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Preschoolers’ explanations of actions based on past realities and false beliefs

Cristina M. Atance, Jennifer L. Metcalf, and Anneke M. Zuijdijk

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We explored preschoolers’ ability to explain actions that were motivated by two different phenomena: false beliefs and past realities. While both contexts were identical with respect to their explanatory requirements, only the false-belief context required children to understand that a mis-representation was the basis of the action. Results revealed that children were significantly more competent at explaining actions in the past-reality context than the false-belief context. Even so, 3-year-olds experienced some difficulty with the past-reality context signalling a more fundamental limitation generating explanations in light of an unexpected change. These findings have implications for the debate surrounding children’s false-belief-based predictions versus explanations, and explanatory capacity more broadly during the preschool years.

Keywords: Cognitive development; Theory of mind; False beliefs; Action explanation; Self.

From 2 to 3 years of age onwards, children show an acute interest in seeking out and providing explanations for events occurring in the psychological, physical, and biological worlds (e.g., Callanan & Oakes, 1992; Hickling & Wellman, 2001). Children’s understanding of the psychological world, in particular, is termed theory of mind and has been an area of intense study in social-cognitive development. No topic in this area has received more
attention than children’s ability to understand the connection between false belief and human action (e.g., Wellman, Cross, & Watson, 2001). It is not until 4 or 5 years of age that children can predict that a character who holds a false belief will behave in accord with this belief, and not with reality (Wellman et al., 2001). Less studied, but equally important, is children’s ability to appeal to a false belief to explain human action. This is because by a “theory–theory” account (e.g., Gopnik & Wellman, 1994) of mental state understanding children’s understanding of the mind undergoes a series of revisions, which eventually results in an understanding of sophisticated mental state concepts such as false belief. Importantly, this process of revision is believed to be stimulated by instances in which children witness behaviour that cannot be explained by their existing theories. As such, observing and then having to explain a character’s false-belief-based action provides a potent context in which these revisions might take place.

Data to support this claim were provided by Bartsch and Wellman (1989). In one of their experiments, 3-year-olds were shown a Band-Aid box and an unmarked box. They then discovered that the unmarked box contained Band-Aids, whereas the Band-Aid box was empty. Next, children watched as a puppet who had a cut and wanted a Band-Aid searched in the (empty) Band-Aid box. Children were asked to explain the puppet’s behaviour (e.g., “Why do you think he’s looking in there?”). If children did not answer this open-ended question, they were prompted with “What does Bill (the puppet) think?” Responses to both the open-ended questions and the prompt were considered correct if the child mentioned the character’s false belief. By this criterion, almost two thirds of children’s responses were scored as correct (though see Perner, Lang, & Kloo, 2002, for why Bartsch & Wellman’s method may have resulted in false positives).

Other explanation tasks have, however, yielded noticeably lower success rates. For example, Moses and Flavell (1990, Experiment 2) showed 3-year-olds the following type of task: a character exclaimed that her finger hurt, said that she was looking for a Band-Aid, saw a Band-Aid box, opened it up and, to her surprise, discovered that it actually contained a toy car. When asked to explain why the character was looking in the box, most children did not refer to the character’s false belief but rather to her desire and, strikingly, in about 15% of instances to the actual state of the world (e.g., “Because there’s a car in there”; see also Wimmer & Mayringer, 1998). In an additional 30% of instances, children were unable to provide any sort of explanation at all.

Similar results are obtained when 3-year-olds are asked to provide explanations for their own false-belief-based actions. For example, in Atance and O’Neill (2004), children were shown a crayon box and were asked what they thought was inside. After they answered “crayons”, the experimenter pointed to some paper on the floor and suggested that the children retrieve it
to draw on with the crayons. When the children returned with the paper, the experimenter opened the crayon box to reveal its actual contents: candles. Children were then asked to state what they had initially believed the box to contain, as well as to explain their action of retrieving the paper. Children explained their actions correctly on less than half of the trials and most often did so by referring to a goal or desire (e.g., “to draw”), rather than to a false belief. As in Moses and Flavell (1990), in approximately 30% of instances, children either referred to the actual state of the world to explain their action or were unable to provide an explanation at all.

