PHILOSOPHICAL TRANSACTIONS B

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Review

Cite this article: Harris PL. 2022 Young children share imagined possibilities: evidence for an early-emerging human competence. *Phil. Trans. R. Soc. B* **377**: 20220022. https://doi.org/10.1098/rstb.2022.0022

Received: 22 March 2022
Accepted: 24 May 2022

One contribution of 17 to a theme issue 'Thinking about possibilities: mechanisms, ontogeny, functions and phylogeny'.

Subject Areas:
behaviour, cognition

Keywords:
children, imagination, pretence, questions, possibility

Author for correspondence:
Paul L. Harris
e-mail: paul_harris@gse.harvard.edu

Young children share imagined possibilities: evidence for an early-emerging human competence

Paul L. Harris

Harvard University, Cambridge, MA, 02138

PLH, 0000-0003-4907-0539

Children's ability to reason about junctures leading to two different destinations emerges slowly, with convergent evidence for a conceptual watershed at approximately 4 years. Young children and great apes misrepresent such junctures, planning for only one expected outcome. However, singular possibilities, as opposed to two mutually exclusive possibilities, are readily imagined, shared and acted upon by 2- and 3-year-olds. Analysis of three domains supports this claim. First, 2- and 3-year-olds respond appropriately to pretend spatial displacements enacted for them by a play partner. Second, they not only respond accurately to claims regarding an alleged but unwitnessed spatial displacement, they also ask their interlocutors about the possible whereabouts of missing objects and absent persons. Third, in ordinary conversation, they appropriately mark some of their assertions as possibilities rather than actualities. In summary, although the ability to reason about mutually inconsistent possibilities develops slowly in the preschool years, the ability to imagine and share information about possibilities is evident among 2- and 3-year-olds. Nothing comparable has been observed in great apes. Young children's ability to entertain shared possibilities diverges from that of non-human primates well before any potential watershed at 4 years with respect to the understanding of mutually exclusive possibilities.

This article is part of the theme issue 'Thinking about possibilities: mechanisms, ontogeny, functions and phylogeny'.

1. Introduction

Consider the prospect of strolling down an unfamiliar, country lane with a companion. Discussion might focus on what lies ahead: a forest of bluebells? A village pub? Such discussion may intensify on arrival at a fork in the road. Which direction would lead where? Ongoing developmental research on children's understanding of possibility has concentrated on such spatial forks, asking when children fully appreciate that the two directions permit two different possible outcomes even if only one of those outcomes will be realized after one or the other direction is taken. In reviewing the findings, two recent papers converge in arguing for an important conceptual watershed at around 4 years of age [1,2]. Below that age, children appear to have difficulty in conceptualizing and planning for two mutually incompatible possibilities. For example, faced with an inverted Y-tube and asked to catch a ball dropped into the vertical arm, 4-year-olds appropriately hedge their bets. Even on an initial trial, most children cup the exit point of each lower arm with one hand and persist with this double-handed strategy across subsequent trials. They appear to realize that when the ball arrives at the fork, it might take either of the two downward forks so that both possibilities need to be planned for in advance. Younger children are less insightful. Most 2-year-olds start off by cupping only one exit point and approximately half continue to adopt that strategy across successive trials. Among those who do eventually cup both exits on a given trial, more than half regress back to cupping only one exit [3]. By implication, even if 2-year-olds do envisage one of the two possibilities and bet on that

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single possibility—given that they place their hand under one of the two exits—they do not systematically entertain the fact that at the moment the ball is launched either outcome is possible even if only one will be realized. Great apes—chimpanzees and orangutans—perform similarly, if not worse. Almost all of them persist in cupping a single exit across multiple trials. However, their performance may be hampered by the challenge of adopting a two-handed strategy and/or their susceptibility to a gravity bias, i.e. the naive assumption that falling objects will pursue a straight-down, vertical trajectory despite the constraints imposed by a sloping tube [4].

