Short communication

Do the wrong thing: How toddlers tell a joke from a mistake

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Abstract

We investigated whether 19–36-month-olds (1) differentiate mistakes from jokes, and (2) understand humorous intentions. The experimenter demonstrated unambiguous jokes accompanied by laughter, unambiguous mistakes accompanied by the experimenter saying, “Woops!”, and ambiguous actions that could either be a mistake or a joke, accompanied by either laughter or, “Woops!” Toddlers were asked to try. Nineteen- to 36-month-olds differentiated jokes and mistakes by copying unambiguous jokes and correcting unambiguous mistakes. Only 25–36-month-olds differentiated mistakes and humorous intentions by copying ambiguous actions marked by laughter, and correcting those marked by, “Woops!” Understanding humorous intentions precedes understanding intentions behind pretense, lying, and false beliefs, thus may be a first step in understanding that others can intend to do the wrong thing.

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An important step in children’s understanding of others’ actions is identifying when and why others do the wrong thing. A familiar example of this is false belief—identifying that someone can believe something that is not true. That we do not understand false beliefs until 4 years (Gopnik & Astington, 1988) illustrates that understanding why others do the wrong thing is quite complex. Other less cognitively demanding possibilities exist, however, to explain why others do the wrong thing, which could be important steps towards more complex forms of understanding this concept. In this study, we aimed to determine when toddlers understand that others can intend to do the wrong thing in order to joke.

One simpler possibility to explain why someone did the wrong thing is to assume a mistake was made. Eighteen-month-olds complete rather than copy failed actions by experimenters (Meltzoff, * Corresponding author.
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Fourteen- to 18-month-olds copy novel actions marked as intentional (There!) significantly more often than those marked as accidental (Woops!) (Carpenter, Akhtar, & Tomasello, 1998). Sakkalou and Gattis (2007) found the same results in British 14–18-month-olds hearing the intonation patterns of, “Woops!” and, “There!” expressed in Greek. Thus 14–18-month-olds understand that others sometimes do the wrong thing because a mistake was made.

Development, however, includes not just learning to do the right thing, but also learning to do the wrong thing. Normally a child carries out an action (physical or verbal) that s/he has learnt to be correct. To do the wrong thing, the child must know that a new action is incorrect, but still carry it out. To some extent, pretense is one form of doing the wrong thing. In pretending, one substitutes an object or action for another, which, in a literal sense, is wrong. Toddlers make object substitutions from 18 months (Elder & Pederson, 1978; Ungerer, Zelazo, Kearsley, & O’Leary, 1981). Children distinguish the intention to pretend from false beliefs at four years (Perner, Baker, & Hutton, 1994). Thirty-six-month-olds differentiate the intention to pretend from sincere intentions by completing actions marked as trying, and copying the same wrong actions when marked as pretending (Rakoczy, Tomasello, & Striano, 2004). Thus 36-month-olds understand that others can intentionally do the wrong thing when pretending. When shown superficially similar incomplete actions, even 22-month-olds extend pretend actions given pretense cues and correct actions given trying cues (Rakoczy & Tomasello, 2006). However, in that study, children were praised during the warm-up for pretending after pretense demonstrations, and for doing correct actions after trying demonstrations, which could have served as training. Thus it is unclear whether 22-month-olds differentiate intentions to pretend and sincere intentions spontaneously.

A less ambiguous form of doing the wrong thing is lying. This requires understanding that the liar intends to say the wrong thing, and intends for the listener to believe the falsehood. Three-year-olds differentiate intentions to lie from sincere intentions (Siegal & Peterson, 1996, 1998), and 4-year-olds differentiate intentions to lie and pretend (Taylor, Lussier, & Maring, 2003).

A third form of doing the wrong thing is joking, which requires children to know that (1) what has been said or done is wrong, (2) the joker intended to say or do the wrong thing, and (3) the joker intended for the listener to disbelieve the falsehood. Sullivan, Winner, and Hopfield (1995) read two stories to 5–8.5-year-olds. In one story, a child lies, as he does not know that the person to whom he is lying knows the truth. In the other story, a child jokes, as he knows that the person to whom he is joking knows the truth. Sullivan et al. found that children six years and older, but not 5-year-olds, understood second-order ignorance (understanding that Person 1 does not know what Person 2 knows), and that children’s understanding of second-order ignorance was imperative to differentiating humorous and lying intentions.

