



Young children's understanding of cultural common ground

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Human social interaction depends on individuals identifying the common ground they have with others, based both on personally shared experiences and on cultural common ground that all members of the group share. We introduced 3- and 5-year-old children to a culturally well-known object and a novel object. An experimenter then entered and asked, 'What is that?', either as a request for information or in a recognitory way. When she was requesting information, both 3- and 5-year-olds assumed she was asking about the novel object. When she seemed to recognize an object, 5-year-olds assumed she was referring to the culturally well-known object. Thus, by 3 years of age, children are beginning to understand that they share cultural common ground with other members of their group.

Keeping track of what knowledge and information we do and do not share with specific other people plays a critical role in human social interaction and communication. For instance, every few seconds in our conversations with others we must determine what we do and do not share with our interlocutor in order to choose whether to refer to something with a noun (e.g., *the bike*) or pronoun (e.g., *it*).

Infants as young as 14 months can keep track of shared experiences with particular other individuals and use these as *common ground* (Clark, 1996) in their comprehension and production of communicative acts. For example, Ganea and Saylor (2007) found that 15- and 18-month-old infants responded correctly to an adult's ambiguous verbal request ('Can you get it for me?') by handing over the one of two objects they had previously searched for together. Crucially, infants did not do this in a control condition in which the requester was a new, second adult who had not shared this searching experience with them (see also Moll, Richter, Carpenter, & Tomasello, 2008, for a similar finding). Fourteen- to 20-month-olds can also keep track of which of two particular objects (balls) they have shared with which of two adults and select that object in response to an ambiguous request from one of the adults ('Where's the ball?') (Saylor & Ganea, 2007). And around the same age infants can even do this when interpreting others' gestural

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communication (Liebal, Behne, Carpenter, & Tomasello, 2009), and when producing declarative points for others (Liebal, Carpenter, & Tomasello, 2010).

One-year-old infants thus use their specific shared experiences with specific other people as common ground to make all kinds of communicative inferences. However, it is not just personally shared experiences that enable interlocutors to make inferences of these kinds. Humans are also members of different groups in which the members all share certain values, knowledge, and experiences. Most importantly, individuals are members of cultural groups, and as such they are expected to know certain things (e.g., who is their leader), and they expect other members of the group to know them as well (and expect others to expect them to know them, etc.). This is the case even if the group members have never shared the experiences personally – and even if they have never met at all. In contrast to particular experiences shared with particular other persons, shared experience of this more indirect type may be referred to as *cultural common ground* (Clark, 1996).

In a seminal study of this phenomenon, Clark, Schreuder, and Buttrick (1983) had an experimenter show adults in a public space in the United States a photograph of two men, then current President Ronald Reagan and the less well-known director of the Office of Management and Budget David Stockman. The experimenter then asked either, 'You know who this man is, don't you?' or, alternatively, 'Do you have any idea at all who this man is?' Participants responded differently to the two questions: Whereas most participants who were asked the first question selected Reagan, this was not the case for those who were asked the second question, about half of whom chose Stockman instead. They did this because (1) the phrase 'this man' indicates that the questioner has a specific man in mind and that he expects the listener to know which one (because a cooperative speaker would not intentionally use a referential phrase that would be ambiguous for a normal listener); and (2) since they are in the United States and both appear to be at home there, the participant can assume that they both know the president already – he is salient in their cultural common ground, whereas Stockman is less so. Importantly, cultural common ground works flexibly and allows participants to identify both facts that are shared and within their cultural common ground and also facts that are less well established or not part of their cultural common ground at all. Thus, even though they have never met before, two individuals can make inferences based on the other's previous experience, indeed their similar previous experiences assuming some cultural common ground.

To our knowledge there are no studies that have directly tested the use of cultural common ground as a basis for communication in children in this way. Some studies in language acquisition have found that children make assumptions about the 'conventionality' of words. For example, 4-year-olds assume that another person knows the object label associated with a character even if that person was not present when the character was labelled for them (but they do not assume that he will know its proper name, for which direct experience is crucial; Diesendruck, 2005). But these studies do not test for the kind of shared common ground necessary to interpret ambiguous communicative acts. That is, in the Clark *et al.* (1983) study participants must know that the questioner not only knows the president but also knows that they know him as well (i.e., the questioner is expecting them to resolve the ambiguity of 'this man' by making inferences about his, the questioner's, knowledge and their common ground). Also, in the linguistic conventionality studies, children basically reason that if an individual is speaking English, for example, she will also know this English word – a generalization within the linguistic system, as it were – whereas in the Clark study the common

knowledge is more about knowledge of things in the world and is thus not limited to any particular linguistic system.

