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Humor and Preschoolers' Trust: Sensitivity to Changing Intentions

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Highlights

-Preschoolers trust a sincere informant over a joker when learning novel labels.

-Preschoolers consider intentions to joke when learning information.

-Preschoolers' trust based on current rather than initial intentions.

-Preschoolers consider the temporal dimension of intentions to some extent

Abstract

This research demonstrates preschoolers (1) avoid trusting informants with humorous intentions when learning novel information, and (2) flexibly consider current rather than initial intentions when determining whom to trust. In Study 1 (N = 61) 3- and 4-year-olds based their trust on intentions or intentional cues alone, trusting a sincere informant over a joker, even when no prior accuracy or inaccuracy was displayed. In Study 2 (N = 32) 3- and 4-year-olds flexibly based their trust on the informants' current, rather than initial, intentions or intentional cues. Children trusted a sincere informant, who originally joked, over a joker, who was originally sincere. In Study 3 (N = 89), 3-, 4-, and 5-year-olds tracked changing intentions, and not just intentional cues, in determining whom to trust. Children trusted an informant who joked during training trials, but was sincere during test trials, over an informant who was ignorant during training trials, and sincere during test trials. However, if the ignorant informant became knowledgeable, and the joker continued to joke, the pattern reversed. This is the first study to show that preschoolers consider intentions to joke when learning information. This is also the first study to show that preschoolers do not see trust as stable, but see it as a function of changing intentions.

Keywords: Trust; Intention; Humor; Learning; Preschoolers

Humor and Preschoolers' Trust: Sensitivity to Changing Intentions

Humans acquire a large amount of information without directly experiencing the empirical evidence associated with it (e.g., Cimpian, Brandone, & Gelman, 2010). Without this ability, we could not learn about history, religion, or countries and cultures not yet experienced (e.g., Harris, 2012; Harris & Koenig, 2006). A large body of research suggests children do not blindly trust just anyone; children consider *whom* to trust (e.g., Clément, Koenig & Harris, 2004; Corriveau, Meints, & Harris, 2009; Koenig & Harris, 2005; Pasquini, Corriveau, Koenig, & Harris, 2007). However, in a world where intentions change over time (e.g., Cohen & Levesque, 1990), an important question is whether children trust individuals on some occasions but not others (e.g., Nurmsoo & Robinson, 2009; Robinson, Butterfill, & Nurmsoo, 2011; Robinson & Nurmsoo, 2009; Scofield & Behrend, 2008; Sobel & Corriveau, 2010; VanderBorght & Jaswal, 2009). Specifically, do children trust informants when they intend to give correct information, but not when they intend to give incorrect information, regardless of their initial intentions. Thus, the question becomes not just *whom* to trust but also *when* to trust a given person. In the current paper, we sought to determine whether children (1) know not to trust someone who intends to joke, and (2) consider current intentions, not initial intentions, when deciding whom to trust.

Preschoolers consider past behaviors when deciding whom to trust. For example, when learning new words, 4-year-olds trust an informant who previously labeled familiar objects correctly over an informant who labeled them incorrectly. Thus, children trust accurate over inaccurate informants (e.g., Clément, et al., 2004; Koenig & Harris, 2005). Four-year-olds also mistrust informants who were previously sometimes inaccurate rather than consistently inaccurate (Pasquini, et al., 2007; Corriveau, et al., 2009). Additionally, children trust accurate informants regardless of their age, trusting accurate children over inaccurate adults (Jaswal & Neely, 2006).

Children also base their trust on informants' knowledge. For example, Einav and Robinson (2011) showed two puppets correctly labeling objects, with one of the puppets doing so on their own, and the other requiring help. When later learning new labels, 4-year-olds, but not 3-year-olds, trusted the puppet that did not need help.

Most of the research to date suggests children believe previously accurate or knowledgeable informants can be trusted in future, whereas previously inaccurate or ignorant informants cannot. However people are not statically trustworthy or untrustworthy, and recent research suggests that sometimes children do not statically trust or mistrust the same individuals (e.g., Nurmsoo & Robinson, 2009; Robinson, et al., 2011; Robinson & Nurmsoo, 2009; Scofield & Behrend, 2008; Shafto et al., 2012; Sobel & Corriveau, 2010; VanderBorght & Jaswal, 2009). Rather, people are trustworthy at times, but not at others.

One way in which children might change whom they trust is by considering intentions. Intention is an important factor to consider in terms of trust as a critical aspect of intention is that it is not a stable mental state. People's intentions change over time (e.g., Cohen & Levesque, 1990; Roy, 2009; van der Hoek, Jamroga, & Wooldridge, 2007). According to Cohen and Levesque (1990, p. 214), people "keep (or commit to) intentions, but not forever; [they] discharge those intentions believed to have been satisfied." Thus, people can revise or complete their intentions, moving onto new intentions. Therefore people can, for example, intend to say the wrong thing in order to joke. However once they are done joking they can then intend to say the right thing to communicate or inform others. Accordingly, the current intention, rather than the former intention, of an informant should be important in deciding whether to trust the informant.

A computational model suggests children likely base their trust, in part, on intentions (Shafto, Eaves, Navarro, & Perfors, 2012). Additionally, from 4 years (but not 3 years) children do not trust liars (Mascaro & Sperber, 2009). From 3 years, children understand that

pretending is not a reliable cue for acquiring correct information compared to, for example, having direct experience with the relevant information (Koenig, 2012). The current paper extends this research by considering a third type of intention to do the wrong thing in the context of trust – joking.

We chose to compare joking and sincerity as joking is a clear example of intentionally saying or doing the wrong thing (e.g., Hoicka & Gattis, 2008; Hoicka, Jutsum, & Gattis, 2008; Leekam, 1991), thus the audience should not trust the information provided as being true. In contrast to liars, jokers want their audience to know about their falsehood, and do not expect the audience to believe any part of it (e.g., Leekam, 1991). Thus, people provide cues when they joke (e.g., Hoicka, 2016; Hoicka & Butcher, 2015; Hoicka & Gattis, 2012; Hoicka, et al., 2008; Mireault, et al., 2012). Additionally, infants appreciate humor in the first year (e.g., Addyman & Addyman, 2013; Hoicka & Akhtar, 2012; Mireault, et al., 2012; Mireault, et al., 2014; Mireault et al., 2015; Sroufe & Wunsch, 1972). Furthermore, virtually everyone jokes. For example, all 3-year-olds in a parent survey produced novel jokes (Hoicka & Akhtar, 2012). Therefore joking is an ideal way to examine whether preschoolers use intent to say the wrong thing as a cue not to learn.