Our study investigates children’s understanding of humorous intentions using a simpler contrast: whether toddlers can distinguish jokes and mistakes, i.e. humorous and sincere intentions. Jokes and mistakes both require the audience to know that the information displayed is incorrect. However, when one makes mistakes, the audience must understand that the demonstrator intends to do the right thing, but fails, whereas when one jokes, the audience must understand that the demonstrator intends to do the wrong thing (Leekam, 1991).

Understanding humorous intentions is less complex than understanding intentions to pretend, which requires some understanding of the representational status of actions. Understanding humorous intentions is also less complex than understanding the intention to lie, which requires an understanding of second-order ignorance. Finally, understanding humorous intentions is less complex than understanding false beliefs, which requires an understanding that others have beliefs that are wrong. Thus it is possible that learning that others intend to do the wrong thing in order to
Fig. 1. Cognitive abilities needed to differentiate reasons for doing the wrong thing in different experiments. Boxes outlined in bold are specific to the current study.

A joke could be a precursor to learning that others intend to do the wrong thing in order to pretend, lie, or due to false beliefs. The relationship and requirements between these different types of intention understanding are displayed in Fig. 1.

In this study we measured whether toddlers can, (1) differentiate jokes and mistakes, and (2) differentiate humorous and sincere intentions. Three sets of unconventional actions were demonstrated to 19–24-, 25–30- and 31–36-month-olds: unambiguous jokes, unambiguous mistakes, and ambiguous actions. We define unambiguous jokes as actions on objects that are dissimilar to actions normally applied to such objects (e.g. putting a boot on one’s hand). These were marked by laughter and a positive facial expression. We define unambiguous mistakes as incomplete actions that are similar to actions normally applied to such objects (e.g. writing with the wrong end of a marker). These were marked by laughter and a positive facial expression. We define ambiguous actions as incomplete actions that are somewhat similar and somewhat dissimilar to actions normally applied to such objects, and therefore could be interpreted either as jokes or mistakes (e.g. putting a hat on over one’s eyes). These were marked either with laughter and a positive facial expression, or by the utterance, “Woops!” and a negative facial expression. The first two sets of actions should reveal whether toddlers differentiate jokes and mistakes, while the last set should reveal whether toddlers differentiate mistakes from humorous intentions.
Our first prediction was that toddlers in all three age groups would differentiate unambiguous jokes and mistakes, based on Meltzoff’s (1995) report that toddlers complete mistakes from 18 months, and McGhee’s (1979) proposal that from 18 months, toddlers joke by using incongruous actions on objects. Furthermore, infants from eight months repeat their own actions to re-elicit laughter (Reddy, 2001), and toddlers are keen to copy others’ actions (Carpenter et al., 1998; Sakkalou & Gattis, 2007), so theoretically toddlers should be eager to both imitate and make jokes.

Our second prediction was that if toddlers can distinguish jokes from mistakes based on intention alone, they would copy ambiguous actions marked as humorous and correct ambiguous actions marked as accidental. We predicted that toddlers would understand humorous intentions after they understand intentions to do the right thing, that is, after 14–18 months (Carpenter et al., 1998; Meltzoff, 1995; Sakkalou & Gattis, 2007), but before understanding intentions to pretend or lie, which occurs around 3 years (Rakoczy et al., 2004; Siegal & Peterson, 1996, 1998).

1. Method

1.1. Participants

Seventy-eight children participated. Twenty-eight were 19–24-months (15 boys, mean age 22 months, 20 days), 27 were 25–30-months (12 boys, mean age 28 months, 4 days), and 23 were 31–36-months (15 boys, mean age 33 months, 28 days). Thirteen children tested in a daycare setting were excluded due to differences from the laboratory setting. Additional children were excluded, due to equipment failure (one), and fussiness (two). Participants were recruited from daycares, playgroups, the NHS, and libraries.

1.2. Materials

Materials included four sets of objects for each of the following: warm-up trials with conventional actions on objects, unambiguous joke trials, unambiguous mistake trials, and ambiguous trials. See Appendix A for a list of objects and demonstrated actions. A Sony digital video camera, a Sony DV cam recorder and a mixing board were used.

1.3. Design

The experiment was a mixed design. All toddlers participated in the same unambiguous joke and mistake trials, making this part a within-subjects design. The independent variable in the unambiguous trials was whether the action was a joke or mistake. All toddlers participated in all ambiguous joke and mistake trials. The order of joke and mistake trials, and the toys used, were counterbalanced between children. For the ambiguous joke and mistake trials, all actions could be perceived either as a joke or mistake. Thus the independent variable was the intentional cue accompanying the action: either laughter and a positive facial expression, or the utterance, “Woops!” with a negative facial expression. The dependent variable for all trials was whether the child first copied or corrected the action, or did neither.