In the current study, therefore, we wanted to know whether young children make inferences about cultural common ground more generally, like adults do in the Clark *et al.* (1983) study. We adapted the task used by Clark *et al.* for 3- and 5-year-olds. We began with an introduction phase in which children were familiarized with both referents equally (without ever naming them). One referent was a figure of a culturally well-known character (e.g., Santa Claus), whereas the other was a new character created on the spot (e.g., a creature made from cloth and wooden blocks) that absent individuals could not already know. After this introduction phase, a new adult entered the room and ambiguously asked for one of the objects. She did this in one of two ways: either she expressed ignorance, and thus her request referred to the object she did not know (it was a serious request for information), or else she expressed recognition, and thus her request referred to the object she already knew (it was a 'test question'). We hypothesized that children would be able to use an understanding of cultural common ground to make the appropriate inferences and select the novel character in the ignorance condition and the culturally shared character in the recognition condition.

Method

Participants

Forty-eight 3-year-olds (24 girls, 24 boys; $M = 2;11$; $range = 2;8-3;2$) and 48 5-year-olds (24 girls, 24 boys; $M = 5;0$; $range = 4;9-5;2$) participated. Children were recruited from a database of children whose parents had volunteered to participate in child development studies. Additional children were tested but excluded because they refused to participate (seven 3-year-olds, two 5-year-olds) or due to experimenter error (three 3-year-olds, one 5-year-old).

Materials and design

Materials were four pairs of objects, each pair consisting of a culturally shared object and a novel object. Each novel object had one extra part that was added to it during the introduction phase when one of the adults (the assistant) finished building the object. Two of the pairs consisted of characters and two consisted of toy objects. The pairs were (1) a Santa Claus figure ($18 \times 12 \times 3$ cm) and a green stuffed character ($12 \times 7 \times 4$ cm) to which the assistant added a green scarf to finish it, (2) a well-known local TV character ('Sandman'; $30 \times 20 \times 8$ cm) and a yellow stuffed character with black hands and feet and a black scarf around his neck to which the assistant clipped green hair to finish it ($30 \times 20 \times 7$ cm), (3) a blue and red plastic car ($10 \times 7 \times 6$ cm) and a blue wooden platform with neon green squares onto which the assistant put a red rubber pyramid to finish it ($4 \times 5 \times 12$ cm), and (4) a yellow rubber duck ($10 \times 8 \times 9$ cm) and a yellow sponge object with eyes which the assistant put into a white rubber base to finish it ($7 \times 12 \times 7$ cm; see Figure 1).

Children were randomly assigned to either the ignorance or the recognition condition. Each child received four trials. The order in which the four pairs of objects were presented was fully counterbalanced. In half the trials, for the test the novel object was on the left side and in the other half it was on the right side, in fully counterbalanced order.



Figure 1. The four pairs of objects used in the study (the culturally shared one is always depicted on the left).

Procedure

Children were tested in a quiet room in their kindergarten. Children sat at a table with the assistant, who sat on their left side. Children sat facing and about 2.5 meters away from the door through which the experimenter (E) would later enter at test. After some warm-up play with both E and the assistant, E left the room, closing the door behind her, and the first trial began.

In each trial the assistant introduced both objects of the assigned pair to children so that they were equally familiar with them. First, she always introduced the culturally shared object. She pulled out the object from underneath a cloth and said, 'Look who/what I've got here!' ('Schau mal, wen/was ich hier habe!'). She then waited for 2 s to see if the child would name the object. She manipulated the object for a total of 20 s and, to keep the amount of verbal input as equal as possible to the later introduction of the novel object, she commented on two aspects of it (Santa Claus: hood, coat; Sandman: beard, cape; car: wheels, lights; duck: colour, beak). She then put it aside, on the table, and presented the novel object, saying, 'And look who/what I've got here!' ('Und schau mal, wen/was ich hier habe!'), waiting for 2 s to see if the child would name the object. In order to convey to children that this was a new object that could not be familiar to anyone, for each novel object the assistant explained that she had just made it and in fact had to finish making it right then, she said, 'He/it is brand new, I just made him/it. But he/it is not even finished yet, I have to finish him/it' ('Der/das/die ist ganz neu, den/das/die habe ich selbst gebaut. Aber der/das/die ist ja noch gar nicht fertig.