The literature on humor and learning is varied in its results. For instance, while humor in the classroom can increase test scores or perceived cognitive learning in higher education, the humor must be related to the content, be positive in nature, and perhaps even be conceptual (Bolkan & Goodboy, 2015; Dixon, Willingham, Strano, & Chandler, 1989; Kaplan & Pascoe, 1977; Wanzer & Frymier, 1999; Wanzer, Frymier, & Irwin, 2010; Ziv, 1988). And even when these criteria are fulfilled, sometimes humor decreases test scores (Fisher, 1997). Even infants are more likely to learn a new functional action when humor accompanies the target action, as long as infants laugh (Esseily, Rat-Fischer, Somogyi, O'Regan, & Fagard, 2016). However the focus of prior investigations was to determine

whether humor increases retention of factual information, and not whether learners know to retain factual information and reject non-serious information (i.e., the joke). We do know that toddlers learn the joke when the goal is to joke (Hoicka & Akhtar, 2011; Hoicka & Gattis, 2008). However, we might expect preschoolers to avoid learning from a joker when the goal is to learn factual information, and when a model of that factual information is provided.

Further questions remain as to whether children's trust is flexible, and whether they track changing intentions. It is not clear from the Mascaro and Sperber (2009) or Koenig (2012) studies, nor the developmental literature on intention understanding in general, whether and when young children understand that intentions are time-dependent. Thus young children may encode intentions in two ways. They may assume that the intention displayed by a new person on their first encounter is forever more their intention, such that a person would always be considered, for example, sincere (and trustworthy) or, e.g., joking (and not trustworthy). A second possibility is that young children have some understanding of the time-dependency of intentions, such that they should trust an informant's latest intention, regardless of their initial intention. For instance, trusting an informant when they are sincere, even if they previously joked.

Infants are aware of others' minds early on. From 5 months, they look longer when an actor performs a new goal (reaching for a new object in an old location) compared to when the actor performs a new action (reaching for an old object in a new location; Woodward, 1998). When 3-month-olds play regularly with sticky mittens and toys (which attach with Velcro), they learn to infer others' reaching goals (Sommerville, Woodward, & Needham, 2005). By 14 months, infants demonstrate an understanding of intentions by imitating intended acts, and avoiding unintentional acts (e.g., Carpenter, Akhtar, & Tomasello, 1998; Gergely, Bekkering, & Király, 2002; Meltzoff, 1995; Sakkalou & Gattis, 2012). However research on early intention understanding focuses on infants' ability to distinguish intentional

versus accidental or incidental actions. Thus infants do not have to contrast prior and current intentions. The experimenters are always sincere and intending to do the right thing, even if they make mistakes.

In order to consider whether children favor current over past intentions when determining whom to trust, it is important to first understand whether children can track intention types other than intentions to be sincere. Research shows that 3- to 6-year-olds judge someone who intentionally took an object from someone else as mean, compared to someone who did so unintentionally (Boseovski, Chiu, & Marcovitch, 2013). However another study found that it is not until 10 years that children judge that people would e.g., scare others to be mean (Grant & Mills, 2011). From 3 years children distinguish intentions to lie or pretend from sincere intentions (e.g., Rakoczy, Striano, & Tomasello, 2004; Siegal & Peterson, 1996, 1998). From 25 months, toddlers distinguish intentions to joke from sincere intentions, and joke intentional contexts from pretend intentional contexts (Hoicka & Akhtar, 2011; Hoicka & Gattis, 2008; Hoicka & Martin, 2016). From 15 months infants are sensitive to cues distinguishing sincere intentions from intentions to joke, and intentions to joke and pretend (Hoicka, 2016; Hoicka & Butcher, 2015; Hoicka & Wang, 2011).

Some of these studies were within-subjects, for example, involving both joking and mistake (sincere) trials; or pretending and trying (sincere) trials; for each participant (e.g., Hoicka & Gattis, 2008; Rakoczy, et al., 2004). While it is tempting to assume this means 2- and 3-year-olds do in fact understand that intentions change over time, it could be argued that the children in these studies responded to emotional cues (e.g., laughter vs. frustration) rather than intentions or intentional cues themselves (see Hoicka & Akhtar, 2011). While other studies directly compared sincere and humorous intentions, (Hoicka & Akhtar, 2011; Hoicka & Wang, 2011; Siegal & Peterson, 1996; 1998), these studies were between-subjects studies, or involved different agents lying and being sincere, so children did not need to decide to

between current and prior intentions. Similarly, children in the Boseovski et al (2013) study could have tracked intentions through cues ("Bob is really sad"), and the study was also between subjects, not allowing a temporal dimension. One study that might capture this temporal dimension to intentions is the Grant and Mills (2011) study, however children only discerned mean intentions from 10 years.

In order to determine whether children (1) understand that one should not trust jokers, and (2) flexibly change their trust based on changing intentions, we ran a series of three studies. Study 1 sought to ensure that children would trust a sincere, accurate informant over an inaccurate joker, i.e., that children understood the task was about learning new labels, not making jokes. Study 1 also sought to ensure that children's trust was based on intentions or intentional cues, not just prior accuracy. Study 2 examined whether children's trust changed alongside changing intentions. It pitted a sincere informant who used to joke against a joker who used to be sincere to examine whether preschoolers would trust based on current, rather than previous, intentions or intentional cues. Study 3 examined whether children tracked changes in intentions, not just intentional cues. This study compared a joker and an ignorant informant. While upon the participants' first encounter both were equally inaccurate when labeling objects, children could infer that the joker said the wrong labels intentionally (and likely had accurate knowledge), while the ignorant informant said them as sincere mistakes (and likely had inaccurate knowledge). Thus when both informants were later sincere, children would have the opportunity to excuse the original joker's prior inaccuracies, as she would now be both sincere and knowledgeable; but would not be able to excuse the originally ignorant informant, who remained sincere, but ignorant. A control condition ensured children did not always avoid originally ignorant informants. During test trials, the original joker continued to give joking cues, while the originally ignorant informant now gave cues she was knowledgeable. Therefore children could excuse the originally ignorant speaker's prior

inaccuracies as she would now continue to be sincere, but also now be knowledgeable, while they could not excuse the original joker, who remained insincere, even if knowledgeable.

Study 1

The Train and Test condition of Study 1 was to some extent a replication of the original trust in accuracy studies (Koenig & Harris, 2005) with one main change. As in the original experiments involving ignorant informants, we gave a reason for the inaccurate informant to mislabel the objects during the familiarization phase making the study more ecologically valid and naturalistic (Lucas & Lewis, 2010). However in our study the inaccurate informant gave the wrong labels because she was joking (not because she was ignorant), and hence intended to say the wrong thing. We ran this study to ensure that children would choose the sincere (accurate) informant over the joker. This was important as previous research found that when the goal is to joke, 2- and 3-year-olds copy a joker's wrong actions or labels (Hoicka & Akhtar, 2011; Hoicka & Gattis, 2008). In contrast, in the current studies, the goal is to learn new words. Therefore children should instead avoid copying a joker's labels. If children understand that the task is to learn new words, they should trust the sincere informant at test trials in this study. However if children misunderstand the task to be about learning jokes, or if children simply prefer the joker, this would suggest this task could not be used to assess whether preschoolers can track intentions, let alone changing intentions.