1.4. Procedure

The set-up of the warm-up and experimental trials is based on studies by Rakoczy et al. (2004). The experimenter began with four warm-up trials in which she demonstrated conventional
actions on objects, and then said, “There” with a neutral facial expression. This was done to get the children used to imitating the experimenter in a conventional way. Next, children were shown two unambiguous jokes and two unambiguous mistakes in alternation. After each joke, the experimenter laughed with a positive facial expression. After each mistake, the experimenter said, “Woops!” with a negative facial expression. Next, the experimenter demonstrated two ambiguous actions, after each of which she either laughed with a positive facial expression or said, “Woops!” with a negative facial expression. After each action, the experimenter gave the child the toy(s) saying, “Now you try.” The experimenter then repeated the unambiguous and ambiguous trials using the remaining toys. If in the first ambiguous trial, the experimenter had said, “Woops!” the experimenter laughed in the second ambiguous trial, and vice versa. Children received no feedback.

1.5. Coding

Actions were coded from video, as, (1) copy (the child first copied the experimenter), (2) correct (the child first corrected the experimenter), or (3) neither (the child neither copied nor corrected the experimenter). See Appendix B for coding criteria.

2. Results

Following Rakoczy et al. (2004) and Rakoczy and Tomasello (2006), we calculated difference scores in which we subtracted incorrect responses (copying after a mistake; correcting after a joke) from correct responses (copying after a joke; correcting after a mistake, respectively) This yielded scores of −4 to 4 in the unambiguous condition, and −2 to 2 in the ambiguous condition. No effects of gender were found in any analyses. Twenty percent of the videos (randomly selected) were second coded by a blind rater. Agreement was excellent, Cohen’s Kappa = .85.

We ran a 2 (ambiguity) × 3 (age) × 2 (percentage response match: copy, correct; since there were twice as many unambiguous trials) ANOVA, which did not reveal a three-way interaction, nor any effects of age. However an effect of ambiguity was found, \( F(1, 70) = 62.67, p < .001, h^2_p = .472 \), such that toddlers made more matches in the unambiguous condition. Furthermore, toddlers made more correction matches than copy matches, \( F(1, 70) = 5.55, p = .021, h^2_p = .074 \), and a higher ratio of correction matches to copy matches in the unambiguous versus ambiguous condition, \( F(1, 70) = 12.45, p = .001, h^2_p = .151 \). As the ambiguous items reveal toddlers’ understanding of humorous intentions, while the unambiguous may only reveal toddlers’ understanding of humor, we tested ambiguous and unambiguous actions separately.

2.1. Unambiguous actions

Fig. 2 shows the means of correcting and copying for unambiguous mistakes and jokes by age. Two participants had correction difference scores outside three standard deviations of the mean leading to the elimination of their data. A 3 (age) × 2 (response match: copy, correct) ANOVA on the differences scores revealed that toddlers made significantly more matches for corrections than for copying, \( F(1, 73) = 18.03, p < .001, h^2_p = .198 \). Following Rakoczy and Tomasello (2006) we tested the difference scores against zero (1-tailed, as there was no reason to predict that toddlers would copy mistakes and correct jokes) for each age group, as age and these difference scores were part of the experimental design. Toddlers in all three age groups corrected mistakes significantly more than they corrected jokes (19–24 months: \( t(27) = 15.00, p < .001, \)
2.2. Ambiguous actions

Fig. 3 shows the means of correcting and copying for ambiguous mistakes and jokes by age. Two participants had both correction and copying difference scores outside three standard deviations of the means, and one participant had a copying difference score outside three standard deviations of the mean, leading to the elimination of their data. A 3 (age) × 2 (response match: copy, correct) × 2 (order) ANOVA on the difference score yielded no significant effects. Following Rakoczy and Tomasello (2006) we tested the difference scores against zero (1-tailed, as there was no reason to predict that toddlers would copy mistakes and correct jokes) for each age group, as age and these difference scores were part of the experimental design.

