perception of attitude generalization. For the variable of the children's perception of the message sender's attitude toward another member of the recipient's group, we found a statistically significant main effect of the message valence variable, $F(1, 169) = 8.02$, $p = .005$, $\eta^2 = .045$. In the groups with a positive

message, the sender's predicted attitude toward a different representative of the recipient's group ($M = 3.25$, $SD = .86$) was significantly more positive than in the groups with a negative message ($M = 2.88$, $SD = .90$).

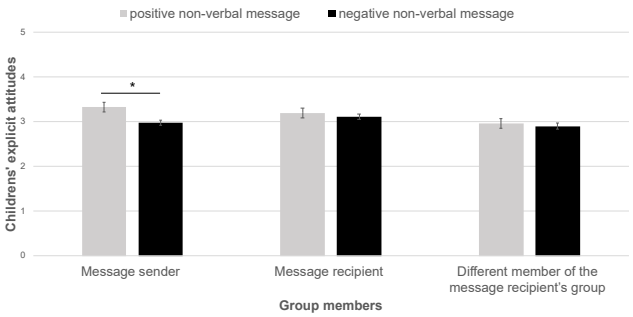
Children's personal attitudes toward the actors. In order to test the influence of nonverbal message valence and the children's group membership on their attitudes toward a particular actor, we performed a two-factor ANOVA: 3 (group membership: message sender's group, message recipient's group, none) x 2 (message valence: positive, negative). The results are presented in Figure 1.

Personal attitude to message recipient. The main effect of the message valence variable for the child's attitude toward the message recipient was not significant, $F(1, 169) = 0.71$, $p = .401$, $\eta^2 = .004$.

Personal attitude to message sender. For the child's attitude toward the message sender, we found a statistically significant main effect of the message valence variable, $F(1, 169) = 7.47$, $p = .007$, $\eta^2 = .042$. In the groups with a positive message, the children's attitude toward the message sender ($M = 3.33$, $SD = .79$) was significantly more positive than in the groups with a negative message ($M = 2.98$, $SD = .91$).

Attitude generalization. We found no statistically significant main effect of the message valence variable for the child's attitude toward a different member of the message recipient's group, $F(1, 169) = 0.18$, $p = .669$, $\eta^2 = .001$.

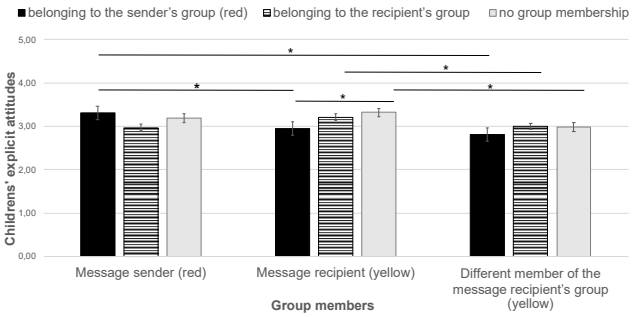
Figure 1. Means for the Child's Attitude Scale Toward an Adult Depending on Message Valence



* different from chance at p < .05. Bars depict standard error.

Explicit intergroup attitudes. We found a statistically significant main effect of the group membership variable for the child's attitude toward the message recipient, $F(2, 169) = 3.70$, $p = .027$, $\eta^2 = .042$. Post-hoc tests (a Bonferroni correction for the pairwise comparisons was applied) revealed a statistically significant difference only between the children belonging to the message sender's group and the children not assigned to any group ($p = .027$). The children belonging to the message sender's group (red) exhibited a less positive attitude toward the member of the message recipient's group (yellow) ($M = 2.95$, $SD = .77$) compared to the children who did not belong to any of the groups ($M = 3.32$, $SD = .63$). We found no difference between the children belonging to the sender's group ($M = 2.95$, $SD = .77$) and those belonging to the recipient's group ($M = 3.21$, $SD = .86$, $p = .185$). We also found no statistically significant main effect of the group membership variable for the child's attitude toward the message sender, $F(2, 169) = 2.30$, $p = .104$, $\eta^2 = .026$, and for the child's attitude toward a different member of the message recipient's group, $F(2, 169) = .72$, $p = .490$, $\eta^2 = .008$. The results are presented in Figure 2.