As children could theoretically base their trust on accuracy alone in the Test and Train condition, the Test Only condition sought to determine whether children could base their trust on intention or intentional cues alone. In this condition, children received no information whatsoever about in/accuracy, but did receive information about whether the informant intended to be sincere or joke based on cues. If children can use intentions or intentional cues

without relying on accuracy information, children in this condition should trust a sincere informant over a joker upon their first encounter with the informants at test trials.

Method

Participants. The Train and Test condition had 33 children (16 male; 16 3-year-olds (*M* = 43.5 months, *range* = 38-47 months); 17 4-year-olds (*M* = 52.5 months, *range* = 48-59 months). The Test Only condition had 28 children (13 male, 15 3-year-olds (*M* = 42.9 months, *range* = 36-47 months); 13 4-year-olds (*M* = 52.0 months, *range* = 48-57 months)). A further four children were excluded because they did not complete any test trials. All children were British. Most children were Caucasian. Parents had a variety of educational backgrounds. Participants were recruited through local schools and nurseries, the Edinburgh Zoo, the Glasgow Science Centre, and through posters and playgroups.

Materials. Slideshows were created using Microsoft PowerPoint, and presented on a laptop computer. Objects in the familiarization trials included a spoon, bottle, doll, and brush. Objects in the action videos included a cookie, cup, scarf, and hat. Objects in the test trials included a brown feathery cat toy; red, black and silver DIY object; blue and white dog toy; and red and white kitchen utensil. Novel names used for each object in the test trials were matched for syllable length (see Table 1). Three female actors, each dressed in one solid color (purple, blue, or grey), were in the training and testing videos, along with one object per video. Action videos were of the actor in the purple shirt, or the actor in the blue shirt, one actor at a time, with one action object at a time. Videos lasted 8-10 seconds each. Each slide contained either a picture or a video. Each of the picture slides were photographs of objects and/or actors featured in the testing and training videos. Children's responses were video-recorded directly onto the laptop computer.

Table 1

Familiar and novel object names given

	Joker	Sincere
Familiar objects, Studies 1 & 2:		
Spoon	Duck	Spoon
Bottle	Apple	Bottle
Doll	Cup	Doll
Brush	Plate	Brush
Familiar objects, Study 3:	Wrong Words	
Spoon	Duck	Train
Bottle	Dog	
Doll	Cup	Ball
Brush	Plate	Coat
Car	Fork	
Pig	Flower	Shoe
	Novel Labels	
Novel object:		
Brown feathery cat toy	Sepa	Mogo
Red, black and silver DIY object	Lig	Slod
Blue and white dog toy	Gepo	Nevi
Red and white unusual kitchen utensil	Chab	Tark

Design. This was a between-subjects design. In the Train and Test condition, one informant consistently joked and one informant was consistently sincere throughout the

familiarization trials, action videos, and test trials. In the Test Only condition, children saw only pictures of objects in the training trials (no informants), and no videos of informants doing actions. Therefore informants only appear in the test trials, which followed the same format as the Train and Test condition. Action videos were included in the Train and Test condition to be consistent with Studies 2 and 3 which required action videos. The dependent variable was whether children trusted the joker or sincere informant at test trials when learning new labels.

Familiar objects were always presented in the same order across trials; however, the order of the novel objects was reversed for half the participants. The actors playing the joker and sincere informant, and the order of speaking for the joker and sincere informant were counterbalanced. See Table 2 for a summary of the design.

Procedure

Familiarization trials. In the Train and Test condition, at the start of the familiarization trials children were shown a slide with a photo of the three actors and told, "In this game we're going to look at some different objects. I've got these two friends, one in a purple top and one in a blue top. They're going to show you some things and tell you what they're called. So you listen carefully and I'll ask you about it afterwards, ok." They were then shown a slide with a photo of the first object, a spoon, and told, "Let's do this one first. Watch the video and see what they say." Children then saw the video of the two informants being asked to name the object. The joker laughed, named it incorrectly (duck) using a humorous intonation pattern (Hoicka & Gattis, 2012) and said, "I'm being silly, only joking." The sincere informant labeled it correctly using a sincere intonation pattern (Hoicka & Gattis, 2012) while smiling. After watching the video children were shown a slide with pictures of the object and the two informants who had named it and asked, "She called it [e.g., a duck]

and she called it [e.g., a spoon]. Can you tell me what it's called?" This continued for the remaining three trials.

Table 2

Informants' (I1 and I2) intentions and knowledge in familiarization, action, and test trials. I1 and I2 were counterbalanced.

	Familiarization Trials	Action Videos	Test Trials
Study 1			
Train & Test	I1 = Joke I2 = Sincere	I1 = Joke I2 = Sincere	I1 = Joke I2 = Sincere
Test Only	None	None	I1 = Joke I2 = Sincere
Study 2			
Changing Intentions	I1 = Joke I2 = Sincere	I1 = Sincere I2 = Joke	I1 = Sincere I2 = Joke
Study 3			
Changing Intentions – Same Knowledge	I1 = Joke (+2 knowledgeable trials) I2 = Ignorant (+2 knowledgeable trials)	I1 = Sincere I2 = Sincere	I1 = Sincere I2 = Sincere
Same Intentions - Changing Knowledge	I1 = Joke (+2 knowledgeable trials) I2 = Ignorant (+2 knowledgeable trials)	None	I1 = Joke I2 = Knowledgeable

In the Test Only condition, children saw no videos during the familiarization trials. Instead, for each of the four objects they were shown a slide with a picture of the familiar object, given two names for the object and then asked to name it. For example for the spoon, they were asked, "Is this a duck or a spoon?"

Action videos. In the Test Only condition, no action videos were shown. In the Train and Test condition, children were told, "Let's watch a video of them doing some different actions. I wonder what they're going to do." Before the joker performed the four actions, she said, "I'm going to make some more jokes." Before the sincere informant performed the four actions, she said, "I'm going to do some actions."

For each action, each informant said the same sentence before performing an action such as, "I'm going to put this hat on." The sincere informant then did the correct action, and the joker did the action incorrectly, e.g., putting the hat under her arm and saying, "I'm being silly, I'm only joking" and laughing. This continued for the other three actions (see Table 3). Children watched one informant do four actions in a row, then the other informant.

