Thesis Title: Creating a Common Ground

Degree Title: Doctor of Philosophy

Department: Philosophy

Candidate Name: Antonio Scarafone

Submission Date: September 2021

Declaration

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

Antonio Scarafone

Abstract

According to a well-established tradition, communicating in a language is, necessarily, a matter of reasoning about psychological states. Recently, it has been argued that for learning a language, and for communicating in the ways they do, infants must be capable of reasoning about their own and others' intentions and beliefs. The overarching aim of this thesis is to show that the orthodox explanatory strategy gets things back to front. There are at least two good reasons to embark on this enterprise. First, I argue, there is no convincing evidence that infants engage in the required kind of psychological reasoning. Second, I argue, the orthodox strategy leads, in general, to a problematic picture of the psychology of communicators. The alternative I propose is inspired by Bart Geurts' works. I argue that prelinguistic communication is better thought of in terms of normative practices. In interactions, commitments and entitlements are created, fulfilled, or reneged. Interactants may act in light of the commitments that they share without knowing *that* this is what they are doing. It is generally possible to learn how to play a game before knowing its rules, and this is how the early stages of language acquisition will look like in the present work. The complexity of the interactions in which they participate is not something that infants understand. It is something that they grow into. Once stable forms of action coordination enabled by the sharing of commitments are achieved, and a rich enough language has thus been acquired, the road to psychological reasoning is paved. Competence in playing the manifold games they play with others makes it possible, for them, to discern and negotiate the whys of others', as well as of their own, sayings and doings.

<div align="center">**Contents**</div>

Acknowledgments

start with nonsense, and we never missed a chance to augment the space of philosophical theorising. I explored this same space in some serious depth with the invaluable, fun, and enduring company of the S.A.B., to whom I am, as always, grateful: Elio Antonucci, Wilko 'Maria' Artale, Luca Castaldo, Tiziano Dalmonte, Francesco Franda (Johnny), Giovanni Marco Martino, Andrea Mazzullo, and Federica Rossi.

If I could, I would give Harry Tappenden a Medal of Honor. His philosophical sensibility and depth, as well as the unlimited generosity of his friendship, made both me and this work a lot better than we would otherwise be. Another Medal of Honor should go to Tomaso Zanardi, for the endlessly many discussions (philosophical and not) which made both me and my work grow beyond our natural limits.

Giovanni Rago, the best of the Achaeans. This time, among other things, he hosted me, my work, and my madness during the first outbreak of the pandemic in Europe. Despite the obvious difficulties, we had a great time, and many ideas discussed here have their roots there. When I was in Berlin, I could also spend some time with my little sister Elisabetta. She is the sensible one, and everybody wonders how I manage go about things when we are not close. Even at a distance, she has never stopped making me feel her presence close. The same goes for the other members of my family, to whom I am deeply grateful. Here, trying to fully express my gratitude would go close to trying to say the unsayable. Finally, a big thank you goes to Patricia Gera, for all the fun we've had and the love we've shared. Without her, I would have probably gone nuts.

What is of value in this work is dedicated to Eva Picardi.

I'm Robert Fripp and this is Frippertronics. I think this is a very brave thing that the producers of this show are doing, since they have no real idea what it is that I'm about to do, but dedicating this performance to the proposition of hazard: neither do I. But if we did, maybe it wouldn't be quite as interesting.

Frippertronics, 1979

Introduction

Imagine that I find myself at the counter with an empty shot glass. It is a lousy evening at the pub, so when the bartender looks at me, I point at my glass. Knowing me well, he pours me another whiskey. Slightly obnubilated, I cannot find my cigarettes. Johnny points for me right under my chair and, look and behold, I find them there. When a few months later I join an Alcoholic Anonymous association, I tell my friend Johnny about it. On a Friday night, I go see him at the pub, but I keep my glass empty for the whole evening. Pointing at it, I look at Johnny, and he goes: 'Bravo'. Before leaving, Johnny goes for a little Jimmy Riddle. Seeing a man leaning on the wall in front of the bathroom, he points at the door with an inquisitive look, and the guy goes: 'It's free, mate'.

One can point at an empty glass for having it refilled, or because having it empty is a source of pride, or because there is a crack on it, and the glass should be disposed of. One can point at a pack of cigarettes as an implicit request for a smoke, or to signal the location of the pack to its owner. Pointing to a door can be a way of inquiring whether the toilet is busy, or, for instance, it can be an implicit request for someone to leave the room, or to close the door. Given that a pointing gesture is, so to say, silent on the reason why it is produced, the possibility of communicating effectively by pointing looks like a bit of a miracle.

Apparently, the wonder starts manifesting itself early on in ontogeny, well before children express themselves linguistically. Mom is preparing dinner and a refrigerator magnet falls in the fruit basket.[1] Realising its absence on the fridge, she starts looking for it. Little Johnny points to the fruit basket, where he can see the magnet amidst the fruit. When dinner is ready, she picks him up, while Daddy takes the highchair. Johnny points at the spot at the table where the highchair goes. Everybody is at the table and Mom fills up Johnny's glass with water. A few minutes after he downed it, Johnny points at the glass while looking up at mom, who promptly refills it. After dinner, Johnny starts playing a puzzle game with Aunt Mary. Alas, the last piece of the puzzle is missing, and Aunt Marie starts looking for it. Johnny's attention is attracted by his father tidying up the room. Daddy is being silly and making funny sounds while throwing little toys in a box. The two of them start playing around and take turns at the new game. Aunt Marie realises that the missing piece of the puzzle is on the floor right behind Johnny, so she calls him excitedly and points at it. Surprised, Johnny looks at Aunt Marie, recognises the piece of the puzzle on the floor and picks it up, before taking Aunt Marie's hand to go back to the table and finish the

---

[1] Examples in this paragraph are adapted from diary observations reported by Tomasello (2008: 114-115) and prefigure some of the experiments that will be discussed in the final chapter.

puzzle. If Daddy were the one pointing at the missing piece of the puzzle, perhaps Johnny would have enthusiastically thrown it into the box.

Infants start pointing from around their first birthday, a time in which they have only a handful of recognisable vocalisations at their disposal, including, for instance, 'no' and 'there'. The examples given above seem to suggest that infants' pointing functions in ways that resemble its adult counterpart, in production as well as in comprehension. How is this possible? According to a well-established tradition, infants and young children communicate in the ways they do thanks to early emerging, and mostly innate, sophisticated capacities for psychological reasoning. According to this tradition, the message that the communicator intends to convey is left vastly indeterminate by the pointing gesture itself, but it can be, and in fact is, effectively recovered by reasoning about what we may plausibly hold each other to intend or believe, given the circumstances in which the pointing gesture occurs.

The core idea is that, unlike other kinds of intentional actions, communicative acts are produced with an intention to make one's own intentions recognised. Upon recognising that there is an intention that you intend me to recognise, I reason about what the content of the embedded intention might be. In so doing, I do not only rely on what I know, or on what I believe you know. Rather, I rely on assumptions that I take to be in our common ground. It is common ground between me and Johnny that I quit drinking, and this warrants Johnny's understanding of my pointing gesture as expressing pride, even though my pointing gesture, in different circumstances, could have functioned as a request for another drink. Little Johnny and Aunt Marie have it in their common ground that there is a puzzle to be finished, so Johnny is warranted in identifying the pointed-to toy as the missing piece of the puzzle. Johnny and Daddy do not have it in their common ground that there is a puzzle to be finished. In fact, they are engaged in playing another game. If Daddy were to point at the very same object, Johnny would have been warranted in placing that object in the basket.

With respect to the communication of competent language users, this explanatory strategy has a long history in the philosophy of language and mind. Recently, it has been championed by Michael Tomasello,[2] who has applied it to the study of infants' communication. Tomasello is not alone in taking this stance. With the work of many theorists in the fields of comparative and developmental psychology, the Gricean explanatory strategy has established itself as something like the orthodox way of thinking about communication from a developmental and an evolutionary point of view.[3]

This tradition of thought has clearly identifiable philosophical roots in Paul Grice's theory of meaning. In broad outlines, according to Grice, meaning something by an utterance is a matter of acting with an intention to make one's own intentions recognised. For instance, in telling you that I'd like a cup of coffee, I might intend you to come to believe that I'd like a cup of coffee partly by intending you to recognise

---

[2] I address some exegetical concerns at the end of this introduction.

[3] With respect to comparative studies, the argument is often that capacities for communicating in Grice's sense are part of a uniquely human evolutionary adaptation. This claim about human uniqueness has been elaborated in a variety of ways, also by Tomasello (2008, 2014).

that this is what I intend. On a different occasion, I might distractedly place my empty cup close to the coffee machine, perhaps intending you to believe that I'd like another cup of coffee. In this case, you might come to believe that I'd like another cup of coffee, but possibly not as a result of having recognised that this is what I intend you to believe. In this case, we might not want to say that I am communicating with you in the relevant sense. For Grice, in the sense of 'communicating' which is relevant to a theory of meaning, communicating is, necessarily, a matter of acting with, and recognising the presence of, intentions to make one's own intentions recognised.

The core of Grice's theory of meaning has been taken as the starting point for providing a theory of the cognition of human communicators. Relevance Theory, elaborated and defended by Dan Sperber and Deirdre Wilson (1995) is an eminent representative of this approach. In Relevance Theory, recognising that someone acts with a 'communicative intention' *à la* Grice is what triggers the heuristic inferential process that leads, often enough, to recovering the message that the communicator intends to convey. The conclusion often reached by advocates of Relevance Theory is that communicating is, necessarily, an exercise in 'metapsychology', and that capacities for conducting this reasoning are hardwired in evolved cognitive modules. This general picture of communication and cognition is assumed to be correct for gestural and prelinguistic communication, too, and it has then been adapted for studying the evolution and development of linguistic competency and communicative abilities. Before they have acquired anything like a natural language, the argument goes, infants must be able to engage in sophisticated forms of psychological reasoning, both for communicating as they do, and for acquiring important segments of their linguistic competency.

In a nutshell, the overarching aim of this thesis is to turn this broadly Gricean explanatory strategy upside down.[4] According to Gricean theorists, the rationale of communication, and even prelinguistic communication, lies in acting with, and recognising the presence of, communicative intentions. If it is assumed that infants communicate successfully in Grice's sense, it follows that they are able to engage in sophisticated forms of psychological reasoning. In this broadly Gricean framework, for communicating as they do, infants must be in a position to understand the rationale of what they are doing. Ultimately, this is the conclusion that I intend to challenge. There are reasons to believe that infants are not in a position to reason about intentions and beliefs in the required sense, and that this sort of reasoning is enabled, at least in part, by the acquisition of large chunks of linguistic competency. If these reasons are sound, there should be a way of identifying the rationale of communication outside the psychology of individuals, so that becoming competent in communicating

---

[4] I will repeat this point several times, but I would like to notice from the start that offering a theory of the cognition of communicators was not Grice's own aim. In broad outlines, Grice's aim was to account for communication as a rational activity, also in relation to the metaphysics of meaning, but not to account for the kind of reasoning that communicators do in fact go through, or the kind of cognition which sustains this kind of reasoning.

linguistically does not necessarily require, but rather enables, reasoning about intentions and beliefs.[5]

The first step is then to move the rationale of communication outside the mind, and this is the spirit in which I propose to adopt the view of communication defended by Bart Geurts. According to Geurts, what speech acts are for is, primarily, sharing commitments, and the point of communicating is, primarily, to enable coordination of action under normative constraints. The commitments and entitlements created by way of, say, making promises and assertions, giving orders, issuing threats, and so on, allow for effective expectation management and planning of action beyond the immediate present. As social relationships, commitments may well be undertaken unknowingly, and still have the potential to govern interactions, analogously to how the rules of a game may be said to govern the behaviour of its players. And it is possible to learn how to play a game before knowing its rules.[6] Taking the notion of commitment as explanatorily prior over that of intention paves the way for explaining how it is possible to get good in communicating effectively, as infants and young children do, without yet understanding most of the potential complexities of the communicative interactions in which they participate.

Assigning explanatory priority to commitments does not make beliefs and intentions fall out of the picture. The normative import of beliefs and intentions can be found again in private commitments, namely, in commitments that one takes with oneself to act in accordance with the truth of a certain proposition. So conceived, intentions and beliefs are (but need not always be) features of communicative exchanges, which can be easily accessed by competent users of a language, and this may even apply to the kind of communicative intentions identified by Grice.[7] The idea is that once competence in playing the game is acquired, it is also possible, for instance, to discern or negotiate reasons for deviating from the norm.[8] From the point of view of ontogenetic development, the idea is that once stable forms of action coordination are in place and linguistic means to explicitly share commitments have thus been

---

[5] Daniel Dennett (2017) reads Grice's analysis of utterer's meaning as uncovering the 'free-floating' rationale of *linguistic* communication, and *contra* Tomasello, he believes that this analysis is not plausible for prelinguistic communication (personal communication, May 2019). A free-floating rationale is what, broadly speaking, governs an activity, and which participants to that activity may come to understand only after they have acquired some degree of competence in that activity. Compatibly with this picture, Dennett sees the acquisition of a language as, at least initially, the acquisition of large chunks of practical knowledge (or, to use his metaphor, as the installation of a powerful programme like Adobe Photoshop, which one can use effectively even without being familiar with all the features of the programme or the ways in which the programme works). I am indeed sympathetic to the stance taken by Dennett, but it is not obvious to me how the rationale of communication can remain not understood and consist in forming intentions about others' beliefs about one's own intentions. Dennett himself talks about beliefs and intentions in normative terms. What I propose to do is to accept Dennett's core point and use an overtly normative vocabulary to describe the rationale of communicative interactions, so to avoid the difficulty and to make it easier to detail a story about prelinguistic communication.

[6] This way of phrasing the point is meant to echo Wittgenstein's remarks at PI: 31.

[7] *Inter alia*, this is a way of vindicating Dennett's idea regarding the free-floating rationale of linguistic communication.

[8] This idea, which is in essence a combination of ideas due to Gilbert Ryle (1949) and Wilfrid Sellars (1956), has been elaborated in detail by Victoria McGeer (2020).

acquired, children are in a very good spot to engage in sophisticated forms of psychological reasoning.

Though not always couched in these terms, elements of this second part of the story have been elaborated by several authors, including Geurts.[9] I will refer to these elements over the course of the present work, but I will not elaborate the picture further in this direction. Rather, I will concentrate my efforts on the first part, which concerns prelinguistic communication. My primary aim is to show that prelinguistic communication can be conceptualised in terms of implicitly shared commitments, even though infants are initially oblivious to most of the complexities which govern the practices in which they participate. Prelinguistic communication is a transient phenomenon, and arguably it should be conceptualised as such. The complexities of infants' interactions are something that infants grow into. From early on, infants often unreflectively regulate their own behaviour according to implicitly shared commitments. Doing so greatly facilitates them in acquiring the linguistic means for coming to share commitments explicitly with others, and it prepares them for acting consistently with those commitments and for expecting others to do the same.

According to the Gricean theorist, infants communicate in the ways they do partly because they can engage in sophisticated forms of psychological reasoning. There are reasons to believe that this explanatory strategy is, in important respects, back to front. Adopting a commitment-based view of communication makes it possible to reverse it, and to account for important aspects of infants' development without presupposing much of the cognitive sophistication that infants are, arguably, yet to acquire.

<p style="text-align:center">***</p>

The present work is structured as a comparison between the socio-normative view of communication and its Gricean counterpart. In Chapter 1, I argue in favour of the more general point of individuating the rationale of communication outside the mind of communicators. I reconstruct the Gricean explanatory strategy, and I argue that, by conflating theories of communication with theories of the psychology of communicators, this explanatory strategy leads to a problematic picture of human psychology. I outline the main tenets of the commitment-based view, and I argue that this view, focusing as it does on communication as a socio-normative phenomenon, makes it easier to avoid pitfalls of psychological implausibility.

In this first Chapter, I make my case by focusing on the key notions of overtness and common ground. According to Gricean theorists, communicating in the relevant sense is a matter of acting with wholly overt intentions or, alternatively, to intend to make one's own intentions enter the common ground. Beyond accounting for the overtness of communicative acts, the notion of common ground is supposed to play a pivotal role in explaining all kinds of pragmatic reasoning which are conducive to successful communication. A potential problem for the Gricean theorist is that for

---

[9] See, e.g., Geurts (2021), McGeer (2020), Zawidzki (2013).

the notion of common ground to do its explanatory work, it must have an infinitary structure. Given its structure, it is then problematic to take common ground (or whole overtness) to consist of psychological states. I argue that this problem affects even the most deflationary of Gricean approaches, such as the one defended by Richard Moore (2017b). A promising alternative, which I suggest adopting, is to take common ground to consist of shared commitments, as proposed by Geurts. So conceived, the notion of common ground can account for the potential complexity of communicative interactions, a complexity which needs not, and often is not, directly reflected in the psychology of each interactant. An important upshot of making this move is that the very notion of overtness becomes a publicity requirement, and communicating needs not consist in acting with a Gricean communicative intention.

The Gricean theorist might concede that common ground is a normative structure, and so that some features of communicative interactions may outstrip individuals' psychology. Alternatively, the Gricean theorist might want to revise the very structure of the notion of common ground and maintain a more psychologistic construal of communication. Should either one of these strategies prove viable, the Gricean theorist might maintain that communicating is necessarily a matter of acting with, and recognising the presence of, intentions to make one's own intentions recognised. It is often argued that infants communicate in this sense, and that there is good experimental evidence showing that they can engage in this kind of psychological reasoning. In Chapter 2, I review the key experiments performed to investigate 'mindreading' in infancy, and I argue that these experiments do not show that infants can engage in sophisticated psychological reasoning of the kind required for Gricean communication. The debate regarding experiments in infants' mindreading is extremely intricate, and developmental psychologists are nowhere near reaching a consensus on what these experiments really show. In this sub-field of experimental psychology, I side with the sceptics.

If the conclusions reached in the first two chapters are sound, there are reasons to elaborate a picture of prelinguistic communication alternative to the Gricean one. This is the goal pursued in Chapter 3. On a wide range of circumstances, I argue, infants' interactions with their caregivers can be plausibly described as governed by implicitly shared commitments to goals. Being picked up, reaching for an object, seeking the adult's finger for balancing while walking, giving a hug or an object, are all familiar examples of joint activities in which coordination of action is achieved, and expectations regarding each other's contributions are managed, in a broadly communicative way. Stable forms of coordinated action enable the infant to issue proto requests. Though systematically reliant on adults, infants do not merely expect the adult to contribute to their goal. They are also ready to do their part, and they are eager to participate to the adult's own goal, in their own ways. They actively seek the adult's approval and start regulating themselves to avoid disapproval. As soon as they master compliance to commands, they start teasing the adult, as in exploring the boundaries of the rule. They have basic behavioural means for expressing acceptance or rejection of what the adult does, which, soon after, also become ways for expressing agreement and disagreement. In due course, I will detail several

descriptions of infants' interactions and I will explore the emergence and development of the preconditions for coming to share commitments with others.

Regarding pointing, I propose to think of it as a mini joint activity which, when later embedded in wider joint activities, can effectively function so as to regulate each other's contributions and expectations. I suggest some of the ways in which pointing can come to have this function and how the vocalisations accompanying the infant's own pointing gestures quickly become words. Importantly, communicating by pointing can do all this even if the individuals involved in the pointing game do not have specific expectations regarding the other's response to the pointing gesture. To go back to one of the initial examples: in pointing where the highchair goes, the infant might just be pointing in anticipation of what she expects to happen. By looking up at the adult and attending to the adult's response, which is most often verbal, the infant might then come to regulate her own expectations regarding what is about to happen, while also coming to stabilise her own uses of words to express these expectations.

It is often argued that it is inappropriate to talk about normativity in infancy and early toddlerhood, because before they are three years of age, children do not understand much of the obligations and entitlements that come with shared commitments. In the second half of the chapter, I argue that this conclusion springs from a narrow construal of normative notions coupled with a dubious interpretation of the main experimental findings. I agree that infants and young children do not yet *understand* (and sometimes do not consistently comply with) a lot of the obligations and entitlements that typically come with shared commitments. However, commitments are features of their interactions to which infants become increasingly sensitive to, and partly because they participate in those interactions. In fact, as soon as they manage to organise their own behaviour according to some commitments that they share, they themselves endorse normative attitudes toward others, and this happens at least from when they are 18 months of age. I will explain how adopting a commitment-based stance toward prelinguistic communication helps in explaining this and several other otherwise puzzling experimental findings (and daily observations). The more general point is that it makes sense to say that infants regulate their own behaviour according to the commitments that they implicitly share with others, and that doing so enables them to coordinate with others in stable enough ways while, at the same time, scaffolding their acquisition of a language.

Finally, in Chapter 4 I detail the Gricean construal of infants' pointing offered by Tomasello and colleagues. I challenge the more general explanatory strategy deployed by Tomasello on the basis of the work done in the previous chapters, and I discuss the main experiments performed to prove its validity. Tomasello's strategy is to perform behavioural tests. If infants respond as they are expected to, it is assumed that they have communicated successfully in Grice's sense, and it is concluded that they must have engaged in sophisticated forms of psychological reasoning. Beyond questioning the validity of some of the experiments, I argue that infants' interactions can plausibly (and sometimes even more plausibly) be described in terms of shared commitments. From this alternative description, it does not follow that infants must engage in sophisticated forms of psychological reasoning. The inference from the

description of the interaction to the description of the psychology of the interactants, which the Gricean theorist invites, is not generally valid, and I argue that the experimental results are in fact best interpreted by assuming that infants do not engage in sophisticated forms of psychological reasoning.

In most experiments, the conclusion regarding infants' psychology is derived from assuming that infants communicate successfully in Grice's sense. In other experiments, Tomasello and colleagues have attempted to directly test the assumption that infants' comprehension of pointing gestures is driven by the recognition of communicative intentions. I argue that there is no obvious way of directly demonstrating, from an empirical point of view, that the Gricean assumption holds. Unclarities in the background theorising are reflected in the experimental design employed, and the results of the experiments can again be plausibly read through the lens of a commitment-based view of communication. Moreover, I argue, a normative rendering of the key notions of overtness and common ground makes it easier to interpret some of the empirical results obtained by Tomasello and colleagues.

The overarching aim of this thesis is to reverse the Gricean explanatory strategy. It is possible for infants to communicate in the ways they do even if they do not yet understand most of the complexities of what they are doing. If their acts are met by their caregivers' interpretive effort, and they themselves are able to regulate their own behaviour according to the responses they receive, they can grow into the complexities of the interactions to which they partake, and later on come to engage in sophisticated forms of psychological reasoning.

<p style="text-align:center">***</p>

In this thesis, Tomasello is considered the champion of the Gricean approach. The reason for this assumption is that Tomasello and his colleagues have elaborated the most comprehensive, broadly Gricean theory of prelinguistic communication to date, and have attempted to systematically detail it from an empirical point of view. Before concluding this introduction, I would like to notice that the decision of taking Tomasello as the best representative of the Gricean approach might be challenged for at least two important reasons. The first is that several other theorists have adopted a broadly Gricean stance, and they have defended it on either theoretical or empirical grounds. Indeed, a great deal of theoretical work on applying Relevance Theory to the study of the evolution of human communication has been done (e.g., Scott-Phillips 2015, among many others). However, as far as I know advocates of Relevance Theory have not conducted systematic empirical investigations on infants' communication. It is also interesting to notice that Sperber himself (2019) has become unsure on the extent to which the proposed category of ostensive-inferential communication can be used to describe infants' communicative interactions.

Within the Gricean camp, among those who have done extensive empirical investigations on infants' communication, advocates of Natural Pedagogy Theory stand out. Though Natural Pedagogy is often presented as a Gricean approach, I think that,

at its core, it is not.[10] I will focus on some specific aspects of this theory in Chapter 3, but I would like to briefly illustrate my general reading of the theory here, to prevent some potential misunderstandings. The central idea in Natural Pedagogy is that infants learn from others in qualitatively different ways when others perform demonstrations for them, as opposed to when infants merely observe others doing things. More generally, on several occasions infants learn from others in qualitatively different ways when others address them, even if the other person does not intend to 'teach' them what the infant ends up 'learning'. In the original formulation of the theory,[11] the idea was that learning from demonstrations at a very early age is especially efficient partly because infants do *not* engage in sophisticated forms of psychological reasoning. The thinner their understanding of what the adult model is doing, the more closely they attempt to imitate the model's actions. The kind of 'blind trust' that infants often (though not always) display puts them in a position to efficiently acquire large chunks of practical knowledge (of which they do not initially see the point), which include their early competency with the use of words. The core of Natural Pedagogy Theory does not mandate the adoption of a Gricean conception of communication, and in fact it seems to me to discourage it.

There is a further potential challenge to my reading of Tomasello that is worth mentioning. Tomasello presents his theory as a neo-Vygotskyan approach to ontogenetic development,[12] according to which higher cognitive functions, including those which support sophisticated psychological reasoning, result, at least in part, from the internalisation of socio-cultural practices. In qualifying his theory as neo-Vygotskyan, Tomasello means what he says. He goes at great lengths to show, for instance, how mechanisms for role-reversal imitation enable children to interiorise specific interactions, and how communicating linguistically scaffolds them in their understanding of others', as well as their own, intentions and beliefs (understood as propositional attitudes). There is no painless way of reconciling this neo-Vygotskian stance with the assumption that, much before they have learned a language, infants communicate in Grice's sense, and so already possess much of the cognitive sophistication that, in the neo-Vygotskyan picture, they are yet to acquire. Tomasello does take this Gricean stance explicitly,[13] and goes at great lengths to defend it, too. This thesis might then be read as an attempt to remove the conflict, by way of taking the neo-Vygotskyan stance to be the central one and proposing an alternative view of prelinguistic communication.

