



Children's capacity to use cultural focal points in coordination problems[☆]



Efrat Goldvicht-Bacon, Gil Diesendruck^{*}

Department of Psychology and Gonda Brain Research Center, Bar-Ilan University, Israel

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ABSTRACT

Coordination problems require one to act based on expectations about how partners will act. In Experiment 1, 5-year-olds ($n = 57$) had to hide a sticker in the box another child from their, or a different, culture was most likely to search in. Boxes were marked with cues presumed to be known by everybody, cultural members, or the child. Experiment 2 assessed 5-year-olds' ($n = 57$) behavior in a competition scenario. In Experiment 1, children were more likely to hide in the cultural box when playing with a same- than a different-culture partner. In Experiment 2, children's behavior was the opposite. Thus by age 5, children are capable of modulating their actions in coordination problems, according to their partners' presumed knowledge.

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1. Introduction

Imagine that you have set up to meet a friend from a distant city, whom you have not seen in a long time. The night before the date, you two decided to coordinate the time and place of the meeting over mobile phone on the next morning. However, in the morning, you realize that you left home without your phone. What do you do now? If you have to decide on a time and place where the two of you would think of as a meeting place, without coordinating in advance, where and when would it be? In his book, *The Strategy of Conflict*, Schelling (1960) presented his subjects with a similar dilemma. The subjects, mainly New York natives, often converged on the same time – 12 noon – and the same place – Grand Central Station. How did these subjects manage to choose the same time and place despite having no prior coordination? Situations like this happen frequently in our daily life: a phone conversation gets cut-off, how do you coordinate who will call and who will wait for the call-back? Two drivers want to switch lanes at the same time, who waits and who passes first? What is needed in all these cases is a coordination of knowledge states, and consequent expectations about people's behaviors. More specifically,

Person A reasons that he knows X, that Person B also knows X, that Person B knows that Person A knows X, and so on, until both Person A and B reach a decision threshold that allows them to derive a reasonable expectation about how to act (Kyle, DeScioli, Haque, & Pinker, 2014). According to Schelling, one shortcut for this infinite string of inferences is the capacity to read the same cue in a common situation, and the identification of that cue as a point onto which the expectations of A and B may coalesce – what Schelling called “focal points”.

As noted by Schelling and others (e.g., Barr, 2004; Mehta, Starmer, & Sugden, 1994; Sugden & Zamarron, 2006), adults are fairly adept at finding such focal points. And they are so because they are quite competent at inferring what is conventional shared knowledge amongst members of a community, and can thus generate reasonable expectations about how others might act based on this knowledge (Clark, 1996; Lewis, 1969). Crucially, in their grounding on common knowledge, focal points are by definition culturally and contextually sensitive. For instance, the results of Schelling experiment would likely have been different had the subjects been Parisians, and had the friends set up to meet at night. Perhaps certain types of knowledge are universally shared (e.g., house number 1 is the first on a street), but others are cultural (e.g., Grand Central Station), and yet others are idiosyncratic (e.g., one's favorite restaurant). Thus, in coordinating an action with another person, we adjust our expectations based on the knowledge we assume to share with a specific partner. In other words, to succeed in such coordination problems, one needs to be capable

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^{*} Corresponding author at: Department of Psychology, Bar-Ilan University, Ramat-Gan 52900, Israel.

E-mail address: dieseng@mail.biu.ac.il (G. Diesendruck).

of: (a) estimating what his/her partner knows, and (b) adjusting this estimation based on *what* is supposed to be known, and *who* the partner is. The present studies investigate whether young children have these capacities.

A number of studies reveal that indeed even infants have some capacity to estimate others' knowledge. For instance, Moll and colleagues showed that 14-month-olds reacted correctly to an ambiguous request by an experimenter ("can you get me that?"), by choosing the specific object that they had shared previously with that experimenter (Moll, Richter, Carpenter, & Tomasello, 2008; see also Saylor & Ganea, 2007). With increasing age, toddlers can even succeed in distinguishing the specific knowledge they share with different partners. For instance, 2-year-olds inferred that if a speaker asked them for the referent of a novel name, the referent was likely to be the one object that speaker had not previously seen. Children chose randomly, however, if the speaker had seen all the objects in display (Diesendruck, Markson, Akhtar, & Reudor, 2004; see also Liebal, Carpenter, & Tomasello, 2010). By preschool age, children start modulating their expectations about what others know, based on the common knowledge established in a given context. Thus, 3-year-olds succeed in maintaining different pretend identities of objects established with different pretend partners (Wyman, Rakoczy, & Tomasello, 2009), and expect another agent to act in accordance with a novel game rule they had both been exposed to, and do not extend this expectation to an agent who had not been part of the pact (see Rakoczy & Schmidt, 2013, for a review). Moreover, 3-year-olds, and even more so 5-year-olds, are sensitive to the partner-specific nature of "referential pacts" – e.g., the establishment of particular names to refer to potentially ambiguous objects – thus evincing some difficulty in interpreting a request when a partner in the pact violates it (Matthews, Lieven, & Tomasello, 2010; see also, Koymen, Schmerse, Lieven, & Tomasello, 2014).

