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Children's informational reliance during inconsistent communication: The public–private distinction

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ABSTRACT

This study examined whether children recognize that when there is a discrepancy between what is expressed in public versus what is expressed in private, the private expression is more indicative of the true state of affairs. Participants (3-, 4-, and 5-year-olds) were shown a video in which a girl expressed that she liked the refreshments her friend had made when the friend was present but expressed dislike when the friend was not present. The results of the first two experiments revealed that older children were significantly more likely to rely on private information than on public information to interpret the inconsistent messages, whereas 3-year-olds were not. In the third experiment, older children performed better when the inconsistency occurred in the nonverbal domain compared with the verbal domain. The finding that even 4-year-olds show some signs of understanding the private–public distinction is remarkable given that previous research on inconsistent communication indicated that children's understanding typically comes much later. Possible explanations for this discrepancy are discussed.

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Introduction

There is more to understanding another's message than simply decoding an utterance using semantics and syntax. Comprehension needs to include the context and intentions of the speaker, for example, to infer intended referents, deal with incomplete sentences, and judge illocutionary force (Sperber & Wilson, 1987). By 4 years of age, children begin to understand that there can be a difference

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between the surface meaning of an utterance and a speaker's intentional state (Lee & Cameron, 2000). By 6 years of age, children also start to recognize when they have made an inference compared with information that is explicitly stated, although this ability continues to develop (Ackerman, 1992; Sodian & Wimmer, 1987). Ackerman (1978) found that 8-year-olds performed similarly to adults in drawing inferences about illocutionary force and that even 6-year-olds showed some understanding of indirect requests (e.g., "Can I have the salt?").

However, communication involves more than just information provided in the verbal channel. During communication, information can come from various channels, and typically this information is congruent, conveying the same message. For example, the verbal and nonverbal channels usually convey similar, or at least complementary, messages (McNeill, 1992). However, it is not unusual for channels to send inconsistent messages. Mismatching the verbal and nonverbal message can indicate that a different form of communication is taking place, such as telling a joke or being sarcastic (Gibbs, 1986; Sullivan, Winner, & Hopfield, 1995; Winner, 1988). Adults regularly use the inconsistency in messages as a cue to interpretation, and even infants can detect inconsistencies in communication (Muir & Hains, 1993; Walker-Andrews, 1986; Walker-Andrews & Grolnick, 1983). However, existing studies have shown that children learn to use discrepant verbal and nonverbal cues to draw inferences only around middle childhood, at which time children begin to use the same heuristic rule as adults. They apply the so-called verbal–nonverbal consistency rule to the situation of inconsistent communication and rely on nonverbal, rather than verbal, cues to infer the true state of affairs. For example, only by 7 years of age can children use nonverbal cues to recognize a joke (Demorest, Meyer, Phelps, Gardner, & Winner, 1984; Leekam, 1991; Sullivan et al., 1995; Winner & Leekam, 1991; Winner, Windmueller, Rosenblatt, Bosco, & Best, 1987), and only by approximately 8 years of age can children use nonverbal cues to recognize sarcasm (Ackerman, 1981; Capelli, Nakagawa, & Madden, 1990; Demorest, Silberstein, Gardner, & Winner, 1983; Demorest et al., 1984; Winner, 1988; Winner et al., 1987).

Another case of inconsistent communication is when an individual is being deceptive, although in this particular case the deceptive individual tends to minimize differences. Whereas adults will use nonverbal information to determine the true state of affairs (Rotenberg, Simourd, & Moore, 1989), research has found that children will rely on verbal cues to interpret inconsistent messages until around 9 or 10 years of age (Demorest et al., 1984; DePaulo & Jordan, 1982; DePaulo, Jordan, Irvine, & Lasar, 1982; Rotenberg et al., 1989; Volkmar & Siegal, 1982). Similar findings have been found with conflicting semantic and paralinguistic cues (Friend, 2000; Friend & Bryant, 2000). However, a few studies have indicated that younger children may use nonverbal cues under certain circumstances if these cues are made to be more salient (Eskritt & Lee, 2003), behavioral measures are used (Friend, 2003), or children are warned that the communicator will try to be deceptive (Freire, Eskritt, & Lee, 2004).

Another type of scenario where children could potentially demonstrate an earlier proficiency with conflicting messages is a politeness scenario. Display rules frequently dictate in politeness scenarios that negative information, such as emotions, should be concealed, and children from a very young age are socialized to follow this display rule. For example, parents teach children to display gratitude and pleasure, rather than disappointment, if children receive an undesirable gift from grandparents. Preschoolers have been found to hide disappointment about a gift (Cole, 1986) and to lie about a person's unusual appearance (Talwar & Lee, 2002; Talwar, Murphy, & Lee, 2007). Although display rules indicate that in politeness scenarios negative information should be concealed in public, they do allow for it to be expressed in private. That is, to be polite, one may make an untruthful statement to avoid hurting another person when that person is present, whereas the true emotions can be displayed in private.