Figure 2. Means for the Child's Attitude Scale Toward an Adult Depending on the Group Membership



* different from chance at p < .05. Bars depict standard error.

In order to test for ingroup bias effects, we additively performed mixed ANOVA: 3 (Group Membership: message sender's group vs. message recipient's group vs. none) x 3 (Target: attitude toward the message sender vs. the message recipient vs. attitude toward a different member of the message recipient's group). Group membership was the between-subject factor, and target was the within-subject factor. We found a statistically significant effect of the interaction between the group membership and the target: $F(4, 344) = 5.57$, $p = .001$, $\eta^2 = .061$. Children belonging to the red group displayed a significantly more positive attitude toward the actor from the red group (the message sender, $M = 3.31$, $SD = .77$) than toward both actors from the yellow group: the message recipient ($M = 2.95$, $SD = .77$) and the different member of the message recipient's group ($M = 2.81$, $SD = .94$, $p < .001$). Children belonging to the yellow group displayed more positive attitude toward the actor from the yellow group (the message recipient, $M = 3.21$, $SD = .86$) than toward the actor from the red group (the message sender, $M = 2.97$, $SD = 1.01$) but the difference was not significant ($p = .095$). There was a significant difference between attitudes toward the two actors from the yellow group: the message recipient ($M = 3.21$, $SD = .86$) and the different member of the message recipient's group ($M = 3.00$, $SD = .99$; $p = .012$). For children who did not belong to any group (non-group membership), there was a significant difference between attitude toward the two actors from the yellow group: the message recipient and the different member of the message recipient's group ($p < .001$). These children displayed a significantly more positive attitude toward the message recipient ($M = 3.22$, $SD = .63$) than toward a different member of the message recipient's group ($M = 2.98$, $SD = .95$).

Implicit in-group bias. The chi-square test revealed no significant relationship between the group membership variable and the color of the sticker the children chose after the study, $\chi^2(2) = 0.66$, $p = .77$.

Interaction between intergroup attitude and nonverbal message. We found no statistically significant effect of the interaction between the group membership variable and the message valence variable for the following variables: the child's attitude toward the message recipient, $F(2, 169) = 2.00$, $p = .138$, $\eta^2 = .023$, the child's attitude toward the message sender, $F(2, 169) = 1.70$, $p = .186$, $\eta^2 = .020$, and the child's attitude toward another member of the message recipient's group, $F(2, 169) = 2.04$, $p = .133$, $\eta^2 = .024$.

Exploratory Analyses: The Relationship Between Children's Declared Attitude Toward the Actors and Children's Gender

In order to test a possible influence of children's gender on the results presented above, we performed a three-factor ANOVA: 3 (Group Membership: sender's group vs. recipient's group vs. none) x 2 (Message Valence: positive vs. negative) x 2 (Gender: boy vs. girl). It's important to highlight, that both actors (the message sender and the message recipient) were men. For the child's attitude toward the message recipient, the effect of the interaction between the message valence variable and the gender variable was statistically significant, $F(2, 163) = 4.03$, $p = .046$, $\eta^2 = .024$. The difference between message valence conditions was significant only for girls, $F(1, 163) = 4.82$, $p < .03$, $\eta^2 = .029$. In the groups with a positive message, they exhibited a significantly more positive attitude toward the recipient ($M = 3.29$, $SD = .89$) than in the groups with a negative message ($M = 2.94$, $SD = .81$). Additionally, for the child's attitude toward the message sender, the interaction of message valence and gender turned out to be significant, $F(1, 163) = 4.97$, $p = .027$, $\eta^2 = .030$. The analysis of simple effects (a Bonferroni correction for the pairwise comparisons was applied) revealed a statistically significant difference between the groups, depending on message valence for girls (positive message: $M = 3.47$, $SD = .74$; negative message: $M = 2.81$, $SD = .91$, $F(1, 163) = 11.50$, $p = .001$, $\eta^2 = .066$), and a non-significant effect for boys ($p = .601$).