Table 3

Action videos

Object	Sincere Action	Humorous Action
Hat	Puts hat on head	Puts hat under arm
Scarf	Puts scarf around neck	Bunches scarf in a ball and puts it on top of head
Cookie	Eats some of cookie	Picks up cookie and puts it to forehead while making eating noises
Drink	Drinks from cup	Puts cup to elbow and makes drinking noises

Test trials. The experimenter introduced the test trials by saying, "Now we're going to look at some strange objects you won't have seen before and we won't know what they're called". Children were then shown a still image of the informants and told, "My two friends are going to help us and they will tell us what they're called, but one will say the name right and one will say it wrong. So listen carefully and we can find out what it's called." Children then saw a photo of the first novel object. If children named the object they were told, "It looks a bit like that but this is something else. Let's watch the video and see what it's called." Children then watched the video where a third actor asked the two informants, "Can you tell me what this is called?" In both conditions, the sincere informant smiled and said, e.g., "That's a mogo" with a sincere intonation pattern. The joker said, e.g., "That's a sepa" with a humorous intonation pattern, then, "I'm being silly, only joking" and laughed. Following the video children were shown a slide with a photo of the object and the two informants and told, "She called it a sepa and she called it a mogo. Can you tell me what it's called?" and waited for the children's answer. If children did not answer they were shown the video again and asked a second time. If they did not answer again the experimenter moved onto the next trial.

Results

We modeled the likelihood of responses using logit mixed effects models with the LME4 package (Bates, Maechler, & Dai, 2008) in R (R Development Core Team, 2009) as the data involved a repeated-measures non-parametric design. See Jaeger (2008) and Hoicka and Akhtar (2011) for reasons for using this statistic, and how it is used. For each analysis, we first built a base model, which included an intercept, and Participant and Trial as random variables. No effects of or interactions with gender or age were found.

See Figure 1 for the percentage of trials on which children chose the sincere actor's label over the joker's, by condition. The best model (*log-likelihood* = -96.95, $N = 228$) found children were significantly more likely to trust the Sincere informant versus the Joker at test

trials overall (*Odd's Ratio*, *OR* = 10.74, $p < .0001$). They were also more likely to trust the Sincere informant in the Train and Test condition than the Test Only condition (*OR* = 4.09, $p = .0003$).

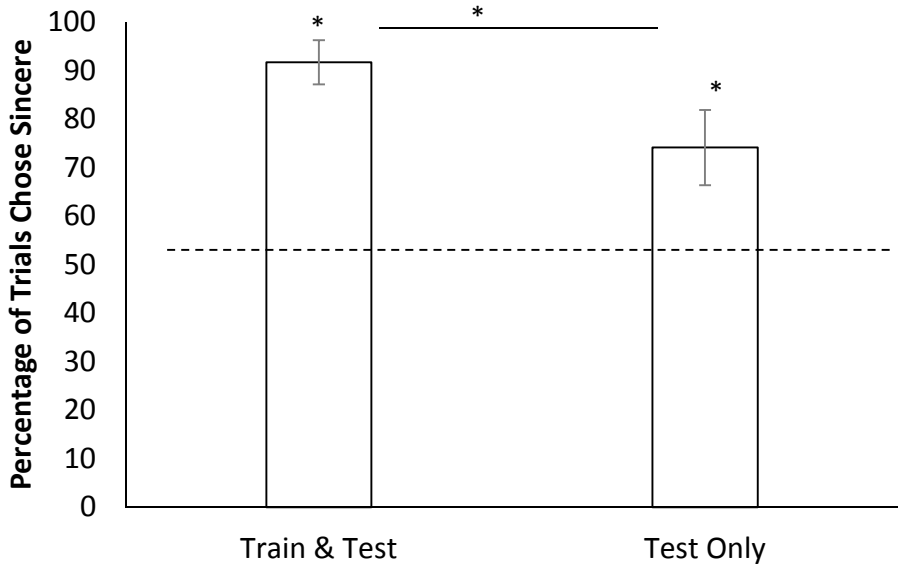

Figure 1. Percentage of trials children chose the Sincere informant at test trials in Study 1, by condition. Error bars represent 95% confidence intervals. *p < .05

Within each condition, the best model for the Train and Test condition (*log-likelihood* = -36.38, *N* = 127) found children were more likely to trust the Sincere informant versus the Joker at test trials (*OR* = 21.67, $p < .0001$). The best model for the Test Only condition (*log-likelihood* = -59.21, *N* = 101) found children were more likely to trust the Sincere informant versus the Joker at test trials (*OR* = 2.67, $p = .0011$).

Discussion

Both conditions found that 3- and 4-year-olds chose to learn new words from the sincere informant versus the joker. Thus children understood the task was about learning, not joking. One possibility is that children based their trust on prior accuracy only, as the sincere informant was always previously accurate, and the joker was always previously inaccurate, in the Train and Test condition. This seems unlikely since 3-year-olds were not better at

determining whom to trust based on accuracy alone in the Koenig and Harris (2005) study. And indeed, in the Test Only condition, children chose the sincere informant based on intentions or intentional cues alone. Instead, it seems that having cues to appropriate intentions which explain why the informants labeled objects correctly or incorrectly helped the children to better understand the task. In the Koenig and Harris study 3-year-olds were able to select the correct informant when cues to ignorance and knowledge were given, suggesting context helps 3-year-olds. However if we examine the percentage of responses in favor of the accurate and inaccurate speakers for the Koenig and Harris study (Experiment 3: 68% for 3-year-olds, 70% for 4-year-olds), we see that children were much better at choosing the correct informant in the Train and Test condition (91%). Therefore joking intentions may have made the task easier than cues to ignorance and knowledge. A second explanation is that humor in the learning environment increased children's positive affect, which in turn increased learning overall (Bolkan & Goodboy, 2015; Esseily, et al., 2016; Wanzer, et al., 2010). However a further possibility is that including the action videos better trained children to identify the accurate and inaccurate informants, as these were not included in the original Koenig and Harris study.

The results of the Test Only condition converge with a computational model suggesting that trust relies on intention (Shafto, et al., 2012), and evidence that 4-year-olds mistrust an informant labeled a "liar" (Mascaro & Sperber, 2009). However in the lying study, 3-year-olds did not know not to trust a liar, while in the current study 3-year-olds knew not to trust a joker, suggesting that younger children better understand intentions behind joking than lying.

Study 2

In Study 2 we sought to examine whether preschoolers know to trust the latest intention of an informant, rather than their first intention. This study pitted a joker who

became sincere over a sincere informant who became a joker. If children's trust is stable, and based only on first encounters, they should trust the previously sincere informant even though she jokes at test trials. In contrast, if children's trust is flexible, such that children consider an informant's current intentions, while ignoring her past intentions, children should trust the currently sincere informant who used to joke over the current joker who used to be sincere.

Method

Participants. Thirty-two children participated (9 male, 16 3-year-olds (*M* = 41.1 months, *range* = 36-46 months); 16 4-year-olds (*M* = 52.4 months, *range* = 49-59 months)), A further three children were excluded because they did not complete any test trials. All children were British and Caucasian. Parents had a range of education backgrounds. Participants were recruited as in Study 1.

Materials. Same as Study 1.

Design. In this study one informant joked in the familiarization trials but was sincere in the action videos and test trials. The other informant was sincere in the familiarization trials but joked in the action videos and test trials. By showing that informants had switched intentions in the action videos, we anticipated this would prepare children to recognize their new intentions in the test trials. The dependent variable was whether children trusted the current joker or the current sincere informant at test trials when learning new labels. See Study 1 and Table 2 for counterbalancing and a summary of the design.