Previous research has not yet directly tested children's understanding of inconsistent messages that vary across the public–private dimensions. One area that has examined this issue indirectly is research examining children's understanding of the difference between real (i.e., felt) and apparent (i.e., expressed) emotions. The typical paradigm to examine this distinction was pioneered by Harris and colleagues (Gross & Harris, 1988; Harris, Donnelly, Guz, & Pitt-Watson, 1986; Harris & Gross, 1988) and involves presenting children with several stories where the protagonist is placed in a situation that evokes a particular emotion but the experimenter offers a rationale for why the protagonist might want to conceal this emotion. Although 4-year-olds can sometimes distinguish between real and

apparent emotions, this knowledge is fragile and 6-year-olds demonstrate a fuller understanding (Banerjee, 1997; Gross & Harris, 1988; Harris et al., 1986; Harris & Gross, 1988; Josephs, 1994). In these studies, children need to interpret conflicting information; however, the experimenter offers a rationale for why the protagonist might want to conceal an emotion rather than have the children interpret conflicting messages in context and needing to draw their own inferences. Thus, children might be more successful at a younger age on the real and apparent emotions task compared with the tasks used in research on the verbal–nonverbal consistency rule because children in the former task are not required to notice and infer from two different types of messages but rather have the messages presented by an experimenter. On the other hand, examining children's interpretation of inconsistent messages via display rules is more familiar and naturalistic; therefore, children may succeed on this task earlier than is typical in other research examining inconsistent messages.

In the current study, the public–private distinction was examined. The task was situated in a politeness situation that called for an actress to tell a prosocial lie. These experiments were designed to provide a naturalistic rationale for the actress's incongruent displays to facilitate children's appropriate use of the private–public distinction. Inconsistent communication was presented to children along with rich contextual information. Children were shown a video where an individual made a punch drink and a cake for her best friend to celebrate the friend's birthday. The birthday girl tasted the drink and cake and in private expressed her dislike, but when asked for her opinion of the drink and cake she expressed that she liked them. This procedure not only simulated a birthday party situation with which children are familiar but also provided children with potentially useful information regarding the rationale for the birthday girl's inconsistent public–private displays. The first experiment was designed to test whether children would interpret the inconsistent message by relying on information provided during the public setting or the private setting. Although existing research has found that by 4 years of age children have begun to understand display rules and the difference between real and apparent emotions, it was unknown whether 4-year-olds will also understand the difference between private and public expressions of information.

Experiment 1

Method

Participants

Children were recruited from day care facilities in a North American city. Participants were 54 3-year-olds (28 girls and 26 boys, mean age = 3.4 years, $SD = 0.4$), 48 4-year-olds (21 girls and 27 boys, mean age = 4.5 years, $SD = 0.3$), and 46 5-year-olds (23 girls and 23 boys, mean age = 5.5 years, $SD = 0.3$). These participants, as well as the participants in the subsequent experiments, were Caucasian and from middle-income families.

Materials and procedure

The materials consisted of videos depicting a short scenario involving two young female actresses. Both videos began with a scene of a birthday party in a room with streamers, balloons, and music playing. The friend, "Suzy," had made refreshments (i.e., cake and a punch drink) for the birthday girl, "Kathy." In one condition, children saw Suzy present one of the refreshments to Kathy, explaining that she had made it especially for Kathy's birthday. Kathy first tries the refreshment and then responds "I like it" with no obvious positive or negative emotion in her tone of voice or expression. Then Suzy leaves the room to get the rest of the refreshments. In Suzy's absence, Kathy reacts negatively in facial expression without making eye contact with the camera (see Fig. 1). Suzy then returns with the other type of refreshment and the same scenario is repeated, except in this case Suzy leaves the room to bring Kathy a napkin.

Half of the children saw Kathy verbally respond to Suzy's inquiry about the refreshment with Suzy present and then react again nonverbally when Suzy leaves (public first condition). The other half of the children saw the same storyline except that Kathy responds nonverbally first with Suzy out of the room and then answers Suzy verbally later (private first condition). In addition, for both conditions,