Finally, even when children are repeatedly asked to explain a character’s misguided action, 3-year-olds still do not provide a great many false-belief-based explanations. For example, in a recent study, Bartsch, Campbell, and Troseth (2007) gave children four stories in which, for example, a character was running away from a fake toy spider. Children were asked, “Why do you think Jenny is doing that?” If children did not respond by attributing a false belief to the character (e.g., “Because she thinks it’s real”), the experimenter repeated the “why” question up to two more times (e.g., “Why else is Jenny doing that?”). Of the 242 responses that children offered (this total excluded “Don’t know” and “failures to respond”) about half were considered “non-psychological” (e.g., “Looking for doll” or simply “Because”) with the other half considered “psychological”. Of these psychological responses, half referenced the character’s desire, and half referenced the character’s ignorance (13%) or false belief (37%).

Though Bartsch et al. (2007) argued that this level of false-belief attribution may signal a “threshold” understanding of false belief in 3-year-olds, it is nonetheless puzzling why a significant proportion of children in studies examining false-belief explanation appeal to a current state of the world (e.g., “Because there’s a car in there”) or are simply unable to construct an explanation at all (e.g., no response, “I don’t know”, or “Because”). As mentioned earlier, in approximately 25% of trials in both Moses and Flavell’s (1990) and Atance and O’Neill’s (2004) studies (see also Wimmer & Mayringer, 1998) children did not provide a response at all, with an additional 10–15% of their responses appealing to the current state of the world or an irrelevant aspect of the task (Bartsch et al. exclude failures to respond and “Don’t know” responses from their analyses so it unclear how often these occurred). Given these data, it is important to question whether there are factors above and beyond false-belief understanding that might contribute to children’s difficulty on such tasks.

Existing research has documented important links between the development of false-belief reasoning and such factors as language (e.g., Astington & Jenkins, 1999) and executive function (e.g., Carlson & Moses, 2001) development. However, one issue that has not been explored is the extent to which the capacity to generate an explanation after an unexpected change
has occurred contributes to children’s performance on false-belief-explanation tasks. This is an important issue given that both children’s capacity to formulate explanations (e.g., Hickling & Wellman, 2001), and to seek out explanations when an unexpected event occurs (Povinelli & Dunphy-Lelii, 2001) increase with age. Because children’s success on false-belief-explanation tasks hinges on each of these factors, it is surprising that their contribution to task performance has not been systematically explored. One means to do so is by assessing children’s explanatory competence in a task that does not entail false-belief understanding, but that does require formulating an explanation after an unexpected change has occurred. The following example describes such a task.

Imagine that you are looking out of your kitchen window and spot the neighbour’s dog in your yard. You decide to go to the pantry to retrieve a dog treat to feed him. Once you return with the treat, the neighbour’s dog is no longer in the yard but, to your surprise, the neighbour’s cat has replaced it! At that moment, your spouse walks into the kitchen with a puzzled look on his face and asks why you went to get a dog treat. Without hesitation, you state, “Because there was a dog in the yard”. This response relies on an understanding that a previous world state (i.e., a “past reality”) can lie at the root of the actions we perform. That is, an actual physical change in the world has taken place (i.e., dog → cat) and our world view is updated as a function of this change. Now consider Atance and O’Neill’s (2004) crayon-box task described earlier. Here, there is no physical change that occurs but, rather, a strictly psychological one. There were candles in the box all along and it is only our representation that changed, not the actual object. Thus, it would be incorrect to answer the question, “Why did you get paper?” by stating “Because there were crayons in the box”. Instead, the only recourse is to appeal to a previous (but incorrect) representation of the world (i.e., a false belief) since at no point did the box actually contain crayons.

