

## Reasoning in communication

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- PRE-PRINT DRAFT -

Published in:

*The Encyclopedia of Child and Adolescent Development.*

Edited by Stephen Huppand Jeremy D. Jewell.

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DOI10.1002/9781119171492.wecad129

*Abstract*

Children use language to achieve social goals, particularly to express reasons for their beliefs and understand others' reasons for their beliefs. Although reasoning is traditionally viewed as an individual skill, recent accounts have focused on the social dimension of the process and the exchange of reasons/justifications in communication to reach joint decisions and solve problems (Mercier & Sperber, 2017; Tomasello, 2018). The literature on argumentation, however, often focuses on school-aged children's reasoning abilities. This chapter lays out how much younger children, children around age 3, begin to communicate reasons effectively to achieve their social goals in interaction. We will highlight that the context of cooperative problem solving with same-age peers is unique in facilitating young children's reasoning.

*Keywords:* reasoning, argumentation, social cognition

## **Reasoning in communication**

Children, just like adults, use language to achieve social goals, communicate their beliefs to others, and jointly solve problems with their conversational partners. Although “reasoning” is traditionally viewed as an individual skill, recent accounts have focused on the social dimension of the process, and on the exchange of reasons/justifications in conversation to reach joint decisions and solve problems (Mercier & Sperber, 2017). It has further been argued that reasoning may have an ontogenetic origin in discourse—children come to understand the norms that govern good or bad reasoning by engaging in mutual critique of one another’s reasons (Tomasello, 2018). Moreover, reasoning offers children a context in which they practice their linguistic skills (because children need to produce and comprehend complex sentences: [PROPOSAL] *because* [REASON]), their cognitive skills (because children need to understand the relevance, validity, etc. of their reasons), and their social skills (because children need to phrase their reasons depending on their audience to achieve their social goals). Children’s reasoning abilities, also referred to as “argumentative abilities”, have often been studied with older children around ages 11/12 (Felton & Kuhn, 2001). However, recent research highlights that at a much younger age, around the third year of life, children begin to communicate reasons effectively to achieve their social goals in interactions and this ability improves significantly in later preschool years.

### ***Children’s evaluation of reasons***

Children rely on others to learn about the world. A strong body of literature on selective trust (Koenig, 2012) suggests that children are vigilant social learners who

trust some individuals more than others. One of the ways in which children assign trust to specific sources is to judge how well speakers justify their claims. Children around age 2 and 3 start asking their parents “why” and “how” questions and demand explanations in their naturalistic interactions (Frazier, Gelman, & Wellman, 2009). As early as at age 2, children ask follow-up questions more often after an explanation by their parent than after a non-explanation. Moreover, children re-ask their original question more often upon receiving non-explanations, compared to explanations, overall suggesting that they seek out reasons in conversations.

Recent studies also investigated what kinds of reasons children find more convincing (Mercier, Bernard, & Clément, 2014). For instance, after presenting a vignette in which a missing dog is searched for, children were asked which of two mutually contradicting informants they believed. One of the informants justified her claim with a circular argument (“The dog went this way because it went this way”); the other justified her claim with a non-circular argument (“The dog went this way because I saw it go this way”). Children aged 3 believed the informants who supported their claims with non-circular arguments more often than those who repeated themselves (Mercier et al., 2014). In her study, Koenig (2012) did not use structural circularity, but informants’ epistemic grounds for a claim for children to distinguish. Three-, 4- and 5-year-old children heard two informants who reached conflicting conclusions. One based her conclusion on good epistemic grounds such as perceptual access, (“I looked and I saw an apple in the box.”); the other, for instance, on wishful thinking (“I like apples. I want there to be apples in the box.”). All age groups preferred the informant that produced a well-grounded argument, such as the perceptual argument.