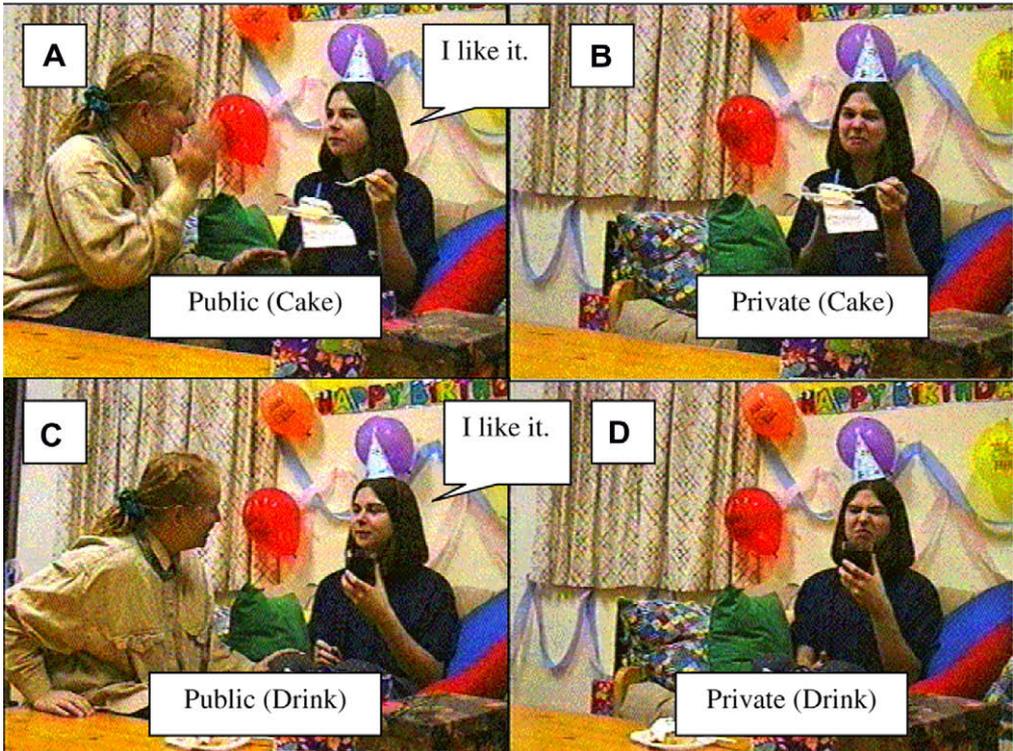


Fig. 1. Examples of scenes from the video presented to children in Experiment 1. In Scenes A and C, the friend asks the birthday girl, “Do you like the cake [drink]?” The birthday girl replies “I like it” with a neutral expression. In Scenes B and D, after the friend is gone, the birthday girl frowns and displays disgust without making a verbal statement.

the order of the cake and drink presentation was counterbalanced. Thus, there were four versions of the video, with children randomly assigned to either the public first condition or the private first condition and the order of refreshment type counterbalanced within conditions. The video was played to the point right after Kathy had responded both privately and publicly about her liking or disliking of the refreshment, and then the video was paused and children were asked, “Do you think that she liked the cake [drink] or not?” (the like–dislike question). Children were asked this question twice: once after the cake presentation and once after the drink presentation. After children had answered the test question, the video was continued. The video ends with Suzy going to get more cake and punch and Kathy looking alarmed.

Scoring

A score of 1 was given if children indicated that Kathy did not like the drink or cake. Otherwise, children were given a score of 0. Inspection of children’s responses to the liking question regarding the drink and the cake showed no difference in response pattern. Therefore, children’s scores for the two like–dislike questions were combined to obtain a single like–dislike score for each child (range = 0–2).

Results

Preliminary analyses revealed no significant gender or order of cake and drink presentation effects. Thus, the data were collapsed across these variables.

Fig. 2 shows the means and standard errors of children's like-dislike scores for the private first and public first conditions. Because 5-year-olds reached ceiling on the task, they were not included in the analysis. A 2 (age: 3 or 4 years) \times 2 (order: private first or public first) analysis of variance (ANOVA) was conducted on children's scores. Both the main effects of age, $F(1, 98) = 13.5, p < .001, \eta^2 = .17$, and order, $F(1, 98) = 19.7, p < .001, \eta^2 = .12$, were significant but were qualified by a significant interaction between age and order, $F(1, 98) = 12.0, p < .001, \eta^2 = .11$. Analysis of simple effects showed that 3-year-olds' scores in the private first condition were significantly lower than 3-year-olds' scores in the public first condition ($p < .05$) and that 4-year-olds performed similarly regardless of order ($p > .05$).

To help further clarify these results, children's performance was compared with chance. When children's like-dislike scores were compared with the chance score of 1, 3- and 4-year-olds in the public first condition were significantly above chance, $t(31) = 3.30, p < .001$, and $t(27) = 3.55, p < .001$, respectively. In addition, 4-year-olds in the private first condition were at chance, whereas 3-year-olds in the private first condition were significantly below chance, $t(21) = 5.92, p < .001$.

Discussion

This experiment examined children's ability to deal with inconsistent communication by looking at children's interpretation of an event when the cues provided in private do not match with those made in public. The results showed that the majority of 4-year-olds and all 5-year-olds relied on the speaker's privately expressed messages to determine her true opinion of the refreshment when the private and public cues conflicted. On the other hand, 3-year-olds' responses were influenced by the order in which the public and private messages were shown to them. The majority of 3-year-olds in the private first condition reported incorrectly that the birthday girl liked the drink and cake, seemingly suggesting that they relied on the actress's public expressions when encountering a conflict in communication. The 3-year-olds' responses in the public first condition suggest that this conclusion is premature. These children instead relied on the private information to decide whether the birthday girl liked the refreshments. The results from both orders taken together suggest that some 3-year-olds' responses were due to a recency effect; when they received inconsistent messages, they relied on the most recent message regardless of whether it was expressed in public or in private. In other words,

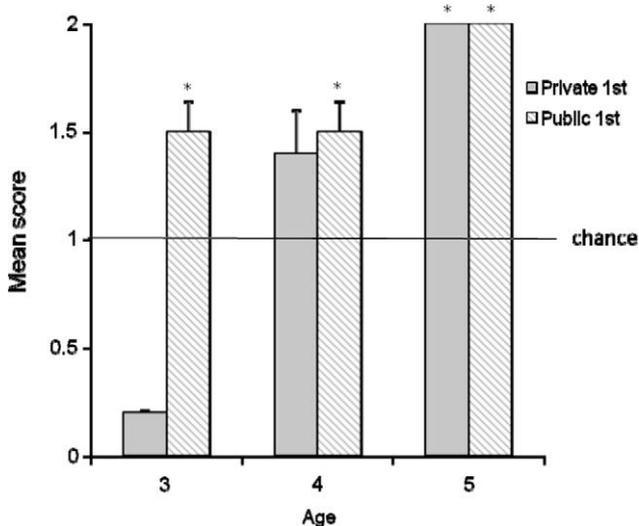


Fig. 2. Mean scores for 3-, 4-, and 5-year-olds in the private first and public first conditions for the like-dislike question in Experiment 1. Error bars indicate standard errors. Asterisks indicate where group performance was significantly above chance.