Den/das/die muss ich nur mal fertig bauen'). She then added the last piece and afterwards showed it to the child, repeating, 'He/it is brand new, I just made him/it' ('Der/das/die ist ganz neu, den/das/die habe ich selbst gemacht'). As with the culturally shared object, the manipulation of the novel object lasted 20 s. Note that the assistant never named any of the objects. In the rare cases that the child came up with a name for the novel object, the assistant said, 'No, that's not an X, he/it is brand new, I just made him/it!' ('Nein, das ist kein X, der/das/die ist ganz neu, den/das/die habe ich selbst gemacht'). Afterwards, the assistant said, 'I'm going to put them on the table now. He/this goes here and he/this goes here' ('So, jetzt lege ich die mal auf den Tisch, den/das/die hierhin, und den/das/die hierhin'). She put both objects on the table to the left and right of the child, 50 cm away from each other and equidistant (30 cm) from the child, always placing the culturally shared object first followed by the novel object. She then said that she needed to take some notes and turned her back to the child.

Then the test followed: E entered the room and said, 'Hello [child's name], hello, I'm back!' ('Hallo [Name des Kindes], hallo, ich bin wieder da!'). She then closed the door and, while still standing by the door, ambiguously asked for an object. In the ignorance condition, with a puzzled facial expression and tone of voice she said, 'Ah!? Look at that! Hm. Look, who/what is *that*? Who/what *is* that? Hm. Can you give him/it to me, please?' ('Ah!? Schau mal! Hm. Schau mal, wer/was ist *das* denn? Wer/was *ist* das? Hm. Gib mir den/das/die mal bitte!'). In the recognition condition she said with a joyful facial expression and recognizing tone of voice, 'Ah!! Look at that! Hm! Look who/what is *there*! Who/what *is* there! Hm! Can you give him/it to me, please?' ('Ah!! Schau mal! Hm! Schau mal, wer/was *da* ist! Wer/was *ist* denn da! Hm! Gib mir den/das/die mal bitte!'). While saying this, E never singled out any of the objects in any way, and looked ambiguously only at the middle of the table. After she had finished, she looked up to the child. If children did not respond immediately, they were given two other opportunities: After 10 s, E repeated, 'Can you give him/it to me, please?' ('Gib mir den/das/die mal bitte!'), and, if needed, after 10 more seconds she repeated the entire request as described above. If children ambiguously handed over both objects at the same time, E asked them to choose by saying, 'Which one do I need?' ('Welchen/welches/welche brauche ich denn?'). After children had made a choice and handed over one object, regardless of which one it was E said, 'Thank you!' ('Danke!'), and moved on to the next trial.

A necessary precondition for being able to reason about whether the adult was referring to the culturally shared object or the novel object is that children themselves know the cultural character or object. In order to assess that, at the end we conducted a comprehension test in which E put all the objects on the table and asked the child to hand her each culturally shared object (e.g., 'Can you give me Santa Claus, please?'/ 'Gib mir mal bitte den Weihnachtsmann!'). She went through each of them, one by one, in the order in which they had been presented during the test. If children did not choose an object correctly, E asked for this particular object again at the end. If children still did not choose the correct object, E held it up and with a friendly facial expression asked, 'Do you know who/what this is?' ('Wer/was ist das denn?').

Coding, reliability, and analyses

Children's responses were coded from videotape. Because children sometimes changed their choice of object during a trial, for each trial we coded children's final choice of object in response to E's request. Responses were coded as either choosing the novel object or the culturally shared object (i.e., handing/moving the object to E or pointing to it and saying something like, 'This one?', or naming it). Each child received one score

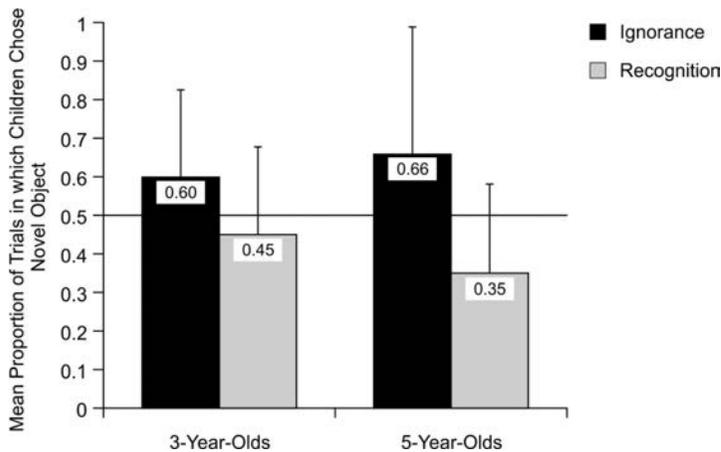


Figure 2. The mean proportion of trials in which children chose the novel object in each condition.

for each trial ('0' if the child chose the culturally shared object, '1' if she chose the novel object). Unclear responses (choosing both objects or no object) occurred infrequently and were thus excluded from the analyses (3-year-olds: three trials, two 'both' responses in the recognition condition, one 'neither' response in the ignorance condition; 5-year-olds: two trials, two 'neither' responses in the recognition condition).