Procedure

Familiarization Trials. Same as the Train and Test condition in Study 1.

Action Videos. Same as the Train and Test condition in Study 1. However the informant who had joked during the familiarization trials became sincere during the action videos and said, "I'm going to stop making jokes." and then made four sincere actions as in Study 1. Similarly, the informant who was sincere in the familiarization trials became

humorous during the action videos saying, "I'm going to make some jokes." and then made four joke actions as in Study 1.

Test Trials. Same as Study 1, however the informant who joked during the familiarization trials was sincere (just as she was during the action trials). By contrast, the informant who was sincere during the familiarization trials joked (just as she had during the action trials).

Results

Children trusted the Sincere informant over the Joker on 82% percent of trials (CI = 74%-89%). Three-year-olds trusted the Sincere informant at test trials on 72% of test trials, while 4-year-olds trusted the Sincere informant on 90% of test trials. The base model was improved by Age, $X^2(1) = 6.03$, $p = .0141$. The best model (*log-likelihood* = -49.84, $N = 112$) found 4-year-olds were more likely to trust the Sincere informant versus the Joker at test trials than 3-year-olds ($OR = 3.62$, $p = .0179$). When 3-year-olds were tested alone, the best model (*log-likelihood* = -31.41, $N = 54$) found they were more likely to trust the Sincere informant versus the Joker at test trials ($OR = 2.86$, $p = .0161$). When 4-year-olds were tested alone, the best model (*log-likelihood* = -19.27, $N = 58$) found they were more likely to trust the Sincere informant versus the Joker at test trials ($OR = 9.71$, $p < .0001$). There were no effects of gender.

Discussion

Children trusted the informant who was sincere at time of testing rather than the informant was sincere upon the children's first encounter with the informants. This suggests trust is flexible. The first encounter with an informant does not determine children's trust permanently. Rather, if a joker stops joking and becomes sincere, children can start trusting the previous joker. Likewise, if a sincere informant stops being sincere and starts joking, children can stop trusting the previously sincere informant.

While Study 2 demonstrates that children are flexible in their trust, there are three possible explanations for these results. The first explanation is that children were tracking intentions, such that they trusted the informant who was currently sincere, and not joking, despite their initial intentions. This would demonstrate that children as young as 3 years do not judge an informant's first intention as their permanent intention. They instead rely on the informant's latest intention to judge their suitability as an informant for novel information.

A second related possibility is that children did not track intentions *per se*, but instead tracked intentional cues. Therefore children may have trusted the person who gave sincere cues, but avoided the person who gave joking cues, without reference to their underlying intention. If this is the case, this would still suggest that children track others' behaviors in sophisticated ways, but without necessarily explicitly representing others' mental states.

The third possibility is that children were tracking changes in accuracy in a sophisticated manner. Certainly children were not basing their trust on the first accuracy of each informant. If this was the case, children would have trusted the joker at test trials significantly more often than they would have trusted the sincere informant. It is also not the case that children judged their trust based on prior proportions of accuracy, regardless of domain. If this was the case, children would judge both informants as equally trust-worthy as each informant was accurate on four trials and inaccurate on four trials across familiarization and action trials. The only possibility is that children trusted the most recent accuracy of an informant, understanding that accuracy changes over time. While possible, this seems unlikely as 3-year-olds in the Koenig and Harris (2005) study (Experiment 1) did not trust accurate informants more than inaccurate informants, despite the fact that in/accuracy was relatively straight-forward and unchanging. It seems more likely that children were only able to do so because they relied on intentions or intentional cues.

Unlike Study 1, we found an effect of age in Study 2. One possibility is that expressing trust flexibly relies to some extent on cognitive flexibility as changing whom to trust involves applying a change of rules. Cognitive flexibility is not fully developed in 3-year-olds (e.g., Zelazo & Frye, 1998), thus this could explain their relative difficulty on the task. This also further supports the notion that children tracked intentions over time, as prior intentions may have impacted a small amount on 3-year-olds' ability to infer or respond to current intention. Future research should directly examine how cognitive flexibility affects flexibility in trust and understanding changing intentions.

Study 3

The goal of Study 3 was to determine whether children understand the underlying intentions to joke or be sincere (rather than their corresponding intentional cues only), and understand that one's trust should be guided by current rather than initial intentions. In the Changing Intentions –Same Knowledge condition a joker intentionally gave wrong labels for familiar objects during the familiarization phase. In contrast an ignorant informant sincerely, but unintentionally, gave the wrong labels. During the test phase both informants were sincere (with no distinguishing intentional cues). If children understand intentions and their changing nature, then they should understand that at test trials, the previously ignorant informant has not switched intentions, and so her past inaccuracies should not be excused. Rather, children might assume that she is continuously ignorant. In contrast, the previous joker has switched intentions, and so now her previous inaccuracies can be excused. Thus the joker could now very well be accurate, at least compared to the ignorant informant. Thus when having to decide between the two informants, children should infer that the previous joker is more likely to give the accurate label than the previously ignorant informant. If children are basing their trust on intentional cues only, they should trust both informants equally at test trial.

It was also important to rule out the possibility that the results of the Changing Intentions – Same Knowledge condition were due to children never trusting an informant who was once ignorant, instead of trusting informants based on their intentions. Therefore in the Same Intentions - Changing Knowledge condition, the previous joker continued to joke throughout the study, such that she did not change intentions, while the previously ignorant informant became knowledgeable, showing a change in ignorance state. Thus the joker's intentions did not change, and so her previous inaccuracy should not be excused. Given that the joker is very likely to give inaccurate information, it would be more prudent to trust the previously ignorant speaker, who is at least trying to give accurate information. Additionally, children may be aided by the previously ignorant informants' cues that she is now knowledgeable, potentially excusing her prior inaccuracy.

Since this study involved a more advanced stage of Theory of Mind, that is, understanding of others' knowledge and/or ignorance, we increased the age range to include 5-year-olds. This is because children generally understand false belief by 4.5 years (Wellman, Cross & Watson, 2001), and 4-year-olds, but not 3-year-olds, track ignorance cues when deciding whom to trust (Einav & Robinson, 2011) therefore only older children might be able to infer intentions and knowledge/ignorance in this task.

It is interesting to note that the original Koenig and Harris (2005) study defined an ignorant informant as someone who gave uncertainty cues and then provided no answer during the familiarization phase. In contrast, the current study defines an ignorant informant as someone who gives uncertainty cues, and then provides an (uncertain) answer during the familiarization phase. It is important to note that both types of informants are considered ignorant according to the Oxford English Dictionary (2016) which states that ignorant means, "Destitute of knowledge, either in general or with respect to a particular fact or subject;

unknowing, uninformed, unlearned." However it is worth considering that young children may view these types of ignorant speakers as distinct.