---

[10] I am not isolated in proposing this reading. György Gergely has remained keen on presenting the core of the theory by using the lexicon of Relevance Theory (personal communication), while Gergely Csibra is not, or at least not anymore (personal communication), like some of his collaborators (e.g., Nima Mussavifard, personal communication).

[11] See, e.g., Csibra 2003.

[12] Most clearly, but not only, in his 2014 and 2019 books.

[13] Most clearly in his 2003, 2008, 2014 books, but the same claim is presented, in an abbreviated form, also in his 2019 book.

Chapter 1: Overtness and Common Ground

Introduction

Communicating in Grice's sense is a matter of intending to make an intention recognised by the audience or, as it is often said, of acting with an overt intention. Communication is successful when the addressee at least recognises the complex of intentions with which a communicative act is produced. Within a broadly Gricean framework it seems natural to take conditions for successful communication, including the requirement of overtness, to be reflected in the psychology of each communicator. This is the heart of the explanatory strategy deployed by Tomasello in investigating the psychology of prelinguistic communicators. In this chapter, I reconstruct the more general strategy, I offer reasons to reject it, and I argue in favour of the alternative conception of communication defended by Geurts.

I make my case by focusing on the very notion of overtness, defined in terms of the more fundamental notion of common ground. Taking common ground to be a psychological construct leads to paradoxical pictures of the psychology of communicators. The core of the problem is that the notion of common ground is supposed to be a normative condition and so to capture the potential complexity of our interactions, but this complexity can hardly be directly mirrored in the psychology of each interactant. Following Geurts, I argue that the key notion of common ground is best understood in terms of shared commitments. So understood, it can play its explanatory roles while avoiding allegations of psychological implausibility. In this picture, overtness can be recognised again for what it is: a publicity requirement. The upshot will be that communicating does not necessarily consist in intending to make one's own intentions recognised, contrary to what is argued by Gricean theorists.

In section 1, I briefly reconstruct the adoption of Grice's analysis of utterer's meaning as a definition of communication. The general idea is that communicating is not only a matter of intending to elicit a certain response in the audience, but also of intending the audience to recognise this very intention. The problem is that acting with an overt intention in this sense is not sufficient for communicating. The proposed solution is that one must intend to make one's own intention 'wholly overt' (Strawson 1964) or 'mutually known' (Schiffer 1972). In other words, the communicator must intend her intention to become part of the common ground between the communicator and the audience, where, as we will see, the relevant notion of common ground has an infinitary structure.

In section 2, I argue that, if it is assumed that common ground has an infinitary structure, it is problematic to construe it in psychological terms. In section 2.1, I consider Schiffer's own account of mutual knowledge. Borrowing an argument from

Timothy Williamson (2000), I argue that *if* knowing or believing that *p* entails being in a certain psychological state, then for psychologically limited beings, mutual knowledge is unachievable, even if the relevant psychological states are characterised in dispositional terms. In sections 2.2 and 2.3 I consider two, more explicitly psychologistic, construal of common ground, proposed by Dan Sperber and Deirdre Wilson (1995) and Michael Wilby (2010). I argue that these accounts are either incoherent or equivalent to Schiffer's notion of mutual knowledge. Importantly, Richard Moore (2017b) relies on Wilby's account of common ground in spelling out his deflationary construal of Gricean communication. Moore thus faces a dilemma: either his account is not deflationary, or, if it is, it remains to be explained why it ought to count as Gricean, and it also remains to be explained which notion ought to play the role of common ground.

To avoid pitfalls of psychological implausibility, it is better to distinguish descriptions of interactions from theories of the psychology of interactants. In section 3, I outline the main tenets of the commitment-based view of communication defended by Geurts. Following Geurts, I argue that the notion of common ground can plausibly be characterised in terms of shared commitments. Regarding overtness, the important point is that if a commitment is shared, it is thereby common ground that it is shared. In the framework defended by Geurts, taking the notion of commitment to be explanatorily prior comes with a shift in what is taken to be the rationale of communicating. From being, necessarily, a matter of recognising communicative intentions, it becomes, primarily, a matter of enabling coordination of action under normative constraints. This is the shift in emphasis that will play a major role in this thesis.

1. Utterer's Meaning and Communication

The fundamental aim of Grice's (1968) theory of meaning was to explain the meanings of sentences and words in a language in terms of the complexes of intentions with which speakers act when producing their utterances. The resulting picture of communication is one in which communicating successfully presupposes access to potentially complex intentional states. For current purposes, the important question is whether the picture of communication provided by Grice is a tenable picture of prelinguistic communication, and my overarching claim is that it is not. In this section, I recapitulate the main motivations that led Grice to formulate his analysis of utterer's meaning, I show how this analysis has been adopted as an analysis of communication, and I explore the resulting problem of accounting for the overtness which is supposed to be the hallmark of genuinely communicative acts.

For Grice (1957: 213-215),[14] the starting point is to distinguish two senses of the verb 'to mean', which he termed 'natural' and 'non-natural'. Intuitively, cases of natural meaning are cases where there is a statistical regularity which is supposed to hold between two events, such that one event predicts, or is a symptom of, the other, as in the following sentences (the examples are from Grice 1957: 213-215):

---

[14] For Grice's works, references are given to the 1989 volume.

18

> 'Those clouds mean rain.'
> 'These spots mean measles.'

The contrast is with sentences like the following one:

> 'That remark, "Smith couldn't get on without his trouble and strife", meant that Smith found his wife indispensable.'

Intuitively, in cases of non-natural meaning, which the above sentence exemplifies, the situation which the embedded remark refers to is not *prima facie* more likely to occur because of what the utterer means by producing a token of that remark.[15]

According to Grice, non-natural meaning is a property of intentional actions of a specific kind. In his analysis of utterer's meaning, Grice proposed to capture this specificity as follows:

> '*U* meant something by uttering *x*' is true iff, for some audience *A*, *U* uttered *x* intending:
>
> (G1)   *A* to produce a certain response *r*,
> (G2)   *A* to think (recognise) that *U* intends (G1), and
> (G3)   *A* to fulfil (G1) on the basis of his fulfilment of (G2).
>
> <div align="right">Grice 1969: 92</div>

The specific response that the utterer intends to elicit in the audience is what, at least in part, determines what the utterer means by that specific utterance. As paradigmatic examples of the first clause, one can think of informative and directive intentions. An informative intention can be, for instance, an intention to make someone believe something, while a directive intention can be, for instance, an intention to make someone do something. Importantly, Grice (1957: 215) intended his analysis of utterer's meaning to cover cases of non-linguistic meaning as well, including gestures. Therefore, by Grice's own light, if a pointing gesture is produced with a set of intentions that fits (G1) – (G3), that pointing gesture is non-naturally meaningful. This is an important steppingstone for theories of prelinguistic communication which, like Tomasello's, have been inspired by Grice's theory of meaning.

According to Grice, intending someone to believe or do something cannot alone be sufficient for an act to count as non-naturally meaningful. To illustrate the point with his own example: suppose that Smith secretly places John's handkerchief at the scene of a murder, with the intention of making the detective believe that John is the murderer. In this case, there is no temptation to say that, by intending to produce a certain response in the detective (namely, to believe that John is the murderer),

---

[15] As Grice (1957: 214) puts it, the point is that while natural meaning is factive, non-natural meaning is not.

Smith meant, let alone communicated, that John is the murderer. The idea is that for an act to be non-naturally meaningful, the intention underpinning its production must be overt, and the second clause is meant to capture this requirement. To non-naturally mean something by an utterance, the utterer must intend to elicit a certain response in the audience partly by making the audience recognise the utterer's own intention to do so.[16]

The crucial move is to take Grice's definition of utterer's meaning as a definition of communication, which is what Strawson (1964: 448) did.[17] The assumption is that communicating is a matter of acting with a complex of intentions which instantiate (G1) – (G3). If Grice's analysis of utterer's meaning is taken as an analysis of communication, then communication is successful if the audience recognises intention (G2), thereby recognising (G1), and, moreover, takes (G2) as a reason to fulfil (G1), without necessarily fulfilling it.

One problem with this move is that, as Strawson (1964: 446-447) argued, conditions (G1) – (G3) are not jointly sufficient for communicating. Adapting an example from Schiffer (1972: 17-18), suppose that Alice is considering buying a house. Ulrich thinks the house is rat-infested and, although he does not want to tell Alice that this is the case, he does intend her to know that he intends her to believe that the house is rat-infested. Ulrich lets some rats loose and does so when he knows that Alice is watching him. Ulrich also knows that Alice does not know that Ulrich knows that she is watching him. He knows, moreover, that Alice will take Ulrich's own rats as grounds for thinking that Ulrich intends her to believe that the house is rat-infested.

In the example, Ulrich (U) arranges some evidence for making Alice (A) believe that p, and for making Alice know that he intends her to believe that p, thereby acting with intentions that instantiate (G1) - (G3). In the example, it is assumed that these intentions are fulfilled. Therefore, the following holds:

(i) *A* knows that *U* intends *A* to know that *U* intends *A* to believe that *p*.

Moreover, the following also holds:

(ii) *U* knows that (i).
(iii) *A* does not know that (ii).

Though *U* is acting with intentions (G1) – (G3), *U* is not even trying to communicate. Strawson describes this situation as one in which *U* acts with intentions which are not

---

[16] Grice's third clause is controversial, and most authors (including Moore 2017a), following Neale (1992: 448-449), are inclined to drop it. Though I do not find Neale's arguments convincing, I will not discuss the standing of the third clause, because the point I wish to make is largely independent of it. The third clause was important for Grice's wider project of providing an account of communication as a rational activity. As we will see in later chapters, reformulations of the third clause play a crucial, though very different, role in Tomasello's (and others') theorising about prelinguistic communication.
[17] To be more precise, Strawson argues that Grice's analysis of utterer's meaning individuates the sense of 'communication' which is relevant to theories of meaning.

wholly overt. According to Strawson, in cases of communication at least the following further clause must hold:

(4) *U* intends *A* to recognise that (G2).

For communication to be successful, the recipient must, at least, recognise that (4). However, with a more perverse mind, more perverse examples can be (and in fact have been) construed, to the effect of showing that not even (4) guarantees whole overtness. It seems then, that a further clause is needed:

(5) *U* intends *A* to recognise that (4).

Iterating this reasoning and adding further clauses seems to lead to the conclusion that, for an intention to be wholly overt, an utterer would need to act with an intention that comprises infinitely many nested intentions.

Grice's (e.g., 1969: 115) own solution was to complement the original analysis with a further clause, roughly corresponding to the following:

(G4) *U* does not intend *A* to be deceived regarding intentions (G1) – (G3).[18]

Although convenient, (G4) is *ad hoc*, and there can be cases in which U has no deceptive intent regarding (G1) – (G3), but the underlying intentions with which the act is produced are not wholly overt either.[19]

Schiffer (1972: 30-42) proposed a more systematic approach to the problem by employing the notion of mutual knowledge. If two or more individuals (*A*, *B*, …) mutually know that *p*, then:

A knows that *p*
B knows that *p*.
A knows that (2)
B knows that (1).
And so on, *ad infinitum*.

More schematically:

$$K_a p \text{ and } K_b p$$
$$K_a K_b p \text{ and } K_b K_a p$$
$$K_a K_b K_a p \text{ and } K_b K_a K_b p$$
$$\dots$$

[18] This is the solution adopted by Neale (1992: 550) and Moore (2017b: 305).
[19] The role of common ground is not limited to account for overtness, and this the most important reason why Grice's own solution is inadequate.

If one wishes to preserve Strawson's insight regarding whole overtness, one might then argue that, in communicating, an intention is made wholly overt when the communicator intends to make it mutually known between the communicator and the audience that the communicator has a certain intention. Deception regarding either (G1) or (G2) are then special cases of violating this requirement. Being deceptive in the relevant sense is a matter of *intending* either (G1) or (G2) *not* to become mutual knowledge.

2. Common Ground as a Psychological Construct

A recurrent objection to the very notion of mutual knowledge is that for a proposition to be mutually known, the agents involved should be in infinitely many knowledge states, and this is not possible for any agent with limited psychological resources. This objection presupposes either that knowledge is a psychological state, or that if knowledge is not a psychological state, there is a set of psychological states (like, e.g., beliefs) that an individual must be in if that individual is to count as knowing that p.[20] Schiffer (1972: 30-42) attempted to defuse the objection by appealing to a dispositional sense of knowledge, and to ways of generating the infinity of knowledge states from finitary bases. By Schiffer's light, it is plausible to claim that, whenever two or more individuals communicate successfully, they are in infinitely many nested (dispositional) knowledge states. In section 2.1, borrowing an argument from Williamson (2000: Chapter 5) I argue that *if* knowledge is a psychological state, then it is not possible to achieve mutual knowledge, even if the nested knowledge states are understood in dispositional terms.

The notion of mutual manifestness (Sperber and Wilson 1995: Chapter 1) was elaborated to avoid the psychological implausibility of mutual knowledge. In section 2.2., I argue that the very notion of mutual manifestness trades on an equivocation between conditions for successful communication in Grice's sense and individual communicators' representational capacities. Mutual manifestness is as psychologically plausible as mutual knowledge. Either it does not provide a window into the cognition of communicators, or it cannot play the same explanatory role of common ground. Recently, some authors have proposed to conceptualise mutual knowledge as a primitive, relational mental state (Wilby 2010, adopted by Moore 2017b). In section 2.3, I argue that this strategy does not work either. The proposed definition of mutual knowledge is not coherent, and if it could be made coherent, it would be equivalent to Schiffer's. The overall conclusion of this section is thus that there is no psychologically plausible notion capable of doing the work required by the Gricean approach.

---

[20] The claim that knowledge is a psychological state is defended by Timothy Williamson (e.g., 2000: Chapter 1). I am not committed to this claim. The argument I propose applies even more straightforwardly to JTB. The factivity of knowledge is not relevant either: substituting knowledge with belief does not make the problem go away, as it will emerge more clearly in section 2.2 below.

2.1 Mutual Knowledge

In bare outlines, Schiffer's strategy to defuse the objection is to appeal to a dispositional sense of knowing that *p* and then derive mutual knowledge as entailed by finitary inductive bases. Intuitively, an individual has dispositional knowledge that *p* if that individual has the cognitive resources to easily infer that *p* from other bits of knowledge that she has. For instance, one might know that the Moon is more than one inch away from the Earth, even if one has never entertained the proposition that the Moon is more than one inch away from the Earth. This piece of knowledge is then dispositional in the relevant sense. The second part of the strategy is to list a finite set of conditions comprising an inductive clause ranging over knowledge states. If these conditions are satisfied, the argument goes, then it is true that the individuals involved mutually know that *p*. Since some such list of condition will be satisfied in most of our daily interactions, it is plausible to say that mutual knowledge is a pervasive feature of our lives.

I use a simplified version of Schiffer's (1972: 31-32) own example to illustrate his point. Imagine that you and I are facing each other at a table which has a conspicuous candle at its centre. The candle is lit and illuminates its surroundings. We both have normal perceptual and reasoning capacities. In this scenario, being normal in this sense is sufficient for knowing that there is a candle on the table. Being normal is also sufficient for knowing that being normal is sufficient for knowing that there is a candle on the table. So, if conditions of normality are satisfied, the right kind of visuo-spatial relationships hold, and we both assume that we both are normal, then we mutually know that there is a candle on the table.

It seems that, even if one concedes that some psychological states are needed for having knowledge, there can be a finite set of psychological states such that, if two or more individuals have them, and they stand in the right sort of relationship between each other, then they have infinitely many nested knowledge states. Of course, not all cases of mutual knowledge will be cases in which individuals stand in some visuo-spatial relationships between each other and a third object and have normal perceptual and reasoning capacities. So, there are bound to be indefinitely many different finite bases which can generate mutual knowledge.

At the end of his treatment of the subject, Schiffer himself recognised that, although plausible, his strategy was not bulletproof. An especially problematic objection can be derived from Timothy Williamson's (2000: Chapter 5) considerations about iterations of knowledge states, which apply to both the intrapersonal and the interpersonal cases, under the assumption that knowledge is a psychological state.[21] As the number of iterations of knowledge increases, the probability of knowing in the occurrent sense tends to zero, if there is at least some margin of error in the knowledge of the initial proposition. If one concedes this much, then even if there is

---

[21] In the intrapersonal case, Williamson's argument constitutes an objection to the adoption of the so-called principle of positive introspection ($K_a p \rightarrow K_a K_a p$), which is a principle that has a long and troubled history in epistemic logic. If Schiffer's construal of mutual knowledge does not need to rely on the assumption that knowledge is closed under entailment, it must at least rely on a principle that is *more* problematic than that of positive introspection.

no cut-off point, for some point *n* in the inferential chain individuals will not even be in a position to know etc., that they both know that *p*. Therefore, even if it is true that, on some occasions, knowing that *p* puts the knower in a position to know that she knows that *p*, after some iterations of this reasoning the individual will not anymore be in a position to know that she is in a position to know, … (*n* times), that *p*. In short, for psychologically limited beings, at some point in the iteration of knowledge states, individuals will not even have *dispositional* knowledge of the subsequent step. Therefore, it is problematic to claim that two individuals can mutually know that *p*, even if the knowledge states are understood in dispositional terms, because psychologically limited individuals do not have the capacities to have dispositional, infinitary, knowledge.

Before considering two, more explicitly psychologistic, construal of common ground, I would like to notice that Schiffer's account of mutual knowledge essentially relies on assumptions of normality. Bracketing concerns regarding infinity and psychological states, this is highly problematic for infants. Assumptions of normality are built up over the course of development, so their presence cannot easily be presupposed. Here is just one example of how far away from assumptions of normality a typically developing one-year-old can be:

> If you give her a toast and she doesn't want it… she… she's sneaky, she's very sneaky, she'll sit there looking at you and while she's got your eyes looking at her eyes, she picks it up and puts it under her arm like that and throws it behind her… and she thinks you can't see. (Mother of Anna, 11 months, interview)

> Reddy 2008: 225.[22]

2.2 Mutual Manifestness

Dan Sperber and Deirdre Wilson (1995: Chapter 1) start from the premise that the notion of mutual knowledge is not psychologically plausible, because for any cognitively limited being, it is not possible to be in infinitely many nested knowledge states. To preserve Strawson's insight regarding the overtness of communication, they propose to substitute the notion of mutual knowledge with that of mutual manifestness. At bottom, the proposed substitution amounts to substituting the notion of 'being in a position to know that *p'* with that of 'being capable of mentally representing an assumption and accepting it as true'. I argue that mutual manifestness is, at best, as psychologically plausible as mutual knowledge, and that it is therefore unclear which explanatory role it could play. Most contributors to the commentary to *Relevance* appeared in «Brain and Behavioural Science» (1987) expressed similar concerns. Although Sperber and Wilson (1987) offered a response to critics, and on various subsequent occasions (e.g., 2015) have repeated their main points, I argue that neither the response nor the subsequent clarifications are convincing.

---

[22] For several other examples and a discussion of the lean sense in which these behaviours count as 'deception', see Reddy 2008: 224-229.

To see the role that the notion of mutual manifestness is supposed to play within the context of Relevance Theory, it is necessary to briefly recapitulate the main tenets of the overall project. Doing so is necessary also because Relevance Theory is an important point of departure for several projects in developmental psychology, including Tomasello's proposed explanation of the cognition of prelinguistic communicators.

The overarching ambition at the heart of Relevance Theory is to provide a theory of communication that, while broadly Gricean at its core, is not only psychologically plausible, but also explanatory of the cognition of human communicators.[23] To illustrate the general strategy they pursue, it is convenient to start with the following list of examples, often presented by Sperber and Wilson:

    (1)   (a) They gave him life.
               (b) Everyone left.
               (c) The school is close to the hospital.
               (d) The road is flat.
               (e) Coffee will be served in the lounge.
    (2)   (a) The lecture was as you would expect.
               (b) Some of the students did well in the exam.
               (c) Someone's forgotten to take out the rubbish.
               (d) *Teacher:* Have you handed in your essay?
               Student: I've had a lot to do recently.
               (e) John is a soldier.

                                            Sperber and Wilson 2002: 4.

In this row of examples, the content potentially communicated by uttering a token of one of those sentence types is left vastly indeterminate by the 'meaning' of the linguistic expressions employed. Virtual indeterminacies include: reference assignment (1a), scope of the quantifier (1b), vagueness (1c-d), illocutionary force (1e), and several different kinds of implicated content (2a-e). According to Sperber and Wilson, there is no obvious semantic rule which provides the sought for enrichment of content in any of the above cases. Therefore (and this is perhaps the most problematic bit of the argument), the pragmatic reasoning which must underlie most communicative interactions *necessarily* consists in an 'exercise in metapsychology'.[24] The general idea is that, upon recognising that the communicator is acting with a certain complex of intentions of the sort that Grice postulated, a heuristic mechanism is triggered in the

---

[23] There are of course many important differences between the account of communication developed by Sperber and Wilson and Grice's project, in both details and general aim (Sperber and Wilson 2012: Chapter 1). The most important difference is, I think, that Grice aimed at providing a theory of meaning and at accounting for communication as a rational activity, thereby aiming at providing a normative account of communication. On the other hand, Sperber and Wilson attempt to translate parts of this normative account into an account of the cognition of communicators. This is already evident in the definition of ostensive-inferential communication, which mirrors Grice's notion of utterer's meaning. Losing sight of the distinction between these very different endeavours is bound to produce confusion.

[24] I agree with the arguments to the contrary presented by Geurts (2019c).

head of the hearer to 'reason' about these intentions, and the output of this mechanism is the interpretation of the utterance that the hearer relies upon.

Sperber and Wilson describe the functioning of the heuristic mechanism as obliging to the 'Principles of Relevance'. According to Sperber and Wilson (1995: 260-272), cognitive activity in general is geared toward the maximisation of relevance, where 'relevance' is understood as a trade-off between the accessibility of a cognitive representation and the positive cognitive effects that forming such a representation has on the subject's 'cognitive environment'.[25] Regarding communication, the idea is that any behaviour performed 'ostensively' (that is, with a Gricean complex of intentions) generates by default a presumption of its own optimal relevance in the addressee, a presumption which is itself constrained by the addressee's beliefs regarding the communicator's abilities and preferences. Conveniently, Sperber and Wilson have provided useful illustrations of the workings of the heuristic mechanism:

> Consider the following dialogue, in which Mary's utterance 'John is a soldier' corresponds to (2e):
>
> > (3) *Peter*: Can we trust John to do as we tell him and defend the interests of the Linguistics Department in the University Council?
> > *Mary*: John is a soldier!
>
> Peter's mentally represented concept of a soldier includes many attributes (e.g. patriotism, sense of duty, discipline) which are all activated to some extent by Mary's use of the word 'soldier'. However, they are not all activated to the same degree. Certain attributes also receive some activation from the context (and in particular from Peter's immediately preceding allusions to trust, doing as one is told, and defending interests), and these become the most accessible ones. These differences in accessibility of the various attributes of 'soldier' create corresponding differences in the accessibility of various possible implications of Mary's utterance, as shown in (4):
>
> > (4)   (a) John is devoted to his duty.
> >   (b) John willingly follows orders.
> >   (c) John does not question authority.
> >   (d) John identifies with the goals of his team.
> >   (e) John is a patriot.
> >   (f) John earns a soldier's pay.
> >   (g) John is a member of the military.
>
> Following the relevance-theoretic comprehension procedure, Peter considers these implications in order of accessibility, arrives at an interpretation which satisfies his expectations of relevance at (4d), and stops there.
>
> <div align="right">Sperber and Wilson 2002: 19-20.</div>

---

[25] Sperber and Wilson repeatedly claim that their usage of 'relevance' is to be understood as a technical one (see, e.g., Wilson 2017). The problem is then to explain the very notion of 'cognitive effect' without relying on a non-technical understanding of 'relevance'. Doing so is crucial to avoid the allegation of being explanatorily vacuous from a scientific point of view.

If Mary asked Peter: 'What does John do for a living?' and Peter answered, 'John is a soldier!', the order of accessibility of the different interpretations would have been different. Presumably, (g) would have been the most accessible assumption, and Mary would have settled on it.

In sum, principles governing the maximisation of relevance are meant to supply the needed heuristic for utterance interpretation. These principles systematically rely on mechanisms for individuating instances of ostensive behaviours, which require communicators to engage, at the sub-personal level, in sophisticated forms of 'mindreading', equated by Sperber and Wilson with sophisticated forms of psychological reasoning.[26] On these foundations, Sperber and Wilson (2002) defend a view according to which communicating in the relevant sense is, necessarily, an exercise in 'metapsychology'.[27]

A non-trivial problem for advocates of Relevance Theory is to offer a theory of ostensive behaviour, since, in principle, any piece of behaviour can be produced ostensively. In the third chapter, I discuss one such attempt, and I reject it, arguing that 'ostension' is best understood in relational, rather than psychological, terms. The problem at the fore in this section is the very definition of ostensive communication, which employs the notion of mutual manifestness.

The definition of ostensive communication provided by Sperber and Wilson (1995: Chapter1, Section 12; 2015: 139) is meant to capture Strawson's intuition that communicating is a matter of acting with a wholly overt intention, and it is also meant to keep Schiffer's cases at bay. With this aim in mind, Sperber and Wilson define ostensive behaviours as follows:

> The communicator produces a stimulus [intending thereby to make it] mutually manifest to communicator and audience that the communicator intends, by means of this stimulus, to make manifest or more manifest to the audience a set of assumptions I.