The evidence for the emergence at around 4 years of age of the relatively complex, conceptual machinery needed to solve such two-possibility or fork problems is convincing [5]. In this paper, I discuss the antecedents of that emergence. What conception of possibility should we attribute to 2- and 3-year-olds, and potentially to great apes, in the absence of the capacity for solving fork problems? The ability to conceptualize and plan for mutually exclusive possibilities might indicate not just a watershed in the conceptual development of young children but also a phylogenetic watershed in the comparison of non-human primates and human children. Arguably, in the course of human evolution, the emergence of the capacity to think through such forks or junctures was a major advance, enabling forms of decision-making and contingency planning not found among great apes [2,3]. Indeed, the emergence of accurate reasoning about such forks is likely to be valuable because it enables agents to entertain more than one specific outcome as plausible and, pending knowledge of the actual outcome, to take planful steps in anticipation of more than one. This type of evolutionary proposal implies that we might reasonably expect to find considerable parallels between great apes and human 2-year-olds with respect to the limitations they display in thinking about possibilities.

Nevertheless, as the opening vignette of the country walkers implies, possibilities are not only contemplated when there is a fork in the road. Independent of, and antecedent to, such choice points, as yet unrealized possibilities exist and they may be contemplated and discussed. More generally, it seems plausible that evolution did not equip agents with the capacity for thinking about possibilities so that they could make informed choices and plans when faced with mutually exclusive possibilities. Arguably, the ability to entertain and share possibilities is a broader, less logically constrained, but nonetheless valuable enterprise. Indeed, it is feasible that young children—2- and 3-year-olds—conceptualize and share possibilities differently from great apes well in advance of the conceptual watershed highlighted above. Three different lines of evidence lend convergent support to this proposal. For the sake of continuity, all three lines of evidence are drawn primarily from research on children's thinking about possible spatial displacements but, ceteris paribus, similar considerations are likely to apply to other conceptual domains, such as object identity or causation.

First, human children engage in pretend play well before 4 years of age. Moreover, as described in more detail below, when 2- and 3-year-olds engage in collaborative pretend play with a partner, the attunement of their pretend actions to the make-believe spatial displacements enacted by that partner shows that they readily comprehend such potential displacements and their consequences [6].

Second, 2- and 3-year-olds not only act appropriately on claims regarding an alleged, but unwitnessed, change of location [7,8], they also acknowledge their ignorance and ask information-seeking questions about location [9]. Indeed, questions about location are frequent from the age of 18 months [10–12]. Such questions imply that toddlers can entertain 'open' possibilities—e.g. the possibility that a missing object is somewhere even if the actual location remains unknown. Children's testimony-guided search, together with their questions about location, imply that they are not egocentric. They can represent an invisible object as being somewhere—in a location that is known to their interlocutor but not to them.

Third, 2- and 3-year-olds mark some of their claims as possible rather than actual. Where appropriate, they temper their assertions with *maybe* and use modal auxiliaries such as *might* [13,14]. They display some sensitivity to the difference between established matters of fact—for example, where a missing object or person is located and matters of possibility—for example, where a missing object person or object might be located.

Below, these three lines of evidence are laid out in more detail. The potential cognitive benefits of this early emerging capacity to consider and share possibilities, as well as the lack of evidence for an equivalent capacity among great apes, is then discussed.

2. Sharing pretend displacements

In the context of collaborative pretend play with a partner, 2-year-olds readily enact imaginary spatial displacements. For example, presented with two sets of props—a cup and an empty teapot on one side, a bowl, a spoon and an empty cereal box on the other side—and told that a toy animal wanted either tea or cereal, they proceeded to use the relevant props to produce a displacement—in a make-believe fashion—of the relevant substance. They either 'poured' from the teapot into the cup or from the cereal box into the bowl, according to the animal's desire. They then 'fed' the animal by lifting the pretend substance to the animal's mouth ([15], Experiment 1). Two-year-olds also understand pretend displacements produced by a play partner, as indexed by their targeted interventions. For example, having watched a play partner 'pour' make-believe tea over one of two pigs and been prompted to 'dry the pig who's all wet', they used a towel to wipe the appropriate pig, even though neither pig was actually wet. Thus, children imagined the spatial displacement of the pretend tea, and directed their wiping at the victim ([15], Experiment 5).