There was no significant difference in how often 19–24-month-olds corrected ambiguous actions marked as mistakes or jokes, t(26) = −0.21, p = .416, nor in how often 19–24-month-olds copied actions marked as mistakes or jokes, t(25) = 1.07, p = .147. Twenty-five- to 30-month-olds corrected ambiguous actions marked as mistakes significantly more than actions marked as jokes, t(25) = 1.99, p = .029, $h^2_p = .137$, and copied actions marked as jokes significantly more than actions marked as mistakes $t(25) = 1.89, p = .036, h^2_p = .125$. Thirty-one- to 36-month-olds

$h^2_p = .893; 25–30$ months: $t(25) = 14.23, p < .001, h^2_p = .890; 31–36$ months: $t(21) = 11.22, p < .001, h^2_p = .857$, and copied jokes significantly more than they copied mistakes (19–24 months: $t(27) = 7.62, p < .001, h^2_p = .682; 25–30$ months: $t(26) = 5.72, p < .001, h^2_p = .557; 31–36$ months: $t(22) = 6.55, p < .001, h^2_p = .661$).
corrected actions marked as mistakes significantly more than actions marked as jokes, $t(22) = 3.17$, $p = .002$, $h^2_p = .313$, and copied actions marked as jokes significantly more than actions marked as mistakes, $t(22) = 2.65$, $p = .008$, $h^2_p = .242$.

3. Discussion

We investigated an important step in children’s understanding of others actions and intentions: whether toddlers can (1) differentiate mistakes and jokes, and (2) differentiate humorous and sincere intentions. Nineteen- to 36-month-olds copied unambiguous jokes and corrected unambiguous mistakes. Only children 25 months and older distinguished ambiguous actions, copying actions marked by laughter, and correcting actions marked by, “Woops!”

3.1. Distinguishing jokes and mistakes

Our results indicate that children can distinguish jokes from mistakes as early as 19 months. For 19–24-month-olds to get a joke, it appears to be necessary that the joke be unambiguous. We propose that toddlers copied unambiguous humorous actions because they found the actions to be funny, and wanted to be funny themselves, akin to clowning (Reddy, 2001). Future studies might address whether intentional cues are also necessary, or whether toddlers first comprehend unambiguous humorous actions on the basis of the actions alone.

An alternative interpretation of our results is that 19–24-month-olds do not understand humor at all, but copy and correct on the principle that others can only intentionally do the right thing, or unintentionally do the wrong thing. According to this interpretation, toddlers copy jokes because they infer that they are correct novel intentional actions. This interpretation would predict similar performance in both the unambiguous and ambiguous conditions, however, whereas we found
that 19–24-month-olds performed differently in the two conditions. On this basis, we propose that toddlers’ humor comprehension is a function of both intentional cues and action ambiguity. The ambiguous condition required that toddlers combine action knowledge with understanding of humorous intentions, which 19–24-month-olds were unable to do.

Although Sroufe and Wunsch (1972) reported that 4–12-month-olds laugh at auditory, tactile, visual, and social actions, laughter does not necessarily indicate humor appreciation but instead could be a surprise or general play response (McGhee, 1979). Our results explicitly demonstrate humor comprehension at 19 months, in line with McGhee’s claim that humor emerges around 18 months. Our paradigm provides a clear test of humor comprehension that can also be used with younger children, to further explore Sroufe and Wunsch’s claims.

3.2. Understanding humorous intentions

Our results indicate that children can distinguish jokes from mistakes on the basis of intentional cues from 25 months. Referring back to our model in Fig. 1, this result places the ability to distinguish humorous from sincere intentions (25–36 months) later than distinguishing intentional actions from mistakes (14–18 months, Carpenter et al., 1998), but earlier than distinguishing intentions to pretend from sincere intentions (36 months, Rakoczy et al., 2004), and intentions to lie and joke (over 5 years, Sullivan et al., 1995). Reddy (1991, 2001) suggests that understanding humor could allow infants to bootstrap their understanding of pretense. Our results support the hypothesis that humor is the first step in understanding that one can intend to do the wrong thing.

Understanding humorous intentions requires an understanding that an action or statement was wrong, and that it was intentionally so. To explain the performance of 25–36-month-olds on ambiguous trials without attributing an understanding of humorous intentions, one might argue that toddlers copied the ambiguous actions because they thought the actions were correct. Each ambiguous action was marked as humorous for half of the toddlers, however, and accidental for the remaining toddlers, and toddlers, performance varied according to marking. Furthermore, if toddlers were simply using positive cues (laughter) to infer which actions were intentional, and negative cues (Woops!) to infer which actions were accidental, performance should have been equal in the ambiguous and unambiguous conditions. Instead, toddlers copied humorous actions and corrected mistake actions more often in the unambiguous condition than in the ambiguous condition, indicating that toddlers, understanding of humor is dependent on action knowledge and an understanding of humorous intentions. It is worth noting that ambiguous actions were not more unconventional than unambiguous actions: unambiguous humorous actions were the most unconventional actions that toddlers saw.