> Sperber and Wilson 1995: 63[28]

---

[26] As far as I can see, Sperber and Wilson do not offer clear distinctions between the activity of subjects (reasoning about nested psychological states) and the various cognitive mechanisms which, on different occasions, might support the subject's reasoning activity in different ways (memory, attentional processes, 'mindreading', and so on). With respect to pragmatic reasoning, I am sympathetic to the considerations put forward by Geurts and Rubio-Fernandez (2015), phrased in terms of levels of explanation. Adopting Marr's (1982) terminology, they argue that while theories of pragmatic reasoning are pitched at the computational level, theories of processing are pitched at the algorithmic level. Different algorithms can make a system behave in ways that approximate, more or less closely, the same computational description ('rational reconstruction') of the activity in question.

[27] On one hand, Sperber and Wilson (2002) argue that the kind of pragmatic reasoning theorised by Grice is too complicated to reflect the psychology of communicators. On the other hand, they take versions of this same reasoning as being implemented by a specific 'sub-module' (part of the 'mindreading' module) meant to deal with regularities in communicative behaviour, the recognition of which should be conducive to the recognition of communicative intentions. They argue that the evolution of some such sub-module must have occurred *before* linguistic communication was possible. I find the argument provided by Sperber and Wilson in many ways unclear, not only because it conflates different levels of explanation, but also because, by their own lights, the regularities exploited by the sub-module are those which characterise *linguistic* communication.

[28] I modified the definition that appears on page 63 to make it coherent with the one that appears on page 61, which is the one defended in the book.

To see how the notion of mutual manifestness works, it is necessary to start with the definition of the notion of manifestness:[29]

> [M] An assumption is manifest to an individual at a given time only if that individual is capable of mentally representing its content and is in a position to accept the representation as true.

Since an assumption can be manifest without being true, an assumption can be manifest without in fact being known. This move is motivated by the plausible idea that, in communication, what matters the most is that communicators rely on assumptions that they have in their common ground, and whether these assumptions are in fact true is secondary. The factivity of knowledge is not what generates the problem, so this aspect of the proposal can be bracketed. Second, an assumption can be manifest without being entertained. For an assumption to be manifest, one must be in a position to generate a representation that p on the basis of other representations (made available by the senses, attentional processes, memory, or other more specialised cognitive systems) relying on certain inferential capabilities, which Sperber and Wilson (1995: 40-41) understand broadly as encompassing any kind of inference, be it deductive, inductive, or abductive.

Sperber and Wilson (1995: 38) define the notion of cognitive environment (of an individual at a certain time) as a set of assumptions that is manifest to an individual at a certain time. The same assumptions may be manifest to different individuals at the same time. The intersection between cognitive environments constitutes what Sperber and Wilson (1995: 41) call a shared cognitive environment. So, if p is part of a shared cognitive environment, the following holds:

(1) It is manifest to a that p.
(2) It is manifest to b that p.

According to Sperber and Wilson (1995: 41-42), a shared cognitive environment is mutual if the assumption that this environment is shared is itself part of the shared cognitive environment. Finally, Sperber and Wilson define mutual manifestness as follows:

> In a mutual cognitive environment, for every manifest assumption, the fact that it is manifest to the people who share this environment is itself manifest. In other words, in a mutual cognitive environment, every manifest assumption is what we will call *mutually manifest.*
>
> Sperber and Wilson 1995: 41-42.

---

[29] I summarise the definitions that appear in the book (1995: 38ff) to avoid some minor issues of circularity. Sperber and Wilson first define manifestness, then cognitive environment in terms of manifestness, then redefine manifestness in terms of cognitive environments.

This definition entails that mutual manifestness has the same infinitary structure as mutual knowledge. If an assumption p is part of a mutual cognitive environment (and thus it is manifest to all that p is manifest to all), then there is an assumption p', part of the mutual cognitive environment, according to which p is part of the mutual cognitive environment. The chief example proposed by Sperber and Wilson confirms this much:

> For instance, every Freemason has access to a number of secret assumptions, which include the assumption that all Freemasons have access to these same secret assumptions. In other words, all Freemasons share a cognitive environment that contains the assumption that all Freemasons share this environment. Any shared cognitive environment in which it is manifest which people share it is what we call a *mutual cognitive environment.* For every manifest assumption, in a mutual cognitive environment, the fact that it is manifest to the people who share the environment is itself manifest. In a mutual cognitive environment, therefore, every manifest assumption is *mutually manifest.*
>
> Sperber and Wilson 1987: 699.

For Freemasons, there is a secret assumption, accessible to all, according to which every secret assumption accessible to all is accessible to all. The assumption that they share a cognitive environment is itself part of the cognitive environment that they share.

Manifestness is defined in terms of assumptions that an individual is in a position to mentally represent and accept as true. Mutual manifestness has an infinitary structure. For a cognitively limited individual, at some point n in the iteration, that individual will not be in a position to mentally represent the $n+1$ assumption. Therefore, the $n+1$ assumption is not manifest, and it is not true that, for every manifest assumption in a mutual cognitive environment, it is manifest to individuals belonging to that environment that that assumption is manifest. Sperber and Wilson (42-43ff) claim that an assumption is mutually manifest only in virtue of individuals recognising that they belong to a mutual cognitive environment. This appeal to mutual cognitive environments does not help. There is nothing beyond individuals' representational capacities (and their assumptions regarding others' representational capacities) that make individuals belong to mutual cognitive environments, and there are limits to these capacities.

The notion of mutual manifestness seems thus no more psychologically plausible than that of mutual knowledge. In their response to critics, Sperber and Wilson (1987: 737-739) emphasise that they do not mean mutual manifestness to be equivalent to mutual knowledge, nor to mutual belief:

> Humans can be said to believe tacitly, or virtually, what they are capable of inferring *demonstratively* from their mentally represented beliefs. […] The infinitely many beliefs which together make up mutual knowledge are not demonstratively inferable from a

The proposed distinction is orthogonal to the problem under discussion. In the passage above, 'demonstratively' is used as a synonym of 'easily deducible'.[30] In short, the point is that one dispositionally knows or believes that p if one can easily deduce that p from other propositions that one knows or believes. On the other hand, a proposition can be manifest in virtue of something being perceptible, or because it can be inferred non-deductively. According to Sperber and Wilson (also in 2015: 133) what is common between dispositional beliefs and manifest assumptions is that, in both cases, the individual is likely, to some positive degree, to entertain a proposition (or mentally represent an assumption)[31] and accept it as true. By Sperber and Wilson own lights, then, it is not possible to mentally represent infinitely many assumptions. Therefore, at some point n in the iteration of manifest assumptions, some $n+1$ assumption will not be manifest. As far as psychological plausibility is concerned, it is unclear how the notion of mutual manifestness is supposed to score better than the notion of mutual knowledge.

The problem with the notion of mutual manifestness is that it is called to perform double duty, and this problem reflects a more general tendency of conflating theories of communication with theories of the cognition of individual communicators. On one hand, mutual manifestness is supposed to, *inter alia*, capture Strawson's intuition that communicating successfully is a matter of making one's own intentions wholly overt, and to shield ostensive-inferential communication from Schiffer's cases (Sperber and Wilson 1995: Chapter 1, Section 12; a claim which is maintained in 2015: 139). In this sense, mutual manifestness should work as a substitute for the notion of common ground and should be definitional of what it is to behave ostensively. On the other hand, mutual manifestness is supposed to be part of an explanation of the heuristic mechanisms that enable humans to communicate in the ways they do. A notion called for to perform both roles seemingly lead to inconsistencies, making it even more problematic to define the very notion of ostensive communication, and to explain how indeterminacies of content are in fact resolved.

2.3 A Deflationary Strategy
In a series of works, Richard Moore has developed a deflationary account of Gricean communication which yields a picture of the cognition of communicators radically different from the one presented in Relevance Theory. According to Moore (2017b), and against Sperber and Wilson (2002), communicating in Grice's sense does not necessarily require communicators to engage in sophisticated forms of psychological

---

[30] See Sperber and Wilson 1995: 40-41.
[31] Sperber and Wilson (2015: 133) take these two formulations to be equivalent.

reasoning. The core idea is that, given a functional characterisation of the constitutive components of certain communicative acts, some agents who might lack capacities for sophisticated psychological reasoning (e.g., chimpanzees, dogs, infants, and perhaps some species of fish) can in fact communicate in Grice's sense, even if only in a limited set of circumstances. Although I am sympathetic to several strands of Moore's project, I argue that his account of communication hinges on a problematic conception of common ground. It is unclear in what sense Moorian communication ought to count as Gricean while, at the same time, being cognitively undemanding.

According to Moore, for communicating in Grice's sense it is sufficient to intentionally produce a sign, as in protruding one's own index finger, and to intentionally address the production of that sign to someone, as in alternating gaze between the addressee and the pointed-to object or event.[32] The intention underpinning the production of a sign might consist in intending someone to do something (e.g., looking in the direction of the protruding index finger), while the intention underpinning the production of an act of address might consist in intending someone to orient toward the sign itself (or the individual issuing the sign). Schematically:

A series of acts (ϕ, χ) is Moorian, or M-communicative, iff:
(M1) A does ϕ [act of sign production] intending B to ψ.
(M2) A does χ [act of address] intending B to orient toward ϕ.
(M3) A has no further deceptive intention regarding (M1) and (M2).[33]

According to Moore (2017b: 316), intentionally producing an act of address makes the very act of producing a sign overt. What makes this form of communication, so to say, psychologically simple, is that what is overt is the act itself, rather than the intention that underpins its production. So, communicating in this sense is not a matter of *intending* to make one's own *intentions* recognised, but allegedly still counts as Gricean. Therefore, the argument goes, for communicating in Grice's sense the communicator only needs to act intentionally, and these intentions need not have propositional attitudes as their content. According to Moore, acting intentionally does not generally require one to represent to oneself the intentions with which one acts. On the other hand, the recipient would need to correctly ascribe only the (fist-order) intentions with which acts of address and sign production are issued.

Moore (e.g., 2017b: 317-318) argues that communicative acts with the above-mentioned structure count as produced overtly, and that their interpretation by the recipient is based on common ground. Regarding the notion of common ground, Moore relies on Michael Wilby's (2010) definition of mutual knowledge, which is supposed to make common ground accessible to cognitively unsophisticated agents.

---

[32] Moore specifies that the same act can, on occasions, perform both functions. In other words, the same act can count, at the same time, as both an act of sign production and an act of address.
[33] As mentioned earlier, Moore drops Grice's third clause and accepts Neale's proposed solution regarding overtness. The problem with this solution is that it is *ad hoc*, and its arbitrariness makes it even more problematic to adopt it for common ground in general.

As I see it, the problem with this strategy is that Wilby's account is either incoherent or equivalent to Schiffer's. If this is the case, it is unclear in what sense Moore's minimally Gricean communicative acts count as produced overtly and based on common ground while, at the same time, not requiring the cognitive sophistication typically associated with Gricean communication.

Wilby's starting point is the following: mutual knowledge between *a* and *b* of a proposition *p* must be identified with a complex relational property that is satisfied by *a* and *b*. The claim is that mutual knowledge is a primitive mental state that two or more individuals have as a co-subject, and that this co-subject is in the mental state of mutually knowing that *p* if and only if the individual subjects stand in the above-mentioned relationship between each other. Wilby (2010: 92) defines mutual knowledge as follows:

> S and A mutually know that p iff there is a relational property H true of S and A, such that:
>
> > (1) S and A are H. (i.e. a three-place relation between A, S and the property H: HAS)
> >
> > (2) Being H is sufficient for knowing that p, and that S and A are H.
> >
> > (3) For any proposition q, if being H is sufficient for knowing that q, then being H is sufficient for knowing that being H is sufficient for knowing that q.

The first problem with this definition is that clause (1) is inconsistent: 'H' is supposed to denote a two-place predicate, as well as a three-place predicate of which H could be an argument. The second and related problem is that in this definition there is no knowledge state ascribed to a plural subject, and it is therefore unclear in which sense mutual knowledge is a mental state that two or more individuals have as a co-subject. The relational account is relational only because it assumes that for two individuals to have mutual knowledge that *p*, they must stand in a certain relationship to each other, and that standing in such a relationship is sufficient for each of them to know that they know, and so on. Arguably, if Wilby's relation H does not incorporate assumptions of normality, or anything of analogous import, it cannot be sufficient for generating mutual knowledge. Wilby complains that Schiffer's assumptions of normality are too vague to be helpful, but he does not offer any alternative specification of the generative relation H. To conclude, assuming that Wilby's definition can be made coherent, that the base must incorporate something like assumptions of normality, and that each knowledge state is the knowledge state of an individual, a refined version of Wilby's analysis would end up being equivalent to Schiffer's.

The sense in which Moorian communication counts as Gricean is that communicating is an activity in which communicators engage intentionally, and that communicating successfully is a matter of recognising the intentions with which communicators act. This move already puts a serious distance between Moore's

project and Grice's conception of communication. What matters the most for current purposes, however, is that without a viable notion of common ground, it is not easy to explain why Moorian communicative acts ought to count as produced overtly, and why communicators respond to each other as they do, seemingly relying on some common ground. Therefore, it remains unclear in what sense Moorian communicative acts count as Gricean, and what is supposed to do the explanatory job typically assigned to the notion of common ground.

3. Common Ground as a Socio-Normative Construct

Construing the notions of overtness and common ground in psychological terms seems to lead to problematic characterisations of the psychology of communicators. It is worth emphasising once again that the problem is not confined to the notion of overtness. The notion of common ground is ubiquitous in theorising about pragmatic reasoning. It is very hard to explain resolution of indeterminacies of the sort illustrated also by Sperber and Wilson without relying on it, and common ground always seems to have the same infinitary structure.

There are good reasons to think that the potential complexity of a communicative interaction, which the notion of common ground is supposed to capture, should not be directly translated onto the psychology of the interactants. The more general point, which can be made in a variety of ways, is that a theory of communication is not thereby also a theory of the psychology, or cognition, of the communicators, contrary to what is seemingly assumed by advocates of Relevance Theory. This more general claim reflects *some* of Grice's own intuitions, in that he was primarily interested in accounting for communication as a rational activity, and he sometimes thought of the postulated kinds of reasoning as rational reconstructions of communicative behaviours, rather than as straightforward accounts of the psychology of communicators.[34]

In this section, I recapitulate the main tenets of the commitment-based view of communication developed by Bart Geurts. This view individuates the rationale of communication primarily in action coordination and, by focusing as it does on communication as a social phenomenon, it promises to keep the distinction between communication and cognition in sight. In this chapter, I illustrate the importance of this distinction with respect to the key notions of overtness and common ground, and I also anticipate how I plan to adopt the view defended by Geurts in investigating prelinguistic communication.

The core insight of the commitment-based view is that communication is, primarily, a form of coordinated action which, chiefly, enables further coordination of action,[35] and it does so by giving rise to commitments and entitlements. Commitments are understood by Guerts as ternary relations between two individuals and a

---

[34] This point figures prominently in the already mentioned Geurts and Rubio-Fernandez (2015) and Neale (1992).

[35] Though cast in different terms, this insight lies at the heart of much of the work done by Herbert Clark (for a bird's eye view, see Clark 1996: Chapter 1).

proposition. Promising is the paradigmatic example: by telling the child 'I'll buy you an ice-cream', and assuming that the promise is accepted by the child ('Yeah!'), I might become committed to the child to, for instance, act consistently with the truth of the proposition that I'll buy her an ice-cream. On the other hand, in this situation the child would be entitled to act on the assumption that I'll buy her an ice-cream and she would be entitled to protest were I not to keep my promise ('You said you buy me an ice-cream'). Moreover, by accepting the promise, the child becomes committed to act consistently with the truth of the proposition that I am committed to her to buy her an ice-cream, where this might require, *inter alia*, resisting the temptation of having a pizza over the course of the same afternoon.[36]

Decoupling a theory of communication from Grice's analysis of utterer's meaning might give rise to a weird feeling of stepping into the void: what grounds assumptions regarding the communicated content, if not the communicator's intentions? There are ways of keeping this *horror vacui* at bay. The common ground on which we rely in communicating is both updated and constituted by shared commitments, and the content of a commitment that we may come to share on an occasion is partly determined by other commitments that we share.[37] In the Gricean picture, determination of content depends on assumptions of rationality being in the common ground. In the commitment-based picture, the very notion of common ground is spelt out in terms of shared commitments, and a subset of these commitments may very well amount to assumptions of rationality. Nothing is lost.

With respect to the metaphysics of meaning that could sit alongside this theory of communication, a natural candidate is the kind of inferential-role semantics proposed by Robert Brandom (1994), or some suitably modified version of it,[38] which is also the most radical inversion of the Gricean perspective. In a nutshell, the idea is that it should be possible to provide a story about propositional content in terms of the most basic 'autonomous discursive practices' in which individuals could engage. From a metaphysical point of view, the very practices in which, say, a set of vocalisations ought to count as assertions are the very grounds for, say, an utterance to have a conceptually structured content, and from a metaphysical point of view, these practices are irreducibly normative.[39] The intuition is that, in attempts at clarifying features of our faculty of understanding, the normativity of the practices in

---

[36] At least this was the deal for me when I was a child.

[37] With respect to the emergence of conventions, their interrelations with the common ground, and how at least some indeterminacy may be solved, I am sympathetic to the proposal made by Geurts (2018a). With respect to other kinds of indeterminacy, it is possible to provide accounts of different kinds of pragmatic reasoning which score just as well as their Gricean counterparts (Geurts 2019a).

[38] There is of course a significant amount of heavy philosophical work to be done to integrate Brandom's insights regarding meaning into a commitment-sharing view of communication as proposed by Geurts. This work would include, for instance, clarifying different understandings of the very notion of commitment, discussing the relative primacy of the notion of assertion in different kinds of explanations, and, relatedly, clarifying in what sense some discursive practices may count as autonomous without featuring clearly recognisable assertions.

[39] As I see it, one of the deepest challenges faced by this view is to prevent holism of content from going wildly out of control. For a promising line of response to this challenge, see Loeffler 2018: Chapter 7. Another deep challenge is to account for representational states which have a non-conceptual content. My hunch is that this can be done by borrowing tools from teleosemantics.

which we engage is the very ground on which it is possible to walk. If this much is accepted, there is no void to be filled.

For current purposes, concerns regarding the metaphysics of meaning can be bracketed. What matters the most is that the commitment-sharing view of communication provides a way of describing communicative interactions in terms of the normative constraints that these interactions create and by which they are governed. The aim of the enterprise is to avoid problematic confusions which come from collapsing this level of description with theories of the psychology or cognition of communicators.

Going back to the commitment-sharing view of communication, Geurts (2019a) proposes a generalisation according to which every speech act creates a commitment on the side of the speaker to act consistently with the truth of a proposition.[40] Different kinds of speech acts create different kinds of commitments, partitioned by Geurts in telic and atelic. A commitment is telic if the propositional content of the speech act by which the commitment is undertaken specifies a goal which the speaker has. The commitment is atelic if the proposition to which the speaker is committed does not specify any such goal. According to Geurts, commissive and directive speech acts typically create telic commitments. In promising you that I will do the dishes, I commit myself to act in accordance with the truth of the proposition that *I* will do the dishes.[41] In asking you to do the dishes, I commit myself to act in accordance with the truth of the proposition that *you* will do the dishes.[42] Although in both cases the speaker is committed to a goal, in the case of commissive speech acts it is the speaker who, typically, must see to it that the goal is achieved, while in the case of directive speech acts it is the addressee who, typically, must see to it that the goal is achieved.[43]

Unlike commissive and directive speech acts, constative speech acts, of which assertion is taken as the paradigm case, do not typically specify a goal which the speaker has. For instance, in asserting that Vittorio Emanuele III was a coward, I do not specify a goal I might have. Although atelic commitments *per se* do not commit the speaker to any specific course of action, they do normatively constrain the speaker's behaviour in indefinitely many ways, just like telic commitments do. This is especially salient if one considers the speaker's linguistic behaviour. In the case at hand,

---

[40] Rules of acceptance make it the case that if a commitment is undertaken, commitments and entitlements are created on both sides. I come back to this point in a moment.

[41] To keep the generalisation uniform, Geurts (2019a: 8-9) proposes to analyse other representative commissives such as threats, bids, bets, and offers as commitments to conditional propositions.

[42] As Geurts (2019a: 10) notices, questions can, but need not be, construed as requests for information. Even when they should be construed as requests for information, there are several ways in which they can be accounted for in terms of commitment-sharing. Geurts (2019a: 9) also suggests that permissives can be construed as, for instance, commitments to not being committed to the negation of a proposition. So, if I tell you: 'you can sit here', I'm committed to not being committed to you not sitting here.

[43] As noticed by Geurts (2019a: 10), it makes good sense to commit oneself to a goal which can only be brought about by someone else, and it might make sense to do so even if it is common ground that the other is not especially willing to comply to the request.

I might have to be prepared to list the relevant facts concerning Vittorio Emanuele's cowardice, starting from the surrendering of the country to Mussolini in 1922.

In Geurts' view, producing a speech act of any kind produces a commitment to act in accordance with the truth of a proposition. This uniformity across illocutionary acts, coupled with suitable rules regarding the acceptance of commitments, is especially helpful in explaining how the production of speech acts of any kind updates the common ground, and thus can potentially contribute to the coordination of actions. As already noticed in the example of the promise made to the child, commitments can be undertaken only if they are accepted. Interpersonal commitments are indeed social relationships. I cannot be committed to you to wash the dishes unless you accept, either implicitly or explicitly, that I am so committed. As Geurts argues (2019b: 120-121), acceptance is here understood as a term of art. It needs not entail awareness, and although it can be signalled by expressing agreement, it is often implicit. It is entailed by appropriate responses, as in complying to an order, answering a question, greeting in response to an act of greeting, and so on. In the absence of overt cues, acceptance is generally taken for granted.

Geurts (2020a: 9-10) proposes to model acceptance as itself being a kind of commitment, governed by the following two rules of inference:

(A):

$$C_{x,y}p \; \rightarrow C_{y,x}C_{x,y}p$$

(R):

$$C_{x,y}p \; \rightarrow C_{x,y}C_{x,y}p$$

If I successfully commit myself to you to do the dishes, then you accept that I am so committed, which entails that you become committed to me to act in accordance with the proposition that I am committed to you to do the dishes. In practice, I might be entitled to protest should you hinder my efforts to do the dishes, or should you do the dishes yourself. On the other hand, if I commit myself to you to do the dishes, I thereby commit myself to you to act in accordance with the proposition that I commit myself to you to do the dishes. So, for instance, I might have to be prepared to acknowledge that I promised you that I would do the dishes.[44]

If these rules governing the acceptance of commitments are assumed, one cannot undertake a commitment to someone without thereby making it common ground that that commitment has been undertaken. Let's assume that $q = C_{x,y}p$. If q is accepted, it follows that q is common ground between x and y (Geurts 2020a: 10-11), if common ground is defined as follows:[45]

---

[44] On many occasions, acting consistently with, say, a nth-order commitment might consist in nothing more than acting consistently with the proposition which is the content of the embedded commitment.
[45] Geurts (2020a) also shows that his definition of common ground subsumes Lewis' (1969) definition of mutual belief, if beliefs are conceived of as private commitments of the atelic variety.

(CG):

$$C_{x,y}q \text{ and } C_{y,x}q$$
$$C_{x,y}C_{y,x}q \text{ and } C_{y,x}C_{x,y}q$$
$$C_{x,y}C_{y,x}C_{x,y}q \text{ and } C_{y,x}C_{x,y}C_{y,x}q$$

…

Geurts further defines shared commitments as follows: a commitment is shared if and only if $C_{x,y}p$ and $C_{y,x}p$.[46] In a nutshell, this accounts for the overtness which the production of speech acts enjoys in typical circumstances, because it follows from the above rules and definitions that a commitment is shared if and only if it is common ground that it is shared.

Of course, in this framework the overtness enjoyed by a communicative act needs not be the overtness of a communicative intention that underpins its production. Therefore, acting with a communicative intention in Grice's sense is not necessary for communicating. It is interesting to notice that the examples proposed by Grice (John placing Smith's handkerchief on the scene of the murder intending the detective to believe etc.) and Schiffer (Ulrich letting the rats loose intending Alice to believe etc.) do not involve the production of a speech act. More importantly, what seems common to these examples is that the agent acts intending thereby *not* to share a specific commitment or, more generally, acts under circumstances in which there is no obvious way to accept a specific commitment.

It is generally possible to undertake a commitment without knowing that a commitment has been undertaken, without having entertained the proposition that constitutes the content of the commitment, or without knowing what commitments are. I suspect that unknowingly undertook commitments are the rule rather than the exception. A non-controversial example is the following: I might sign up for a PhD in Philosophy without realising that I will have to hand in a thesis in four years. Alas, ignoring the rule does not erase the commitment I undertook. Regarding communication, indefinitely many examples might be produced in cases where, for instance, propositional knowledge of conventions, be them linguistic or not, is, in some sense or other, absent. For instance, though competent speakers of a language have some degree of authority over their judgements of grammaticality, and they seek to avoid negative judgements on their own linguistic productions, they generally are not in a position to state the rules which those judgements implicitly lay out.[47]

---

[46] There is a subtle relationship between sharing and accepting. Although sharing entails accepting, the reverse is not true: the same commitment $C_{x,y}p$ may be accepted without being shared. This is the case, for instance, of two interlocutors who agree to disagree ($C_{x,y}p$ and $C_{y,x}\neg p$, but we both accept that we are so committed).

[47] This kind of remarks are at the heart of Michael Dummett's (e.g., 1996, esp. chapters 1-3) theorising regarding what it is to know a language or the meaning of words. In agreement with Dummett, I do not see any obvious way of answering these questions without relying, in one way or the other, on the notion of practical knowledge.