Discussion

The aim of our study was to examine children's tendency to perceive and follow nonverbally expressed attitudes toward other people is related to ingroup bias, i.e., the tendency to favor one's own group over other groups. Like in previous studies (Castelli, Dea, & Nesdale, 2008; Skinner, Meltzoff, & Olson, 2017), we showed that children were not only sensitive to a nonverbal signal (accurately identifying the message sender's attitude toward the message recipient) but also linked it with the actors' group membership. Importantly, in our study, in contrast to the one performed by Castelli and colleagues (Castelli et al., 2008), this phenomenon was demonstrated when group membership was based on a trivial distinction, not on meaningful social category (race). Children expected that the attitude displayed during the conversation would also manifest itself in other behaviors (we have demonstrated the influence of message valence on the behavioral measure of the assessment of the actors' attitudes toward one another) and toward other members of the group (attitude generalization was predicted by the children). This result is consistent with the research of Castelli and colleagues, which highlights the strong influence of nonverbal messages on children's perception of other people's social attitudes (Castelli, Dea, & Nesdale, 2008).

Based on the results of previous studies (Castelli, Dea, & Nesdale, 2008; Skinner, Meltzoff, & Olson, 2017) and bearing in mind the strength of the imitation process (e.g., Meltzoff & Williamson, 2013), we hypothesized that the children would not only be sensitive to the applied nonverbal message manipulation but would also imitate the message sender's negative attitude toward the message recipient. We did not, however, find significant differences in the attitudes toward the message recipient between children influenced by a negative vs. positive nonverbal message. This result shows that despite the fact that the children who participated in this study read and understood the message sender's attitude correctly, their own attitude toward the message recipient and his group was not affected by it. This can be caused by the fact that artificial categories compared with meaningful social categories like race are less salient and do not refer to the main characteristics of people, so in this case, the formation of attitudes requires finding meaning in an arbitrary feature and making an inference about it. It is important to highlight that generally children's explicit attitudes toward both actors were relatively positive (2,29–3,32 in 4 points scale), which can be based on a conventional norm of being nice to others, which children learn via socialization (Greener & Crick, 1999; Tisak, Holub, & Tisak, 2007). Probably to break this norm and form their own attitudes children need a longer and more explicit exposure to nonverbal behaviors. An absence of the attitudes imitation effect can be also associated with the message sender's characteristics. Our results show that message valence had a crucial influence on children's declared attitudes toward the message sender. This probably indicates that the sender, due to his behavior, was perceived as an unfriendly and unpleasant person (not only toward the message recipient). This interpretation is consistent with the results of a study reported by Abramovitch and Daly (1978) in which children aged 4–5 showed a more positive attitude toward individuals displaying positive nonverbal behavior than toward people manifesting negative nonverbal behavior. Given the influence of the model's credibility on the strength of children's imitation, as demonstrated in the research (Zmyj, Buttelmann, Carpenter, & Daum, 2010), it is legitimate to expect that the dislike of the message sender made children refrain from imitating his attitude toward the recipient.

As noted before, to test intergroup attitudes, we introduced a manipulation of children's membership

in particular groups. We found explicit ingroup bias in children belonging to the message sender's group (red group). Children belonging to this group displayed a more positive attitude toward the actor from their own, red group (the message sender), than toward both members of the outgroup (yellow group): the message recipient and a different member of the message recipient's group. We found no ingroup bias in children belonging to the yellow group – they displayed a more positive attitude toward the actor from the yellow group (the message recipient) than toward the actor from the red group (the message sender), but the difference was not significant. The effect of ingroup bias in children belonging to the message sender's group may be linked with the fact that the message sender was more active in the video than the message recipient, which made him more vivid (he spoke and gesticulated more) but also might be perceived as more agentic, competent and perhaps also more powerful, so the children from this group found him more attractive. Moreover, for the children from the yellow group, we found a significant difference in attitudes toward the two members of the yellow group: the message recipient and a different member of the message recipient's group. This can be caused by the fact that the different member of the message recipient's group was new and unfamiliar (he wasn't present in the movie and children saw only his photo). The more positive attitude toward the message recipient than to a new member of his group is consistent with the familiarity effect (Hansen & Wänke, 2009).