Importantly, in all these cases, children were required to respond to a partner's communicative act, by assessing the partner's knowledge of the relevant information in a given communicative context. Coordination problems are more taxing, because they require children to initiate an action based on *presuppositions* about their partner's knowledge of the relevant information in any given situation, and the consequent expectations about how the partner will act in that same situation. There is some evidence that with *minimal* communication – i.e., eye contact – 4-and-a-half year olds succeed in coordinating actions with another partner (Wyman, Rakoczy, & Tomasello, 2013). However, to our knowledge, only one study to date has directly addressed children's capacity to coordinate actions in the *absence* of communication with a partner. In their recent study, Grueneisen, Wyman, and Tomasello (2015) tested 3- to 8-year-olds in a task that required children to choose in which box to hide an object, such that if another child chose to hide his object in the same box, the subject would win a prize. Three of the boxes had the same picture affixed to them, whereas a fourth box had a distinct picture. Grueneisen et al. found that starting at 5-years of age, children succeeded in picking the distinctive box as a preferred location to hide the object. In other words, children at this age succeeded in converging on the focal point in that given situation.

The question the current studies address is whether children are capable of *modulating* their actions in coordination problems, according to the *type of knowledge* presumed to be known and *who the partner is*. In other words, in addition to asking whether children can rely on a seemingly universal cue to what the focal point in a given situation is (e.g., a salient mark, as in Grueneisen et al., 2015), can children recognize that certain cues will be viewed by *some* partners as focal points (e.g., cultural cues by cultural members), and others might seem focal only to themselves (e.g., idiosyncratic cues)?

Plenty of research demonstrates that by age 5, children make generalizations based on people's social group membership, and expect members of the same social group to share a number of psychological characteristics (Diesendruck & haLevi, 2006; Dunham, Baron, & Carey, 2011; Shutts, Roben, & Spelke, 2013). More sparingly, however, there are only a few studies suggesting that children at this age have different expectations about what others know based on their group membership. For instance, 4-year-olds expect speakers of their language – but not of a different language – to know the common names of objects, and they do not expect even speakers of their language to know the proper names of novel creatures that only they had been exposed to (Diesendruck, 2005). Moreover, at this age, children also start assuming that familiar objects and certain social conventions are cultural common ground, and thus presumed to be known by members of their cultural community (Liebal, Carpenter, & Tomasello, 2013; Schmidt, Rakoczy, & Tomasello, 2012). Whether these conceptual achievements suffice for children to coordinate actions based on differential expectations about what knowledge is shared by whom, is a question motivating the present studies.

Similar to Grueneisen et al. (2015), we too presented 5-year-olds with coordination problems in which they had to decide in which one of a number of boxes they should hide an object. Differently from Grueneisen et al., however, we manipulated two crucial variables. First, we marked one box in each set with a cue that was supposed to be known only by the participant (e.g., his/her name was written inside the box), another with a cue that was supposed to be known by members of the participant's cultural group (e.g., the Israeli flag), and a third with a cue that was supposed to be known universally (e.g., a picture with all the world's flags). Second, in half of the trials children played the "hiding game" with a partner from their cultural group (i.e., a Hebrew-speaker from Israel), and in the other half of the trials the partner belonged to a different cultural group (i.e., an English-speaker from England). A further addition to the present experiments is that we used two rather distinct types of cues, namely, verbal and visual ones. This was done primarily to provide a broad assessment of the processes presumably underlying children's decisions.

In Experiment 1, the goal of the game was described to the child as cooperative. Namely, the child was asked to hide a sticker in one of the boxes, such that if the partner eventually chose to look for the sticker in the box the child had chosen, the child would win the sticker. In other words, the child had to guess in which of the boxes the partner was most likely to search, and then place the sticker there. From a logical standpoint, two cues are supposed to be known by a same-culture partner – i.e., the cultural and the universal cues – but only one by a different-culture partner – i.e., the universal cue. Consequently, when playing with a different-culture partner, children's choice should be straightforward: hide the sticker in the box marked with the universal cue. However, when playing with a same-culture partner, children face a dilemma between two logically equivalent options.

Given these considerations, our "cautious" hypothesis was that if children are capable of modulating their decisions based on expectations about what different others know, then they should be more likely to select a box marked with a cultural cue when playing with a partner from their culture (since that partner might recognize that cue), than when playing with a partner from a different culture (since that partner is much less likely to recognize that cue). A "stronger" hypothesis is that when playing with a same-culture partner and thus facing the dilemma between the two logically equivalent options, children will select the option that is most relevant to that particular partner (Sperber & Wilson, 1986); namely, select the cue that is most distinctive. In this case, the stronger hypothesis is that when playing with a

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