Here's an especially interesting example of how the communicative behaviour of a young child may be perilously responsive to the commitments she happens to have in his common ground with others:

> I returned home with the children as their uncle and aunt arrived for the weekend. After a brief chat the aunt asked "Where's your daddy?" R chattily volunteered "He's upstairs." A little later his father's voice was heard coming from the backdoor (rather than from upstairs). R said immediately "My *other* daddy's upstairs." His aunt (who had forgotten his previous statement) looked puzzled. I started laughing, realising the purpose of his statement (and there was indeed no one else upstairs!). (Mother of R, 2 years, 5 months, dictaphone).
>
> Reported in Reddy 2008: 220.

The possibility of, in many different senses, unknowingly sharing commitments is especially important for the young child, in indefinitely many ways (and I presume that this possibility has been important for our evolutionary history too). Some of these ways will be explored in the subsequent chapters of the present work. The general idea is that even though caregivers will take the child to be accountable for what she says and does only gradually, the caregivers' interpretive effort and consistency in behaviour, partly dependent on the commitments that they share with the child, scaffolds in many important ways the child's own development, including the development of communicative and linguistic competencies.

One important consequence of the possibility of unknowingly undertaking commitments is that, as Geurts (2019a: 4-5, 2020a: 10) argues, it is plausible to claim that the notion of commitment, unlike that of knowledge and belief, is closed under entailment: if p entails q, and $C_{a,b}p$, then $C_{a,b}q$. Since it is plausible to assume that commitments are closed under entailment, it is also plausible to claim that the infinitary structure of common ground really is a chain of inferences that is not meant to mirror communicators' inferential processes. Common ground can thus be regarded as a cluster of sets of shared commitments which constrain our interactions, and which we can reason about and come to represent in more or less accurate ways.

The above definition of common ground leaves the following possibility open: we may come to share a commitment without either of us being aware that we do, but the shared commitment can still potentially govern our interactions. I do not find it implausible to say that, e.g., an article of the law might be common ground between us in exactly this sense. The more general worry is that this definition of common ground is entirely stripped of psychological reality. I agree that, for several purposes, this account of common ground will need to be coupled with accounts of how individuals, on several occasions, may come to act in light of the commitments they explicitly share and how they come to hold each other accountable for what they say and do. In later chapters, I will have something to say in this respect regarding the case of infants. The important point is, for now, to distinguish the two endeavours: one thing is to say what it is to participate in a practice, the nature of which can be

described by employing a normative vocabulary, and a rather different thing is to explain the processes which enable individuals to regulate their own behaviour in light of the commitments that they share.

Shared commitments function to coordinate action interpersonally because they give rise to commitments and entitlements on both sides. Regarding the intrapersonal case, Geurts (2018b, 2019a) argues that private commitments, be them telic or atelic, may well function to plan and coordinate one's own actions over time.[48] The normative import of private commitments can plausibly be taken to reflect the normative import of attributions of intentions (telic) and beliefs (atelic). If some maxims of sincerity are the default, so that, for instance, $C_{x,y}p$ typically entails $C_{x,x}p$, there is a way of showing how the normative features of attributing intentions and beliefs can well be accessible features of some, if not most, communicative interactions. Assuming that the required degree of conceptual mastery is in place, communicators can easily reason about the presence or absence of even Gricean communicative intentions. It would perhaps be an unusual world one in which, in typical circumstances, I seriously assert that Vittorio Emanuele III was a coward, but I strenuously deny that, in so doing, I intend my interlocutor to believe that I intend her to believe that Vittorio Emanuele III was a coward.

<p style="text-align:center">***</p>

Explicitly sharing commitments in communication is an especially powerful form of expectation management which enables effective and complex action coordination beyond the immediate present. Taking commitments and entitlements to be fundamental building blocks in explaining communicative behaviour reflects the assumption that the kind of action coordination afforded by linguistic communication is stable and effective partly because, first, we are highly responsive to each other. The required degree of responsivity is manifest in strong tendencies to contribute to each other's goals, especially in communication, and in signalling agreement and disagreement (Geurts 2020b: 5-7). Second, it is stable and effective because regularities between sayings and doings are at least partly sustained by dispositions to behave normatively toward one another, and to be responsive to others' endorsement of normative attitudes (Geurts 2020b: 7-9).

In Chapter 3, I argue that the joint activities in which prelinguistic infants participate can plausibly be described as governed by implicitly shared commitments to goals, at least within the context of direct engagements. From early on in ontogeny, infants manifest the required degree of responsivity, and they also seek it in others. They manifest the required kind of active participation to others' goals, and, quite

---

[48] The possibility of unknowingly undertake a private commitment may also be open: in committing myself to adhere to every article of the Catholic doctrine, I might thereby commit myself to accept the belief in the Assumption of Mary, even though I do not know of the existence of this article of faith. It is not an unusual experience one in which we hold ourselves accountable to certain standards without knowing why, or even without fully understanding those standards. Finally, it is also possible to undertake a private commitment without yet mastering the concept of private commitment.

ubiquitously, they expect suitably engaged and familiar others to contribute to their own goals. The ways in which infants manage to coordinate their actions with those of others can plausibly be characterised, at least initially, in terms of patterns of accepted and rejected contributions to the ongoing joint activity. Coordination of action is achieved and reobtained in broadly communicative ways, and by the time they have started pointing, infants have also started measuring their own behaviour according to others' endorsement of normative attitudes (e.g., of approval and disapproval), and they have already acquired the most basic behavioural means of signalling agreement and disagreement.

Conclusion

By taking Grice's analysis of utterer's meaning as definitional of what it is to communicate, Strawson proposed to identify the rationale of genuine communication with the recognition of communicative intentions. Contrary to what is often assumed, this view on communication cannot be straightforwardly translated onto a theory of the psychology or cognition of communicators. The reason is that making an intention overt in Strawson's sense is a matter of making it common ground, and there is no easy way of accounting for the very notion of common ground in psychological terms. In this vein, I showed that recent attempts in this direction have not succeeded, thus leaving the corresponding theories (Relevance Theory, Minimally Gricean Communication) without a solid base in accounting for the overtness of intentions which is supposed to be the hallmark of communication in Grice's sense. Without a plausible notion of common ground, it is also unclear how to explain the indefinitely many kinds of pragmatic reasoning which are conducive to successful communication. The negative point of this chapter is thus that theories of communication ought not to be conflated with theories of the psychology or cognition of individual communicators.

The commitment-based view of communication identifies the rationale for communicating in coordinating actions under normative constraints. By focusing as it does on communication as a social phenomenon, this approach offers a promising way of distinguishing theories of communication from theories of the psychology of communicators. It is possible to provide an account of common ground in terms of shared commitments, thus avoiding, in a principled manner, allegations of psychological implausibility. If private commitments are meant to capture the normative features of the notions of intention and belief, it is also possible to re-identify the role to be played by communicative intentions in communication. Though not strictly necessary for communicating, communicative intentions can be features of communicative interactions, and communicators can easily come to reason about them.

The general idea is that a theory of communication should provide some of the rules of the games that we happen to play together. It should be possible to get good at playing the game before knowing the rules, and possibly without ever coming to (propositionally) know most of the rules. Once competence in playing the game is

acquired, it is also very much possible to discern and negotiate reasons for playing games in certain ways, for deviating from the norm, and even to consciously establish new norms. In this first chapter, I took the first step in the direction of inverting the Gricean explanatory strategy by moving of the rationale of communication outside the minds of individual communicators. In the next chapter, I raise a different challenge for the Gricean theorist by scrutinising experiments in 'infants' mindreading', often held as evidence that infants engage in the sort of psychological reasoning required for communicating in Grice's sense. I deny that these experiments show what they are sometimes purported to show.

Chapter 2: Psychological Reasoning in Infancy?

Introduction

In the previous chapter, I argued that theories of communication should be distinguished from theories of the psychology of communicators. Following Geurts, I argued that, for many purposes, communication can be thought of as a form of coordinated action that aims at further coordinating actions under normative constraints. Accordingly, I defended a conceptualisation of the key notions of common ground and overtness in normative terms. In the third chapter, I develop this conception of communication further and extend it to the case of infants and young children. In the fourth chapter, I see how this alternative conception scores compared to its Gricean counterpart.

The aim of the present chapter is to undermine an argument frequently marshalled in favour of the Gricean picture. Gricean theorists might concede that overtness and common ground are best conceptualised in normative terms. Alternatively, they might develop a different psychologistic construal of these two notions and argue that the kind of psychological mutuality that communicators do in fact achieve is enough to ground their communicative interactions. I am sceptical of either solution, but, bracketing concerns regarding common ground, the Gricean theorist might maintain that intending to make one's own intentions recognised, in one sense or the other, is a defining feature of communication. Studies in infants' 'mindreading', it is often argued, vindicate the validity of this picture for the case of infants. In brief, the argument is that there is evidence that infants can engage in sophisticated psychological reasoning, and so there is evidence that they can communicate in Grice's sense. The present chapter is dedicated to undermining this argument. I argue that the evidence produced in studies of infants' 'mindreading' falls short of showing that infants engage in the kind of psychological reasoning postulated by the Gricean theorist. More interestingly, if the results of some of the experiments I discuss (section 3.1) were taken as evidence for sophisticated psychological reasoning in infancy, they would constitute a *problem* for the Gricean theorist. This objection, if sound, further motivates the elaboration of an alternative view according to which reasoning about intentions and beliefs is not a defining feature of communication.

In the first section, I clarify which kind of psychological reasoning is required for Gricean communication and I outline the basic distinctions which I will use in the rest of the chapter. For the Gricean theorist, it is crucial that infants attribute intentions and beliefs as propositional attitudes. This is a claim about the activity of the subject and the degree of conceptual mastery that the subject has achieved, and it should be distinguished from claims pertaining to different cognitive systems that, on

different occasions, might support this activity, or that gradually develop to later support it. This distinction is often neglected in the literature, and the result is again a confusing picture of human psychology and cognition.

In the first section, I also recapitulate the traditional view regarding the development of capacities for psychological reasoning. According to this view, children attribute beliefs as propositional attitudes consistently from when they are roughly four years of age, after they have acquired a language rich enough to contain sentential complement syntax and propositional attitudes terms. This picture has received a rich theorising and is also corroborated by findings in atypical development. Deaf children born of hearing parents, who are delayed in various ways in the acquisition of a language, manifest a correlative delay in developing capacities for reasoning about others' intentions and beliefs.

Most, though not all, of the traditional studies employed verbal measures. Subjects are *asked* how they predict the observed individual would act on a given occasion. To eliminate exogenous task demands, over the past fifteen years developmental psychologists have tried to devise experiments which employ non-verbal measures but might nonetheless reveal attributions of propositional attitudes. In the second and third sections, I discuss the key experimental findings produced in infants' studies. I first consider the classic violation of expectation paradigm devised by Baillargeon and colleagues (Onishi and Baillargeon 2005, Scott and Baillargeon 2009), which employs looking time as the dependent measure. Infants look longer at events that surprise them, and what is measured in these studies is the infant's surprise in the face of actions which are incongruous with the actor's own beliefs. I also consider more direct measures, such as infants' helping behaviour, employed by Buttelmann and colleagues (2009, 2015). The assumption in these studies is that, for helping the other person as they do, infants must have attributed to her a false belief. For both sets of findings, I also briefly review the history of attempted replications (direct and conceptual). My conclusion will be that there is no good evidence that infants ascribe propositional attitudes. Interestingly, if some experiments in infants' mindreading were taken as evidence for sophisticated psychological reasoning, they would constitute evidence against the Gricean picture.

In my review, I will not consider experiments which take anticipatory looking behaviour (rather than looking time) and neural responses as the dependent measures. Anticipatory looking has proven to be an unreliable indicator of the subject's expectations regarding others' actions, in both children and adults, and neural responses are not relevant for assessing degrees of conceptual mastery. I will detail my reasons for setting these two sets of findings aside over the course of the exposition.

1. Psychological Reasoning and 'Mindreading'

Communicating in Grice's sense necessarily requires attributing intentions and beliefs *as propositional attitudes*.[49] This is so because, first, the relevant beliefs and intentions are supposed to determine the content of the utterance, and this must be a propositional content. Second, in this picture communicators must reason about intentions and beliefs which are *about* intentions and beliefs. Though one can have a belief without mastering the concept of belief, conceptual mastery is required for having beliefs which are about other beliefs. Since most experiments have focused on belief attributions, this will be the focus of the present chapter. The overarching claim is that experiments regarding infants' 'mindreading' capacities do not show that infants' 'mindreading' is 'recursive', and neither they show that infants attribute intentions and beliefs as propositional attitudes. My claim is not that infants are oblivious to other minds, but that infants' copings with other minds need not, and in fact seem not to be, conceptually mediated in the sense required by the Gricean theorist.

It is convenient to recount the traditional story about the development of capacities for psychological reasoning starting from recent findings regarding infants' capacities for goal attribution.[50] There is good experimental evidence that, by the time they are they are 10 months of age, infants expect observed agents to achieve their goals efficiently, along several dimensions and in a variety of different circumstances.[51] For instance, they are surprised if an agent whose goal appears to be to reach a location L takes a detour or jumps where there is no physical barrier. They also manifest surprise if, in the presence of a barrier, the detour or the jump are not commensurate to the height or the width of the barrier. If young infants have expectations about how agents achieve their goals, then it makes sense to say that infants perceive features of the agent's environment as either opportunities or obstacles for that agent's actions.

In general, opportunities for action are also constrained by information that is not available to the agent, but which might be available to the infant. For instance, an agent might be looking for a ball, which she previously placed in a green box. The infant might have seen that, in the absence of the agent, the ball was moved from the green to the yellow box. The infant might then expect that the agent will look for the ball where that agent has last seen it, and not where the ball actually is. An important question to ask is thus when do infants start to form expectations about others' actions based on informational constraints to which the agent, but not the infant, is subject to. Most theorists would agree that, around when they are 18 months of age, if not before, infants sometimes do expect the goal-directed behaviour of other agents to be subject to some informational constraints which do not apply to the infant

---

[49] In relation to this point, see also the considerations put forward in Millikan 1984: Chapter 3, and elaborated further in Millikan 2004, 2017.

[50] Although the ascription of an intention presumably involves the identification of a goal, the converse is not true. Building a tower is a goal which some colonies of ants have. It is unclear in what sense, if any, the colony of ants intends to build a tower. Dennett (2017), among many others, is especially clear on the many distinctions to be drawn between goals and intentions, and the corresponding ascriptions.

[51] For a thorough experiment and a useful introduction to this field of inquiry, see Pomiechowska and Csibra 2020.

herself. Where theorists disagree is whether the informational constraints ought to be identified as beliefs that the child believes the agent has. Though seldom recognised as such, an importantly different source of disagreement is on which cognitive mechanisms the infant relies upon in detecting the relevant informational constraints, and how this detection feeds into their goal attributions. I address the first question first, arguing that the relevant informational constraints should not be identified with beliefs.

It is problematic to characterise the relevant informational constraints in terms of beliefs, if a belief is an attitude of an agent toward a proposition, which determines a course of behaviour only in conjunction with other propositional attitudes under constraints of rationality. A first and serious obstacle for the developing mind is that propositional content is truth-evaluable and conceptually structured. Ascriptions of propositional attitudes create, as it is often said, opaque contexts. The same fact can be individuated by different propositions, and this makes a difference for action. J. J. Jameson intends to convince everyone that Spider-Man is a criminal. He regularly meets Peter Parker, who is in fact Spider-Man. Nothing that J. J. does suggests that he intends to convince everyone that Peter is a criminal. J. J.'s behaviour can easily be explained by assuming that he does not know that Peter is Spider-Man. To readers of Spider-Man comics, this sort of reasoning seldom, if ever, needs to be made explicit. The point is not confined to cases of secret identities: it invests conceptual mastery in general. The very same situation can be individuated under different descriptions, which place that situation in certain inferential relationships with other situations, and this makes a difference for action.

From an experimental point of view, research about the development of capacities for psychological reasoning has traditionally assumed that, before the age of four, children typically do not reason in terms of beliefs and intentions as propositional attitudes. In the original study conducted by Wimmer and Perner (1983), the child is narrated a little story with the aid of illustrations. The story features Maxi, a boy who hides a chocolate bar in the cupboard and then goes out to play a game. In his absence, someone moves the chocolate bar to a different shelf. When, in the story, Maxi goes back to the kitchen, the child is asked where Maxi will look for his chocolate bar. When they are about four years of age, most children say that Maxi will go for the shelf where he left the chocolate bar, and not for the shelf where the chocolate bar actually is. This finding suggests that children predict others' actions based on the beliefs that they ascribe to other agents. Although the design of this first pioneering experiment is quite rough and overly demanding, a large set of much more refined versions have validated and refined the suggested interpretation (see, e.g., Wellman et al. 2001, but see Yazdi et al. 2006 for a critique). The beliefs that children consider can be about many things such as, for instance, the location of an object, the true content of a box, or the identity of an object. Ample validation across different measures and different experimental paradigms has been achieved.

The interpretation of these findings is also corroborated by the results obtained with classic 'perspective-taking' tasks.[52] Level-1 perspective taking is a matter of being sensitive to whether someone can perceptually access something at all or not, regardless of the description under which that something is individuated by either the subject or the agent. Level-2 perspective taking, on the other hand, is a matter of being sensitive to how the other individuates what they perceive, where this individuation potentially differs from the one adopted by the child. Since children from around their fourth birthdays pass several (genuine) False-Belief and (Level-2) Perspective-Taking tasks, there is clear evidence to support the claim that children this age are capable of psychological reasoning in terms of beliefs and intentions.[53]

It is possible to be sensitive to, say, relationships of 'perceptual access' between agents and features of the surrounding environment without being sensitive to how these accessibility relations are conceptually mediated.[54] This sensitivity is what is targeted in 'Level-1 perspective taking' tasks. In several situations, young infants effectively keep track of what the other has or has not seen, and of what the other is or is not attending to,[55] even if they do not share with the adult much, if any, recognisable conceptual mastery, let alone mastery of folk psychological concepts. In fact, it is generally unclear how young infants themselves parse out features of the surrounding environment, and it is not even clear that the ways in which they individuate objects as stable features of the environment is comparable to the ways in which adults do so (Hildebrandt et al. 2020).[56] It is therefore even more unclear how infants could detect the conceptually mediated relationships to which adults stand to features of the surrounding environment, and if they could, how would we establish that they do so from an experimental point of view. Conceptual mastery is only the first obstacle,[57] but it is a serious one.

The relationships of perceptual access between agents and features of the environment to which infants are sensitive to might not be adequately captured by any folk psychological concept, because detecting these relationships is one of the

---

[52] In his book-length treatment of the subject, Apperly (2011) has provided a useful overview of the experiments that have shed light on different stages of the development of capacities for psychological reasoning, from infancy to adolescence. As anticipated in the introduction, for a model of the ways in which important segments of linguistic competency contribute to the acquisition of folk psychological concepts, I am very much sympathetic to the proposal made by Geurts (2021).

[53] For important considerations regarding the role of different aspects of linguistic competency, see Astington and Baird (2005) and the literature reviewed in Heyes (2018), which covers more recent findings. Evidence coming from deaf children born of hearing parents strongly suggest that capacities for psychological reasoning heavily depend on having acquired a language with mental state terms and sentential complement syntax. In this respect, the experiment performed by Pyers and Senghas (2009) with signers of the Nicaraguan Sign Language is the most important and well-conducted one.

[54] For a fuller illustration of this point, see Bermúdez 2003: 171-178.

[55] I will expand on the topic of attention in the following two chapters.

[56] Hildebrandt and colleagues (2020) push it as far as to say that, before infants have mastered the use of deictic terms in a natural language, they do not even parse out the world in terms of objects and their properties *at all*. I am not committed to this more specific conclusion, which I find extreme, but only to the more negative points made by Hildebrandt and colleagues.

[57] Further and very much related obstacles include (but are not limited to): the normative import of propositional attitudes attributions (McGeer 2020) and the unavailability of these attributions for action prediction unless they are already available for action explanation (Andrews 2009).

many preconditions for acquiring those concepts. Further specifications of how infants detect these relationships may be provided, but this is quite a different endeavour, and to avoid confusion, it is better to provide those specifications in a technical vocabulary that is not the vocabulary of folk psychology. Apperly and Butterfill (2013) have provided one such candidate vocabulary. In what follows, I briefly recapitulate the strand of their proposal which I adopt in the rest of this chapter. After having done so, I come back to the distinction between conceptual mastery and cognitive systems, and I offer some reasons not to adopt Apperly and Butterfill dual-system view of mindreading.

The basic notions employed by Apperly and Butterfill (2013) are those of *encountering* and *registration*. Encounters are defined as relations between agents and objects. Relations of encountering hold between agents and objects that are in that agent's 'field'. A field of an agent at a given time is determined by the orientation and posture of the agent, as well as by conditions of lighting in the environment, the proximity of objects in the environment, and the presence of opaque barriers between the agent and objects in the environment. The principle governing the relation between goal-states and encountering is that if an outcome involves an object that the agent has not encountered, that agent does not have the production of that outcome as a goal.

While the notion of encountering targets conditions for ascribing goal-states, the notion of registration targets conditions for succeeding in achieving goal-states. The location at which an agent has most recently encountered an object is the location at which that agent registers the presence of that object. An agent will successfully achieve a goal involving the registered object only if that object is at the location where she registered it to be. Finally, if the agent has an incorrect registration of the location of the object, and has the goal of getting that object, the agent is expected to reach for the object where that agent registered it to be. This final principle enables infants to implicitly ascribe states which have correctness conditions, and that on some occasions do the same predictive job as belief states.[58] However, implicitly ascribing these states need not presuppose anything like mastery of the concept of belief.

Apperly and Butterfill (2013) tend to translate the complexity of the concepts that children come to master onto the nature of the cognitive systems that subserve the deployment of those concepts. Since propositional attitude concepts are complex, their deployment must be effortful. On the other hand, tracking of belief-like states occurs in a largely automatic and effortless manner. Since in both cases the 'same' features of the environment are targeted, the argument goes, there must be two different specialised systems that subserve 'mindreading'. I believe that this reasoning rests on equivocations which often, though not always,[59] go unnoticed and are widely shared in the literature. Before delving into studies of infants' mindreading, then, I intend to distance myself from this aspect of Apperly and Butterfill's proposal. The

---

[58] These are all principles which constraint infants' expectations. They need not be anywhere represented 'as such' to do their job.

[59] Brandom (e.g., 2009: Chapter 8) is especially clear on this point.

importance of carrying out this operation will emerge more clearly in the discussion of the experimental evidence below.

According to Apperly and Butterfill (2013), System-1 Mindreading works by implementing some version of the principles listed above, and thereby functions as a heuristic mechanism which does not represent propositional attitudes 'as such'. On a significant range of occasions, this tracking yields predictions that would also be yielded by genuine belief attributions. The functioning of this system is supposed to be automatic, meaning that this system's processing activity occurs, by and large, regardless of the subject's aims and interests. The functioning of this system is also supposed to be largely inflexible and limited with respect to the range of circumstances in which it enables successful heuristic tracking of propositional attitudes. The other, late emerging, System-2, is supposed to reliably track propositional attitudes as such; its activity is supposed to be effortful and non-automatic. Some non-human primates, as well as infants, employ some version or other of the early emerging system in forming expectations about others' goal-directed activities. Apperly and Butterfill (2013) argue that human adults under time pressure (or other situational constraints) deploy the heuristic mechanism too. It is only on some occasions that human adults deploy the System-2 mechanism which enable them to keep track of beliefs and intentions 'as such'.

As I see it, the problem is that it is generally not warranted to assume that, given the complexity of propositional attitude concepts, adult humans must deploy them only on a limited set of circumstances, or that it is cognitively effortful to deploy these concepts, or that this deployment cannot occur 'automatically'. There is nothing inherently effortful in thinking about what someone intends or believes.[60] These concepts are difficult to analyse, and presumably their acquisition presupposes, among many other things, proficiency in a rich enough natural language. Different degrees or varieties of conceptual mastery afford different kind of inferences, and which inferential patterns are relied upon (or inhibited) on an occasion will depend on indefinitely many situational factors. At least in principle, the subject's reasoning about psychological matters may be subserved, on different occasions, by quite different cognitive systems such as, e.g., memory, attentional processes, and so on. Nothing in the nature of folk psychological concepts suggests that we keep track of the very same features of the environment with two different domain-specific systems, that represent those features in either conceptually poor or rich terms.

Part of the motivation for positing the existence of two distinct systems that track propositional attitudes in different ways comes from evidence regarding human adults. On some occasions, but not others, adults seem to automatically keep track of propositional attitudes, and this tracking exhibits signature limits that make it reasonable to postulate the existence of two distinct systems that range over the same domain.[61] However, from an empirical point of view, the initial findings regarding automaticity in adults, which motivated the dual-system view in the first place, have

---

[60] This point is made vividly in McGeer 2020.
[61] The evidence in favour of this claim is reviewed in Apperly and Butterfill 2013.

proven to be not entirely reliable and difficult to interpret,[62] consistently with the objection outlined above. From an experimental point of view, there are good reasons to take some distance from the dual-level view of mindreading, and to keep hold of the distinction between the deployment of concepts and the workings of domain-specific cognitive systems.

Other important aspects of the distinction outlined above will emerge more clearly in the following sections. The main point of this section is that the Gricean picture requires infants to reason in terms of intentions and beliefs as propositional attitudes. It is not obvious to explain how, before they have acquired anything like a natural language, infants could be in a position to engage in this form of psychological reasoning. On the other hand, infants form expectations regarding others achieving their goals, and some of these expectations seem to be informationally constrained. In an important sense, infants do keep track of what others have or have not seen. Further specifications of *how* infants do what they do are better framed in a vocabulary that is not the vocabulary of folk psychology, because the reliability of the expectations that infants manifest contributes to the acquisition of folk psychological concepts (rather than presupposing mastery of these concepts). This does not entail that there is a second, later emerging, domain-specific cognitive system which subserves the deployment of folk psychological concepts.