In the current study we compared children’s performance on past-reality-explanation tasks to their performance on false-belief-explanation tasks. Assessing children’s performance in these two contexts is important because it will determine whether part of children’s difficulty on false-belief-explanation tasks is due to an inability to construct explanations (even those that do not pertain to false belief). If so, this implies that children’s difficulties on false-belief-explanation tasks are not solely conceptual in nature (i.e., failure to understand false belief) but are also due to a broader inability to construct explanations after the world itself (and not just our representations of it) has unexpectedly changed. In fact, young children are often described as being unduly influenced by current reality (e.g., Robinson & Mitchell, 1995; Saltmarsh, Mitchell, & Robinson, 1995), and so it is possible that the past-reality context will be problematic for them. Finally, from a more theoretical viewpoint, such findings would have implications

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for studies that compare children’s performance on false-belief explanation and prediction tasks (e.g., Bartsch et al., 2007; Wimmer & Mayringer, 1998) since the goal of these studies is to determine whether explanation is a more accurate reflection of children’s nascent concept of false belief than prediction.

METHOD

Participants

Participants were 18 3-year-olds (9 boys; \( M_{\text{age}} = 41.50 \) months, range = 38 to 45 months) and 18 4-year-olds (9 boys; \( M_{\text{age}} = 52.89 \) months, range = 49 to 59 months). Two additional children were excluded from the final sample because of fussiness. Participants were mostly from middle-class backgrounds, and were predominantly White, but also included several children of Asian and African descent. Children spoke English as their first language. The children were recruited in a large city using newspaper advertisements, posters, and pamphlets. Parents received parking reimbursement and children received a toy for their participation.

Design and procedure

Thirty-two of the children were tested individually in a laboratory playroom by a female experimenter, whereas the remaining four were tested individually in a closed-off area of a day-care centre. Before each child entered the playroom, materials were placed in a set of drawers next to the experimenter’s chair. The remaining materials were placed in an additional set of drawers in the hallway outside of the playroom. Once in the playroom, children were introduced to an Elmo puppet (which the experimenter controlled). Children were told that they would be playing “games” with Elmo. These included four action tasks—two false belief and two past reality—presented in counterbalanced order. Children were also administered several other tasks that were not analysed for the purposes of this experiment. All sessions were video recorded.

False-belief tasks

Each of the two tasks described below involved children acting on a belief about the world that they subsequently discovered was false. Once this discovery was made, the children were asked to explain the cause of their action.

1. Crayon/candles task. This task was borrowed from Atance and O’Neill (2004) and was based on Gopnik and Astington’s (1988) unexpected
contents task. Children were presented with a crayon box and were asked to state what they thought was inside. Once children stated that they thought the box contained crayons, the experimenter said: “You know what? There’s some paper in the red drawer in the hall. Would you like to go get it to draw on with the crayons?” When children returned with the paper, they were shown that the crayon box actually contained candles. Once the box was closed back up, Elmo appeared and asked the following action-explanation question: “Why did you go get the paper?” If children’s responses did not make explicit reference to their false belief (i.e., “crayons”), then a false-belief question was asked: “When you first saw the box all closed up like this, what did you think was inside?”

2. Rock/sponge task. This task was based on Flavell, Flavell, and Green’s (1983) appearance-reality task. Children were presented with a sponge that was painted and shaped to look like a rock, and the experimenter asked them to state what they thought the object was. Once children stated that they thought it was a rock, the experimenter said, “You know what? There’s a hammer in the yellow drawer in the hall. Would you like to go get it to pound on the rock and make noise?” Once children had returned with the hammer, the experimenter revealed that the rock was actually a sponge and invited the children to touch it. Elmo then asked the action-explanation question: “Why did you go get the hammer?” and, if necessary, the false-belief question, “When you first saw this, what did you think it was?”

Past-reality tasks

Each of the two tasks described next involved children acting on a physical state of the world that they subsequently discovered had been updated. Once this discovery was made, children were asked to explain the cause of their action. These tasks were meant to mirror the structure (or “performance” demands) of the false-belief tasks, save for the fact that they did not involve a false belief, but rather, a past reality.