Two-year-olds also talk cogently about pretend displacements. Having watched Teddy, a mischievous hand puppet, enact various transgressions (e.g. 'pour' pretend tea from an empty teapot over the head of a toy monkey), they replied appropriately to an adult's questions about what had happened. When asked what had been displaced (What did Teddy put on the monkey's head?) and about the resultant state of Teddy's victim (Is the monkey's head wet or dry?), the majority of both younger (24–30 months) and older (25–36 months) children replied correctly (i.e. 'tea' and 'wet') ([15], Experiment 6). Similar results emerged when Teddy's transgression was directed at the victim's food, represented by a substitute object (e.g. a block standing in for chocolate) ([15], Experiment 7). These verbal replies reinforce the pattern implied by children's pretend interventions described above. Thus, 2-year-olds can build on a pretend displacement introduced by a play partner. They make

appropriate pretend responses to, and produce appropriate descriptions of, that displacement, temporarily setting aside the actual state of affairs. Even if the target of a pretend pouring was objectively dry, they treated it as if it were wet by wiping it and by describing it as 'wet' rather than 'dry'.

Two-year-olds also display their comprehension of a partner's pretend spatial displacements in matching tasks. For example, having watched an experimenter pick up an empty milk carton and 'pour' milk from it over a toy pig, they were shown either three picture choices or alternatively three toy choices, representing a pig with: (i) milk splashed on its neck; (ii) with an irrelevant change (a red mark); or (iii) with no transformation. When asked: 'How does the pig look now?', young 2-year-olds aged 26–30 months responded correctly to both the picture and the toy choices [16,17]. Again, these results confirm that 2-year-olds are able to set aside current reality, namely the objectively untransformed state of the pig, and to select the representation corresponding to the make-believe state of the pig resulting from the pretend displacement they have just observed.

The imaginary displacements described so far involved familiar containers with familiar contents (e.g. the pouring of pretend tea from a teapot or pretend milk from a carton). However, 2-year-olds can also imagine two successive pretend transformations, with the second involving a neutral container not ordinarily associated with a specific content [18]. Thus, having seen either pretend talcum powder 'shaken' or pretend milk 'poured' into a neutral container, and that container subsequently carried towards, and inverted over, a toy animal, 2-year-olds appropriately described the ensuing state of the animal, i.e. as 'powdery' in the context of the pretend talcum powder but as 'wet' in the context of the pretend milk. These findings indicate that 2-year-olds can imagine successive, causally chained displacements, where the outcome of the second displacement (i.e. whether the toy animal has been covered with powder or with milk) depends on the outcome of the first (i.e. the particular substance that ended up in the neutral container).

Summarizing, even if they lack an understanding of the mental representational basis for pretend actions [19], 2-year-olds are able to share imagined spatial displacements, as indexed by: (i) their pretend enactment of such displacements; (ii) their appropriate interventions following pretend displacements enacted by a play partner; (iii) their verbal descriptions of such pretend displacements; and (iv) their accurate selection of pictorial or three-dimensional representations of the outcome of a partner's pretend displacements.

When sharing such imagined displacements, 2-year-olds draw on their grasp of naive physics. What they imagine is guided by their naive understanding of how liquids and substances behave when a container is moved laterally, tilted or inverted. More generally, the possible outcomes that young children envisage in their early pretend play are grounded in the causal regularities of everyday life [6]. Contrary to traditional speculation about the undisciplined and wayward nature of early fantasy, 2-year-olds rarely entertain fantastical possibilities that violate real-world constraints. Instead, their causal knowledge helps to constrain what a pretend displacement implies and thereby promotes the mutual understanding of pretend enactments [20].