A recent study with 5- and 7-year-olds (Domberg, Köymen, & Tomasello, submitted) showed that children prefer to reason with people who submit to reason. Children were given a cooperative task in which they needed a partner to solve problems together and they were presented with two candidates searching for a lost paint brush. One candidate agreed to a good reason (“Go search [the paint brush] in the red box because that is where I saw it yesterday”), and the other agreed to a poor reason (“Go search [the paint brush] in the yellow box because yellow is my favorite color”). Thus, children had to choose between candidates based on their acceptance of good vs. poor reasons. This required children not only to evaluate the quality of the reasons, but also to evaluate someone else’s evaluation of reasons. Crucially, however, both candidates arrived at the wrong conclusion. That is, unlike in other studies, argument quality was judged independently of informant accuracy. Seven-year-olds, and 5-year-olds to a lesser extent, preferred to reason in the subsequent cooperative game with the candidate who had followed the good reason, even though this did not indicate better knowledge.

In sum, these studies suggest that around age 2/3 children seek out reasons/explanations about the world and begin to judge the quality of these reasons during the preschool period. Starting around age 5, children are able to evaluate 1) the quality of reasons, even if these lead to incorrect decisions, and 2) how others evaluate reasons, and prefer to reason with partners who are able to distinguish good reasons from poor ones.

### ***Children’s exchange of reasons with different partners***

When giving reasons for claims/proposals/beliefs, speakers have to take into account their partners’ needs for these reasons to be effective. One of the most salient factors that influence reason-giving in a social interaction is who their conversational

partner is. Piaget (1965) proposed two fundamentally different, but equally important, contexts in which children's reasoning takes place: adult-child interactions and children's peer interactions. When reasoning with adults, the child often only acts as the recipient of knowledge and follows the adult's lead. When reasoning with peers, however, both partners are equal and actively bring their perspectives to the task at hand. Since both perspectives are equally valid in peer interactions, children have to negotiate which perspective is the most viable in a given situation and engage in active reasoning.

With adults, children's reasoning has been mostly observed through their responses to why-questions. In interview studies, young children were able to provide good reasons for their beliefs about the world. Particularly, children were quite adept at giving reasons in the domain of morality. Research suggests that children are quite sensitive to "rights" and "wrongs" in their social world. Already 3-year-olds justify their moral judgments about transgressions (Mulvey, 2016). For instance, when they are asked whether a character who committed a moral transgression (e.g., pushing a child) should be punished, children refer to a victim's welfare and feelings to justify their judgments, and show an understanding about the reasons behind moral norms (e.g., "Pushing hurts people").

In their naturalistic discussions with adults, such as their parents, however, children are observed to produce reasons for their claims spontaneously. Family discourse allows children to learn and practice reasoning skills. For young children, adults, particularly parents, are reliable sources of information and knowledge, who structure interactions according to children's cognitive capabilities, focus children's behavior and readily offer reasons for doing so. Spontaneous family conversations have been observed to focus on the resolution of conflict between family members

and on current or past problematic behaviors of the child (Eisenberg, 1992). In fact, parents' use of reasons/explanations has shown to be the most efficient way for young children to de-escalate a conflict. When mothers provide reasons in a discussion, children are less likely to insist on their position than when mothers do not elaborate on their oppositions. In turn, children occasionally produce justifications in conflicts with their mothers, especially to oppose their mother's view or defend their noncompliance (Eisenberg, 1992). Parents' production of justifications further enhances children's understanding of their social norms: When parents provide explanations for social rules and moral norms that prohibit certain behaviors, children are likely to understand and respect these rules (Smetana, 1999).

Within their family interactions, children also practice interacting with other children, such as their siblings. Although the hierarchy between a child and an older sibling is not as strong as the hierarchy between a child and a parent, research has shown that children are still sensitive to the age difference. Ram and Ross (2001) found that children take different roles depending on their position in the hierarchy (i.e., older or younger sibling). In a problem-solving task (e.g., fair division of toys between children), older siblings tended to take the role of the leader of the interaction, just like an adult caregiver, and tended to structure the discussions, by asking questions and instructing their younger siblings. The younger siblings, in turn, reacted to questions and explained themselves by offering more self-centered justifications (e.g., justifications about their own needs and desires) than their older siblings. Phinney (1986) found that when an older sibling provided justifications, younger children were more likely to drop the conflict. Older siblings in turn ignored their younger siblings more often when they used simple rejections or objections without offering justifications.