1. Dog/mouse task. This task was similar in structure to the crayon/candles task. It involved two distinct objects (a dog and a mouse) with the first being replaced by the second. However, unlike the crayon/candles task, neither of the representations that the child constructed was false. The task began with the experimenter placing a stuffed dog on the table and telling children: “You know what? There’s a bone in the red drawer in the hall. Would you like to go get it to feed to the dog?” When the child returned with the bone, the dog was no longer in sight, but instead a toy mouse. Elmo then asked the action-explanation question: “Why did you go get the bone?”
If children did not explicitly mention the initial state (i.e., “dog”) in their explanation, they were asked a past-reality question, “Who were you going to feed?”

2. Cup/box task. This task was similar in structure to the rock/sponge task. It involved one object that really did have two different identities (a cup and a box) and so unlike the rock/sponge task, neither of the child’s representations of the object was false. The task began with the experimenter showing children a cup and telling them: “You know what? There’s some juice in the yellow drawer in the hall, would you like to go get it to pour into the cup?” When children returned with the juice, they watched as the experimenter transformed the cup into a small, closed box. We decided that it was preferable to have children witness the transformation since we wanted it to be clear that the object really did have two identities, rather than have them think that we had replaced one object with another (which would essentially be akin to the dog/mouse task).

After the experimenter pointed out to the children that the object was now a box, Elmo appeared and asked them the action-explanation question: “Why did you go get the juice?” and, if necessary, the past-reality question: “When you first saw this, what was it?”

Coding

The following categories were based on a scheme used by Atance and O’Neill (2004) and were used to code both the false-belief and past-reality tasks (see Table 1 for examples of children’s responses and corresponding codes).

1. Initial state. Responses to the action-explanation question made explicit reference to the initial state—either the child’s initial belief in the

<table>
<thead>
<tr>
<th>Explanation</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Because I thought this was a rock (rock/sponge)</td>
<td>Initial state</td>
</tr>
<tr>
<td>To feed the doggy but now there’s a mouse on the table (dog/mouse)</td>
<td>Initial state</td>
</tr>
<tr>
<td>Because I wanna colour (crayons/candles)</td>
<td>Goal/desire</td>
</tr>
<tr>
<td>Because I wanted to pound on it (rock/sponge)</td>
<td>Goal/desire</td>
</tr>
<tr>
<td>To bang the sponge (rock/sponge)</td>
<td>Current reality</td>
</tr>
<tr>
<td>’Cause we needed the candles (crayons/candles)</td>
<td>Current reality</td>
</tr>
<tr>
<td>It had no numbers on there [holds up paper] (crayons/candles)</td>
<td>Irrelevant</td>
</tr>
</tbody>
</table>
case of the false-belief tasks (e.g., “Because I thought there were crayons in there”) or to the initial reality in the case of the past-reality tasks (e.g., “To pour in the cup”). These responses were considered correct and children received a score of 1 on the task.

2. Goal/desire. Responses to the action-explanation question made reference to the child’s goal or desire (e.g., “Because I wanted to draw”, “To pour”). Recall that in these cases children were immediately asked either a false-belief or past-reality follow-up question (depending on the task). If children’s responses to these follow-up questions were correct (i.e., “crayons”, “rock”, “dog”, and “cup”), then children received a score of 1 on the task. However, if responses to the follow-up questions were incorrect, then children received a score of 0 on the task. This was to ensure that the explanation “to draw”, for instance, was predicated on the belief that there were crayons in the box or, similarly, that the explanation “to pour” was predicated on the fact that there had been a cup on the table. Although this scoring decision may seem overly conservative, we did not wish to credit children with passing the task if they did not recognize a prior false belief or past reality. Note that if a child mentioned both the goal and the initial state (e.g., “to pour in the cup”) then the response was coded as initial state, and the task received a score of 1.

3. Current reality. Responses to the action-explanation question made reference to current reality (e.g., “Because of the sponge”, or “To feed the mouse”). These explanations were considered incorrect and the task received a score of 0.