Children's accurate verbal replies in the context of pretence also cast doubt on a long-standing generalization about children's early language, namely that it is tied to the here-and-now. Commenting on the utterances of a 2-year-old, Brown & Bellugi [21, p. 135] stated that: 'there is no speech of the sort that Bloomfield called 'displaced speech' about other times and places'. Current research on such displaced speech has tended to support that conclusion by focusing on children's limited talk about the past and the future [11]. However, as discussed in the following section, 2-year-olds understand and produce comments about entities and individuals that are spatially displaced from their own current location.

3. Communicating about displacements

Young children update their existing representation of an object's location on the basis of another person's say-so. More specifically, 2-year-olds are able to understand a claim about the unwitnessed displacement of an object, to represent the resultant location of that object, and to search for it appropriately at the stated new location rather than at the location where they last saw it [7,8]. Children aged 23 and 30 months were introduced to a living room with four possible hiding places, such as a basket, a box etc. On each trial, they were prompted to place a stuffed toy in one of the four hiding places and then went to a next-door room where they were given information in one of two formats about a change in the location of the toy that they had hidden. In the observation format, they were lifted up so that via a window they could see an adult move the toy to one of the other three locations. In the testimony format, they were not lifted up and could not see the change of location. Instead, an adult told them about the change of location. Next, in both conditions, children returned to the first room and were prompted to find the toy.

In the observation format, both 23- and 30-month-olds searched accurately at the new location, consistent with a large body of work showing that toddlers of this age are able to adjust their search in the wake of an object's visible displacement from one hiding place to another [22]. In the testimony format, 23-month-olds were prone to perseverative search at the original location, arguably because of difficulties in overriding stored information about the initial location on the basis of purely verbal testimony about the subsequent location. By contrast, 30-month-olds searched appropriately at the new hiding place—just as they did in the observation format. How should their success be interpreted? One possible interpretation is that among 30-month-olds testimony about a change of location is treated as equivalent to direct observation of such a change. Indeed, this encoding equivalence would be consistent with the similar level of accuracy that was displayed across the observation and testimony formats. If this interpretation is correct, it implies that 30-month-olds treat the alleged new location as the actual location. On this lean hypothesis, there is no reason to assume that 30-month-olds solve such displacement problems by entertaining an alleged location as a plausible location. Instead, they simply encode the alleged location as the actual location.

However, this equivalence hypothesis is strained as an account of the way that young children ask questions, especially questions about location. A comprehensive analysis of the spontaneous questions asked by preschool children whose naturalistic language had been recorded at home with a familiar carer, showed that they asked on average more than 100

questions per hour [10]. Of those questions, around 76 per hour (i.e. 71%) were information-seeking questions (as opposed to questions aimed at attracting attention, seeking permission or clarification etc.). Moreover, among 2- and 3-year-olds, 20% to 25% of their information-seeking questions were questions about the location of someone or something. They asked a question about location approximately every 3–4 min. A follow-up, parent diary study based on a larger sample of children ($n = 68$) and a broader age range (1–5 years) confirmed these basic findings. Children asked many information-seeking questions and among those, location questions were frequent from 18 months upwards.

Arguably, children pose such location questions idly or playfully rather than with a genuine interest in securing location information. For example, children might ask: 'Where's my ball?' even when the ball is visible and/or they know its location. Two pieces of evidence speak against this interpretation. First, children responded differentially depending on whether they did or did not receive informative answers to their information-seeking questions. More specifically, following an uninformative answer, they were more likely to persist in repeating their question [10].