3-year-olds appeared to be insensitive to the private–public distinction in communication. On the other hand, 5-year-olds and the majority of 4-year-olds relied on the private information to determine the birthday girl's true opinion of the refreshments.

However, there existed a confound in this experiment in that the verbal information was always presented in public, whereas the nonverbal information was presented in private. Although more naturalistic, the difference in modality of expression may account for the older children's apparent success in distinguishing private or public expressions. Thus, it is possible that the children did not understand the public–private distinction but instead were using the modality of expression to determine the birthday girl's true opinion of the refreshments. The verbal–nonverbal consistency principle suggests that information from the nonverbal channel is usually more reliable (Rotenberg et al., 1989). Thus, 4- and 5-year-olds in this experiment could have performed correctly by simply relying on nonverbal cues expressed by the birthday girl while ignoring whether the message was expressed in private or in public. Experiment 2 was conducted to address this possibility.

Experiment 2

In this experiment, 3-, 4-, and 5-year-olds were shown a revised version of the video where the birthday girl expressed her like or dislike for both the verbal and nonverbal channels in private and public; that is, both verbal and nonverbal information was consistent in private and in public but conflicting across situations. Therefore, if the older children in Experiment 1 were using the private–public distinction to solve the task, the results of Experiment 1 should be replicated. However, if the older children in Experiment 1 were using the verbal–nonverbal consistency principle, their performance in the current experiment should be at chance level because that rule no longer applies. Also for the second experiment, another question was added; children were also asked to explain why the actress conveyed inconsistent messages to examine whether children were explicitly aware of the rationale for the conflict between messages in the public and private contexts.

Method

Participants

Participants were 22 3-year-olds (11 girls and 11 boys, mean age = 3.6 years, $SD = 0.2$), 30 4-year-olds (15 girls and 15 boys, mean age = 4.4 years, $SD = 0.2$), and 15 5-year-olds (3 girls and 12 boys, mean age = 5.4 years, $SD = 0.3$). None of the children participating in the second experiment participated in the first experiment.

Materials and procedure

Children were shown a video similar to the one used in Experiment 1 but with one major modification; the video contained the birthday girl, Kathy, expressing both verbally and nonverbally that she liked the refreshments in public and that she disliked them in private. For example, in Suzy's absence, after Kathy tasted the drink, she frowned and stated "I don't like it." When Suzy returned carrying a piece of cake, she asked Kathy her opinion of the drink. Kathy responded "I like it" with a positive facial expression. Half of the children saw Kathy react to the refreshment first and then respond to Suzy (private first condition). The other half of the children saw Kathy respond to Suzy first and then react to the refreshment (public first condition). In both conditions, Kathy first tried the refreshment before reacting. Different versions of the videos were then made with the order of the cake and drink presentation counterbalanced; the cake was brought out first, followed by the drink.

Children were randomly assigned to view one of the versions of the video. After Kathy had responded both privately and publicly about the cake or drink, the video was paused and children were asked, "Do you think she really liked the cake [drink]?" (the like–dislike question). Following the like–dislike question, children were also asked, "Why did she say she liked the cake [drink] when her friend was there, but didn't like it when her friend was gone?" (the explanation question).

Results

Preliminary analyses revealed no significant effects of gender or order of presentation. Thus, the data were collapsed across these variables. Again, 5-year-olds reached ceiling on the task and were not included in the analyses.

Fig. 3 illustrates the mean scores of children on the like–dislike question for Experiment 2. A 2 (age: 3 or 4 years) \times 2 (order: private first or public first) ANOVA was conducted on children's scores. No significant differences were found for order, age, or the interaction between the two factors. Also, *t* tests were conducted to compare children's performance with chance. The performance of 4-year-olds was significantly better than chance in both the private first condition, $t(16) = 2.70$, $p < .05$, and the public first condition, $t(12) = 4.63$, $p < .005$, whereas 3-year-olds were at chance. In addition, 4- and 5-year-olds clearly used information provided in private to determine whether the birthday girl liked or disliked the refreshments, whereas 3-year-olds did not.

Table 1 displays the types of responses children gave to the explanation question in relation to their scores on the like–dislike question. For the explanation question, a number of children responded that they did not know (i.e., ignorance) or simply restated the fact that Kathy either liked or disliked the refreshments (i.e., statement of fact). However, some children used an intention explanation and referred to the fact that Kathy did not want to hurt her friend's feelings. A few children also gave responses that did not fit into any one category, for example, "She changed her mind" and "She was acting silly". These responses were placed in the "other" category. Interrater reliability for categorizing the responses was 97%. Chi-square analyses indicated that there was a significant difference in the pattern of responses for children depending on their performance on the like–dislike questions, $\chi^2(6, N = 67) = 19.14$, $p < .005$. As can be seen in Table 1, the only participants to give an intention explanation were those who answered the like–dislike questions correctly.