Thus in family interactions, young children often interact with partners who are older or younger than they are. The asymmetry in power and authority between them and their partners, however, might limit children's active reasoning. In fact, children do become more active participants or more active reasoners when they interact with same-age peers. Some studies systematically compared children's reasoning in two contexts: mother-child interactions and peer interactions. In an experimental study, Kruger and Tomasello (1986) investigated how 7- and 11-year-old girls reasoned about moral dilemmas with their mothers or with same-aged peers. They found that girls of both age groups followed their mother's lead in the discussion and mostly provided justifications for their views after being asked to do so. In their discussions with peers, children more often commented on their partners' reasoning, challenged their partners' view and asked for feedback. A more recent study (Mammen, Köymen, & Tomasello, under review) had 4- and 6-year-old children discuss moral dilemmas with peers or with their mothers and found that even preschool children are sensitive to whom they are reasoning with. With their peers, children produced more spontaneous justifications than with their mothers. In the peer context, the equal structure of the interaction additionally allowed children to produce justifications that opposed their partner's previous statements. In the mother-child context, children hardly opposed their mother's view. Thus, in their interactions with peers, children display more sophisticated reasoning skills, such as incorporating and opposing the partner's view, than with their mothers. In fact, in some intervention studies, children's individual scores on moral reasoning tasks significantly improved after having a discussion with peers, as compared to having discussions with mothers, because the peer context allowed children to reflect one another's reasoning, rather than following the lead of an authority figure (Damon & Killen, 1982).



Consequently, children's reasoning is affected by the social context, particularly with whom they are reasoning. Asymmetrical interactions such as those with parents or older siblings can limit children's spontaneous reason-giving. Symmetrical interactions with same-aged peers, however, enhance children's active reasoning. Thus, peer interactions seem to offer a special context in which the perspective of each participant is equally valid and in which young children's reasoning skills can be best observed.

### *Exchange of reasons in peer interactions*

An important and inevitable part of peer-to-peer interaction is conflict. Particularly resolving a conflict through verbal means has often been viewed as a positive phenomenon that allows children to understand a perspective that is different from their own. To win or overcome opposition, children would then have to produce good and effective reasons to persuade their peers. Children as young as 2 produce reasons for their oppositions in peer conflicts (e.g., "But that's mine", Kyratzis & Ervin-Tripp, 1999). When children produce reasons, the conflicts tend to get resolved more quickly. With age they tend to produce reasons for their oppositions more frequently (Phinney, 1986).

However, recent experimental work highlights that looking at conflictual situations may give an incomplete picture of children's reasoning skills. In fact, studies have compared conflictual or competitive contexts, in which the goal is to win, with cooperative contexts, in which the goal is to find a solution benefitting both parties. Felton and Kuhn (2001) had adolescents discuss controversial topics (such as capital punishment) in dyads of consenting or dissenting peers. Dyads were asked either to convince their peers (i.e., to win), or to come to an agreement. When adolescents were instructed to reach agreement, in contrast to winning, they produced

more complex arguments (e.g., refutations) and less biased argumentation, showing ‘two-sided reasoning’. The same pattern has also been observed in younger children’s discussions. Five- and 7-year-old peer dyads produced not only more justifications, but also more diverse justifications when playing a game cooperatively than when playing the same game competitively (Domberg, Köymen, & Tomasello, 2018). In this study, both children within a dyad were motivated to win. However, when “winning” meant “winning together” (i.e., *each child* gets a reward), children’s reasoning improved significantly as compared to when “winning” meant “winning individually” (i.e., *only one child* gets a reward).