Second, there is evidence that some young children ask location questions about important figures within their social network who are temporarily absent—for example, a father or a grandmother who is not currently present. A study of four English-speaking children showed that 2-year-olds referred to such absent individuals approximately 7 times per hour—as did 3- and 4-year-olds [23]. In a follow-up study of the spontaneous utterances of three young Mandarin-speaking children, utterances in which children expressed concern about an absent carer were sub-divided into three types: vocative utterances in which children called out the name of the absent person (e.g. Daddy. Daddy. Daddy); desire utterances in which children expressed a desire for the absent person (e.g. I want see Daddy); and locative utterances in which children asked after the whereabouts of the absent person (e.g. Where is Daddy?). All three children asked locative questions about absent carers in the period under study, namely 20- to 40-months [12]

In summary, evidence from studies of natural language indicates that 2- and 3-year-olds ask information-seeking questions. Such questions are frequently asked about the location of objects. Some children also ask about the location of familiar but absent carers. Granted these findings, what representational structures underpin children's location questions? A plausible answer is that many questions posed by young children, including location questions, call for the ability to entertain mental slots that are at once open and constrained, open insofar as children signal, by the very act of asking a question, that for the time being they do not know what information should be added to the slot—hence it remains open—but also constrained insofar as the answer sought by the child is expected to provide information about the location of the referent as opposed, for example, to information about its identity or current activity (i.e. other topics that children also ask many questions about) [10]. Effectively, toddlers appear capable of entertaining 'somewhere' slots, which an apposite answer from an interlocutor will fill in with a specific location. This hypothesis implies that 2- and 3-year-olds are capable of entertaining spatial possibilities that go beyond, or are uncoupled from, the representation of an actual or anticipated outcome. This hypothesis implies that it is misleading to assume on the basis of 2- and 3-year-olds' tendency to prematurely converge on a single possibility when questioned about spatial forks where each of two outcomes is possible that their conception of possible locations is invariably prone to such foreclosure. Indeed, if young children—faced with uncertainty about the current location of an object or person—were to prematurely converge on a single possibility, and to effectively regard it as the actual location of the object, there would be no reason to pose a question in the first place: children would already have presumed an answer. Hence the emergence of question-asking, alongside the emergence of pretend comprehension and enactment, appears to reflect an emerging ability to entertain a representation of a possible state of affairs—a representation that is not treated as equivalent to an actual state of affairs.

4. Children talk about possibilities

If children share and seek information about possibilities as implied by the previous two sections, it is feasible that they will add appropriate linguistic markers to their own assertions about possibilities. Two sources of language evidence are pertinent—children's production of modal terms and their production of two common cognitive verbs, notably *know* and *think*.

In the light of selected examples of the production of modal terms by both 2-year-old Finnish-speaking [24] and German-speaking children [25], O'Neill & Atance [13] used the CHILDES database to conduct a more exhaustive analysis of the spontaneous production of four modal terms (*maybe*, *possibly, probably* and *might*) by 10 English-speaking children between 24 and 59 months. Production was dominated by *maybe* and *might* (59% and 32% of children's total production of the four target terms). Two- and 3-year-olds used these terms to talk about: (i) states of the world that were currently indeterminate, for example with respect to possible locations (e.g. maybe down that street; maybe these fit in here), possible attributes (e.g. maybe it's dark; it might burn you) or possible identities (maybe it's Kimberly), as well as (ii) possible or imminent actions, whether by others or by the self (e.g. maybe you finish that one?; maybe I'll go away).

O'Neill & Atance [13] are conservative in their interpretation, noting that children rarely voiced multiple possibilities within a single utterance. Nevertheless, the relatively flexible production of *maybe* and *might* is consistent with the hypothesis that 2- and 3-year-olds are able to entertain a single as yet uncertain possibility (e.g. the possibility that a particular destination may be down a particular street). On this interpretation, although 2- and 3-year-olds rarely talk about multiple, competing possibilities—in which travel along one possible path precludes the outcome that would be realized by travel along a different path (as probed by the studies with spatial forks, described earlier)—they are able to represent the uncertainty that can surround a single possibility—acknowledging that it may be the case rather than asserting that it is the case.

It could be argued that 2- and 3-year-olds simply use *maybe* and *might* to make predictions about what is probably the case, much as pre-verbal infants are assumed to make predictions when tested in the violation-of-expectancy paradigm. However, if the above interpretation is correct, 2- and 3-year-olds use *maybe* and *might* to mark their prediction as a possibility that may or may not be true. Clearly, we have

no comparable evidence for pre-verbal infants; indeed their surprise at an unexpected outcome is routinely interpreted as an indication that they did *not* anticipate that outcome. By comparison, 2- and 3-year-olds appear to be more circumspect. Indeed, as O'Neill & Atance [13] point out, children of this age not only signal their uncertainty when making assertions about location, attributes, or identity, they ask questions regarding these topics as noted in the previous section [10,26].