It is often (implicitly) held that studies in infants' mindreading do not merely uncover steppingstones in the process of acquiring folk psychological concepts. These experiments, it is explicitly argued, show that infants, prior to having acquired anything like a natural language, already reason in terms of intentions and beliefs. In the next two sections, I consider the key experiments and I argue that they fall short of showing what they are sometimes purported to show.

2. Observing Others

Infants do not speak, so seeing whether they engage in any kind of psychological reasoning requires the adoption of indirect measures, such as looking time. The general problem is that indirect measures are at their best when they target discrimination of low-level perceptible features of the environment, and, as we will see in this section, their reliability is at best uncertain when targeting high-level conceptual mastery. This is the crux of the matter.

I start my scrutiny by discussing the paradigmatic experiment performed by Onishi and Baillargeon (2005) based on a non-verbal violation of expectation paradigm, and on looking time as the dependent measure. The background premise of the experiment is that infants tend to look longer at events that surprise them. If infants ascribe goals and beliefs (or belief-like states) to other agents, they should manifest surprise when those agents act in a way that is incongruent with the beliefs that infants attribute to them. The general idea is to have the infant look at an adult repeatedly reaching for an object at a certain location, and then, with the adult either present or absent, have the object moved to a different location. If the infant looks longer when

---

[62] For references, see Carruthers 2020, Heyes 2018.

the agent's reaching is incongruous with the agent's belief, then, it is argued, there is some evidence that infants attribute beliefs. However, I argue, manifesting surprise in the expected manner does not require ascribing a belief. Interestingly, the results of this first experiment have also been replicated when the human agent was substituted by a toy crane.

In the second sub-section, I discuss an experiment performed by Scott and Baillargeon (2009) often cited as evidence for the claim that infants ascribe beliefs *as propositional attitudes* (e.g., Carruthers 2020, Jacob 2020). Like the experiment by Onishi and Baillargeon, this more recent experiment by Scott and Baillargeon employs a violation of expectation paradigm and relies on looking time as the dependent measure. The important difference is that, allegedly, the infant is supposed to track genuine beliefs which involve the identity of the object, as opposed to tracking belief-like states about its location.[63] I argue that the very design of this experiment makes the relevant attribution of belief neither obvious nor warranted. If expectations are consistently formed, these are unlikely to depend on the attribution of a belief about the identity of an object.

In the third sub-section, I offer reasons to set aside similar experiments which employed two different indirect measures: anticipatory looking time and neural responses. I argue that the first is not even a reliable indicator of the formation of the relevant expectations in either infants or adults, and that the second could hardly provide any evidence regarding the degree of conceptual mastery which infants have achieved, even if the results of all the other experiments were valid (and there are reasons to believe that they are not).

2.1 Change of Location

In the experiment set out in Onishi and Baillargeon (2005), each 15-month-old infant receives three familiarization trials, a single belief-induction trial, and a single test trial. In the first familiarization trial, the infant sees two boxes, one yellow and one green, and a toy watermelon slice placed between them. The boxes have openings that face each other and are covered with fringe. The background window behind the boxes and the table is then opened. An adult with a visor appears, takes the toy watermelon slice, and then places it in the green box. In the remaining two trials, the infant first sees the two boxes, then the background window is opened, and the adult reaches for the green box.

After the familiarization phase, each infant receives one belief-induction trial. There are four different kinds of belief-induction trials. In each of them, a change in the scene occurs, the result of which is that the adult has either a true or a false belief (TB or FB) about the toy watermelon slice being in either the green or the yellow (G or Y) box. In the Green-True-Belief condition, the adult sees the yellow box moving halfway toward the yellow box, and then going back to its starting position in the

---

[63] Object identity is a bit of an obsession in the field, and it has generated much confusion. If what is at issue is conceptual mastery, it would be more appropriate to talk about different descriptions under which an object is (or can be) identified.

green box. The assumption here is that both the adult and the infant truly believe the toy to be in the green box. In the Yellow-True-Belief condition, the adult sees the toy watermelon slice going from the green box to the yellow box. The assumption is, again, that both the adult and the infant truly believe the toy to be in the yellow box. In the Green-False-Belief condition, the toy watermelon slice moves from the green to the yellow box, but the background window is closed, so the adult cannot witness the happening. In this condition, the assumption is that the adult falsely believes that the toy is in the green box, while the infant truly believes that it is in the yellow box. In the Yellow-False-Belief condition, the adult sees the toy moving from the green to the yellow box. Then, the background window is closed, and the toy moves again from the yellow to the green box. The assumption is then that the adult falsely believes the toy to be in the yellow box, while the infant truly believes that the toy is in the green box.

In the test phase, half of the infants see the adult reaching for the green box, while the other half see the adult reaching for the yellow box. Therefore, there is a total of 8 experimental conditions. The prediction of the authors is that the infant looks longer at the scene if the adult reaches for a box while believing that the toy is in the other box. If this prediction is confirmed, the authors argue, then infants will have ascribed a belief to the agent, the content of which may not match with the content of their own belief about the location of the object. The background assumptions for this conclusion are that, first, since infants have paid attention in the familiarisation trials, they ascribe to the adult the goal of reaching for the toy, and that, moreover, they look longer at events that surprise them, and in these cases, they can be surprised only by the fact that the adult's actions are incongruent with the adult's own belief about the location of the object.

These background assumptions can be challenged in more than one way. It is unclear which goals ought to be ascribed to the agent based on the familiarisation trials: the agent might have the goal of reaching for the green box, whether or not it contains the toy (as we shall see in a moment, this ambiguity does affect the results). More generally, nothing in this experiment suggests that what is ascribed to the agent must be a propositional attitude. There is a relationship between the agent and the object which the infant is in a position to detect even if she is not in a position to ascribe beliefs. 'Having seen' (or having registered the presence of an object at a certain location) is a good place holder for one such relationship. Having registered the presence of an object at a certain location has correctness conditions which need not be truth-conditions. It is worth expanding on these points by recapitulating the results of the experiment and the troubled history of replication attempts.

In all binary comparisons between reaching for either the green or the yellow box according to the different 4 belief-inducing conditions, infants look longer when the agent reaches for the box where the agent ought not to believe the toy is. The prediction of the authors was thus confirmed, and there have been some successful replication attempts. However, several failed replications have recently been

uncovered,[64] and it is not obvious that they are false negatives.[65] Second, and interestingly, some experimenters have managed to replicate the results only if the test trials were preceded by a rule-based training phase (Yott and Poulin-Dubois 2012). Moreover, infants' looking time in the False-Belief-Green condition is significantly higher than in any other condition, including the False-Belief-Yellow condition, and it is unclear why.

Interestingly, the same results obtained by Onishi and Baillargeon have recently been reproduced in a study with a subset of the same situations, but in which the human agent was replaced by a toy crane, that could by itself orient toward a box and pick it up (Burnside et al. 2020). The experimenters also presented adults with the same set of stimuli. Prior to the beginning of the test phase, adults were given a sheet of paper, and they were required to answer the following two questions: "Do you think the crane will go into the yellow box or the green box?", "Why?". Most adults (77%) predicted that the crane would have gone to the green box, and most of them (61%) motivated their prediction by saying that the toy crane always turned to the green box during the familiarisation trials. It is worth noticing that the import of this assumption might also explain the difference in looking time between FB-Green and every other condition in the original experiment with infants. Some adults said that the crane would have gone where the target object was (26%), and some other (13%) said that the crane would have gone where the crane last 'saw' the object.

Rather unfortunately, Burnside and colleagues did not use a control group to code adults' looking time, and they tested infants only in the FB-Green and TB-Green conditions. Moreover, an important difference between the adult and the toy crane was left unchecked: the adult does not pick up the box. Rather, she puts a hand into it. This lack of systematicity is frustrating, but the experiment with toy cranes points to a deep difficulty for studies which target high-level conceptual mastery by using indirect measures such as looking time. Minimal agential cues (being self-propelled and goal-directed) are sufficient to generate the target predictions regarding the agent's behaviour in the circumstances of the experiment. Ascribing a belief to the agent is not necessary for forming the expectations that infants and adults alike manifest.

In spirit, the experiment with the toy crane is analogous to the one conducted by Santiesteban and colleagues (2014),[66] where an avatar, oriented toward a wall in a room, was substituted by an arrow with the same orientation. In that experiment, adults were asked how many dots on the walls they could see, and how many dots the avatar could see. The correct answer to the two questions was sometimes the

---

[64] For a *subset* of the *unpublished* replication attempts, see Kulke and Rakoczy 2018.

[65] The commentary provided by Baillargeon et al. (2018) and the response by Poulin-Dubois et al. (2018) are especially instructive in this respect.

[66] The two experiments are not directly comparable because in the experiment by Santiesteban et al. the arrow shares with the avatar some superficial properties (approximate shape and colour) and orientation, while in the experiment by Burnside et al. the toy crane shares with the adult model *agential* properties (self-propelled, goal-directed). The measures employed and the nature of the task are also radically different, and the experiment was not meant to discriminate between sophisticated or unsophisticated forms of psychological reasoning, but rather for the presence or absence of any kind of psychological reasoning. The important point, however, is the same, namely, that these measures are silent on how the subjects themselves conceptualise the relevant features of the situation.

same and sometimes not (2x2 design). Adults were consistently slower in answering the question when the number of dots they could see was incongruous with the number of dots that the avatar could see, even when detecting the difference was irrelevant for answering the question. By itself, this finding could have been taken as evidence that adults spontaneously engage in some form or other of psychological reasoning. However, arrows, like avatars, have an orientation, but presumably they do not have psychological states. Therefore, people might be consistently slower in answering regardless of whether they go through any kind of psychological reasoning.

2.2 Object Identity

Baillargeon and colleagues performed other experiments meant to make belief ascription necessary for forming the right sort of expectations. In the 2009 experiment, often held as prime evidence for propositional attitude attribution (see, e.g., Carruthers 2020, Jacob 2020), Scott and Baillargeon created a situation in which, allegedly, to form the right kind of expectations the 18-month-old infant must keep track of the adult's belief regarding the identity of the object. The measure is again differential looking time, in a violation of expectation paradigm. I argue that the experimental design employed makes the target belief attribution neither obvious nor warranted. If certain expectations are consistently formed, these are unlikely to depend on the ascription of a belief about the identity of an object to an agent.

The infant first receives 4 familiarization trials, followed by two test trials, both in either the False-Belief or the True-Belief condition. In the first two familiarization trials, an agent sits at a table, which has two platforms. In front of one platform there is a toy penguin, while in front of the other platform there are two parts which can be assembled to form another toy penguin, indistinguishable from the first one. From an aperture on the wall to the right, a gloved hand places the whole penguin on the right-most platform, and the two pieces of the disassembled penguin on the other platform. An agent places the key in the bottom half of the disassembled penguin, and then 'closes' the penguin by placing the other half on top. The other two familiarization trials are identical to the first two, except that the location of the two penguins is reversed, and the platforms are replaced by shallow containers.

In the two False-Belief test trials, the platforms are substituted by an opaque and a transparent box. No agent is present at the beginning of the trial. The gloved hand assembles the two-pieces penguin, places it in the transparent box, and then places the one-piece penguin in the opaque box. The agent returns with the key in her hand, and either goes for the penguin in the transparent box, or for the opaque box. In these two False-Belief conditions, the infant is supposed to manifest surprise when the agent goes for the penguin in the transparent box. According to Scott and Baillargeon, this is because the infant is supposed to attribute a false belief to the agent that the penguin in the transparent box is the one-piece penguin. I do not find this claim compelling. As far as the evidence available to the agent goes, believing that the perceivable penguin is the one-piece penguin is as rational as believing that it is not.[67]

---

[67] An analogous point is made by Zawidzki (2013: 180-185).

As far as the agent knows, the two-pieces penguin can be assembled to look like a one-piece penguin, and there might be nothing under the opaque box. Regarding ascriptions of beliefs, then, it is unclear what this experiment *could* show, no matter the specific results obtained, because either expectation could be made in accord with the hypothesis of the study.

That the very task might not be valid is evidenced by the fact that, when the same experiment was performed with adults, participants did not consistently interpret the task as intended by Scott and Baillargeon, and this was evidenced by their responses, their descriptions of the task, and their explanations of how they themselves would have acted if they had the goal of placing the key in the penguin (Low and Edwards 2018).

2.3 Other Indirect Measures

A different indirect measure often used in studies of infants' mindreading is anticipatory looking time. What is measured is where infants look first as an indicator of what they expect the other will do. This measure does not require a violation of expectation paradigm and is importantly different from looking time. The idea behind its adoption is that it should be possible to see not only that infants' expectations are violated, but also which expectations they form as they form them. This point is often made by saying that anticipatory looking behaviour targets expectations that are formed 'online' (see, e.g., Baillargeon et al. 2018). I find the very assumption driving this kind of measure unclear. More importantly, from an empirical point of view anticipatory looking is not a reliable indicator of the expectations that infants, as well as adults, form. Even the most committed advocates of sophisticated mindreading in infancy admit this much (Baillargeon et al. 2018), and the most thorough experimenters have failed to replicate the key experimental findings, with both infants and adults (see, e.g., Kulke et al. 2018).

Another set of findings that I will not discuss concerns infants' neural responses to False-Belief scenarios. In two experiments (Hyde et al. 2015, 2018), it has been found that, when watching the same videos of False-Belief scenarios, both young infants and adults show similar patterns of neural activation in the same areas of the brain. According to the authors of the experiments, these findings are jointly taken to show that young infants and adults, when watching these videos, are indeed engaged in the same task, and that infants, in some circumstances and from very early on in ontogeny, are capable of psychological reasoning in adult-like ways (this conclusion is also endorsed in Jacob 2020: 9-10; Jacob and Scott-Phillips 2020: 5). This conclusion can hardly be warranted. What is telling of conceptual mastery is evidence that the subjects successfully and robustly engage in the kind of reasoning in which the target kind of concepts must be deployed. If it is questionable that this kind of evidence has been produced (and it is), it is also questionable that when engaging the same brain areas in the same circumstances subjects are deploying the same concepts.

To see this from a different angle, consider the following experiment (Bartels and Zeki 2004): it has been found that, when looking at pictures of their own children, mothers do not show a relevant activation of those regions of the brain that are

presumably dedicated to mindreading.[68] On the other hand, when they look at pictures of other children with whom they are acquainted, the mindreading regions are more active. From this finding, it is not plausible to conclude that, say, a mother reasons about mental states only when the child is not her own.[69] Neural findings are indeed important, but the ways in which neural activity is related to the activity of the subjects, as well as to the degree of conceptual mastery that these subjects have, is, at best, *very* indirect. No straightforward conclusion of the sort proposed by Hyde and colleagues is warranted.

3. Helping Others

When targeting high-level conceptual mastery, indirect measures are in too many ways equivocal. More direct measures have been employed by Buttelmann and colleagues (2009, 2015), who considered infants' helping behaviour as an indicator of infants' beliefs attributions. Mirroring the tasks employed in classic False-Belief experiments, the false beliefs in question were about the location of an object (2009), and the individuation of an object considered according to its appearance or its function (2015). To illustrate the general idea: the infant sees a toy being moved from one box to another, with an adult either present or absent during the change of location. Previously, the adult had expressed interest in the toy, and now she tries to open the box where she previously placed the toy. If the adult was present during the change of location (true belief), the infant helps her opening the box that the adult is currently trying to open and which does not contain the toy. If she was absent during the change of location (false belief), the infant goes to the other box, retrieves the toy, and offers it to the adult.

The series of experiments performed by Buttelmann and colleagues is especially interesting. It offers a way of detecting the infant's own goals and motivations, and so offers a potential window into how the infant herself has registered what she has paid attention to. Correlatively, it is also more telling of which goals presumably the infant attributes to the adult. In both the True-Belief and the False-Belief conditions infants are expected to produce a specific, though different, active behavioural response, and, arguably, it can be assumed that the same motivations to help are present in both conditions. In this section, I offer a close reading of both experiments, and I recapitulate the troubled history of replication attempts. The conclusion will be that none of the experiments provide evidence in favour of the claim that infants engage in sophisticated forms of psychological reasoning, and, perhaps surprisingly, if they did, some of them would constitute potential evidence *against* the Gricean picture.

---

[68] Evidence regarding regions of the brain presumably dedicated to mindreading is usefully reviewed in Van Overwalle 2009.
[69] This is one more reason to carefully distinguish the activity of subjects (psychological reasoning) from the activity of cognitive systems, especially if identified with brain regions ('mindreading', which apparently has a significant overlap with lack of familiarity, and this has been confirmed by other experiments, as we will see in the next section).

3.1 Change of Location

In the first study (2009), the infant sits in front of two boxes. One experimenter (E1) is at the infant's side. In the familiarization phase, E1 makes sure that the infant knows how to open and lock the boxes with a pin. After the familiarization phase another experimenter (E2) sits in front of E1 and the infant, facing the two boxes. E2 starts playing excitedly with a toy caterpillar, while engaging both the infant's and E1's attention, and then places the toy caterpillar in either one of the two boxes. In the False-Belief condition (FB), E2 then leaves the room. While E2 is away, E1 puts the toy in the other box, requesting the complicity of the infant as if they were playing a trick on E2.[70] In the True-Belief condition (TB) E2 remains present and attentive, and E1 moves the toy to the other box, while engaging both E2's and the infant's attention. E2 simply witnesses the object transfer. E2 goes toward the door to close it before coming back to where he was. In both conditions, then, E2 approaches the infant from the door, and then always attends to the same box, examining it with puzzlement and trying to opening it. At this point, the infant is encouraged to help E2.

In the FB condition, most 18-month-olds (18 out of 25) went for the box where the toy was, while in the TB condition, most of them (21 out of 25) went for the box that E2 was trying to open. This difference between conditions is statistically significant. Although less significant from a statistical point of view, 16-months-olds displayed an analogous behaviour in the FB condition. In the TB conditions, however, their choice of box was at chance. The interpretation of the findings proposed by the authors is that, in the FB condition, the infant tends to ascribe to the agent the false belief that the toy is in box A. When the agent reaches for the box, they get the toy and hand it to her. In the TB condition, the infant tends to ascribe to the agent the true belief that the toy is in box B, and so when the agent reaches for box A, they tend to help her opening box A, rather than fetching the toy in the other box.

A few preliminaries are in order before interpreting the results. First, the TB condition is hard to replicate. As per the published attempts, the experiment performed by Knudsen and Liszkowski (2012a) is sometimes seen as a conceptual replication, but in the TB condition of this experiment the infant is not expected to produce any specific kind of behaviour.[71] In this and several other respects, the two experiments are not comparable. As per the unpublished replication attempts,[72] there have been at least seven, three of which did not contain the True-Belief condition. In the remaining four, infants' behaviour did not differ from chance in the TB condition.

Second, minor modifications to the experimental design bring the results to chance level, as evidenced in the experiment by Crivello and Poulin-Dubois (2018) where the infant sits on a table and the boxes are much closer and easier to reach. This modification was introduced to reduce the drop-out rate. When the distance

---

[70] This is a so-called conspiracy factor, which is present in the FB condition but not in the TB condition, and therefore can act as a confounding factor, altering participants' performance without entailing a better capacity to attribute beliefs (as found by Wellman et al. 2001).
[71] The other experiment by Knudsen and Liszkowski (2012b), often cited as another conceptual replication of Buttelmann et al. 2009, does not contain a TB condition at all.
[72] See Kulke and Rakoczy 2018.

between the infant and the boxes is increased again, the results start to become more significant. Buttelmann (Baillargeon et al. 2018: 116) has argued that the decreased distance of the boxes makes the infants unable to process the stimuli, in analogy with failed replications of the VOE tasks in which the *time* infants had to form the expectation was reduced. This analogy is of dubious significance, and it remains to be explained in what sense and why infants should be 'unable to process the stimuli' if the distance between them and the boxes is reduced. It is worth noticing that, if the analogy were valid, then infants' communicative interactions could not, on many occasions, be premised on sophisticated forms of psychological reasoning.

Another replication attempt was carried out by Crivello and Poulin-Dubois (2018), who administered the Buttelmann's task in a row of 3 to 4 different tasks, counterbalanced across infants, and all featuring the same experimenter. Only infants who had the relevant task as their first task showed responses aligned with those reported in Buttelmann et al. (2009). In subsequent trials, the rate of correct responses was roughly the following: 50%, 25%, 12%. According to Buttelmann (Baillargeon et al. 2018: 117), the increased familiarity with the experimenter tends to reduce 'mindreading activity'. It is worth noticing that, if familiarity reduces mindreading, and mindreading is equated with psychological reasoning, it follows that, when communicating with their moms, infants *never* communicate in Grice's sense.[73] I take it that this is not an acceptable conclusion for Gricean theorists.

In support of the proposed rejoinder, Buttelmann (Baillargeon et al. 2018: 117) refers to a series of findings with adults in which, in conversation with a friend or a stranger, subjects tend to adopt their own egocentric visual perspective in interpreting utterances more often when they are more familiar with their interlocutor. This comparison is highly contentious. The task in the adults' experiment is a completely different kind of task, and it is at least dubious that the attentional biases governing adults' behaviour in conversation with a friend can be found in infants' behaviour with an experimenter (even assuming that the experimental results obtained with adults are reliable, and that their interpretation is clear, which it is not).

There are two important problems concerning the very validity of the 2009 experiment. In a recent series of experiments (see Oktay-Gür and colleagues 2018), it has been found that older children do not pass the task administered in the 2009 experiment. However, at this age children do pass analogous tasks with different design and aiming at assessing the same competence. As Oktay-Gür and colleagues (2018) convincingly argue, this fact casts doubts on the very validity of the task and its interpretation.

This impression is reinforced by an especially ingenious experiment by Priewasser and colleagues (2018), who used 3 boxes rather than 2. To see how the experiment works, assume that, in the FB condition, the experimenter puts the toy in box A, and that, when she is away, the assistant places the toy in box B. The experimenter returns and tries to open box C, where the toy never was. In this

---

[73] Here again, it is important to distinguish the activity of subjects (reasoning about beliefs and intentions) and the activity of cognitive systems ('mindreading', which does seem to have significant overlaps with lack of familiarity).

condition, infants do not help the adult opening box C. Rather, they fetch the toy and give it to her. What this variation on the experimental design suggests is that the ascription of the goal to the adult, also in the original experiment, does not go through the attribution of a false belief regarding the location of the object. Rather, it goes through the ways in which the adult has previously played with the toy and, possibly, through what the assistant does, which can very well be seen as setting up a hide and seek routine.

3.2 Object Identity

In the third experiment, Buttelmann and colleagues (2015) intended to test more directly for the hypothesis that infants ascribe beliefs with a propositional content. The experiment is modelled on classic appearance/reality tasks. The core idea is that if infants attribute beliefs, they should be able to discriminate between an adult holding a belief about an object (a sponge that looks like a rock) individuated under a certain description (say, the object that can be used as a sponge) from the same adult holding a belief about the same object individuated under a different description (say, the object that looks like a rock).

The familiarization phase sees the infant playing with an assistant (A) and an experimenter (E). When E requests an object from the infant by showing an open palm, A verbally encourages the infant to give the requested object to E. This was done to familiarize the infant with both E's name and the appropriate response to E's requesting behaviour. As soon as the infant hands over to E the requested object, they all go to a different room and the experimental session begins. In each trial, A shows a deceptive object, such as a sponge-rock, to both E and the infant. Then, E leaves the room. In the True-Belief condition (TB), E comes back to the room, and A demonstrates to both E and the infant how to use the object as a sponge, and then places the object on a high shelf. In the False-Belief condition (FB), A performs the same demonstration, but only to the infant, and then puts the object on the same shelf. In this condition, after A puts the object on the shelf, E comes back to the room. In both conditions, E goes toward the shelf, tries unsuccessfully to reach the deceptive object, and asks A for help. A first pretends to be busy and ignores E's request. After E has stopped reaching for the object and has expressed some frustration, A lifts a cover on the floor, thus revealing two objects to the infant: a rock and a sponge (which does not look like a rock). She then encourages the infant to give E what she wants. In the FB condition, the infant is expected to give E the object that matches the appearances of the deceptive object, whereas in the TB condition the infant is expected to give E the object that matches the function of the deceptive object.

The hypothesis of the authors is that if infants manifest the correct helping response in both conditions, then there is evidence that they ascribe beliefs with a propositional content to other agents.[74] I am sceptical about this interpretation, but

---

[74] This interpretation is shared also by Carruthers (2020) and Jacob (2020).

the problem of finding the correct one does not even arise. As a matter of fact, the results obtained by Buttelmann and colleagues (2015) are not statistically significant.[75]

Overall, infants helped in only half of the trials (58% in the FB condition, 46% in the TB condition). It is not clear why, in this as in other similar experiments, they tend to help more in the FB condition. Anyway, considering only the trials in which they manifested a helping behaviour, they choose the 'correct' object in roughly two thirds of the trials, in both conditions. Taking the duck-brush pair to illustrate, they handed over a brush, thus individuating the object by its function, significantly more often in the TB condition (roughly 67%) than in the FB condition (roughly 33%), and they handed over a duck, thus individuating the object by its appearances, significantly more often in the FB condition (roughly 67%) than in the TB condition (roughly 33%). There are two main problems with the statistical analysis of the results. First, when the analysis includes trials in which infants did not manifest an appropriate helping behaviour at all, the rate of correct helping response drops to roughly 30% in both conditions, whereas the incorrect helping response drops to roughly 12%. This observation casts doubt on the validity of the task: most infants simply do not manifest the target helping behaviour. There is a second and more serious problem. Each infant underwent four trials in only one of the two conditions. In each trial, a different triplet of objects was used. The triplets were constituted by: (1) duck, brush, and duck-brush; (2) sponge, rock, and rock-sponge; (3) book, box, and book-box; (4) pencil, branch, and branch-pencil. Although there was no carryover effect over trials, infants' behaviour differed from chance only in the duck-brush case, while for the other three pairs of objects their behaviour did not differ significantly from chance.