Discussion

Experiment 2 examined children's understanding of the private–public distinction after removing the confound of modality of expression in Experiment 1. Results showed that 5-year-olds as a group performed almost perfectly. For the younger children, when both verbal and nonverbal information was provided, there were no significant differences between 3- and 4-year-olds. However, when comparing children's responses with chance, 4-year-olds relied significantly more often on the speaker's private message to determine her true liking of the refreshments, whereas 3-year-olds performed at chance. These findings confirm that many 4- and 5-year-olds understand the difference between the public and private displays of information in the scenario presented and are able to use private

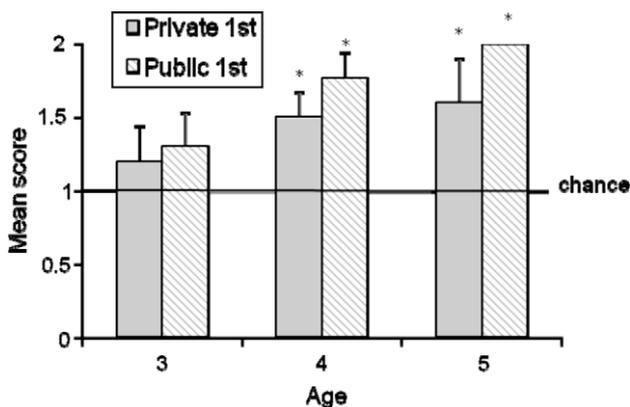


Fig. 3. Mean scores for 3-, 4-, and 5-year-olds in the private first and public first conditions for the like–dislike question in Experiment 2. Error bars indicate standard errors. Asterisks indicate where group performance was significantly above chance.

Table 1

Number of children making each response type to the explanation question divided by their scores on the like–dislike question for the cake and drink in Experiment 2.

Response	Score on like–dislike question		
	0	1	2
Ignorance	4 (44)	6 (40)	18 (42)
Statement of fact			
Disliked	2 (22)	6 (40)	4 (9)
Liked	2 (22)	3 (20)	2 (5)
Intention	0	0	15 (35)
Other	1 (11)	0	4 (9)

Note. Percentages are in parentheses.

information to determine the true state of affairs. These results also suggest that 4- and 5-year-olds' success in Experiment 1 was not due to their use of the verbal–nonverbal consistency principle. However, despite the older children's success in deriving the correct answer in the current task, many children still had difficulty in explaining why the birthday girl conveyed inconsistent messages. Although the only children who gave intention explanations were those who answered both like–dislike questions correctly, they still represented only just over a third of the children who were successful on the task.

The differences in results between Experiments 1 and 2 are worth noting. There was a significant age effect in Experiment 1, but the age effect was not significant in Experiment 2. In particular, 3-year-olds did more poorly in the private first condition of Experiment 1. They demonstrated a recency effect that was not present in Experiment 2. Furthermore, 4-year-olds were significantly above chance only in the public first condition of Experiment 1 but were significantly above chance in both orders of Experiment 2. One possibility for why children found Experiment 2 to be easier is that in Experiment 2 verbal and nonverbal cues together provided more enriched information for children to use to decipher the birthday girl's inconsistent messages than was the case in Experiment 1. An alternative possibility is that in Experiment 1 not only did children have a single cue to use but also the cue expressed in public (verbal) was unmatched with the cue expressed in private (nonverbal). The contrast in message inconsistency may have been less salient in Experiment 1 than in Experiment 2 due to the lack of matching in modality of expression. For example, in Experiment 2 children could compare the verbal private message with the verbal public message, whereas in Experiment 1 they would have needed to compare the verbal public message with a nonverbal private message. Experiment 3 was conducted to test these possibilities.

Experiment 3

In this experiment, we randomly assigned children to one of two conditions. In the verbal condition, children saw the birthday girl express her like or dislike of the refreshments with verbal cues only in both private and public. In the nonverbal condition, children saw the birthday girl express her like or dislike of the refreshments only nonverbally in both private and public. Thus, this design allowed us to examine separately whether children's understanding of public–private distinction is influenced by the modality of expression or whether needing to compare across modalities was the main reason for the discrepant results of Experiments 1 and 2.

Method

Participants

Participants were 50 3-year-olds (20 girls and 30 boys, mean age = 3.5 years, $SD = 0.4$), 51 4-year-olds (24 girls and 27 boys, mean age = 4.5 years, $SD = 0.3$), and 41 5-year-olds (23 girls and 18 boys, mean age = 5.3 years, $SD = 0.3$). Of these, 76 children participated in the verbal condition and 66 chil-

dren participated in the nonverbal condition. None of the children had participated in the previous two experiments.

Materials and procedure

The materials consisted of two different videos depicting the same scenario as used in previous experiments except for one major modification. In the verbal video, the birthday girl, Kathy, said she liked the refreshment to her friend Suzy but said she disliked the refreshment when Suzy was not in the room. In expressing her opinion of the refreshment, she showed no positive or negative emotion in either her tone of voice or her expression regardless of whether her friend was present or not. In contrast, in the nonverbal video, Kathy displayed a positive emotional expression in front of Suzy but a negative emotional expression when Suzy was not present. At no time did she say verbally whether or not she liked the refreshment. There were four versions for each video type. In constructing the different versions, the order of cake and drink presentation was counterbalanced, as was the order in which the birthday girl expressed herself; half of the time she expressed her opinion in private first, and the other half of the time she expressed herself to her friend in public first.