4. Nonsensical. Responses to the action-explanation question were not relevant to the action in question (e.g., “Because we opened the drawer”). These explanations were also considered incorrect and the task received a score of 0.

5. No response. This category included such responses as “I wanted it” (although this type of explanation contains reference to a desire, because it is devoid of content, it was not considered correct), “I needed it”, “Because”, and “I don’t know”, and received a score of 0. Test questions were only asked once because we wished to obtain children’s spontaneous, unprompted responses.

Inter-rater reliability
All of the children’s explanations were coded by the second author. For reliability purposes, a trained undergraduate psychology student independently
coded 50% of the testing sessions from the DVD recordings. Inter-rater agreement was 96.8%, with Cohen’s kappas for each task ranging from 0.84 to 1.00. All disagreements were resolved through discussion.

RESULTS

Preliminary analyses revealed no effects of sex and so we collapsed the data across this variable. To obtain an overall assessment of the types of explanations that children provided, we summed the codes for children’s explanations on the two false-belief tasks \((n = 70)\), and the two past-reality tasks \((n = 70)\; \text{see Table 2 for a code} \times \text{age breakdown; there were two instances of missing data for the false-belief tasks and two for the past-reality tasks). Only 23% of 3-year-olds’ explanations were scored as correct on the false-belief tasks, whereas the corresponding percentage on the past-reality tasks was 69. These percentages were 71 and 97, respectively, for 4-year-olds.

Task differences

We first explored whether children’s explanations were affected by task type (i.e., false belief vs. past reality). Recall that children’s explanations were scored as correct if they provided either (1) an initial-state response to the action-explanation question or (2) a goal/desire response (e.g., “to draw” or “to pour”) to the action-explanation question, followed by a correct response to the false-belief (e.g., “crayons”) or past-reality (e.g., “cup”) questions. Because the crayon/candles and dog/mouse tasks, and the rock/sponge and cup/box tasks were created to be structurally similar, we compared children’s explanations on each of these two tasks separately using two McNemar chi-square tests.

Children provided significantly more correct explanations on the dog/mouse task, as compared to the crayon/candles task, McNemar \(\chi^2(1, N = 35) = 17.00, p < .001\), and on the cup/box task, as compared to the rock/sponge task, McNemar \(\chi^2(1, N = 34) = 5.33, p < .05\). Specifically, at an individual level, five children provided incorrect explanations on the crayon/candles and dog/mouse tasks, whereas 13 provided correct explanations for both. No child who passed the crayon/candles task failed the dog/mouse task. In contrast, 17 children who passed the dog/mouse task failed the crayon/candles task. Similarly, four children failed both the rock/sponge and cup/box tasks, whereas 18 passed both. Only two children who passed the rock/sponge task failed the cup/box task. In contrast, 10 children who passed the cup/box task failed the rock/sponge task.

This general pattern also held within age groups. Both 3- and 4-year-olds’ explanations were correct significantly more often on the dog/mouse task
than on the crayon/candles task, McNemar $\chi^2(1, N = 17) = 9.00, p < .01$ and, McNemar $\chi^2(1, N = 17) = 8.00, p < .01$, respectively. However, the comparison between explanations on the rock/sponge and cup/box tasks revealed that whereas 3-year-olds provided significantly more correct explanations to the cup/box task as compared to the rock/sponge task, $\chi^2(1, N = 17) = 5.44, p < .05$, the 4-year-olds did not, $p = 1.0$. This was likely due to the fact that most 4-year-olds performed close to ceiling on both of these tasks (see Table 2).

**Age differences**

To determine whether age affected task performance, we ran a series of Pearson chi-square tests comparing the performance of 3-year-olds to those of 4-year-olds on each of the four tasks. Results revealed that 4-year-olds provided significantly more correct explanations than 3-year-olds on the crayon/candles, $\chi^2(1, N = 35) = 5.38, p < .05$, rock/sponge, $\chi^2(1, N = 35) = 13.05, p < .001$, and dog/mouse tasks, $\chi^2(1, N = 36) = 7.20, p < .01$, with this difference showing a marginal level of significance on the cup/box task, $\chi^2(1, N = 34) = 3.24, p = .07$.