The hypothesis that 2- and 3-year-olds voice uncertainty about single possibilities implies a basic, albeit limited, grasp of epistemic modality—i.e. an acknowledgement that a proposition might or might not be true. Against that hypothesis, research on children's production of auxiliary modal verbs (e.g. *have to* or *could be*) has typically shown that early usage is dominated by deontic rather than epistemic usage. Thus, children use modals verbs such as *have to* or *could be* to express obligations or abilities not epistemic necessities or possibilities. Such evidence might be taken to cast doubt on the proposal that 2- and 3-year-olds use *maybe* or *might* to express cognitive uncertainty. However, it is plausible that the relatively slow production of auxiliary modal verbs to express epistemic modality reflects a linguistic rather than a conceptual limitation. Indeed, Cournane [14] argues that children's early production of modal adjuncts, especially *maybe*, is consistent with a grasp of epistemic modality. Cournane examined the production of five potentially epistemic adverbs (*maybe, probably, possibly, certainly* and *definitely*) by 17 English-speaking children. Spontaneous production of these adverbs was dominated by *maybe* (92% of the overall count). Consistent with the findings of O'Neill & Atance [13], children used *maybe* to make assertions about indeterminate states of the world as well as potential or imminent actions. Importantly, most children used *maybe* prior to 36 months and prior to their first uses of epistemic modal verbs.

Among the cognitive verbs that young children produce, the verbs *know* and *think* predominate. Analysis has shown these two verbs account for 96% of children's early production of cognitive verbs. By contrast, *forget, remember, wonder* etc. are used much less frequently [27]. Given the overall frequency with which *know* and *think* are produced, they might be produced equally often and interchangeably. Alternatively, children might be sensitive to a fundamental difference between them, notably that *know*, unlike *think*, is a factive verb, in which the truth of the complement is assumed.

With respect to relative frequency, recent evidence based on a large sample of English-speaking children ($n = 130$) indicates that in the 4-year period between 12- and 60-months, *know* is produced more frequently than *think* and has a somewhat earlier onset [28], consistent with the proposal that children's conceptualization of knowledge, as opposed to belief, is likely to be foundational for their theory of mind [29]. Moreover, this differential frequency cannot be attributed to adult input. Children's interlocutors produce *know* and *think* with greater frequency as children get older, but the two verbs are produced equally often.

Is the differential frequency of production accompanied by differences in the mode of production? Bartsch & Wellman ([27], table 3.4) report utterances by 2- and 3-year-olds suggesting that they differentiate between their ignorance of an actual situation and their untested beliefs about some as yet indeterminate situation. In the former case, children produce utterances with *know* (e.g. you have pockets to keep your hands warm. I didn't know that; well, she's not out back, so we don't know where she is). By contrast, in the latter case, children produce utterances with *think* (e.g. I think it's in here, mommy; I think he's going to open the door; I think he's gonna come back; I think it upstairs in my bedroom somewhere; Think this is … bout to fall apart). Thus, children use *know* to signal cases when the situation that they refer to is regarded as an actuality rather than a possibility, but they use *think* to signal cases when the situation that they refer to is regarded only as a possibility.

5. Comparative evidence

Taken together, the three lines of evidence just described imply that 2- and 3-year-olds can represent and share possibilities. In the context of joint pretend play, they enact pretend displacements and understand the pretend displacements enacted by a play partner. They also pose questions about possible locations and mark their own assertions about such possibilities.