For the comprehension test at the end, for each culturally shared object we scored whether the child selected the correct object as requested. A score of '1' was given if the child handed or moved the correct object to E or pointed to it and named it or said something like 'This one' during the comprehension test, or if the child named the object spontaneously during the introduction phase of the main test trials. A score of '0' was given if the child did not select the correct object or name it. To assess inter-rater reliability, a coder who was unaware of the hypotheses of the study independently coded 33% of the videotapes for children's choices in the main test and in the comprehension test. Perfect agreement was achieved ($\kappa = 1$ for main test and comprehension test for both 3- and 5-year-olds). Two-tailed p values are reported throughout.

Results

As it is a necessary precondition for the main test that children knew the culturally shared objects themselves, we first analysed the comprehension test. All children passed the comprehension test and knew all the culturally shared objects except two 3-year-olds who did not know Santa Claus and two 3-year-olds who did not know Sandman. These four trials were excluded from the analyses.

Almost all children participated in all four trials (3-year-olds: 185 of 192 possible trials or 96.4%; 5-year-olds: 190 of 192 possible trials or 99.0%; see Method section for criteria for exclusion of trials). Results are depicted in Figure 2. A 2 (age) \times 2 (condition) ANOVA on the mean percentage of trials in which children chose the novel object as the referent revealed a significant main effect of condition ($F(1, 92) = 19.28$, $p < .001$, $\eta^2 = .17$) but no main effect of age and no interaction (both $ps > .147$).¹

¹ An ANOVA on children's first choice (instead of final choice) revealed similar results: a significant main effect for condition ($F(1, 92) = 15.49$, $p < .001$, $\eta^2 = .14$) but no main effect of age and no interaction (both $ps > .551$).

Thus, overall, children chose the novel object significantly more often when the adult expressed ignorance (63%) than when she expressed recognition (40%), in which case they chose the culturally shared object instead. Planned comparisons analysing each age group separately revealed that both 5- and 3-year-olds correctly differentiated between conditions (5-year-olds: $t(46) = 3.74$, $p < .001$; 3-year-olds: $t(46) = 2.35$, $p = .023$; see Figure 2). In addition, the 5-year-olds correctly chose the novel object significantly above chance in the ignorance condition ($t(23) = 2.33$, $p = .029$) and significantly below chance in the recognition condition (in which they chose the culturally shared object instead; $t(23) = -3.20$, $p = .004$). The 3-year-olds also correctly chose the novel object significantly above chance in the ignorance condition ($t(23) = 2.20$, $p = .038$), but did not choose it significantly below chance in the recognition condition ($t(23) = -1.13$, $p = .271$). In order to see whether children performed equally well for both the toy objects (car, duck) and the characters (Santa Claus, Sandman), we also analysed the data separately for both kinds of referents. A repeated measures ANOVA on children's choice of the novel object/character as the referent of the adult's request with age group and condition as between-subjects factors and type of referent as within-subjects factor revealed a significant main effect for condition ($F(1, 92) = 20.00$, $p < .001$, $\eta^2 = .18$) but no main effect of age or type of referent, nor any interaction effects (all $ps > .139$). Thus, children selected the novel object more often when the adult expressed ignorance and the culturally shared object more when she expressed recognition, and they did this equally well for both toys and characters.

Finally, we looked at children's performance in their first trial to see whether they responded correctly from the beginning of the study. The 5-year-olds did: on their first trial, they correctly chose the novel object when E expressed ignorance but chose the culturally shared object when E expressed recognition (χ^2 test: $N = 46$,² $\chi^2 = 12.83$, $df = 1$, $p < .001$; see Figure 3). The 3-year-olds showed a similar pattern of results, but they did not quite reach significance (χ^2 test: $N = 46$,³ $\chi^2 = 3.42$, $df = 1$, $p = .064$).

Discussion

In the current study, we presented young children with a situation in which a questioner asked for a specific object but did so ambiguously. Like adults (Clark *et al.* 1983), 3- and 5-year-old children resolved the ambiguity based on an assessment of the common ground (common knowledge) they shared with the adult – even though the two of them had never directly shared any relevant experiences before. Children did this based solely on assessments of the cultural common ground they shared with the adult (about Santa Claus and other culturally common and salient entities). We showed that at least by 5 years of age, children make inferences of this type very flexibly: if the adult expressed ignorance and seriously requested information, they gave her the new object, whereas if she expressed recognition and used a 'test question', they gave her the culturally shared object.