**TABLE 2**

<table>
<thead>
<tr>
<th>Code</th>
<th>Task</th>
<th>C/C (n = 35)</th>
<th>R/S (n = 35)</th>
<th>D/M (n = 36)</th>
<th>C/B (n = 34)</th>
</tr>
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<tbody>
<tr>
<td>Correct explanations 3-year-olds</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Initial state</td>
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<td>1</td>
<td>12</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Goal/desire (correct)</td>
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<td>4</td>
<td>0</td>
<td>6</td>
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<td>Incorrect explanations 3-year-olds</td>
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<tr>
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<td>1</td>
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<td>0</td>
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<tr>
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<tr>
<td>No response</td>
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<td>7</td>
<td>4</td>
<td>4</td>
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<td></td>
</tr>
<tr>
<td>Initial state</td>
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<td>12</td>
<td>18</td>
<td>12</td>
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<td>Goal/desire (correct)</td>
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<tr>
<td>Goal/desire (incorrect)</td>
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</tr>
<tr>
<td>Current reality</td>
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<tr>
<td>No response</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
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</table>

Note: C/C = Crayons/Candles task; R/S = Rock/Sponge task; D/M = Dog/Mouse task; C/B = Cup/Box task.
DISCUSSION

We have argued that false-belief-explanation tasks are difficult for young children for reasons other than the ability to understand false belief. More specifically, children must formulate a verbal explanation that draws upon a past state (in this case, a false belief) that has unexpectedly changed. It is reasonable to assume that young children’s performance on false-belief-explanation tasks is influenced by this “explanatory” component, in addition to a “false-belief” component. The only means to disentangle these two contributions is to assess how children perform on a task that requires the same level of explanatory competence as the false-belief-explanation task, but does not require an understanding of false belief. Our results revealed that both 3- and 4-year-olds tended to perform better on the past-reality tasks (69% and 97% correct, respectively) than on the false-belief tasks (23% and 71% correct, respectively). With respect to absolute levels of performance 4-year-olds were very close to ceiling on the past-reality tasks. Thus, we can conclude that the difficulty that they experienced with the false-belief tasks was primarily due to a lack of false-belief understanding and not to the capacity to generate an explanation in light of an unexpected change.

The 3-year-olds’ data showed a different pattern. Despite the fact that they, too, performed better on the past-reality tasks than on the false-belief tasks, they were not as close to ceiling on the past-reality tasks as were the 4-year-olds and, indeed, performed more poorly than them on these tasks. This suggests that the actual generation of an explanation is more difficult for 3-year-olds, regardless of whether this explanation pertains to a false belief or a past reality. This is supported by the fact that a number of 3-year-olds failed to provide an explanation in both the false belief and past-reality contexts (see Table 2).

With respect to the false-belief tasks, in particular, 35% of 3-year-olds in the crayon/candles task and 44% in the rock/sponge task either appealed to current reality, provided a nonsensical response, or provided no response at all. The percentages of explanations in which 3-year-olds mentioned a false belief to explain their action were 18 and 28 for the crayon/candles and rock/sponge tasks, respectively. These rates of responding are very consistent with those of previous studies that have used a similar method (e.g., Atance & O’Neill, 2004; Moses & Flavell, 1990) of exposing children to a character (or the self) acting on a false belief and then asking them to explain why the character/self performed the action in question.