It should be noticed that we didn't find implicit ingroup bias (the was none significant difference in stickers' color choosing by children from yellow or red group). This last result may suggest that children insufficiently identified with the teams they had been assigned to, which may stem from the fact that they did not perceive the applied experimental induction of group membership as personally significant. It is also possible that in our study children did not associate stickers with group membership and preferred some colors or shapes regardless of the ingroup-outgroup distinction. This interpretation is consistent with the fact that the majority of the children (60%) chose the red heart or yellow star. This means that the children preferred stickers, which shape matched the typical color. Especially one of these stickers – the red heart was clearly preferred (selected by 37% of all children).

An important difference between the results of our study and the results of previous studies (Castelli, Dea, & Nesdale, 2008; Skinner, Meltzoff, & Olson, 2017) is that ours did not reveal the generalization of the attitude developed toward the message recipient to the entire group. This fact may suggest a difference between the process of categorization based on a socially significant characteristic, such as race, and the categorization based on a non-significant characteristic of an artificially formed group.

It should be also noted that in additional analyses that aimed at exploring gender differences, the effect of message valence on the children's attitude toward the message recipient manifested only in the group of girls. Additionally, in the case of the attitude toward the message sender, we found an interaction between message valence and gender. The use of negative nonverbal messages resulted in a more negative attitude toward both representatives of the groups – the sender and the recipient – only in the group of girls. Girls, to a greater extent than boys, were guided by the valence of non-verbal message. The negative message resulted in their more negative attitude towards both actors (the message sender and the message recipient). The second of the manipulated variables – the group membership – was not significantly related to gender, but a trend indicating its greater importance in boys was noticed. It can, therefore, be assumed that in assessing their attitude towards the characters, boys were more guided by the preference of their own group, while girls – by the observed non-verbal message. An earlier study concerning the influence of nonverbal communication on children's attitudes toward black people revealed no gender differences (Castelli, Dea, & Nesdale, 2008). This is, therefore, a novel and interesting result, but its interpretation should be preceded by checking whether it is an outcome of methodological factors, rather than an outcome of actual gender differences (see Limitations section).

Limitations

One limitation of our study is related to the attempt to induce the child's ingroup identification. We assumed that we would induce it by clearly informing the children which group they would be assigned to and by having them wear a red or yellow T-shirt during the study. It is possible, however, that these actions were insufficient to induce identification with a particular group in the children. Perhaps ingroup bias would have been stronger if the division into groups had been maintained for a longer period of time.

The second limitation is connected with the exploratory analyses. As noted above, an interesting result we obtained is the influence of nonverbal message manipulation only on the female group of participants. This issue requires further research, mainly due to two methodological aspects of the present study. The first is the unequal sizes of the groups as we did not ensure an equal number of boys and girls in each experimental condition. The other aspect is the gender of the characters evaluated by the children. All three adult representatives of the groups were male, and studies show that there is a link between the participants' gender and the gender of the individuals whose nonverbal communication is assessed (Brey & Shutts, 2015; Castelli, Carraro, Pavan, Murelli, & Carraro, 2012; Hall, 1978). Additionally, it should be stressed that preschool children show a clear bias in favor of their own gender, which manifests itself, among other ways, as a greater focus on information relating their own sex and in remembering this information better (Martin & Ruble, 2004). In sum, it is worth noting that in order to confirm the hypothesis postulating a greater influence of nonverbal messages on the development of personal attitudes in girls, the study should be repeated with the size of groups controlled for and with the actors' gender corresponding to the participants' gender.

Finally, a limitation of our study might be the way data was collected. Because we did not have a possibility to film the experimental sessions, the data was registered life (all answers were marked by the researcher on the test sheet immediately after a child answered a question; verbally, by pointing on a scale or both). The filming of sessions and off-line coding should be applied in future studies.

Conclusions

To conclude, the results of our study showed that preschool children can read and understand nonverbal bias and link it with the group membership even when it is based on a trivial distinction. However, contrary to previous studies (Skinner, Meltzoff, & Olson, 2017), we showed that in the case of artificial categories, short exposure to nonverbal bias can be insufficient to form their own attitudes in preschool children. Perhaps, longer exposure to novel group categorizations and an older sample of children would be necessary to observe such effects (Files, Casey, & Oleson, 2010). It is important to notice that the studies conducted in MGP allow us to explore fundamental mechanisms of biased attitude formation. According to developmental intergroup theory, those mechanisms together with other factors (like explicit attributions, implicit attributions or essentialist beliefs) may lead from ingroup-bias to the expression of prejudice towards existing social groups (Bigler & Liben, 2007).