² $N = 24$ in the ignorance condition, $N = 22$ in the recognition condition. Two children were excluded because they did not choose an object (see Method section for exclusion criteria).

³ $N = 22$ in the ignorance condition, $N = 24$ in the recognition condition. Two children were excluded, one child because she did not pass the comprehension test for the culturally shared object used in trial 1, and one child because she did not choose an object (see above for exclusion criteria).

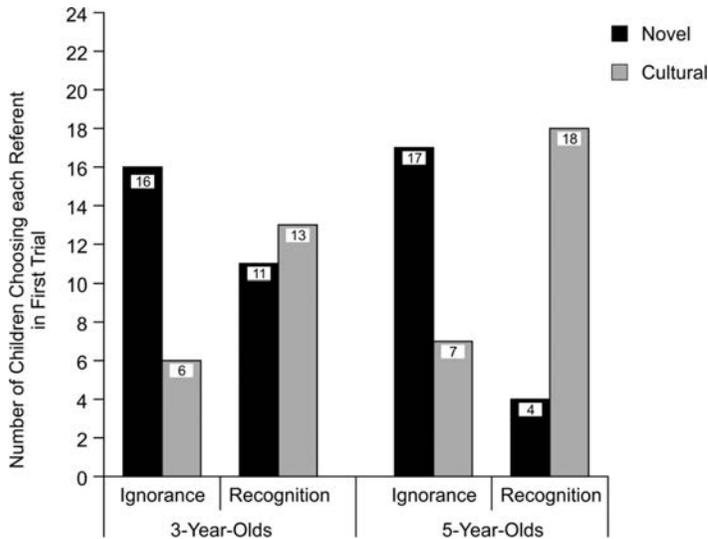


Figure 3. The number of children who chose each object in their first trial in each condition.

Three-year-olds also differentiated between the two conditions, but they were not as flexible as the older children: their choices were only correct at above-chance levels in the ignorance (not in the recognition) condition. The problem may be that the adult's excitement in the recognition condition is potentially ambiguous, as people can get excited both about familiar things they recognize (Liebal *et al.* 2010; Moll *et al.* 2008) and about new things (e.g., Moll, Carpenter, & Tomasello, 2007; Moll & Tomasello, 2007). We thus think that more experience may be necessary for the 3-year-olds to differentiate excitement about new objects from excitement about recognized objects in this situation. It is unlikely that these children were simply using a general strategy of choosing the novel or salient object. If that were the case they would be expected to choose this object in both conditions but they did not do this. Instead, their pattern of results was very similar to that of 5-year-olds (and adults), just not as pronounced.

Previous research has shown that young children understand conventionality of words in language acquisition. In the study by Diesendruck (2005), 4-year-olds assumed that everybody in their community of speakers knew the common names for objects, but not the proper names, when encountering the objects for the first time. It is interesting that in the character trials in our study, children assumed that the novel adult must know the identity of the familiar character (and, by implication, his proper name). This finding thus extends that of Diesendruck (2005) in showing that children know that some individuals are known generally in the culture, just like in the Clark *et al.* (1983) study with adults.

Our interpretation of children's behaviour in terms of an understanding of cultural common ground might conceivably be considered too rich. That is, if 3- and 5-year-old children know nothing about cooperative communication, they could be just reasoning about the questioner's knowledge as an individual rather than the cultural common ground that they share. Thus, children might have reasoned simply that 'he must know that one'. Even if this were true, it would still show that children know what kinds of things other people may be expected to know in general (with no direct experience of them having encountered these things), and so it would still support the idea of an understanding of some kind of general cultural knowledge. Support for this view also

comes from all that we know about the social-cognitive and pragmatic abilities of children in this age range. That is, even before they are 2 years of age, young children interpret ambiguous requests for objects not in terms of their own individual experience, or in terms of the other's individual experience (which they witnessed), but rather in terms of the experiences they have had together, that is, in terms of their shared common ground (Liebal *et al.* 2009, 2010; Moll *et al.* 2008). It is thus likely that they are doing this in the current study as well, only using cultural (instead of personal) common ground.

The current study shows that young children know a lot about what members of their cultural group can be expected to know in common with everyone else – even if they have previously had no personally shared experiences with them. And they know this not just about linguistic items based on a generalization from other linguistic items (as in the linguistic conventionality studies), but rather about things in the world based on assumptions about cultural experiences in general. Combined with common ground based on personal experience, such cultural common ground contributes to the complex way in which young children interact with different individuals socially, and especially communicatively.

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