Finally, if toddlers were simply copying intentionally wrong actions in general (actions that are wrong, but marked with positive cues), they should also copy intentional pretend actions accompanied by positive cues at this age, even if they do not yet understand the intention to pretend. However, they do not do this until 36 months (Rakoczy et al., 2004). As they copy only intentionally wrong actions that are humorous, this suggests that toddlers understand humor-specific intentions to do the wrong thing.

3.3. Conclusion

This study is the first to provide experimental evidence that toddlers understand humor. We propose that humor understanding is an important step toward understanding that human actions
can be intentional not just when actions are right, but even when actions are wrong. Our results combined with previous results indicate that toddlers understand humorous intentions before they understand intentions to pretend or lie. Thus understanding humor could be the first step for humans to understand that others can intend to do the wrong thing.

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Appendix A

*Normal actions on objects (warm-up)*
- Stir spoon in cup.
- Comb hair.
- Stack blocks.
- Move duck and say, “Quack”.

*Unambiguous joke actions*
- Put boot on hand.
- Put toy cat on head.
- Brush chin with hairbrush.
- Pour tea in boot.

*Unambiguous mistake actions*
- Put lid on sugar jar and slide to the side so that it is not in place.
- Put glove on hand so that it falls off without completely covering hand.
- Write with wrong end of a marker.
- Put ring over ring stacker and let it drop next to the ring stacker rather than on it.

*Ambiguous actions*
- Bring upside down cup to lips.
- Put hat on head and over eyes.
- Bring spoon up to face and hit into cheek.
- Brush teeth with wrong end of toothbrush.

Appendix B

**Coding scheme**

*Boot*
- *Copy.* Puts boot on own, parent’s or experimenter’s hand.
- *Correct.* Puts or tries to put boot on own, parent’s or experimenter’s foot.

*Cat*
- *Copy.* Puts cat on own, parent’s or experimenter’s head.
- *Correct.* Moves cat like it is walking or says “meow”.

*Brush*
- *Copy.* Brushes own, parent’s or experimenter’s chin.
- *Corrects.* Brushes own, parent’s or experimenter’s hair.

*Teapot and boot*
- *Copy.* Pours “tea” into boot with teapot.
- *Correct.* Pours tea elsewhere or puts/tries to put boot on foot.
Appendix B (Continued)

Sugar jar
Copy. Purposely misses when putting lid on jar, e.g. obviously slides or throws lid off the side of the jar.
Correct. Puts lid on jar or tries to put lid on jar. “Trying” could be seen by putting the lid on and getting it on, but without it fitting properly (this is due to the nature of the toy’s structure).

Glove
Copy. Puts glove slightly on own, parent’s or experimenter’s hand, but not all the way on, and lets it fall off/pulls it off, etc. so that if falls on the ground.
Correct. Puts glove on own, parent’s or experimenter’s hand so that whole hand is in glove. The fingers don’t have to be on properly.

Marker
Copy. Writes on paper with wrong end of marker (so not actually writing).
Correct. Writes properly so that ink goes on page.

Ring stacker
Copy. Holds ring to side of ring stacker and lets go so that it falls to the ground.
Correct. Puts ring on ring stacker and lets go so that it falls in place.

Cup
Copy. “Drinks” out of upside down cup, or puts bottom of cup to own, parent’s or experimenter’s mouth.
Correct. Drinks out of cup properly, or directs properly to parent’s or experimenter’s mouth.

Hat
Copy. Puts hat on own, parent’s or experimenter’s head/face so that it falls over the eyes.
Correct. Puts hat properly on own, parent’s or experimenter’s head.

Spoon
Copy. Puts spoon on own, parent’s or experimenter’s cheek or area around there.
Correct. Puts spoon in own, parent’s or experimenter’s mouth, or pretends to eat with spoon (or pretends to feed parent or experimenter).

Toothbrush
Copy. Puts wrong end of toothbrush in own, parent’s or experimenter’s mouth/shakes wrong end of toothbrush in front of own, parent’s or experimenter’s mouth.
Correct. Puts right end of toothbrush in own, parent’s or experimenter’s mouth/shakes right end of toothbrush in front of own, parent’s or experimenter’s mouth.

References