Method

Participants. Forty-six children participated in the Changing Intentions – Same Knowledge condition (25 male, 17 3-year-olds (*M* = 41.9 months, *range* = 38-46 months); 17 4-year-olds (*M* = 52.1 months, *range* = 48-58 months); 12 5-year-olds (*M* = 65.8 months, *range* = 61-71 months). Forty-three children participated in the Same Intentions - Changing Knowledge condition (20 male; 17 3-year-olds (*M* = 42.5 months, *range* = 37-47 months); 16 4-year-olds (*M* = 52.8 months, *range* = 48-57 months); 10 5-year-olds (*M* = 66.4 months, *range* = 61-71 months)). Six other children were excluded because they did not complete any test trials. All children were British. Most children were Caucasian. Parents were from a mix of educational backgrounds. Participants were recruited as in Study 1.

Materials. The same as Study 1, except there were an additional two familiarization trials involving a car and a pig, each with their own incorrect labels; and additional incorrect labels were used for the spoon, doll, and car (see Table 1).

Design. This was a between-subjects design. For both conditions, one informant was ignorant during training whereas the other joked. There were six training trials. The joker joked for four trials, and was knowledgeable for two trials. The ignorant informant was ignorant for four trials, and knowledgeable for two trials. This was to prepare children to recognize that jokers can sometimes be sincere, and ignorant informants can sometimes be knowledgeable. Overall each participant saw two trials during which the joker joked and the ignorant informant was ignorant, two trials during which the joker joked and the ignorant informant was knowledgeable, and two trials during which the joker was knowledgeable and the ignorant informant was ignorant. See Table 4 for an example. Familiar objects were always presented in the same order across trials; however, the order of the novel objects was

reversed for half the participants. The actors playing the joker and ignorant informant, and the order of speaking for the joker and ignorant informant were counterbalanced.

Table 4

Example of Training Trials in Study 3. Speaker order was counterbalanced.

	Joker	Ignorant
Familiar objects, Study 1:		
Spoon	Duck	Train
Bottle	Bottle	Dog
Doll	Cup	Doll
Brush	Plate	Brush
Car	Car	Fork
Pig	Shoe	Flower

For the Changing Intentions – Same Knowledge condition, both informants were sincere during action and test trials. Action trials were included to show a change of intentions in the joker, as in Study 2. For the Same Intentions - Changing Knowledge condition, there were no action videos. During test trials, the joker continued to joke, whereas the ignorant informant showed signs of knowledge. Counterbalancing for the test trials was the same as Study 1. The dependent variable was whom children trusted when learning new labels – the original joker, or originally ignorant informant. See Table 2 for a summary of the design.

Procedure

Familiarization Trials. The task proceeded in a similar way as in the Train and Test condition of Study 1. The joker gave incorrect labels paired with joking cues for four out of

six familiarization trials and correct labels paired with knowledge cues for two familiarization trials. The ignorant informant gave incorrect labels paired with ignorance cues for four out of six familiarization trials and correct labels paired with knowledge cues for two familiarization trials. Humorous cues were the same as in Study 1. For ignorance cues, the informant shrugged her shoulders and labeled the object incorrectly saying, e.g., "I don't know, that's a train?" Knowledgeable cues involved displaying their knowledge and labeling an object correctly, e.g., "I know this one. That's a spoon."

Action Videos. In the Changing Intentions – Same Knowledge condition only, children saw the same action videos as in Study 1. The informant who had joked during the familiarization trials said, "I'm going to stop making jokes" before carrying out the four sincere actions. The informant who was ignorant during familiarization trials said, "I'm going to do some actions." before carrying out the four sincere actions.

Test Trials. The test trials were the same as Study 1. For the Changing Intentions – Same Knowledge condition, both informants labeled the novel object giving sincere cues, where they would smile and say, "That's a mogo." or "That's a sepa." For the Same Intentions - Changing Knowledge condition, the joker gave joking cues as in Study 1. The previously ignorant informant became knowledgeable saying, e.g., "I know this one. It's a mogo."

Results

See Figure 2 for the percentage of trials on which children chose the label of the original Joker over the originally Ignorant informant, by condition. No effects of or interactions with gender or age were found. The best model (*log-likelihood* = -187.90, N = 326) found children were significantly more likely to trust the originally Ignorant informant versus the original Joker at test trials overall (OR = 1478, $p < .0001$). They were also more likely to trust the originally Ignorant informant over the original Joker in the Same Intentions

- Changing Knowledge condition compared to the Changing Intentions – Same Knowledge condition (*OR* = 6.79, $p < .0001$).

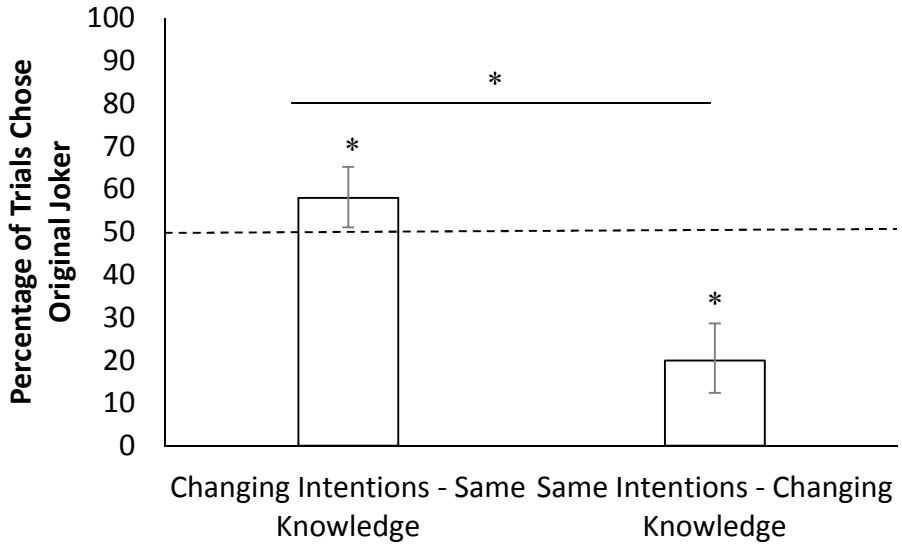

Figure 2. Percentage of trials children chose the original Joker at test trials in Study 3, by condition. Error bars represent 95% confidence intervals. *p < .05

The best model for the Changing Intentions – Same Knowledge condition (*log-likelihood* = -114.60, *N* = 169) found children were more likely to choose the original Joker over the originally Ignorant informant when both were sincere at test trials (*OR* = 1.41, $p = .0264$).

The best model for the Same Intentions - Changing Knowledge condition (*log-likelihood* = -71.40, *N* = 157) found children were significantly more likely to trust the originally Ignorant informant (now knowledgeable) over the original Joker (still joking) at test trials (*OR* = 7.50, $p < .0001$).