The significance of the results obtained by Buttelmann and colleagues (2015) is thus dubious. To my knowledge, this kind of experiment has never been successfully performed, let alone replicated, with 18-month-old infants. This negative result is in line with other findings relative to older toddlers. For instance, in a series of similar experiments which involved an active behavioural response in non-verbal tasks, Oktay-Gür and colleagues (2018) found that 2-year-olds did not pass the task that involved the tracking of the adult's perspective. Importantly, toddlers of this same age pass analogous tasks which do not involve a recognition of the diverging aspects under which an object is represented by the adult. Analogous negative results have been obtained by Fizke and colleagues (2017) with both 2-year-olds and 3-year-olds. In light of these results, then, it is safe to conclude that the experiment performed by Buttelmann and colleagues does not constitute evidence in favour of the claim that infants ascribe beliefs.

Conclusion

For the Gricean theorist, it is crucial that infants can reason about intentions and beliefs as propositional attitudes, and that this is what they do when they communicate. Studies in infants' mindreading do not provide convincing evidence in favour of the claim that infants can engage in sophisticated forms of psychological

---

[75] *Pace* Carruthers (2020) and Jacob (2020).

reasoning as required by the Gricean theorist. In fact, some experiments in this tradition even discourage this assumption. If the kind of 'mindreading' investigated in these experiments is equated with psychological reasoning of the kind required by the Gricean theorist, then there are reasons to believe that, in most communicative interactions, infants do not engage in sophisticated forms of psychological reasoning (sections 2.3 and 3.1). This outcome cannot be accepted by the Gricean theorist.

My conclusion is that 'mindreading' should not be equated with 'psychological reasoning', and that experiments performed to study mindreading in infancy are (at best) not evidence in favour of the claim that infants engage in sophisticated forms of psychological reasoning as required by the Gricean theorist. The conclusions reached in these first two chapters motivate the elaboration of an alternative picture of prelinguistic communication, according to which reasoning about intentions and beliefs is not definitional of what it is to communicate. This is the task to which I now turn.

Chapter 3: Action Coordination in Infancy

Introduction

In the previous chapter, I argued that those experiments performed to investigate infants' mindreading capacities do not show that infants reason about psychological states as required by the Gricean theorist. Some of these experiments even discourage the adoption of a Gricean stance. There are good reasons, then, to look for alternatives. In this chapter, I aim to show how the commitment-sharing view of communication can be fruitfully employed to investigate the communicative interactions of infants and young children. The key is to think of communication as a normatively constrained form of action coordination, and to keep sight of the distinction between theories of communication and theories of the psychology of communicators.

In the first section, I start by presenting examples of joint activities which gradually become organised around a shared commitment to a goal, such as the activity of being picked up, in which the infant is an active participant. In this and other structurally analogous activities, coordination of action is achieved, and expectations are managed, in a broadly communicative way. Once the routine is stabilised, the infant is in a position to issue proto requests. I illustrate how situations structurally analogous to that of being picked up are pervasive in infancy. Then, I focus on different kinds of joint activities, and I explain in what sense it is appropriate to talk about shared commitments also in these cases.

In section 1.2, I propose a re-conceptualisation of what have been called ostensive cues. I argue that it is problematic to give a theory of ostensive behaviour focusing only on what the communicator does, and that it is also problematic to think of ostensive cues (eye-contact, infant-directed speech) as invariably signalling, for the infant, the presence of a communicative intention in Grice's sense. I argue that what is crucial to ostensive behaviours is their relational dimension. Infants' sensitivity for ostensive cues, coupled with robust tendencies to seek others' responsiveness, are met by analogous dispositions in the adult. I argue that these and other dispositions on both sides create the ideal pre-conditions for sharing commitments.

In section 1.3 I illustrate how communicating by pointing is itself a joint activity which, when embedded in more structured joint activities, effectively functions to regulate them, prefiguring (and scaffolding) in important respects the function that more articulated communicative acts will serve. From a communicative point of view, I propose to characterise pointing gestures as creating shared commitments to attend to objects and events. In the following chapter, I complement the description of the communicative uses of pointing gestures provided here by comparing it to its Gricean

counterpart. From a cognitive point of view, pointing gestures are unlikely to perform a uniform function across development. I suggest that they emerge in the infant, and are often responded to by the adult, as instances of explorative behaviour, and I sketch some of the ways in which pointing gestures, so conceived, can contribute to stabilising the infant's own uses of words.

The proposed characterisation of infants' communication requires that, in the process of acquiring a language, infants and young children come to share commitments to goals with adults, at least implicitly. Most research in developmental psychology seems to suggest that talking about normativity prior to when children are 3 years of age is inappropriate. In section 2, I argue that this is a misimpression, created by a narrow construal of normativity, a dubious construal of the existing experimental evidence, and a partial lack of appropriate experimental evidence. I argue that shared commitments are features of infants' interactions with adults and, later, with their peers. Infants become increasingly sensitive to these features, and they progressively regulate their own behaviour and expectations accordingly. This is what, at least in part, makes their own behaviour more organised and intelligible to themselves and others. In this section, I also argue that understanding normativity in these terms allows for a better interpretation of otherwise puzzling experimental findings.

Before delving into the complexities of prelinguistic communication and cognitive development, a *caveat* is in order. My main contention in this chapter is that infants' communicative behaviour can plausibly be understood in terms of implicitly shared commitments, where the notion of 'shared commitment' is a socio-normative one. A theory of communication is not thereby a theory of the cognitive capacities which enable communicators to do what they do, and it is important to keep the distinction between these two different enterprises in sight, as I argued in Chapter 1. Nevertheless, I believe there is value in complementing a commitment-based account of prelinguistic communication with the outline of an account of the cognitive and developmental processes which gradually enable infants and young children to become skilled in communicating linguistically and in self-regulating their non-linguistic behaviours. It is also important to explain, at least in part, the interplay between these two levels of explanation, the socio-normative and the cognitive, since it is assumed that infants become more skilled interactants partly through participating in interactions which are normatively regulated. Therefore, although I primarily intend to defend a commitment-based view of prelinguistic communication, a significant part of this chapter is devoted to exploring facts regarding infants' psychology, and to explaining the interplay between the two levels of explanation. The nature of this operation and the significance of carrying it out will emerge more clearly in the discussion of infants' pointing in section 1.3.

1. Action Coordination

Most accounts of joint action are premised on the assumption that, to participate to a joint activity, one must know or believe something about the jointness of the joint activity. In agreement with Ludwig (2007), I do not see any principled reason why this

ought to be the case. As a starting point, one can assume that what there is to a joint activity as such is the participation of multiple agents to an event. More detailed descriptions of different kinds of joint activities can be given by specifying the nature of the event, what counts as participating in it, what counts as doing so appropriately, and, possibly, which capacities one must have to participate effectively in the more specific kind of joint activity.[76]

1.1 Coordinating Actions

For current purposes, it is convenient to start by focusing on joint activities where there is a recognisable goal that the actions of the interactants, jointly, aim at achieving.[77] *Being picked up* is one such joint activity in which the infant is an active participant. From when they are 2-4 months of age, when the caregiver looks at them and goes down to pick them up, they look up at the caregiver, open and stretch their arms and adjust their bodily posture in anticipation of being picked up, for instance by protruding toward the caregiver, and stiffening their backs and legs.[78] These adjustments make the whole process more comfortable for the infant and facilitate it for the adult. Over time, coordination of action becomes smoother, and infants start adjusting their posture before the adult grabs them. It is important to emphasise that action coordination in this and other analogous cases is achieved and re-obtained over time in a broadly communicative way. The infant and the adult look at each other, and over the course of the process, the infant looks mostly at the adult's face. Around when infants are five months of age,[79] stretching their arms while intercepting the

---

[76] Tomasello (2014, 2019) adopts Bratman's (2014) account (and sometimes strands of Gilbert's (2014), or Searle's (2010), or Tuomela's (2007)) as a general account of the kind of joint action in which humans, but not other primates, engage, and from here he derives the kind of uniquely human motivations and cognitive capacities that children and infants must possess to engage in joint activities in this sense (human-unique cognitive abilities and motivations for 'joint intentionality' or 'collective intentionality'). Even bracketing considerations regarding human uniqueness, which I regard as problematic, I am sceptical of this strategy, which is an instance of the more general explanatory strategy often deployed by Tomasello. My concern is that, even assuming that a general and informative account of joint action could be given (which I doubt), this account would most likely *not* be informative of the cognition of the participants to the joint action (Bratman himself is quite careful in this respect, and very much aware that he is spelling out a normative account of joint action). There are indefinitely many things that we can happen to do together in one sense or another, as there are indefinitely many different capabilities that we might need to deploy for achieving our goals whenever we happen to coordinate with others. Correlatively, much research on joint action in infancy indicates that children take part to different kinds of joint activities, which have various degrees of complexities identifiable along several dimensions, in a piece-meal fashion (for an overview, see Rakoczy 2018).
[77] Stephen Butterfill (2012, 2013) developed an infant-friendly account of joint action in which shared goals, and individuals' assumptions about shared goals, do most of the explanatory work. I am sympathetic to Butterfill's account, especially if it is understood as an account of a specific kind of joint action, and only as a starting point for investigating some of the cognitive processes that participants to these specific joint activities must possess for doing what they do. I do not see it necessary to assume, in general, that individuals participating to joint activities must have assumptions about the sharedness of the goal. In fact, in some joint activities there might not even be a shared goal.
[78] From an experimental point of view, the emergence and modulation of these anticipatory adjustments has been studied in detail by Reddy and colleagues (2013).
[79] See Carpendale and Carpendale 2010: 121.

adult's attention becomes a way of 'requesting' the adult to pick them up.[80] When they are 1 year of age, issuing this proto request has become a piece of cake for the infant. From an interpersonal point of view, it is plausible to describe the infant's proto request at this stage in terms of sharing a commitment to a goal: if the commitment is shared, the infant and the adult prepare themselves to contribute to the goal and expect each other to do their part.

Interactions analogous to being picked up and which give rise to analogous proto requests are ubiquitous in infancy. Infants systematically rely on adults, and the expression of their needs is typically met by the adult's response, which often includes a serious interpretive effort. For instance, young infants express a wide range of needs by crying in subtly different ways, and their caregivers typically come to differentiate these expressions by responding differentially to them. Over the course of ontogeny, some instances of crying become ritualised into an incipient whining which can be taken as expressing frustration in the face of an unmet goal. The infant might unsuccessfully try to grasp an object, start whining and trying to intercept the adult's attention, in the expectation that the adult will contribute to her goal. Met by the adult's responsivity, the incipient whining and reaching is ritualised in, say, protruding toward the object with an open palm facing upwards, while vocalising and looking at the adult.[81] For a sample of reported analogous cases:

> Madeline at 13 months sitting in her high chair, eating fresh bread and jam, raised her arm and opened and closed her right hand. Her mother responded by saying, 'oh, you want some more,' and gave her some more bread and jam. Similarly, Grey developed a way of requesting a finger to hold onto for balancing while walking by raising his arm and opening and closing his hand. Grey made requests for different things in a variety of ways. Grey's early requests were rooted in dyadic forms of interaction.
>
> <div align="right">Carpendale and Carpendale 2010: 121.</div>

If one takes these cases to be pervasive in infancy because infants systematically rely on adults, it is plausible to assume that infants develop, so to say, an overarching sense of entitlement.[82] The mere fact that they have a goal, and that you are attentive to what they are doing, makes them feel entitled to your contribution to their goal, where your contributions might well consist in just a smile, a word, an expression of approval, or the acceptance of an offered object.

Of course, the mere fact that the infant has a goal and expects the adult to contribute to it does not invariably leads the adult to do so. Around when infants are

---

[80] Infants later diagnosed with ASD were reported not to adjust their posture in preparation of being picked up, and not to produce the correlative proto request later in development (Reddy 2008: 167-168). This remark does not license any specific inference regarding why these infants do not look at the adult and do not adjust their posture. More importantly, it does not license the inference that infants later diagnosed with ASD do not coordinate their actions with those of others. They often do but employ non-obvious strategies. An examination of how this happens and where this process leads them is beyond the scope of the present work.

[81] As it will emerge more clearly in the discussion below, pointing is *unlike* ritualised grasping in many respects, contrary to what Vygotsky (1978) initially thought.

[82] This line of interpretation is sketched in Michael et al. 2016: 9.

8 to 10 months of age, parents start verbally prohibiting them to do certain things ('No!' or 'Don't put your fingers there!', referring to the plug socket). Infants not only comply with some of these commands but, after the compliant behaviour is in their repertoire, sometimes they 'tease' familiar adults in circumstances that are analogous to the ones in which the command originally featured. From a behavioural point of view, this teasing consists in repeatedly initiating the prohibited sequence of actions without completing it, while glancing up at the adult in total amusement:

> Last week, I was round at my friend's and she's got a plant in the front room and she touched it, and I told her no, but she kept reaching out, like, not actually touching it, but like reaching out half an inch away from it, and then taking her hand away. Just so I'd say no. She was laughing, and she kept, she kept doing it, and she kept looking at me when she was doing it. (This was a one-off incident which did not recur.) (Mother of Melanie, 11 months, interview).
>
> Reddy 2008: 172

It is plausible to think of playing as, *inter alia*, a way of measuring one's own behaviour against a rule,[83] the content of which is, in these early cases, implicitly laid out by the adult's response to the infant's own actions. Situations which are suggestive of analogous processes are pervasive in infancy. Not all of them involve teasing, but some of them already have something to do with infants pushing the boundaries of their entitlements, and prefigure in important ways later occurring negotiations:

> Victoria definitely knows when she is doing something she shouldn't. She headed toward the video, looked round to see if anyone is going to tell her off and then actually… gone to touch it. When Paul told her off, she actually sat there and tried to make herself cry, but the tears just wouldn't come. (Mother of Victoria, 8 months, dictaphone).
>
> Reported in Reddy 2008: 226.

> The 11-months-old who is apprehended heading for the forbidden soil in the rubber plant scoops his hand up in a funny manner, "as though he was waving" rather than going to touch the soil, and repeats this whenever his mother says a warning "No.".
>
> Reddy 2008: 227.

Infants are not only sensitive to others' disapproval of their own doings, as in the case of prohibitions, but often enough they actively seek others' approval, in the form of emotionally significant expressions of praise. It is important to notice that infants' seeking approval from familiar or authoritative others is so pervasive that experimenters must resort to ingenious experimental designs to rule out the hypothesis that part of infants' motivations in acting as they do is to obtain approval

---

[83] To be clear: this is not how Reddy frame these episodes. As far as I can see, the way in which I propose to frame early 'teasing' is in line with how Laura Schulz (BCCCD 2021, Plenary Lecture) has recently proposed to investigate some of the roles which certain kind of games have for the psychology of older children. The relevant games are conceived of as activities oriented toward the achievement of an arbitrary goal under arbitrary constraints. The amount of evidence that she has gathered regarding the details of these processes and their cognitive effects is tremendous.

and avoid disapproval. The form of expressions of approval to which infants are sensitive to is most evident in cases of 'showing off', as in the following:[84]

> She waves to the lollipop people when she's in front of her pram, … she sits bolt upright and she waves to people as she goes by, and its like the royal wave you know, she does that to get attention and they say "oh aren't you clever" and … she claps as if to say "yes, I'm a clever girl, I clap." … She does it quite a bit now, if you say "clever girl" she'll clap her hands at you or beam at you… she'll play with her bricks and you'll say "clever girl" she'll do it again… I'm trying to get her to build bricks up, but all she does is take them off and run off with them, but if you say "clever girl, clever girl" she'll do it. (Mother of Alice, 11 months, interview)
>
> <div align="right">Reported in Reddy 2008: 138.</div>

> He's rather pleased with himself now that he can crawl and pull himself up on the furniture and he'll crawl across the room and pull himself up on the toy box… And then turn round and bang on the toy box and turn round and look at you and give you a big smile as if to say look at me. Look at what I've done. Very much so, cos its only in the last week he's been pulling himself up on the furniture and, you know, he definitely looks round to see, look at you and smile at you…" The mother reports that she responds to such things by saying "clever boy. Look at you" etc. (Mother of James, 8 months interview).
>
> <div align="right">Reported in Reddy 2008: 138.</div>

Importantly, behaviours of 'showing off', as well as behaviours of 'clowning', are strictly predictive of 'declarative' pointing (pointing gestures addressed to the other but not because the infant is, say, requesting an object from them). In longitudinal studies (see, e.g., Reddy 2008: 109-110), it was found that infants who systematically do not engage in clowning or showing off later do not point, and the infants who point all engaged in clowning and showing off.[85] I will detail my construal of infants' pointing in section 1.3 below. The important point, for now, is that in 'showing off' the infant manifests an emotionally mediated awareness of the other's attention not merely to the infant's herself, but more specifically to what she is doing, and what the infant is seeking is praise. With pointing, the process will be less emotionally mediated, and the adult's attention on what the infant is doing is most often presupposed.

To have an abstract generalisation at hand, one might say that infants and adults regulate their own behaviour, and manage expectations regarding the other's behaviour, according to which contributions to the joint activity itself are accepted or rejected by the other party.[86] A joint activity in which patterns of accepted and rejected contributions is more salient is the game of giving objects. In these games, giving an object to someone is something that cannot be done felicitously if the other party does not accept the offered object, and acceptance generates the expectation

---

[84] Reddy (2008) presents an ample variety of these examples and discuss them with perceptiveness.

[85] I find Reddy's own reading of these examples very much plausible.

[86] The 'contributions' include, for instance, initiating the joint activity, as when the infant 'requests' the adult to pick her up by stretching her arms and seeking the adult's attention.

that the object will be taken.[87] When they are minimally familiar with this activity and its patterns, infants sometimes tease the adult by suddenly withdrawing the offered object right after the adult has accepted it (in analogy with what she does in cases of provocative non-compliance):[88]

> She stretches out her arm once again to her father holding out the little biscuit, her eyes on his face, watchful, a slight smile on her face. He obediently (but perhaps now wanting to get on with his dessert) stretches his arm out for it again. As his hand starts to approach she pulls hers back, smiling more and wrinkling her nose. He is surprised and laughs, saying "Give me, gimme, gimme!" and reaches further forward for it. She pulls it back further, smiling. He withdraws his arm, turns away. Her eyes have never left his face. She stretches her arm towards him again, offering the biscuit, watching his face with a half smile; as he reaches out in response she quickly whips it back.
>
> Reported in Reddy 2008: 150

A few remarks about acceptance are in order. As we saw in Chapter 1 (section 3), acceptance is the default when it comes to sharing commitments. What invites talking about acceptance for infants is that, by the time they are one year of age, infants have behavioural means to signal acceptance and rejection which go even beyond mere avoidance, or trying to undo what the other does, or expressing a negative emotion (e.g., pain, discomfort, disgust, fussiness, …). Most 1-year-old infants are reported to say 'no' or to shake their heads in a way that is equivalent to saying 'no' (Fenson et al. 1994: 158). When they are 18 months of age, infants are reported to respond with a 'no' to an adult who, e.g., asks 'Is this a cow?' while pointing to a ball (Hummer et al. 1993), and shortly after they utter 'no' in response to assertions with an analogous content made in analogous circumstances (Pea 1982).

Let's take stock of the variety of joint activities illustrated so far. In the case of requesting the adult to pick them up, infants expect the adult to contribute to the goal, and they themselves are ready to do their part. On many occasions, infants expect others to contribute to their goals, as when they protrude toward an object looking up at the adult in the expectation that the adult will hand it to them. They actively seek others' approval of their doings, as in showing off, where approval takes the form of emotionally significant expressions of praise. They also regulate their own behaviour according to what the adult does not approve, as in the case of prohibitions. In these cases, regulation of behaviour is achieved, at least in part, by teasing, in ways which sometimes prefigure later negotiations of commitments and entitlements. More generally, they behave, and form expectations regarding others' behaviour, according

---

[87] For an analysis of infants' third-personal expectations regarding observed actors giving and taking objects, and the cognitive structures that might support the formation of these expectations and their connection with further expectations, see the experiments performed by Tatone and colleagues (2015, 2019, 2020, Yin et al. 2020).

[88] That this kind of teasing, like that of provocative non-compliance, is common and that it follows initial familiarity with the target pattern of responses was confirmed in the longitudinal study by Reddy and colleagues (1991). What is given might be a hug rather than an object, and a similar kind of teasing occurs: they open their arms inviting a hug, the adult goes toward them smiling, and they withdraw themselves with a laugh.

to patterns of accepted and rejected contributions to the joint activity, where this is more evident in the game of giving objects. By the time they have started pointing, they also have basic behavioural means for expressing acceptance and refusal which go even beyond mere avoidance, expression of negative emotion, or undoing, and which quickly develop in ways of expressing agreement and disagreement.

Importantly, there are also many ways in which infants actively participate to others' goals (I explore further implications of this claim for communication in 1.3 below). As mentioned in the previous chapter, infants spontaneously facilitate others in achieving their 'material' goals as soon as they have the behavioural means to do so. For instance, if they are close to an object that the adult is unsuccessfully trying to reach, they hand it to her (Warneken and Tomasello 2007). With age, the range of goals that they can help the adult achieving broadens (Warneken and Tomasello 2006). So, for instance, 18-month-olds will help the adult by opening a closet if the adult is carrying magazines that she wants to put in the closet (infants open the closet less often if the adult accidentally bumps into it while trying to put the pile of magazines on top of the closet).[89] Importantly, what encourages infants and young children to help on further occasions are the adult's expressions of praise and approval (Warneken 2013: 434-436), and they are generally discouraged in helping if they receive a material reward for their efforts (Warneken and Tomasello 2008).

1.2 Ostensive Signals
In this subsection, I focus on early preconditions for coming to share commitments, and I do so by offering a re-interpretation of 'ostensive signals'. As I noticed in the first chapter (section 2.2), within the context of Relevance Theory ostensive behaviours are defined as behaviours which are produced with a communicative intention, namely, an intention to make it mutually manifest that the communicator is acting with an informative intention. Even assuming that the notion of mutual manifestness is not problematic, a non-trivial problem for advocates of Relevance Theory is to offer a theory of ostensive behaviours. What makes the task non-trivial is that any piece of behaviour can, on different occasions, count as being produced ostensively or not. In the case of infants, a potential solution to this problem has been offered by advocates of Natural Pedagogy Theory, according to which there is a set of signals accompanying behaviours which infants interpret by default as indicating the presence of a communicative intention, and this recognition leads them to have an expectation of there being an informative intention. In the below, I offer an overview of the empirical findings and I argue that they positively discourage the assumption

---

[89] Denying that infants attribute intentions as propositional attitudes does not entail that infants are insensitive to every aspect of the intentions with which others act. In particular, they can (and often do) recognise goals which others might have in doing what they do. So, at least from when they are 18 months of age, they sometimes are in a position to 'complete' (or remedy to the 'faults' of) others' action-sequences, or to not imitate instrumental actions which do not achieve the expected effect, or to not imitate some aspects of others' actions which are irrelevant for the achievement of a familiar goal, unless these aspects are made salient in a demonstration. I take up this point again in footnotes 102 and 105 below. For a fuller description of the aspects of others' intentional actions that infants are gradually more sensitive to, and of how this sensitivity is achieved, see Reddy 2008: Chapter 8.

that infants recognise the presence of communicative intentions. I then propose my alternative interpretation of 'ostensive signals' in relational terms, and of the correlative dispositions (also on the adult's side) in terms of dispositions that prepare infants to, later in ontogeny, share commitments with others.

There is a series of very robust experimental findings, systematically reviewed by Gergely Csibra (2010), showing that: (i) new-born infants preferentially look at people looking at them in the eyes; (ii) they preferentially orient toward people speaking to them in motherese, and (iii) they actively seek others' responsivity contingent on their own acts. According to Csibra (2010), signals such as eye-contact and motherese are signals for the presence of a communicative intention, the detection of which induces infants to form expectations regarding the presence of an embedded informative intention. Regarding contingent responsivity, it is supposed to be an ostensive signal produced by the infant. The idea is that contingent responsivity counts as an ostensive signal in the same way in which a sound heard through the wall of a prison cell can be taken to be an attempt to communicate. It might be just a sound, but if you knock and the sound stops, and you stop knocking and the sound is repeated, you have a reason to believe that that sound is produced by someone with an intention to communicate something.

1.2.1 Eye-contact

When photographs of faces with either direct or averted gaze are placed in front of them, newborns (3 days old) look longer at faces that appear to be looking at them, rather than to faces with averted gaze (Farroni et al. 2002). The same effect is preserved with schematic faces (Farroni et al. 2004), but not when the face in the picture is upside down (Farroni et al. 2006). Moreover, the preference disappears if the polarity of the picture is inverted, as in the so-called Bogart illusion (Farroni et al. 2005), where inverted polarity makes a direct gaze appear averted. Collectively, these findings strongly suggest that newborns' attentional orienting is guided by a preference for faces in an upright position with direct gaze, where gaze is identified with the relative proportions of a dark element on a white background, and not by geometrical features alone.[90]

It is important to notice that having the other's attention on oneself is, for the infant, a highly significant event from an emotional point of view.[91] The emotional arousal typically, but not invariably, manifests itself in the expression of a positive emotion. Not invariably: its intensity does sometimes lead to avoidance, and insistence on the side of the caregiver causes distress. Securing the infant's attention on themselves is an emotionally significant event for adults too, especially for the infant's caregivers, and they are distressed when the infant looks back at them but then avoids

---

[90] These findings are unusually robust: no single infant deviated from the pattern. It is worth noticing that these findings speak against Heyes' (2018: 60-63) hypothesis, according to which newborns have an attentional bias toward the geometrical configuration of faces that, thanks to reinforcement learning, during the first few months of life becomes a preference for eyes that look at them.
[91] Regarding the emotional significance of having the other's attention on oneself for both infants and adults, see Reddy 2008: Chapter 4.

their attention.[92] I will come back to the significance of this second half of the story in a moment.