There is a growing literature suggesting that contexts of cooperative problem solving, in which participants are motivated to find the right answer together, facilitate children’s reasoning. For instance, children take into account their mutual knowledge with their partners in formulating their reasons. Starting around age 3, children keep track of their common ground (their shared experiences) to draw inferences about whether their partners are knowledgeable or need explanations. In a study by Köymen, Mammen, and Tomasello (2016), peer dyads were introduced to a novel animal with unique characteristics (e.g., eating rocks) either individually or with a peer, and were later asked to jointly decorate the house of the animal. Both 3- and 5-year-olds produced explanations about the novel animal (or reasons for their proposals such as “[We should put rocks in here because] They eat rocks”), when they learned about the animal individually (assuming that their peer may not know what the animal needs), but not when they learned about the animal together with their peer (because their peer knew what they knew).

Children also make some assumptions about what their peers *would* know and adjust the informativeness of their justifications accordingly. For instance, studies

have shown that children assume that moral norms (e.g., “One should not steal”), for instance, are known to everyone, but context-specific rules (e.g., “In this kindergarten, the blue toys go into the blue boxes”) are only known to a select group of people such as the children who go to this kindergarten. In a collaborative problem-solving task, 3- and 5-year-old peer dyads had to choose one of two characters who deserved punishment (Mammen, Köymen, & Tomasello, 2018). One child knew about a wrongdoing of one character and had to convince his/her peer partner about this character’s wrongdoing. Both 3- and 5-year-olds provided longer and more informative justifications to convince their peer if the wrongdoing of the character was a violation of an unfamiliar context-specific rule (e.g., “Because in Mia’s kindergarten, you must not put yellow cars in the green box, but only in the yellow box”), because their peers may not know about this rule and would not be able to understand why an act of putting a toy in a box deserves punishment. However, they switched to shorter and less informative justifications, if the wrongdoing of the character was a violation of a familiar moral norm (e.g., “She stole”) because they assumed that the “wrongness” of stealing was obvious and required no further explanation.

Studies further show that disagreement in the context of cooperative problem solving also assists children’s reasoning. In these contexts, partners do not only express arguments, but they critique one another’s reasoning to reach the correct decision. They express reasons to accept or reject one another’s arguments, such as the use of counter-arguments. It has been shown that children as young as 5 years old, and also 3-year-olds after training, are able to evaluate their peer partner’s reasoning and produce counter-arguments that are valid and relevant (Köymen, O’Madagain, Domberg, & Tomasello, under review). Moreover, in another study, 5- and 7-year-old

peer dyads were again presented with a cooperative problem task (Köymen & Tomasello, 2018). Children within a dyad individually received conflicting information so that they would disagree with one another. Crucially, one child received the information from a reliable informant (reporting a first-hand observation) and the other received the information from an unreliable informant (reporting second-hand information). Dyads in both age groups were able to reliably settle on the option provided by the reliable informant. In other words, 5- and 7-year-old children were able to disregard their own prior knowledge, especially when they acquired this knowledge from an unreliable source, and accepted the alternative proposed by their peer in a joint problem-solving task. Thus, hearing a conflicting perspective in collaborative decision-making allows children to evaluate the reliability of their own reasoning, and also to invite their partner to justify his or her reasoning.

All these studies show that young children trust (and prefer to reason with) individuals who provide good reasons for their claims. Peer interactions, in which the perspectives of the participants are equally valid, provide a fruitful context to observe children's reasoning. Unlike the popular view, peer interactions are not only about conflicts, and peer conflicts are not the only context that facilitates children's reasoning. Thus, when there is a joint goal benefitting all participants, children pay attention to their peers' reasons, reflect on them and change their minds if necessary. To conclude, young children display sophisticated reasoning skills—both in terms of evaluating reasons and producing reasons—in social interaction. Children's joint reasoning with peers is fundamentally cooperative, which allows to make rational joint decisions.



Acknowledgements: This publication was made possible through the support of a grant from Templeton World Charity Foundation, Inc. awarded to Bahar Köymen.

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SEE ALSO: wecad00128, wecad00144, wecad00402

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