Moreover, the different types of responses provided by the 3-year-olds in our study do not differ a great deal from Bartsch et al.’s (2007) study in which children were repeatedly asked the explanation question. Although Bartsch et al. (Study 1) do not report how many of their 3-year-olds failed to
respond or said “I don’t know” in response to the explanation question, at least half of the explanations provided were categorized as non-psychological (e.g., “Because”). Of the half that was categorized as psychological, only 37% included reference to a false belief. Thus, even with repeated “why” questioning, the percentage of appeals to a false belief was relatively low in 3-year-olds. Nonetheless, it is important to note that in our study (and others) 3-year-olds do appeal to desires to explain their actions—explanations that are mentalistic in their own right. And, even though we coded “goal-desire” explanations as incorrect (unless they were followed by an appeal to false belief), they appear to signal an important transitional step between explanations that incorrectly draw on the outcome/reality of a situation (e.g., “Because there are candles in the box”) to ones that reference the character’s belief (Amsterlaw & Wellman, 2006).

The fact that the results of our study are consistent with those from previous studies that have either used a “single” or “multiple question” approach has important methodological implications because it means that, in 3-year-olds at least, repeated “why” questions may not draw out more sophisticated reasoning. This conclusion should be qualified, however, by the fact that Bartsch et al. (2007, Study 2) found that repeated questioning may benefit older children ($M_{age} = 4; 5$) who are transitioning to an understanding of false belief.

One of the most significant contributions of our findings is that there are instances in which 3-year-olds fail to provide an explanation, or appeal to reality (rather than their false belief), in false-belief-explanation tasks in part because of their difficulty constructing explanations after an unexpected change has occurred. Were this not the case then the 3-year-olds’ performance on the past-reality tasks would have been at ceiling as was the case with 4-year-olds. Instead, their performance hovered around two-thirds correct for the dog/mouse and cup/box tasks combined. Another important contribution of our findings is that children’s difficulty on false-belief-explanation tasks cannot be reduced to a difficulty generating an explanation after an unexpected change has occurred. Otherwise, children’s performance on the past-reality tasks and on the false-belief tasks would not have significantly differed.

Part of the 3-year-olds’ difficulty on past-reality tasks may stem from an inability to inhibit a current, salient reality to formulate an explanation based on a previous, less tangible reality. This interpretation is consistent with some theoretical accounts of false-belief understanding that posit that children have difficulty disengaging from a known reality to contemplate a false belief (e.g., Robinson & Mitchell, 1995; Saltmarsh et al., 1995). Whether or not 3-year-olds’ difficulty on the past-reality-explanation tasks was due to inhibitory control, our results show that explaining actions based on previous world states (even those that were true) is not a simple task for these young children.
The fact that 3-year-olds are not at ceiling on past-reality tasks has important methodological and theoretical implications for comparisons that researchers have drawn between children’s performance on false-belief explanation and false-belief prediction tasks (e.g., Bartsch et al., 2007; Wimmer & Mayringer, 1998). Whether children find the former easier than the latter is an ongoing source of debate because it has implications for the age of emergence and mechanisms that underpin false-belief understanding (see Bartsch et al., 2007, for a review). Thus, it is imperative that differences in performance between the tasks be attributed to differences in children’s capacity to reason about false belief, rather than to other extraneous task factors. Specifically, if a child fails a false-belief-explanation task, then this failure should reflect a lack of false-belief understanding, rather than an inability to formulate an explanation. Yet, our results indicate that, in almost one third of instances, 3-year-olds were unable to provide a correct explanation on the past-reality tasks (compared to only 3% for 4-year-olds). In light of this finding, future studies comparing false-belief-explanation and false-belief-prediction tasks should screen out children who do not succeed on the sort of past-reality tasks that were administered in the present study. Otherwise, it is impossible to know whether children are having difficulties with the generation of an explanation or with understanding false belief.

In conclusion, our study revealed important age-related developments in children’s explanatory capacity during the preschool years. Whereas by 4 years of age children were extremely skilled at explaining actions based on past realities, 3-year-olds had more difficulty in this respect thus suggesting some limitations in their ability to generate explanations. For both ages, children had more difficulty explaining actions based on false beliefs than past realities. Nevertheless, 4-year-olds outperformed the 3-year-olds in this respect, which is consistent with theories that argue for an important conceptual shift between ages 3 and 4 in theory-of-mind development (e.g., Wellman et al., 2001).

REFERENCES