In previous research, that was bridging developmental and social psychological perspectives to study formation of children's intergroup attitudes and prejudice acquisition, the role of intergroup experiences and cultural learning was pointed out (see Dunham & Degner, 2010). Still, it seems important to address in more detail the link between basic social categorization processes and the development of attitudes and prejudice amongst preschool children in future research.

Results of our study are important in the context of anti-discrimination education. They show that in order to prevent biases in attitude formation in preschool periods, it is not sufficient to consider the content of verbal messages directed to children. What should also be taken into account is the consistency of the verbal message with nonverbal cues and the role of processes related to social categorization.

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Appendix 1

The verbal message presented in the video:
Yellow Actor (message recipient):
Hi, my name is Michał and I'm on the Yellow Team.
Red Actor (message sender):
Hi, my name is Adam and I got into the Red Team. I like sport very much. In my free time I run and go for walks with my dog. Playing football is also very fun, so I'm very happy that I joined the Red Team. We will meet on Fridays on the field near the school. Your Yellow Team will train on Mondays.

Appendix 2

All questions of the scale measuring how children assessed the actors' mutual attitudes and their own attitude toward the message sender (a representative of the red group in the video), the message recipient (a representative of the yellow group in the video), and another member of the message recipient's group (yellow).

The children answered them on a 4-point scale presented to them by the researcher in a graphic form (1 = not at all, 2 = little, 3 = somewhat, 4 = very much).

I. Perception of interaction
   1. Do you think that Adam from the Red Team likes Michał from the Yellow Team?
   2. Do you think that Michał from the Yellow Team likes Adam from the Red Team?
   3. Do you think that for Adam from the Red Team the conversation with Michał from the Yellow Team was pleasant?
   4. Do you think that for Michał from the Yellow Team the conversation with Adam from the Red Team was pleasant?

II. Perceived attitude generalization (children's assessment of the message sender's attitude toward different member of the message recipient's group)
   5. How much do you think Adam from the Red Team would like to have conversation with Jacek from the Yellow Team?
   6. Do you think that Adam from the Red Team could become a friend of Jacek from the Yellow Team?
   7. Do you think that Adam from the Red Team would like Jacek from the Yellow Team?

III. Personal attitude to message recipient
   8. How much do you think that Michał from the Yellow Team is a nice person?
   9. How much do you like Michał from the Yellow Team?
   10. Would you like to play with Michał from the Yellow Team?
   11. If Michał from the Yellow Team says he likes your toys, would you be willing to lend them to him?
   12. If Michał from the Yellow Team asked you for a piece of your cake, would you be willing to give it to him?

IV. Personal attitude to message sender
   13. How much do you think that Adam from the Red Team is a nice person?
   14. How much do you like Adam from the Red Team?
   15. Would you like to play with Adam from the Red Team?
   16. If Adam from the Red Team says he likes your toys, would you be willing to lend them to him?
   17. If Adam from the Red Team asked you for a piece of your cake, would you be willing to give it to him?

V. Attitude generalization (personal attitude toward the different member of the message recipient's group)
   18. How much do you think that Jacek from the Yellow Team is a nice person?
   19. How much do you like Jacek from the Yellow Team?
   20. Would you like to play with Jacek from the Yellow Team?
   21. If Jacek from the Yellow Team says he likes your toys, would you be willing to lend them to him?
   22. If Jacek from the Yellow Team asked you for a piece of your cake, would you be willing to give it to him?

Appendix 3

Instruction given to the children before the beginning of the study:

Today I would like to play a game of sports teams with you. Children from the nursery school have been divided into two teams: the Yellow Team and the Red Team. The Yellow Team will wear yellow T-shirts while playing football and the Red Team will wear red T-shirts. You will be in the Yellow/Red Team, so I would like you to put on a yellow/red T-shirt (the child is given a T-shirt of the appropriate color to put on).[1] *Now, I would like us to watch a video of a conversation between two people: Michał from the Yellow Team and Adam from the Red Team. Please watch carefully, because later I will ask you if they like each other.*

[1] This fragment was omitted in the group of children not belonging to any of the teams.