Children saw either the verbal video or the nonverbal video. Children were also randomly assigned to one of the four versions of the videos. After Kathy expressed to Suzy that she liked the refreshment and expressed her dislike in private, the video was paused and children were asked, "Do you think that she really liked the cake [drink]?" (the like–dislike question). Children were then asked to explain why the actress gave conflicting messages in the private and public situations (the explanation question).

Results

Preliminary analyses revealed no significant effects of gender or order of cake and drink presentation. Thus, the data were collapsed across these variables.

Fig. 4 displays the means and standard errors of children's like–dislike scores for Experiment 3. A 3 (age: 3, 4, or 5 years) \times 2 (order: public first or private first) \times 2 (condition: verbal or nonverbal) ANOVA was conducted. A significant main effect of age was found, $F(2, 129) = 12.38, p < .001, \eta^2 = .16$, and was qualified by a significant interaction between condition and age, $F(2, 129) = 1.70, p < .05, \eta^2 = .05$. Post hoc analyses indicated that there were no significant differences in performance across age groups in the verbal condition. However, 4- and 5-year-olds performed significantly better than 3-year-olds in the nonverbal condition. In addition, although there was no significant difference between the verbal and nonverbal conditions for 3- and 4-year-olds, 5-year-olds did significantly better in the nonverbal condition. Also, *t* tests were conducted to compare children's performance with chance. In the nonverbal condition, 4-year-olds were significantly above chance in their responding for both the public first condition, $t(10) = 2.63, p < .05$, and the private first condition, $t(11) = 3.02, p < .01$, whereas 3-year-olds were not. All of the 5-year-olds in the nonverbal condition performed without errors on this question. In the verbal condition, only two groups of children were significantly above chance: 3-year-olds in the public first condition, $t(10) = 3.46, p < .01$, and 5-year-olds in the private first condition, $t(9) = 2.71, p < .05$.

Children's responses to the explanation question were also examined. The number of each response type given for the verbal and nonverbal conditions is shown in Table 2. There was a significant relation in the pattern of response types between explanation types and the number of like–dislike questions that children answered correctly: nonverbal, $\chi^2(6, N = 66) = 16.06, p < .05$; verbal, $\chi^2(6, N = 76) = 13.61, p < .05$. Once again, those who gave an intention explanation tended to perform better on the like–dislike questions than those who did not give such an explanation.

Discussion

Experiment 3 examined whether modality of expression was related to children's interpretation of inconsistent messages from the private and public settings or whether modality versus mismatching was the main reason for the discrepant results of Experiments 1 and 2. The results suggest that the difficulty was not likely due to the mismatching of cues and was more likely due to the modality of cues available for children to use. It was clear that 5-year-olds found the verbal condition to be more

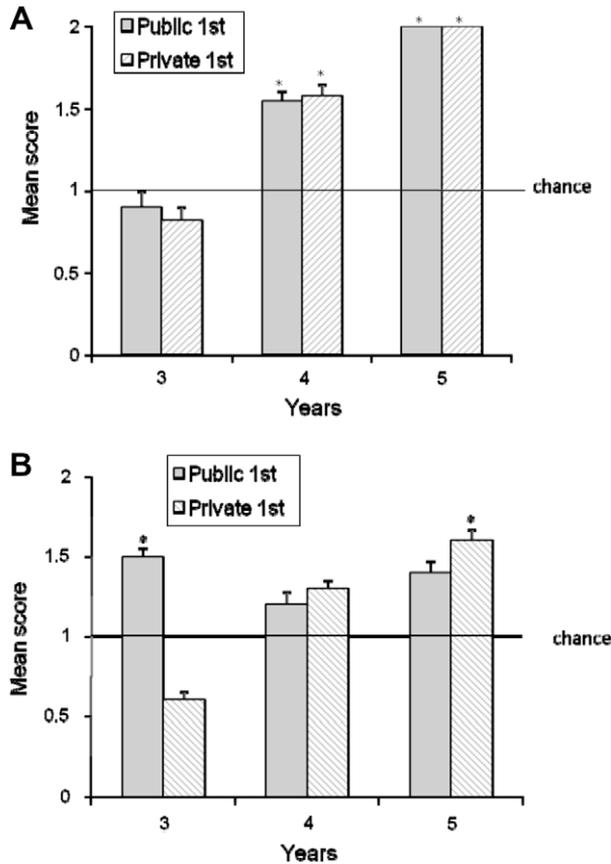


Fig. 4. Mean scores of 3-, 4-, and 5-year-olds in the private first and public first conditions for the nonverbal condition (A) and verbal condition (B) on the like-dislike question in Experiment 3. Error bars indicate standard errors. Asterisks indicate where group performance was significantly above chance.

difficult than the nonverbal condition. As in Experiment 1, 5-year-olds reached ceiling on the task in the nonverbal condition, whereas their performance was only significantly different from chance in the private first order in the verbal condition. Although there were no significant differences in performance across modalities for 3- and 4-year-olds, 4-year-olds' performance was above chance only in the nonverbal condition. The results suggest that having the modality of cues match in the private and public conditions did not aid performance. Therefore, children's performance in Experiment 2 was likely enhanced by the presence of both cues providing an enriched context in which to interpret the inconsistency.