Do we see anything comparable among great apes? Adding to earlier reports of pretending [30], Matsuzawa [31] provides detailed examples of chimpanzees in the wild engaging in the re-enactment of an activity involving either a prop (e.g. wearing a grass cushion used by humans as a protective hat when carrying a load) or a substitute object (e.g. carrying and grooming a dead hyrax, or a log, as if it were an infant chimpanzee). Similarly, human-reared chimpanzees sometimes re-enact an activity with a prop (e.g. placing a toy phone to the ear) or with imaginary objects (e.g. moving several imaginary blocks across the floor) [31]. However, all these examples involve solitary re-enactment. They do not include attunement to the pretend displacements enacted by a play partner, as described earlier for 2-year-olds.

A similar pattern emerged from the longitudinal video records of five human-reared apes [32]. Two of the five animals, one bonobo and one chimpanzee, produced examples of pretend displacements (e.g. the 'picking' of blueberries from a picture, followed by 'eating' them from the fingers; the 'grooming' of a monkey puppet with subsequent 'eating' of pretend bugs) but there were only five or six such episodes across almost 100 h of longitudinal video recording. Thus, like chimpanzees in the wild, human-reared apes do sometimes show a capacity for enacting pretend displacements, but that capacity is rarely deployed. Moreover, such displacements are produced by individual animals. There is no evidence of the shared pretence that is widespread among human children [33].

There are also no unequivocal reports of great apes spontaneously producing interrogative gestures aimed at securing information. Indeed, an absence of interrogatives persists even when apes learn to use a medium of communication. For example, the chimpanzee Sarah was familiarized with a symbol system and learned to answer wh-questions with it. Yet she never used the symbols to ask such questions herself [34]. Kanzi, a male bonobo who was trained in the use of a lexigram keyboard, devoted more than 90% of his utterances to expressing desires and preferences (e.g. for food) but he did not use the keyboard to ask questions [35,36]. Similarly, five chimpanzees given an opportunity to acquire American Sign Language, frequently used signs in an instrumental fashion to request objects but were not observed to produce

signs in an interrogative fashion to request information [37]. By contrast, not only do hearing children ask many questions, as noted earlier, including questions about location, deaf children who lack access to both a conventional spoken language and a conventional signed language also ask questions by spontaneously recruiting a stylized gesture. For example, David, a profoundly deaf child, who had not been exposed to a conventionalized sign system, was regularly observed at home between 34 and 47 months [38]. He produced 90 question sentences (3% of the total number of sentences that he was observed to produce). The majority (71%) of his questions were questions about location. For example, having noted that a toy drummer was missing its customary drumstick, he first pointed to the drummer's hand and then produced his customary gesture for expressing ignorance, notably the rotation of one or both hands from palm down to palm up.

6. Conclusion

Infants are equipped to both understand and produce communicative gestures about actual states of affairs [39]. The above review indicates that 2- and 3-year-olds can, in addition, encode and convey information about possible states of affairs. Thus, not only do young children understand how communication works via the supply of testimony about the way things actually are, they also understand how communication works via the signalling of the way that things might be. Indeed, young children's early sharing of information about possibilities suggests that they are likely to heed, engage with, and trust informants who are not making straightforward factual assertions and continue to do so even when those assertions are not accurate descriptions of current reality (as in the context of pretend play and fictional stories), or may prove to be false (as in the context of opinions about non-immediate possibilities). In summary, children's early participation in communication is not confined to the transmission of known facts. From an early age, it also includes requests for, and the provision of, information about possibilities—alongside the world of known facts.

The available comparative evidence indicates that this early-emerging human capacity is not observed in great apes—although further comparative and cross-cultural research is needed to firmly establish such a cross-species claim [40]. Granted that children can contemplate and share possibilities and do so well before they respond optimally on the forked tubes task (i.e. with two hands), it will also be important to probe how this early-emerging capacity is eventually applied to more demanding contexts, especially those in which mutually exclusive possibilities need to be planned for.

Data accessibility. This article has no additional data.

Authors' contributions. P.L.H.: conceptualization, writing—original draft, writing—review and editing.

Conflict of interest declaration. I declare I have no competing interests.

Funding. I received no funding for this study.

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