Discussion

Study 3 shows children consider current rather than initial intentions, and use this understanding to determine whom to trust. When both informants were sincere during test trials children trusted the original joker more than the originally ignorant informant. Because

both informants were equally inaccurate during training trials, accuracy could not be used as a cue. Because both informants gave the same sincere cues at test trials, children could not be simply responding to current intentional cues. Moreover, children in Studies 1 and 2 did not trust the joker, even when no previous training was given, suggesting children do not simply prefer jokers. Thus children understood that the joker was no longer joking, and was instead now sincere. While she was previously inaccurate, it was because she was intentionally so, and so this was excusable when she became sincere. In contrast, the ignorant informant did not necessarily change knowledgeability, so her prior inaccuracy was not excusable.

Another explanation is that children avoided learning from an originally ignorant informant. However the Same Intentions - Changing Knowledge condition demonstrates that children do not forever mistrust originally ignorant informants. Thus children understood that the original joker's intentions have not changed, and so her previous inaccuracy should not be excused. Children are thus more likely to trust the originally ignorant informant because she is at least trying to give accurate information, unlike the joker. Additionally, children may have understood that the originally ignorant informant's knowledge has changed, such that her previous inaccuracy could be excused. These results thus suggest that children trust the original joker in the Changing Intentions – Same Knowledge condition because they understand that one should base trust on current rather than initial intentions; not because they forever mistrust an ignorant informant.

Surprisingly we found no effects of or interactions with age. This suggests 3-year-olds were just as likely as 5-year-olds to base their trust on current rather than initial intentions, and possibly current rather than initial knowledge or ignorance. While 3-year-olds and younger 4-year-olds were unlikely to have full false belief understanding, it is possible that understanding concepts of knowledge and ignorance are not as complex as understanding false belief. Indeed, Koenig and Harris (2005) found 3-year-olds used ignorance to inform

their trust. Therefore one possibility is that children based their trust on intentions in combination with ignorance/knowledge. In the Changing Intentions – Same Knowledge condition, children may have trusted a sincere informant who used to joke because they understood that she was originally intentionally inaccurate, and so could excuse her prior inaccuracies when her intentions changed. In contrast, they may have found it more difficult to trust the originally ignorant informant because they had no evidence she had ceased to be ignorant. In the Same Intentions - Changing Knowledge condition, children may have understood that the original joker, who continued to joke, would continue to intentionally say the wrong thing. In contrast, they may have understood that the originally ignorant informant had become knowledgeable, and continued to intend to say the right thing, making her a better person to trust.

A further, less rich, possibility is that children based their trust on intentions alone. In the Changing Intentions – Same Knowledge condition, again, children may have trusted a sincere informant who originally joked because they understood that she had previously been intentionally inaccurate, and so could excuse her prior inaccuracies when her intentions changed. In contrast, they may have found it more difficult to trust the originally ignorant informant because they had no reason to excuse her prior inaccuracies since she had always intended to be sincere. In the Same Intentions - Changing Knowledge condition, children may have understood that the joker, who continued to joke, would continue to intentionally say the wrong thing. Therefore, compared to someone who intended to say the right thing, even if often inaccurate, the originally ignorant speaker might be a better person to trust.

General Discussion

Altogether, these studies tell us preschoolers (1) understand that one should not trust jokers when learning novel information, and (2) flexibly change their trust based on changing intentions. Thus children do not rely on the first intention of an informant, but rather their

latest intention, and use that understanding to guide their trust. In Study 1, children trusted an informant who was consistently sincere over consistently joking when learning new labels, even when they had no prior experience with either informant, and had to base their decision on intentional cues only. In Study 2, children trusted an informant who was previously joking, but currently sincere, over an information who displayed the opposite pattern. This suggests children consider current intentions, or intentional cues, when deciding whom to trust, and not their first encounter with a person. In Study 3, children trusted an informant who originally joked, but became sincere, over an informant who was originally ignorant and sincere, and continued to be sincere. This suggests children consider current intentions, and not just intentional cues, when deciding whom to trust. It was not the case that children simply avoided anyone who used to be ignorant, as children reversed their pattern of trust when the original joker continued to joke, and the originally ignorant informant became knowledgeable.

Humor and Trust

These studies show that children know not to trust a joker when learning novel information. This contrasts with past research showing that toddlers will imitate a joker when the purpose of the game is to make a joke (Hoicka & Akthar, 2011; Hoicka & Gattis, 2008). However, this research is consistent with recent studies showing that toddlers are less likely to attend to, endorse, or enforce joke actions and labels compared to pretend or literal actions and labels (Hoicka, 2015; Hoicka & Butcher, 2016; Hoicka & Martin, 2016). Therefore young children are flexible in how humorous intentions guide their behavior. They endorse jokes when the goal is to joke, but reject jokes when the goal is to learn novel information.

Further possibilities could explain the difference in results between the current studies and past research (Hoicka & Akthar, 2011; Hoicka & Gattis, 2008). One difference is that the children in the current study were older (3 and 4 years) than children in previous studies (2

years). Therefore older children may be more likely to reject novel information from a joker than a sincere informant compared to younger children. A second possibility is that the way the experiment was run affected the results. Past studies involved toddlers playing directly with an experimenter. In the current study, children watched a video, and the experimenter was not the one doing the labeling. Therefore perhaps children are more likely to copy a joker when the interactions are more direct. However it is not clear why the experimental differences would also make toddlers less likely to copy a sincere informant, and make preschoolers more likely to do so. Future research should examine these questions.

This research also converges with a computational model suggesting intentions guide trust (Shafto, et al., 2012). Moreover, it converges with evidence that children are less likely to trust people who intentionally technically say the wrong thing, including liars and pretenders (Koenig, 2012; Mascaro & Sperber, 2009). Therefore from 3 years, children have a sophisticated understanding of how to interpret complex intentions, such as humorous intentions, in a learning environment.

From a general learning point of view, Study 1 may converge with adult literature showing that humor in general can increase learning (Bolkan & Goodboy, 2015; Dixon, et al., 1989; Kaplan & Pascoe, 1977; Wanzer & Frymier, 1999; Wanzer, et al., 2010; Ziv, 1988) in that Study 1 showed higher overall learning rates than the original Trust studies (Koenig & Harris, 2005). A study directly comparing humorous and non-humorous conditions would be necessary to determine whether this is the case. However research on 1-year-olds suggests that humor does enhance learning of functional actions (Esseily, et al., 2016), so it may not be a great stretch to predict that humor might increase label learning in preschoolers as well.