General discussion

This study examined 3-, 4-, and 5-year-olds' understanding when they encounter situations in which the same individual conveys inconsistent messages in public and private situations. Experiments 1 and 2 revealed that 4- and 5-year-olds selectively relied on private information to interpret inconsistent messages in the scenario presented, whereas 3-year-olds did not. In Experiment 3, which examined the effects of modality on children's understanding of the private-public distinction, 5-year-olds found the nonverbal condition to be easier and 4-year-olds performed above chance only in the nonverbal condition, suggesting that they found nonverbal cues to be easier to use in a polite-

Table 2

Number of children making each response type to the explanation question divided by their scores on the like–dislike question for the cake and drink in Experiment 3 in the verbal and nonverbal conditions.

Response	Score on like–dislike question		
	0	1	2
<i>Nonverbal condition</i>			
Ignorance	10 (77)	4 (40)	19 (44)
Statement of fact			
Disliked	2 (15)	2 (20)	14 (33)
Liked	1 (8)	1 (10)	0
Intention	0	0	8 (19)
Other	0	3 (30)	2 (5)
<i>Verbal condition</i>			
Ignorance	14 (74)	11 (52)	14 (39)
Statement of fact			
Disliked	1 (5)	6 (29)	12 (33)
Liked	1 (5)	0	0
Intention	2 (11)	0	8 (22)
Other	1 (5)	4 (19)	2 (6)

Note. Percentages are in parentheses.

ness situation for interpreting private–public inconsistencies in this study. In sum, when facing inconsistencies in public and private messages, 3-year-olds appeared to be insensitive to the public–private distinction to determine the true state of affairs, 4-year-olds began to appreciate the distinction and rely on the private message to derive the true state of affairs, and 5-year-olds reliably used the private message to determine the true state of affairs. Furthermore, older children appeared more inclined to rely on the private message when private and public messages conflicted with each other in the nonverbal modality than they did in the verbal modality.

The fact that children understand the private–public distinction at such a young age is remarkable given that research on children's understanding of conflicting messages suggests it to be a late developmental milestone. Although some 4-year-olds in the current study were able to handle inconsistent messages in the private and public settings, inconsistent messages such as jokes or sarcasm (e.g., Ackerman, 1981; Capelli et al., 1990; Demorest et al., 1983, 1984; Sullivan et al., 1995; Winner & Leekam, 1991; Winner et al., 1987) and deceptive messages (Demorest et al., 1984; DePaulo & Jordan, 1982; DePaulo et al., 1982; Friend, 2000; Friend & Bryant, 2000; Rotenberg et al., 1989; Volkmar & Siegal, 1982) are usually understood by children starting around middle childhood. The results of the current investigation are more in line with research conducted on children's understanding of the appearance–reality distinction (Flavell, Flavell, & Green, 1983), in particular the difference between real (i.e., felt) and apparent (i.e., expressed) emotions. Research has shown that 4-year-olds can sometimes distinguish between real and apparent emotions (Banerjee, 1997; Gross & Harris, 1988; Harris et al., 1986; Harris & Gross, 1988; Josephs, 1994). However, the research on real and apparent emotions differs from the current study in that the experimenter offers a rationale for why the protagonist might want to conceal an emotion rather than have the children interpret conflicting messages in context and needing to draw their own inferences.

Why then does the majority of research on inconsistent communication find that children are not successful at understanding until middle childhood, whereas the current study found that 5-year-olds frequently reached ceiling on our task? One factor that should play a role in children's ability to interpret inconsistent messages is the context within which the messages are presented. The current study restricted itself to only one scenario; however, research has shown that even 3-year-olds show evidence of familiarity with this situation by producing different messages in private and public when given an undesirable gift (Cole, 1986; Talwar et al., 2007). Familiar social contexts provide children with a rationale for why a speaker would convey inconsistent messages. Thus, the current study used a familiar naturalistic scenario that would optimize children's ability to interpret inconsistent messages. A potential issue, however, is that the actress always communicated dislike of the refreshments

in private and like of the refreshments in public. Previous research has examined the influence of different valence cues for verbal and nonverbal information. Eskritt and Lee (2003) examined preschoolers' interpretation of conflicting verbal and nonverbal information as an individual tried a number of novel drinks. As in the current study, they asked children whether the actor liked the refreshment; however, Eskritt and Lee provided both negative nonverbal cues with a positive verbal message and positive nonverbal cues with a negative verbal message. As in previous research using concurrent conflicting cues, Eskritt and Lee found that children had difficulty with the task unless they made the nonverbal information more salient. However, as in a number of studies examining children's ability to understand inconsistencies between verbal and nonverbal information, they found that the valence of trials can influence performance. Children tend to succeed earlier on negative valence trials where the individual's verbal message is positive but the nonverbal message is negative than on positive valence trials where the individual's verbal message is negative and the nonverbal message is positive (Banerjee, 1997; Eskritt & Lee, 2003; Friend & Bryant, 2000; Friend & Davis, 1993; Gnepp & Hess, 1986). The superior performance on negative valence trials has been explained as this trial type being more familiar in that it is similar to situations where children are socialized to learn social display rules, for example, faking pleasure at receiving an undesirable gift (Gnepp & Hess, 1986; Talwar et al., 2007). Thus, the current study presented children with a scenario that optimized their performance.