1.3.2 Motherese

Analogous processes are observed when adults seek the infant's attention by talking to them in infant-directed speech or 'motherese'. When addressing infants, adults typically speak with altered, emotionally charged, pitch, greater amplitude variation and lower speed, compared to when they typically address older children or adults. Infant-directed speech, like attempts at making eye-contact, is readily detected by infants, induces preferential orientation toward its source, and is often accompanied by positive affective responses, since shortly after birth (Cooper and Aislin 1990, 1994, Werker and McLeod 1989).

1.3.3 Contingent responsivity

Infants' sucking behaviour primarily serves a nutritive function, and it is reinforced by the intake of food. When continuous, sucking maximises food intake. The interesting finding (Masataka 2003) is that, when they suck from their mothers' breast or a milk bottle, infants make pauses even if there is no physiological cause that might induce them to do so (e.g., they can breathe normally, and they are not yet full). When infants pause during sucking, mothers respond by jiggling them (or the bottle). When infants start sucking again, the jiggling stops. Mothers usually do not jiggle infants while they are sucking (Kaye 1977), but if they do, infants stop sucking (Kaye and Wells 1980). Crucially, if mothers do not jiggle infants when infants pause, infants tend to pause more often (Masataka 2003). The total amount of milk intake is not affected by maternal responses to infants' pauses. Collectively, these findings suggest that, in pausing over the course of these interactions, infants actively seek responses which are contingent on their own acts, for the sake of it.

<div align="center">***</div>

Taking contingent responsivity as an ostensive signal analogous to knocking on the wall of a prison cell is especially problematic. It is unclear that this is a case of communication at all, and it is also unclear what would count as a message that the infant intends to convey. If there were such a message, it would be systematically misunderstood by mothers, who say that they jiggle the infant to encourage sucking, while in fact jiggling leaves milk intake unaffected. I propose to take this set of findings at face value: new-born infants sometimes actively seek others' responsivity contingent on their own acts for the sake of it. I will come back to the importance of these findings in a moment.

Regarding eye-contact and motherese, the important thing is that they tend to be reciprocated by the infant: they look at those who look at them, and they orient

---

[92] See Reddy 2008: 100-104 for perceptive descriptions of the emotional significance of receiving and seeking attention on both sides.

toward those who speak to them in infant-directed speech. The problem is that it is unclear in what sense infants (and adults) invariably form expectations regarding embedded informative intentions upon spotting these signals. In many cases, there might not be such an intention on either side at all. If there is, it is not obvious to see how infants would infer the content of these intentions. Very young infants do not yet share with adults most of the common ground that, in the adults' case, governs interactions, including mastery of linguistic conventions, background encyclopaedic knowledge, and so on.

Csibra's (2010) proposal[93] is that, gradually, from early on in ontogeny infants come to form expectations of referentiality and genericity, and they use these assumptions as the default for filling in the content of the informative intention. For instance, they manifest a robust tendency to follow the gaze direction of an adult after, say, having established eye-contact with them, and they are surprised if they do not find anything lying in the direction of the adult's line of sight (first proximally, and later in ontogeny distally). Later in ontogeny, they manifest an analogously robust disposition with pointing gestures, in that they preferentially attend to what lies in the direction of the pointing finger (and expect to find something to attend to).[94] Regarding genericity, the idea is that if the adult points to an object for the infant or demonstrates to the infant a novel property that an object has, the infant is likely to retain information pertaining to the object's superficial (e.g., shape) and functional properties, and they expect superficially similar objects to have the same functional properties. When the adult points without addressing them, they tend to focus on the location of the pointed-to object. The same often applies to the emotional valence of the adult's response: if the adult is addressing the infant while expressing an emotion and gazing at the object, the infant seemingly expects other adults to feel likewise toward that same object. This expectation does not seem to be in place when they are not addressed by the adult.[95]

The important point is that, within this picture, it is problematic to hold that infants invariably recognise ostensive signals as signals for communicative intentions in Grice's sense. Most of the time when engaged in a proto-conversational exchange with a young infant, the adult might not even have any identifiable informative intention. From the point of view of cognitive development, the functioning, subsequent refinements, and outputs of the relevant mechanisms constitute an extremely powerful way of learning from, and progressively aligning with, others. However, what the infant gets from the exchange from a cognitive point of view (the

---

[93] I would like to notice that Csibra (2010: 160) was initially sceptical of the possibility of proving, from an experimental point of view, that infants detect communicative intentions in Grice's sense. Now, he is inclined to believe that infants in fact do not detect Gricean communicative intentions, and that what they do use in communication is an innate concept of representation (personal communication).

[94] The 'expectation of referentiality' seems to show, primarily, that infants are coming to grips, at least implicitly, with the concept of attention, especially if it is assumed that, in many senses of 'attending' *there must be something* which one is attending to.

[95] Arguably, the expectation of genericity can be better accommodated in normative terms, also because later in ontogeny it leads infants' expectations to be resilient to counterexamples (see Hernik and Csibra 2015).

'informative intention' that allegedly they come to recognise), goes well beyond what adults might intend the infant to recognise.[96] The picture assembled by advocates of natural pedagogy discourages the idea that infants start out by communicating in Grice's sense.

Assuming a commitment-sharing view of communication, it is plausible that ostensive signals (and later emerging expectations, however the details are to be characterised) contribute to creating the preconditions for communicating effectively with others. Dispositions to reciprocate others' gaze and to orient toward them when they speak in certain ways, make it the case that, often enough, the infant and the adult will be mutually responsive to each other and in a position to monitor each other's response to what they do. Coupled with intense emotional reactions to having each other's attention, and the disposition, on both sides, to seek each other's responsivity contingent on their own acts, the infant and the adult alike will be, often enough, ideally positioned (and in fact 'forced') to track patterns of accepted and rejected contributions to joint activities, and to remain engaged in the interaction. Finally, the cognitive mechanisms that the infant deploys in processing information gathered over the course of the exchange, and the filters that gradually come to sieve this information, contribute to make it the case that, progressively, the infant will come to have more and more cognitive resources for aligning herself with the adult, and all this can be done without going through the recognition of communicative intentions.

In sum, it is hard to offer a theory of ostensive behaviour by focusing only on what the communicator intends to achieve, and it is also hard to demonstrate empirically that there is a set of innately specified context-invariant signals for communicative intentions. It is less hard to conceive of the role of ostensive signals, and the correlative dispositions, from the point of view of the interaction, as creating preconditions for sharing commitments.

1.3 Pointing

Many joint activities to which infants are active participants can plausibly be described as organised around shared commitments to goals. By re-interpreting 'ostensive signals' it is possible to explain several aspects of how infants become increasingly prepared to share commitments with adults. In this section, I focus on pointing gestures. The aim of the enterprise is to individuate a useful generalisation regarding the communicative function of pointing, and to distinguish this function from how pointing emerges, and which roles pointing plays for the infant's own psychological or cognitive economy. Keeping the communicative function fixed, I identify 4 varieties of pointing: **explorative**, **anticipatory**, **regulative,** and **helpful**. I explain how these different instances of pointing subserve, in different but related ways, word learning and expectation management, at different stages of development.

Typically developing infants are reported to start pointing from around their first birthday, which is when they start uttering their first 'words', like 'no' and 'there',

---

[96] Csibra is very careful in not applying the picture symmetrically to the case of adults spotting that infants have a communicative intentions in Grice's sense.

and they already have a considerable receptive vocabulary. Pointing is widely regarded as a milestone in cognitive development. Despite the vast amount of attention that pointing has received, it is still unclear how it emerges, how its cognitive and motivational underpinnings are to be characterised, and what exactly is the role of pointing in promoting further cognitive development. Despite the uncertainties that surround the role of pointing in the infant's cognitive economy, it is possible to give a uniform description of how pointing functions as a communicative act. My proposed generalisation is the following:

> A pointing gesture which is addressed to someone and is met by the acceptance of the addressee creates a shared commitment to attend to a certain object or event.

This generalisation is meant to uniformly cover a broad range of cases, and to explain at least part of the behaviour of infants and adults when they point for each other. This characterisation is fruitful because:

(i)   pointing might not play the same role in cognition across different phases of development;

(ii)   it does not appear to be produced with a uniform set of motivations;

(iii)   from a cognitive point of view, pointing plays different roles for infants depending on whether it is them or the adult who is doing the pointing.

A characterisation in terms of a shared commitment offers a basic infrastructure to frame pointing behaviour as a communicative act, making it easier, with ancillary assumptions, to investigate its potentially different cognitive and motivational underpinnings on different occasions or at different stages of development.

Regarding the ontogenetic roots of pointing, longitudinal studies (Carpendale and Carpendale 2010) suggest that pointing gestures emerge as ways for the infant to focus their own attention onto something, and they are often instances of explorative (non-tactile) behaviour. In naturalistic settings, adults typically respond to infants' pointing gestures as they do when they accompany the infant's explorations, namely, by talking to them and attending to what the infant is attending to (Kishimoto et al. 2007). The same kind of verbal responses are not systematically part of the adult's response to superficially similar behaviours, as in ritualised grasping gestures produced by the infant. It is convenient, then, to label these instances of pointing **explorative**.

In line with naturalistic observations, in experimental settings (Kovács et al. 2014), it has been found that when presented with novel objects or unusual instances of familiar objects (e.g., a toy cat with boots), infants tend to point more often across trials if the adult provides a verbal response which includes a novel label, which presumably the infant can, cognitively speaking, use to categorise what she sees. These kinds of situations are ideal settings, for the infant, to familiarise herself with a novelty,

acquire or stabilise the use of a label, and thus substitute some instances of pointing.[97] The emotional valence of the response provided by the adult in these situations does not seem to affect the frequency of pointing on further similar occasions, and it is plausible to assume that the emotional valence of the adult's response has the potential to inform the infants' categorisation of the pointed-to object.[98] When pointing in the face of a novelty and addressing the pointing gesture to an adult, infants do not seem to intend to elicit a specific kind of response, except perhaps a very general one, namely, that the adult orients toward the pointed-to object and responds to them.

Novelty is not the only prompt of infants' pointing. Sometimes, and usually a couple of months following the onset of pointing, infants point in anticipation of what they expect to happen. For instance, if there is a tradition such that the infant and her mom go to the bathroom to wash their hands after dinner, upon having finished eating the infant might point in the direction of the bathroom in anticipation of going there.[99] It is convenient to label these instances of pointing **anticipatory**. If one assumes that the infant glances up at her mom while pointing, one can also assume that the expectation of going to the bathroom can be effectively managed by the infant through monitoring her mom's response to the pointing gesture. As already seen, adults tend to respond verbally to infants' pointing gestures (say: 'Yes, the bathroom. We'll go wash our hands in a moment.'), while alternating gaze between the infant and the pointed-to object, and the adult's verbal response is what encourages infants to point again in analogous circumstances. These situations present, again, excellent opportunities for the infant to refine their vocalisations and, on further occasions, using them to express some of their expectations verbally even without pointing.

The results obtained by Goldin-Meadow and colleagues in several experiments speak in favour of this hypothesis.[100] Infant's own vocalisations that accompany their own pointing gestures are *predictive* of the vocabulary that they acquire. Talking about refining vocalisations is warranted because, often enough, adults echo back to the infant an interpreted version of the vocalisation which co-occurs with the pointing gesture.[101] This echoing can, at the same time, raise the probability that the

---

[97] For a proposal on word learning which could be brought in accord with the perspective outlined here, see Yurovsky 2018. Apparently, the most efficient strategy to acquire the use of a novel word is to have the adult verbally accompanying the infant's explorative behaviours. The least efficient strategy is when the adult herself does the pointing and, so to say, provides an ostensive definition of the word employed (which as far as I can see, is not something that adults outside experimental contexts typically do). The infant might not know what to do with the adult's ostensive definition, or she might not be able to identify the adult's focus of attention without the adult's further help. So, she might preferentially attend to the object as required by the commitment she has come to share, but there might be too much going on which is beyond her cognitive reach. From an informational point of view, tying the label to her own behaviour is much more convenient. So, although the shared commitment created by pointing is the same, and it is symmetrical for the infant and the adult, its cognitive effects are not.

[98] Unfortunately, most experiments are focused on what happens on the spot, and this makes it harder to identify the role of interactions in the infant's cognitive development.

[99] Tomasello 2008: 114. (Diary observation)

[100] See, e.g., Cartmill et al. 2014, Goldin-Meadow and Butcher 2003, Iverson and Goldin-Meadow 2005, Özçalışkan and Goldin-Meadow 2009.

[101] This idea is not very far away from the conclusion reached in Meltzoff and Gopnik 1993.

expectation expressed by the infant will be fulfilled, and provide the infant also with a phonetic standard for expressing that expectation.

Though not performed with these ideas in mind, a set of experiments performed by Warneken and colleagues (2006) provide good examples of a subsequent development of these processes from when infants are 18 months of age up to when they are 24 months of age. For reasons that will become clear in a moment, it is convenient to label infants' pointing in these experiments **regulative**. The authors had children of both ages have a few goes in playing 4 different new games together with an experimenter. Each game is played by either performing the same action simultaneously, like pulling two ends of a tube to make a toy pop up, or by performing a complementary action, like one person making a toy sliding down a tube and the other catching it with a box. The infant could not by herself make the toy pop up, because the tube was too long, and for the same reason she could not by herself make the toy slide down the tube and catch it with the box too.

The playing of each game was preceded by a demonstration of how to play the game, performed by the experimenter and an assistant. In this and many other similar contexts, if the infant is attentive and responsive, when invited to play the game she strives to perform her role, taking the adult's demonstration as a standard.[102] Children had four trials in every game. The authors of the experiment inserted the following manipulation: in the third and fourth trial, the adult would simply stop playing the game for 15 seconds, for instance by not pulling the end of the tube or not catching the toy at the end of the fall. During this interruption phase, if the infant addresses the adult, the adult 'responds' simply by looking at them in the eyes and smiling.[103] Regardless of the kind of game played and infants' proficiency in playing it, on most interruptions most of the infants (of both ages) looked at the adult in the eyes and, for instance, pointed to the object which the adult was supposed to use, or offered the object to the adult, or said something like 'pull'. It is worth noticing that half of the games were problem-solving games with a clear outcome, like the release of a toy (as in the game which consists in pulling two ends of a tube). Importantly, infants showed no interest in the toy obtained at the end of the game. Indeed, at the end of each trial, infants at both ages almost always placed the obtained object back into the tube to play the game again. It seems fair to assume, then, that what matters to the infant on these

---

[102] This point is supported by a vast set of findings produced within the context of natural pedagogy theory, especially in studies about imitation (the many studies conducted by Ildikó Kyráli and colleagues (e.g., 2013) are particularly instructive in this respect). There are of course filters to what infants, and especially 18-months-olds, imitate. For instance, they might imitate even outlandish acts (like switching on a lightbulb with the forehead), but not if there is an expected effect which is not produced by the model's actions. The outlandish act is also not imitated if it is not demonstrated (the adult performs a similar action, but without making some of its features especially salient and without addressing the infant, and the infant in these situations typically resorts to more obvious means at her disposal for achieving the same effects). Moreover, the less infants see how a specific outcome is brought about by the model, the more closely they follow the demonstration. Zawidzki (2013: chapter 3) proposes an interpretation of the findings in terms of conformity in dispositions to behave. I am broadly sympathetic to Zawidzki's proposal, but I think that if it is not cast in terms of conformity to a normative standard, it might fail to make sense of how, upon having mastered the demonstrated behaviour, older infants and young children correct others who fail to conform, as we shall see in the following section.
[103] This is the kind of response employed in the 'still face' paradigm, which gets younger infants horrified.

occasions is the playing of the game itself, rather than its 'material outcome'.[104] What changes with age is that children achieve a greater degree of physical coordination with the adult, they become able to play different kinds of novel games, and they more frequently express their expectations verbally.

By accepting the adult's invitation to play the game, the infant and the adult have come to share a commitment to playing the game. What 'playing the game' consists in is determined by the demonstration of how the game is to be played. The child is typically eager to perform her role and has expectations regarding the adult's contributions to the goal. When these expectations are violated, the infant expresses them by, e.g., pointing. The infant regulates these expectations according to the response they receive from the adult, so for instance if the adult remains still, after a while they try to play the game by themselves. Of course, this experiment was not performed with the aim of detailing a commitment-based view of communication, so from this angle many details and control conditions are missing. However, the results fit well within the overall picture, and further support is offered by other experiments and observations recapitulated earlier in this section.

Before considering the experimental evidence regarding normativity in infancy and toddlerhood, I would like to highlight a further way in which pointing gestures can function as a way of regulating contributions and expectations to joint activities, which will prove especially useful in the next chapter. It will be convenient to call this instance of pointing **helpful**.

In responding to a pointing gesture addressed to her, the infant may end up being informed about something, even if she does not know that the adult intends her to know that the adult intends to inform her of something. One can assume that if the infant and the adult share a commitment to a goal, the infant is entitled to rely on the adult's pointing gesture as a contribution to that goal. Pointing is itself a mini joint activity which requires the addressee's response to function as a contribution to the wider joint activity. So conceived, a way in which a pointing gesture can effectively be informative can be, for instance, the following: while looking for an object, the infant might look up at the adult. In response, the adult might point to a box where the object is located, while reciprocating the infant's gaze. By attending to the box (in accordance with the sharing of the commitment created by the pointing gesture), the infant will find the sought-for object there, thus resulting in effectively being informed about the location of the object.

Analogous processes may occur on the production side. For instance, after having witnessed a demonstration of an action, the infant might ascribe a goal to the adult which involves the manipulation of a certain object. If on a subsequent occasion the adult accidentally makes the object fall out of sight and then starts looking for it, the infant might point to the object as a way of facilitating the adult achieving her goal.[105] In the next chapter, I will explore further ways in which infants rely on pointing

---

[104] The importance of this observation will be clearer in the next chapter, where I will again consider games involving the giving and accepting of objects.

[105] For how infants might set on the goal, see footnotes 89 and 102 above.

gestures to regulate their own behaviour and manage expectations regarding others' behaviour.

2. Normativity

It might seem odd to talk about normative constraints in infants' interactions, and it might seem especially odd to talk about implicitly shared commitments. A great deal of research in developmental psychology seems to show that, before they are three years of age, children do not really share commitments and do not really act in light of norms, and that it is therefore inappropriate to talk about normativity in infancy or early toddlerhood.[106] I argue that this is a misimpression, coming mainly from a questionable construal of normative notions, which conflates the sharing of commitments with the child's own robust understanding of social or moral norms. On one hand, this construal leads to problematic interpretations of the available empirical evidence. On the other hand, it has discouraged the production of experimental evidence which would make the normative features of infants' and toddlers' interactions more salient. If commitments are taken to be features of interactions to which infants and young toddlers become increasingly sensitive to, and on which they progressively tie their behaviour as well as their uses of words, it is possible to explain otherwise puzzling experimental findings, and it is also possible to explain how children come to have a robust understanding of the normative import of explicitly shared commitments by the time they are 3 years of age.

It is therefore important to distinguish between sharing commitments, understanding some of the consequences of so doing on certain occasions, and being motivated to honour shared commitments in the face of distractions and potential disadvantages for oneself. Infants actively seek others' responsiveness, they are sensitive to others' adoption of normative attitudes, and they themselves sometimes endorse normative attitudes toward others. At least implicitly, then, infants share commitments. Of course, infants and young toddlers seem to be oblivious to a great deal of the consequences of sharing commitments. This is so for good reasons. They are in the process of acquiring a language and they do not yet participate in most of adults' practices. Moreover, although they protest perceived violations of shared commitments, they are held accountable for what they say and do only gradually, according to the responsibilities that the adult feels they can, or are supposed to, take. This does not entail that infants do not share commitments, which are features of their interactions to which they are sensitive. It only entails that they have a limited, but rapidly growing, understanding of what they say and do. When they are 2 years of age, and adults' scaffolding start to become less of a necessity, they also start interacting meaningfully with their peers, and it is not implausible to think that

---

[106] Tomasello (2014: 39ff; 2018, 2019: Part III, especially Chapter 9), like many others in the field, often suggests that this is the case. I would like to stress, however, that Tomasello and colleagues have performed most of the pioneering experiments in this sub-field, and that they have much advanced understanding of how dispositions to behave normatively develop in late toddlerhood, from angles that were left unexplored before.

processes of mutual regulation with peers contribute to progressively modulating toddlers' overarching sense of entitlement.

In recent years, Hannes Rakoczy and colleagues have performed several experiments inspired by the intuition that important aspects of toddlers' linguistic competency co-develop with finer-grained sensitivity to the normative import of uses of language within the context joint activities.[107] In the first experiments (e.g., Rakoczy et al. 2008), it was found that from at least when they are 2 years of age, children verbally protest if a puppet who has agreed to play a game does something which is not a permissible move in that game. In these experiments, the adult sets the rules explicitly by demonstrating some actions and qualifying them as permissible or impermissible, after participants have explicitly agreed on playing the game together. What changes over the next year of development is that, typically, children acquire a much richer normative vocabulary, and their protests are more perspicuous and appropriate across a much wider variety of situations. They progressively make finer-grained distinctions regarding the different normative import of different kinds of norms in different contexts. Moreover, and criticise more appropriately the violation of different kinds of norms by different people. Importantly, they seem to go through a phase of over-criticising lack of conformity (to models that they themselves adopt) to refraining from adopting normative attitudes when it is not appropriate to do so.

To strengthen my case in favour of the claim that these processes start in infancy, in section 2.1 I consider a recent experiment performed by Marco Schmidt and colleagues (2019) showing that infants as young as 18 months of age, within the context of a game played with an adult and a puppet, sometimes correct the puppet if the puppet does not play the game in the manner demonstrated by the adult and reproduced by the infant. I argue that the infant's own endorsement of normative attitudes, on top of their sensitivity to the adult's normative attitudes, reinforces the impression that it is plausible to speak of commitments that infants share with others.

In section 2.2., I consider one of the paradigm experiments suggesting that children under the age of 3 do not really share commitments. A closer look at this experiment reveals that, in fact, children younger than 3 expect more from adults, and that their protests are appropriate in light of the commitments that they in fact share. The slightly decreased rate of protests in 3-year-olds in one condition of the experiment is not hard to explain. In this condition, the content of the commitment is left, in important respects, unspecified. Older toddlers are sensitive to the same shared commitments as the younger toddlers: they often manifest the correlative expectations. The higher degree of autonomy they have achieved, however, sometimes allows them to come to accept a different specification of the content of the shared commitment, and so to refrain from protesting.

In section 2.3, I consider a different set of experiments suggesting that children before the age of 3 do not yet understand most of the obligations and entitlements that come with sharing commitments. For instance, it has been found that if two

---

[107] I take some liberty in rephrasing Rakoczy's main point. For a comprehensive overview of the main available findings, see Schmidt and Rakoczy 2018.

toddlers can each get a certain reward only through coordinating their actions, but one of the toddlers unexpectedly receives her reward from an adult prior to the end of the game, she is likely to stop playing the game, even if her contribution would be necessary for the other toddler to get the reward. I argue that it is highly unclear what is going on in these experiments, and that other experiments strongly suggest that these results should not be taken at face value. Nonetheless, it is true that complying with understanding to the consequences of sharing commitments within certain practices is a gradual acquisition, and that, in many respects, young toddlers have not yet come to regulate their behaviour with their peers. Their interactions with adults often seem to be underpinned by an overarching sense of entitlement. There is reason to believe that this sense of entitlement is gradually modulated in part by adults, and in part through interacting with peers.

Finally, in section 2.4 I present two recent sets of experiments which aimed at testing infants' sensitivity to normative constraints from a third-personal point of view, employing indirect measures. These experiments yielded results analogous to the ones found for mindreading in infancy, and at an earlier age. The second experiment examined in this subsection also reinforces the conclusions reached in the previous subsection.

2.1 The Mischievous Puppet

Schmidt and colleagues (2019) performed an experiment with 18-months-old infants to see whether they adopt normative attitudes toward deviant behaviours in the context of a game.[108] In this experiment, the infant is sitting at a table with an experimenter (E1) and a puppet called Max, which is controlled by another experimenter (E2). In one condition (GAME),[109] E1 takes out a few objects from the box (a Styrofoam board with a gutter on one side, and two building blocks, one yellow and one green) and sets up a new game by saying something like 'Let's play Daxing! I'll show you how Daxing is played'. The adult then uses the green block to make the yellow block go into the gutter (action A1). The infant is then invited by the adult to play the game ('Now you can have this'). After the infant has played with the toys, E1 sets up another round of Daxing and invites the puppet to give it a try ('Now Max can have this'). Instead of playing the game by trying to reproduce the demonstrated action, the puppet makes the yellow block slide down the gutter by lifting the board (action A2). In the other condition (DISCOVERY) the adult takes out the same objects from the box but does not set up any game. Instead, she looks surprised and puzzled, puts the objects on the table, and expresses her puzzlement to the infant. She then performs the same action (A1) and tells the infant 'Now you can have this'. After the infant has played with the toys, the sequence with the puppet is the same as in the other condition: the adult puts the objects close to the puppet and says 'Now Max

---

can have this', and then the puppet makes the yellow block slide down the gutter by lifting the board (action A2).