Intentions

This research demonstrates that children do not forever base their trust on an informant's first intention, but instead flexibly base their trust on the informants' current

intention, taking time into account. This research thus supports the proposal that intention understanding is more complex than simply knowing *that* someone has acted intentionally. For instance, much research considers toddlers' understanding that people intend to be sincere (e.g., Carpenter, et al., 1998; Gergely, et al., 2002; Meltzoff, 1995; Sakkalou & Gattis, 2012). However understanding complex intentions, such as intentions to do the wrong thing, shows that children consider *why*, and not just *whether*, someone would do something intentionally. This likely does not occur until 25 months (e.g., Hoicka & Akhtar, 2011; Hoicka & Gattis, 2008; Rakoczy, et al., 2004; Siegal & Peterson, 1996, 1998). From a philosophical point of view, the question of *why* may be thought of as inherent to truly understanding intention (Anscombe, 1963). The current studies extend this research by showing that by preschool age children have an understanding of the time-dependence of intentions. However, as we did not test children younger than 3 years old, a question remains as to whether younger children would be able to consider intentions as a function of time. Future research should explore this possibility.

One could argue that preschoolers did not really understand intentions in the current studies. Perhaps children relied on prior accuracy. While this could help explain the results for the Train and Test condition in Study 1, and to some extent, Study 2, children could not rely on prior accuracy for the Test Only condition in Study 1, or either condition in Study 3, as prior accuracy was equal across informants. Additionally, Koenig and Harris (2005) found that 3-year-olds could not base trust on prior accuracy alone, suggesting that accuracy alone is unlikely to explain the results even for these conditions.

It is also arguable that we simply gave children the "answer" by using cues - laughter, humorous intonation patterns, and the word "joking". However we did not give these cues at test trials in the Changing Intentions – Same Knowledge condition in Study 3, thus this cannot be the full answer. While children did not perform as well in Study 3 as in Studies 1

and 2, their responses were significantly above chance levels, suggesting they understood the intentions rather than the cues alone to some extent. Additionally, for the other conditions where these cues were used at testing, it is important to note that these cues are not a direct synonym of saying that the information is wrong, and from a child's point of view, they may be difficult to interpret. For instance, Mascaro and Sperber (2009) found that 4-year-olds, but not 3-year-olds, mistrusted an informant who was explicitly labeled a liar. Thus giving lexical cues to 3-year-olds did not help them infer that the information was false, presumably because they did not yet understand either the term or the concept of "liar". Thus the fact that 3-year-olds in the Test Only condition of Study 1 correctly interpreted the cues during test trials, when no actual accuracy information was available, shows a sophisticated achievement.

A further possibility is that children did not base their trust on changing intentions in Study 3, but instead based their trust on changing ignorance or knowledge alone. Thus children may have ignored the intentions of the joker and focused on the ignorance or knowledge state of the previously ignorant informant. Therefore children may not have excused the previously ignorant informant in the Changing Intentions – Same Knowledge condition because it was not clear that her knowledge had changed. In contrast, they may have excused the previously ignorant informant in the Same Intentions – Changing Knowledge condition because it was clear her knowledge had changed, based on the knowledge cues given. While possible, this interpretation is much richer than an intention-based interpretation. While children understand infer goals from 5 months (Woodward, 1998), intentions from 14 months (e.g., Carpenter, et al., 1998), and intentions to do the wrong thing from 25 months (Hoicka & Gattis, 2008), children do not understand ignorance until 3 or 4 years (Einav & Robinson, 2011; Koenig & Harris, 2005), nor false beliefs until 4.5 years (Wellman, et al., 2001). Additionally, given that intentions can be considered by

nature to be time-dependent, while knowledge may be less time-independent (e.g., Anscombe, 1963, Cohen & Levesque, 1990), this suggests it would be more natural for children to capture time shifts in intentions rather than knowledge.

A final possibility is that children combined their understanding of both intentions and knowledge/ignorance, relying on the most recently inferable mental states. Analysis based in philosophy and artificial intelligence shows that intention is not a stand-alone mental state. Rather, to have an intention, one must also have other mental states such as beliefs and knowledge (Cohen & Levesque, 1990; van der Hoek, et al., 2007). Thus for children to truly understand others' intentions, they must also understand others' beliefs or knowledge. In Study 3, children may have understood (1) that a joker likely *knew* the correct labels, but *intended* not to say them, and (2) that an ignorant informant *did not know* the correct labels, but *intended* to say them. Therefore in the Changing Intentions – Same Knowledge condition, children may have been more willing to excuse the previous joker's past inaccuracy over the previously ignorant informant's past inaccuracy because at test trials the joker likely *knew* the correct labels and now *intended* to say them, while the ignorant informant still *did not know* the correct labels, but *intended* to say them. Similarly, in the Same Intentions - Changing Knowledge condition, children may have been more willing to excuse the previously ignorant informants' past inaccuracy over the joker's past inaccuracy because the knowledge cues that the previously ignorant informant now gave would suggest that she likely *knew* the correct labels and *intended* to say them, while the joker still *knew* the correct labels, but *intended* not to say them. However, it is important to note that this is a richer interpretation than assuming children solved the task with intention understanding alone given the developmental trajectories of understanding intentions and knowledge. Future research should consider whether preschoolers can flexibly track changing ignorance and knowledge alone.

One more point to consider is *how* children made sense of the actors' intentions. One possibility could have been to ask children, "Why was she not good at answering questions" (Explanation Probe, Koenig & Harris, 2005). However looking at the Koenig and Harris study suggests that children at this age are not very good at answering these open-ended questions, giving plausible answer such as, "She doesn't know what they are." to implausible answers such as, "Maybe she was mad at her sister." with many children giving no answer at all (Koenig & Harris, 2005, p.1266). This was despite children in that study being good at determining whom to trust. Therefore while we would ideally like to get in depth information from preschoolers, they may be limited in their capacity to explain how they make their choices.

Stable Traits

Much of the research to date portrays children's trust as involving the attribution of a stable trait concerning prior accuracy or knowledge (e.g., Clément, et al., 2004; Corriveau, et al., 2009; Einav & Robinson, 2011; Koenig & Harris, 2005; Pasquini, et al., 2007). By showing that children alter their trust based on changing intentions, this adds to a growing body of research showing that children are flexible in their trust (e.g., Nurmsoo & Robinson, 2009; Robinson, et al., 2011; Robinson & Nurmsoo, 2009; Scofield & Behrend, 2008; Shafto et al., 2012; Sobel & Corriveau, 2010; VanderBorght & Jaswal, 2009). In the case of intentionally saying the wrong thing, such as joking, it is highly unlikely that someone would always joke, even if most people joke at certain times (e.g., Hoicka & Akhtar, 2012). Thus, research into trust should be more broadly defined as *when* to trust someone, instead of *whether* to trust them.

Conclusions

The current studies found that children do not trust a joker when learning novel information. Furthermore, the current studies found children's trust is not solely reliant on

informants' past behaviors. Rather, preschoolers consider people's current, rather than past, intentions to determine whom to trust. Although most research on trust focuses on the question of *whom* to trust (e.g., Clément, et al., 2004; Corriveau, et al., 2009; Koenig & Harris, 2005; Pasquini, et al., 2007), the current studies further the suggestion that research should open up to consider the question of *when* to trust someone. The current research also demonstrates that preschoolers have a complex understanding of intentions. They know to consider an informant's current intention, not their first intention, and they understand the reasons behind people's intentions.

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