Another difference between previous research and the current study is that private and public information must be presented at different points in time, whereas research on other types of inconsistent messages presents conflicting information simultaneously. Children may find it difficult to attend to, let alone interpret, the concurrent conflicting cues. Children can be distracted by the more salient message, which may lead them to not notice the less salient message. For example, young children might find the verbal channel to be more salient than the nonverbal channel when the two conflict. Indeed, research has shown that when the saliency of the nonverbal channel is increased, younger children are more inclined to use nonverbal cues to interpret an inconsistent message (Eskritt & Lee, 2003; Morton, Trehub, & Zelazo, 2003). Perhaps presenting the conflicting information at different points in time makes nonverbal cues easier to attend to and they are not overshadowed by the verbal cues. This saliency explanation is also consistent with the recency effect found with 3-year-olds under some conditions in the current study given that the most recent information could be argued to be more salient.

The scenario chosen for this study was designed to promote optimal performance in children by controlling more than just the valence and type of situation depicted. In the Introduction, we defined private information as being information conveyed when the source of that information was not present. In this study, private information was presented with no one but the communicator present. It may be more difficult for children to decide whether that information is private if another individual, to whom the information did not apply, was also present. Would children recognize that it is "safe" for the speaker to express her dislike? Furthermore, the definition provided did not address the number of recipients of a message that can affect whether the message is evaluated as being expressed in private. If an individual provides examples from her home life while lecturing in an introductory psychology course, although her family members are not present, it is unlikely that an adult would perceive the situation as private. Thus, although the results of this study suggest that the older children have some understanding of the private–public distinction, the depth of their understanding is not yet known.

The results of the current study add to the small number of studies that have found that 4- and 5-year-olds can, under some conditions, use nonverbal cues to interpret inconsistent messages (e.g., Eskritt & Lee, 2003; Freire et al., 2004; Friend, 2003). This raises the question as to what factors might influence the changes that are observed in children's understanding of inconsistent communication. Emotion cues are responded to quite early in infancy (Cooper & Aslin, 1990; Fernald, 1985; Werker & McLeod, 1989). Friend (2001) found that the majority of 15-month-olds in a social referencing study used a nonverbal message, rather than the conflicting verbal message, to regulate their behavior. Yet older children rarely rely on nonverbal information to interpret inconsistent messages before 6 years of age at the earliest. Of course, infants are not as competent at language, so the shift from relying on nonverbal to verbal cues and back to nonverbal cues is likely to be related to language acquisition. Thus, the development of language may actually suppress the use of nonverbal cues to interpret com-

municative intentions over early childhood and only regains significance later (Friend, 2000). Another factor that might influence this shift may be the increase in the complexity of reasoning during early childhood that allows children to consider multiple sources of information to infer speaker intent (Friend, 2003; Hancock, Dunham, & Purdy, 2000). Research that has found preschoolers using nonverbal information in some contexts that highlight information for children (Eskritt & Lee, 2003; Freire et al., 2004) or reduce cognitive demands for responding (Friend, 2003).

Not only do children need to be able to consider multiple sources of information, they also need to have an understanding of others' minds if they are to infer intent. Research supports the idea that theory of mind development is related to understanding inconsistent communication. Children's ability to distinguish jokes from lies is related to their understanding of the importance of intention in communication and whether the speaker is trying to mislead the listener or commenting on shared knowledge (Sullivan et al., 1995). Although 4-year-olds can understand the difference between the appearance and reality of an object (Flavell et al., 1983), their understanding of real and apparent emotions is much more fragile (Gross & Harris, 1988; Harris & Gross, 1988; Harris et al., 1986). Harris and Gross (1988) suggested that to recognize the distinction between real and apparent emotions, children need to have an understanding of second-order mental representations, making it a more difficult task. That is, children must recognize that an individual not only is producing a misleading emotional display but also wants to influence what others think. Research on children's interpretation of ironic statements also indicates that there is a relationship between performance on second-order false belief tasks and performance on irony tasks (Happe, 1993; Winner & Leekam, 1991). Furthermore, Banerjee and Yuill (1999) found that children's understanding of self-presentational display rules, but not prosocial display rules, was related to second-order mental representation.

Evidence for understanding of second-order representation is usually not found until at least 6 years of age (Astington, Pelletier, & Homer, 2002; Sullivan, Zaitchik, & Taber-Flusberg, 1994; Wimmer & Perner, 1983), consistent with findings from the majority of studies on inconsistent messages. However, under some circumstances, children have been found to be sensitive to nonverbal cues (Eskritt & Lee, 2003; Friend, 2003; Milosky & Ford, 1997). The findings of Experiment 3 indicate that although nonverbal cues might not play as large a role in interpreting single source conflict in general, under some circumstances the use of nonverbal cues may become more prominent than what has been found in most of the existing research. It is possible that children may demonstrate evidence of using nonverbal cues without necessarily understanding the full meaning behind the message. In the current study, many children could not explain why the speaker gave conflicting messages. Of course, children may have some understanding of a situation before they can explicitly discuss it (Karmiloff-Smith, 1992). Friend (2003) did find that with a behavioral response measure, 4-year-olds were influenced by the nonverbal channel. Yet research on children's understanding of irony has shown that although children may be able to detect irony, they might not necessarily be able to determine the intent of the irony (Dews & Winner, 1997). In addition, some types of inconsistent messages may be easier to understand than others (e.g., Harris & Pexman, 2003). More research, preferably longitudinal, is needed to study how these various factors may interact with one another to influence children's understanding of inconsistent communication.

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