Overall, infants imitated the adult's model often in both conditions, with no significant difference between conditions. The authors distinguished partial from full imitations, with the former characterised by the reproduction of only some, though not all, segments of the action sequence performed by the adult. They found that in the GAME condition infants performed significantly more full imitation acts than in the DISCOVERY condition. As we shall see in a moment, this difference disappeared in the follow-up experiment. The important difference between conditions is that infants intervene to correct the puppet, by either saying (e.g., 'No! Like this!') or doing something (e.g., undoing what the puppet has done, pointing at the green block, …),[110] significantly more often in the GAME as opposed to the DISCOVERY condition.

A possible, though unclear, alternative explanation that the authors consider is that in doing what they do, infants are merely assisting the puppet achieving its goal, regardless of whether this goal is aligned with the (implicitly laid out) rules of the game.[111] To eliminate some potential confounds, the authors thus performed a follow-up experiment in which the game consists in placing object X in box A, and object Y in box B. The discovery condition is substituted by a condition (PREFERENCE) in which the adult says that object X can go in either box A or box B (while pointing at the corresponding boxes), and that object Y can go in either box, too. Then, the adult points toward herself, and says: 'I put [X] in [box A]', then holds X between the two boxes, and put it in box A, and the same script is played out for object Y. In both conditions, the puppet displays the opposite pattern of behaviour, namely, always put X in B and Y in A. In this second experiment, infants imitated the adult's model often in both conditions, with no significant difference between conditions in either full or partial imitations. Importantly, infants adopted a normative attitude toward the puppet significantly more often in the GAME than in the PREFERENCE condition.[112]

Schmidt and colleagues also found that infants' adoption of normative attitudes in both experiments is positively correlated with their comprehension of what the authors term 'normative language'. The measure for infants' comprehension of normative language consisted in ratings given by parents to items in a questionnaire,

---

[110] The authors provide detailed and convincing descriptions of the coded behaviours which count as 'correcting the puppet'. The questionable bit is that they code interventions such as shaking the head or pointing to a piece of the game as non-communicative. As we shall see in a moment, this coding might have been especially misleading in the second experiment.

[111] I cite this alternative explanation for the sake of completeness, but I find it unclear. The child does not assist the puppet in the discovery condition, and the only difference is that in this condition the adult has not set up a game through an assertion and a demonstration. It is difficult to understand what 'assisting the puppet' means in this situation without referring to conformity to the norm laid out by the adult.

[112] The authors notice that infants performed significantly more *communicative* interventions, but that their non-communicative interventions did not significantly differ between conditions. However, the coding employed by the authors in partitioning different kinds of interventions is not very convincing, as noted in footnote 110 above. It is fair to say that most interventions in both conditions of both experiments were communicative, and in both experiments the total number of interventions is significantly higher in the game condition as opposed to the control condition, where interventions are very rarely observed.

which included 'normative terms' (e.g., 'right', 'wrong', 'bad'), phrases (e.g., 'This way!', 'Not this way!') and sentences (e.g., 'This is how you do it'). As recognised by the authors, this measure is in many ways rough, but it is nonetheless suggestive of important relationships between language comprehension and adoption of normative attitudes.

The experiment performed by Schmidt and colleagues is interesting, though unnecessarily demanding as a test for infants' adoption of normative attitudes. Infants this age have just started engaging in pretence play, and it is quite remarkable that they already promote conformity significantly more often when the adult creates the context of a game through an assertion followed by the demonstration of an action, compared to when there is no such context. What the results of this experiment suggest is that if the norm is implicitly laid out by the adult model and the infant accepts to conform to it, the infant expects others who have agreed to play the game to conform to the norm too. This expectation is manifest by the infant's own endorsement of a normative attitude toward the puppet's incongruous behaviour. This finding thus suggests that, by the time they are 18 months of age, infants gradually come to regulate their own behaviour according to shared commitments, and, in suitable circumstances, also start enforcing conformity toward third parties who do not do so.

2.2 The Protests of Young Toddlers

The experiments performed by Rakoczy and colleagues, briefly presented at the beginning of this section, suggest that from when they are 2 years of age, children verbally protest violations of explicitly laid out rules, and that over the course of the third year their abilities to do so rapidly become more sophisticated, partly through a process of modulating over-generalisations regarding the scope of the rule. It remains to be explained, then, why it is often thought that children younger than 3 do not really share commitments with others. In this section, I scrutinise one of the paradigm experiments performed in this tradition, and I argue that the interpretation it originally received is misconstrued.[113]

In the experiment by Gräfenhain and colleagues (2009), 2- and 3-years-old children play a series of short games. There are four different games, each of which can be played together with someone or individually. First, the experimenter demonstrates to the child how to play the game individually. Then, the assistant and the experimenter together demonstrate to the child how to play the game together. The demonstrations always occur in this order for every game.[114] When playing together, the assistant and the experimenter always start by, for instance, clapping their hands at the same time. Playing the game together consists, in large part, in synchronising actions in similar ways several times. There are two experimental conditions. In the first (labelled by the authors JOINT COMMITMENT), the assistant leaves the game pretending to be busy and the experimenter invites the child to play the

---

[113] The interpretation I offer is inspired by a remark I found in Michael et al. 2016: 9.
[114] This is confounding factor, as will emerge more clearly in the discussion below.

game together with her. In the second condition (labelled by the authors NO COMMITMENT), the assistant says she is busy, but tells the child that it is now her turn and invites her to go play the game. If the child accepts the invitation and goes toward the game, the experimenter shows interest in the game and announces that she is going to play it (without specifying that she is going to play it on her own), performing her announcement without establishing eye-contact with the child. It is important to notice that in this condition the experimenter nonetheless performs the synchronising movement that is supposed to signal the start of the game when the game is played together, and occasionally glances up at the child and smiles. In both conditions, at some point during the game the adult stops playing for no apparent reason. If the child attempts to reengage her, she just looks at the child and smiles. If the child offers her an object involved in the game, she takes it but does nothing with it.

According to the experimenters, in the first condition the child and the adult have a joint commitment to playing the game, while in the other condition there is no such joint commitment (this is the assumption which I find questionable). The experimenters therefore predicted that children would try to reengage the adult more often when they shared with the adult a commitment to play the game together, and that this would signal an understanding of the entitlements and obligations that come with sharing a commitment. As expected by the experimenters, 3-years-old children attempted to reengage the adult more often in the JOINT COMMITMENT condition compared to the NO COMMITMENT condition. It is important to notice that, in the NO COMMITMENT condition, 3-year-old did try to re-engage the adult, though not as often as in the other condition. Contrary to the experimenters' prediction, however, 2-year-old children attempted to reengage the experimenter most of the time in both conditions, and the experimenters concluded that younger toddlers do not really understand the obligations and entitlements that come with shared commitments.

There can be little doubt that older children tailor their expectations regarding others' behaviour more appropriately and in a finer-grained way to what is said. The problem with this experiment is that the NO COMMITMENT condition is fundamentally equivocal: a commitment to playing the game has been shared, though it is initially left unspecified whether it is a commitment to play the game *together*, and the adult's subsequent behaviour warrants the assumption that it is indeed a commitment to play the game together. Assuming that younger toddlers are more in need of the adult's attention and contribution, it is expected that they protest in this condition, and for all the adult has done, they are also entitled to do so.

Why do 3-year-olds behave differently in the two conditions? It is important to notice that 3-year-olds do *not* systematically ignore the shared commitment, though they (sometimes) come to accept a different specification of the content of the commitment. First, 3-year-olds actively attempt to re-engage the adult, even though they do so less often in the NO COMMITMENT condition. Second, the coding employed by the authors leaves out plenty of behaviours which would manifest an expectation, on the side of children, that they are to play together with the adult. For instance, if the child stops playing when the adult stops, and waits for the adult to start playing the game again, the authors do *not* code this reaction as signalling an expectation to

play together. Second, the experimenters did not code whether, for instance, in this condition the child looks at the experimenter and tries to act in synchrony with her, which seems crucial to establish whether, in the eyes of the child, there is an expectation that they will play the game together. Other kinds of expectations grounded by the shared commitment might perfectly be in place, namely, that the adult will not leave the child alone in playing the game. To see whether these expectations are in place, it would have been useful to record whether the child focuses on the game only (which I think is highly unlikely) or whether she looks at the adult, seeking her approval and guidance, or, say, seeking to share her joy in playing the game.

One can assume that both 2- and 3-year-olds initially expect the adult to play with them. The commitments they have come to share (explicitly and implicitly) ground this expectation. They later adjust their expectations, and 3-year-olds sometimes come to accept a different specification of the content of the commitment, based on what the adult subsequently does. For the reasons outlined above, this option might not be available to younger toddlers. What this experiment does not show is that younger toddlers do not share commitments. Their interactions do feature commitments, and the appropriateness of their protests manifest their own sensitivity to this feature of the interaction.

2.3 Helping Peers in the Face of 'Temptations'
It is often argued that, upon having shared a commitment to a goal, helping others achieve their goals in the face of distractions and temptations signals an understanding of the entitlements and obligations that come with sharing commitments to goals. It is argued that young toddlers do not seem to show such understanding in their collaborations with their peers, and it is therefore dubious to what extent one can speak of commitment-sharing in the case of young toddlers.[115] In this section, I argue against the validity of the key experiment, as well as of the background theoretical assumptions.

The experiment by Hamann and colleagues (2012) employs a task in which toddlers must coordinate their actions with other toddlers for each of them to obtain a separate reward. What is assessed in these experiments is whether, for instance, upon receiving her own reward 'by luck' from an adult in advance of completing the game, the toddler keeps cooperating until also the other toddler receives hers. It has been found that 2.5-year-old toddlers often stop collaborating after having received their reward, while 3.5-year-olds usually keep assisting the other.

I agree that honouring a commitment in the face of distractions and temptations is an important milestone in the development of understanding the obligations and entitlements that come with sharing commitments within the context of cooperative activities.[116] However, this experiment is unlikely to shed light on this

---

[115] See, e.g., Tomasello 2018.
[116] It might be argued that this is a life-long achievement, and that some people never quite get their heads around it.

strand of ontogenetic development, for several reasons. First, it is not at all clear that, in these experiments, 2.5-year-olds understand the very structure of the task,[117] and whether, for instance, they take the game to be a cooperative or competitive enterprise. Indeed, 3.5-year-olds offer help in both the cooperative and control condition (in which cooperation is not necessary), and younger toddlers offer help *more often* in the control as opposed to the cooperative condition. Second, and as suggested in section 1.1., it has been shown that obtaining a material reward generally discourages helping behaviours in infants and toddlers when they interact with adults (Warneken and Tomasello 2008), while acknowledgement of their efforts encourages them to be helpful (Warneken 2013: 434-436). Finally, even if one were to concede that the results of the experiment are reliable (and they are not), it is important to notice that infants do not interact in meaningful ways with other infants (if they are close to each other, they most often play in parallel), and young toddlers have just started playing together with their peers. Processes of mutual regulation with peers are still very much on their way, and it is plausible to assume that adults' scaffolding at this age is still, in many respects, crucial.

2.4 Indirect Measures

The same kind of evidence produced for mindreading in infancy has recently been produced to show that infants form expectations regarding others' expressions of approval and disapproval, as well as on the normative constraints that regulate resource distribution in cooperative versus competitive activities.

In the study by Köster and Hepach (submitted), 11-months-olds infants are presented with the following sequence: one adult performs a certain action, and a second adult then performs the same action. A third adult approaches them, and either performs the same action or a different one. The action performed by the third adult is met with either an expression of positive emotions and inclusion, or an expression of negative emotions and exclusion. The dependent measure for this study was infants' pupil dilation, which is generally relied upon as an indicator of infants' surprise. The experimenters adopted a within-subjects design, in which each infant is exposed to 6 sequences of events. There was a robust correlation between increased pupil dilation and both 'incongruent sequences', namely, conformity met with disapproval and non-conformity met with approval. There was no effect of either action or response, and the shape and colours of all three characters were identical, within and across conditions. Importantly, the authors performed the same experiment but substituted the third actor with a self-propelled machine and found no correlation between pupil dilation and conditions. Even though this experiment by Köster and Hepach is in many ways simplistic and not wholly on target, it is important to notice that it produced results analogous to those produced by studies in infants' mindreading, and it seems to suggest that infants form expectations regarding

---

[117] In a follow-up study, the authors of the experiment tried to check the assumption that the younger toddlers understood the nature of the game. However, in this follow-up study the very structure of the game was different.

conformity and behaviours of approval and disapproval from a third-personal perspective.

A more telling set of experiments has recently been performed by Elizaveta Vorobyova and colleagues (2021), targeting resource distribution in cooperative and competitive activities. Importantly, in a set of experiments performed by Hamann and colleagues (2011) targeting resource distribution with toddlers, it was found that 3-year-olds, but not 2-years-old, are averse to unequal resource distribution even if it is advantageous for them, within the context of a cooperative activity aimed at acquiring those resources. This set of findings is sometimes held as evidence in favour of the claim that young toddlers do not have clear expectations regarding obligations and entitlements that come with sharing commitments in the context of cooperative activities.[118] A closer look at the findings suggests that the situation is more complex. Younger toddlers are slightly less likely to share with peers more generally, and when they do understand the very activity in which they are engaged, they are more likely to share if the resources were supposed to be acquired as a result of a joint effort. Nothing in these findings suggest that toddlers do not share commitments. What they do suggest is that, in certain circumstances, they feel entitled when they should not. As noticed in the previous section, it is plausible to think that part of the explanation for toddlers' behaviour is that they have not yet undergone processes of modulating an overarching sense of entitlement.

The experiments performed by Vorobyova and colleagues lend further support to this conclusion. Infants seem to already have some expectations regarding fair resource distribution when they themselves are not directly involved in the interaction.

In their experiments, Vorobyova and colleagues exposed 13-months-old infants to videos of agents (self-propelled blue balls) chasing a target (self-propelled red ball), either cooperatively or competitively. Each sequence of events terminated with either the agents sharing or not sharing the spoils of their chase, and the experimenters then measured infants' looking time in a 2x2 design. A 'cooperative chase' is one in which the agents communicate (by emitting and echoing brief sampled sounds), coordinate their actions so to, e.g., remove an obstacle, or push the target in an enclosure while the other agent blocks an escape route. A competitive chase is one in which, e.g., agents hinder each other, do not effectively coordinate their actions, or do not communicate. The important finding is that infants are surprised if, in the context of a cooperative chase, the agents do not share the spoils, and they are equally surprised if agents do share the spoils in a competitive chase. Infants look reliably longer at cooperative chasers who do not share the spoils of the chase, compared to when they do share, and they look reliably longer at competitive chasers who do share the spoils, compared to when the winner of the competitive chase consumes the spoils on its own. Importantly, Vorobyova and colleagues have replicated their results with a variety of cues for both cooperation and competition. In sum, infants seem to be building up expectations which will enable them to produce and respond to

---

[118] See, e.g., Tomasello 2018: 8.

considerations of fair resource distribution, which are sometimes relevant in negotiating what it is to act consistently with shared commitments.

<p style="text-align:center">***</p>

It is appropriate to talk about normative constraints in describing infants' and toddlers' interactions if the relevant normative notions are properly construed. It would be admittedly hard to interpret the experimental results without employing normative notions. Infants and young toddlers do sometimes adopt normative attitudes toward others, they often protest when they are entitled to, and they progressively come to modulate their overarching sense of entitlement according to the commitments that they do in fact share. All these processes co-develop in important ways with their acquisition of linguistic competency, as argued at the beginning of this section.

Conclusion

In this chapter, I proposed a way of extending the commitment-based view of communication so as to characterise infants' and young toddlers' communicative interactions, and I defended the validity of this move on several fronts. I argued that infants' interactions are, from early on in ontogeny, governed by shared commitments to goals, as in being picked up, grasping a finger for balancing while walking, giving an object, and so on. Coordination of action is achieved in broadly communicative ways, and according to patterns of accepted and rejected contributions to the joint activity itself. I described several ways in which infants gradually bring their own behaviour into conformity with the commitments that they happen to share with others, how they manage their expectations regarding adults' contributions, and how they themselves are eager to contribute to adults' goals. I argued that infants actively seek others' approval, avoid disapproval, and (among many other things) explore the boundaries of their entitlements, in playing as well as in early negotiations. They themselves have the behavioural means of expressing acceptance and rejection, which quickly develop into ways of expressing agreement and disagreement to what is said. I argued that, by re-interpreting ostensive signals in relational terms, it is possible to detail a story of how infants become gradually more and more prepared to share commitments with others.

I detailed a construal of pointing by distinguishing its communicative function from the different roles that it plays in cognitive development. Pointing gestures create shared commitments to attend to objects and events. Infants' pointing emerges as a form of **explorative** behaviour, and it is responded as such by adults, namely, verbally. The adult's response facilitates the infant's categorisation of objects and events and contributes to the stabilisation of the uses of words. **Anticipatory** and **regulative** uses of pointing contribute in similar ways to early word learning. The difference is that these later emerging uses of pointing also enable important forms of expectation management regarding, first, what is about to happen and, second, the adult's contribution to a wider joint activity. Finally, **helpful** uses of pointing allow for

effective and cooperative information transfer in a broad range of circumstances. None of these uses of pointing requires the recognition of a communicative intention. In the final section, I argued against the general impression that it is not appropriate to talk about normative constraints in relation to infants and young toddlers, thus giving further credence to the idea that the commitment-based view can plausibly be extended to cover prelinguistic communication. It is appropriate to talk about normative constraints. In fact, it is hard to understand what happens in the experiments without doing so.

In the next chapter, I zoom in on pointing gestures, and I compare how the commitment-based conceptualisations I proposed score against their Gricean counterparts.

Chapter 4: Is Prelinguistic Communication Gricean?

Introduction

The idea guiding Gricean conceptions of communication is that in communicating, the communicator aims at eliciting a certain response from the audience by means of making this very intention recognised, and communication is successful when this complex of intentions is at least recognised. Tomasello argues that, long before they have acquired a language, infants communicate in Grice's sense, and that several experiments speak in favour of this hypothesis. In the present chapter I detail Tomasello's explanatory strategy, and I offer reasons to reject it through a close reading of the key experiments. I argue that the alternative commitment-based construal of infants' pointing, provided in the previous chapter, scores better than its Gricean counterpart on empirical grounds, and that there is no good reason to think that prelinguistic communication is Gricean.

I illustrate Tomasello's explanatory strategy in section 1. Tomasello frames his argument in terms of the variety of reasons that can, on different occasions, underlie the production of pointing gestures, and on the tacit assumption that, for acting as they do, infants must understand these reasons. This last assumption is the one I challenge in the rest of the chapter. In section 2, I consider Tomasello's taxonomy of the motives that underlie the production of pointing gestures. He groups these motives into three broad categories: expressive, requestive, and informative. I present some reasons to reject the aptness of the proposed taxonomy, then I scrutinise the correlative experiments, and I argue that, for each of the individuated motives, infants can communicate effectively without going through the recognition of communicative intentions. I make my case by distinguishing a stable communicative function of pointing gestures, which I maintain is to create shared commitments to attend to objects and events, from the psychological states or cognitive processes which underlie the production and reception of pointing gestures. The conclusion will be that the kind of understanding postulated by Tomasello is a potentially distal outcome of, rather than being a prerequisite for, communicating by pointing.

Tomasello concedes that most experiments lend only indirect support to the Gricean construal of infants' pointing. For this reason, Tomasello and colleagues attempted to directly test for the hypothesis that infants communicate in Grice's sense. In section 3, I argue that unclarities in the background theorising are reflected in the experimental design. There is no obvious way of testing experimentally for the hypothesis that infants, in acting as they do, must go through the recognition of communicative intentions. I make my case by providing an alternative description of infants' interactions in terms of shared commitments, and by framing infants' behaviour

in terms of a growing preparedness to act consistently with the commitments that they happen to share with others. In the final subsection, I extend this analysis to the experiments that, according to Tomasello, show that infants communicate based on common ground.

1. The Indeterminacy of Pointing

The main argument that Tomasello offers in favour of his Gricean construal of prelinguistic communication is that, with pointing gestures, infants communicate about a wide variety of things for a wide variety of reasons, and recognise when others do so, too.[119] By itself, a pointing gesture does not determine which aspects of a certain situation the communicator is referring to, and it does not make the motivation for its production clear either. You might point for me at the door as an invitation to close it or to leave the room, or to appraise its new colour. Tomasello argues that pointing gestures are produced with a referential intention, which determines the referent of the pointing gesture, and a social intention, which determines the reason why the communicator has pointed. Jointly, the referential and the social intention are supposed to determine the content of the communicative act.[120] Tomasello claims that communication with pointing gestures is successful when the recipient comes to infer both the referential and the social intention, based on assumptions that are in the common ground, upon having recognised the presence of a communicative intention, namely, an intention to make the recipient recognise that the communicator is acting with a certain referential and social intention.

From an experimental point of view, Tomasello's strategy is to perform behavioural tests, see whether infants respond in the expected manner and, if they do, infer the kind of inferences that they must have gone through, under the assumption that they have communicated successfully in Grice's sense. In the first chapter, I argued that, in general, this is not a good strategy, because it translates a rational reconstruction of the potential complexities of an interaction onto the complexity of the cognition of the interactants. In the case of infants, this strategy tacitly relies on the assumption that, for acting as they do with pointing gestures, infants must understand the rationale of so doing, and assume that others understand it as well. I challenge Tomasello's tacit assumption by offering an alternative interpretation of the key experiments. The thread of my argument is that understanding the rationale of communicating in certain ways is a piecemeal (and late) acquisition, partly dependent on the infant's own familiarity with the activity in which

---

[119] This argument is put forward most explicitly in the 2008 book (Chapters 3 and 4) and is maintained, in some form or other, in the following books and papers. The core of the argument is adopted also by Moore (2018).

[120] Tomasello is systematically equivocal on what constitutes the content of a pointing gesture. Sometimes this is supposed to include the social intention (2008, 2019, but see also Schulze and Tomasello 2015), while some other times (2014: 50-54) it is supposed to include only the referential intention, which is supposed to have a 'situational content' (not an object, nor a property of an object, nor an event, but a situation). A further problem is that 'situations' are individuated by propositions, and although Tomasello claims that situational content is merely a prelude to propositional content, it is never clear how it differs from it.

the communicative exchange is embedded, rather than being a prerequisite for engaging successfully in the communicative exchange.

2. Communicative Acts

Tomasello (2008: 117-124, 2019: 99-104) classifies the motives underlying infants' production of pointing gestures ('social intention') into three broad categories: expressive, requestive, and informative. Pointing with an expressive motive is supposed to consist in pointing with an intention to share an emotion about something. For instance, the infant is excited at the sight of a dancing puppet suddenly appearing through the curtains, and she points at the puppet while alternating gaze with the adult. I consider this motivation for pointing in section 1.1. As far as I can see, Tomasello does not suggest construing expressive pointing in Gricean terms, and the experiments that he and his colleagues performed do not provide a reason in favour of this construal either. I take it a step further, and I argue that, often enough, infants' expectations do not seem to match an intention to share an emotion, even in cases of 'expressive pointing'. I propose to interpret some instances of 'expressive pointing' as belonging to a subtype of the **explorative** pointing outlined in the previous chapter, and I detail the construal of this subtype further.

According to Tomasello, pointing with a requestive motive consists in pointing at something with the aim of having the recipient do something. Tomasello suggests that, when expressing their requests by pointing, the infant intends the adult to know that she intends the adult to do something. The argument in favour of this claim is that, often enough, infants attempt at repairing the message even when they get what they want by luck. In section 2.2, I argue that the inference from repairing attempts to the presence of communicative intentions is not valid, and that impressions to the contrary are due to a questionable construal of the experimental evidence. The 'requestive pointing' which features in these experiments is an instance of **regulative** pointing, embedded within a game which features the giving of an object.

Finally, Tomasello argues that infants sometimes point with an informative motive, namely, to helpfully provide the adult with needed information, as opposed to wanting to share an emotion or as a way of requesting the adult to do something. For instance, if the adult is looking for a misplaced object, the infant points in the direction of the misplaced object, but neither because the infant wants the object nor because she is excited about it. Tomasello suggests that this pointing behaviour is underpinned by an intention to have the adult recognise that the infant intends the adult to know something that is relevant to the adult's own goal. Analogously, when the infant is the recipient of an informative pointing gesture, the infant is supposed to recognise that the adult intends her to recognise that the adult intends her to know something that is relevant to her goal. In general, it is not warranted to infer that a motive is informative because it is neither requestive nor expressive. In section 1.3, I argue that it is highly unclear what infants are doing when, allegedly, they are pointing informatively. By the time they are 18 months of age, infants do sometimes point informatively for adults, and on several occasions respond appropriately to adults'

informative pointing gestures. Even in these cases, I argue, infants' behaviour should not be analysed in Gricean terms, and that these instances of pointing can be seen as instances of **helpful** pointing.

2.1 Expressive pointing

As far as I can see, Tomasello and colleagues do not suggest that infants' expressive pointing is Gricean. Tomasello's claim is that when infants, say, point excitedly at something and occasionally glance up at the adult, infants aim at sharing a positive emotion with the adult. They do not merely expect the adult to react by displaying a positive emotion; they also expect the adult to turn toward the object. The concern I have with the proposed construal of pointing is in the details. For instance, it is never considered what happens when the infant points while expressing a negative emotion (as in, e.g., pointing at a spider crawling up the wall and expressing fear): would the infant, in this case, intend the adult to look at the pointed-to object and express a negative emotion? More generally, it is unclear whether the infant has precise expectations regarding the emotional valence of the adult's response to the pointing gesture, as well as regarding other specific aspects of this response. I present the experimental evidence produced by Tomasello and colleagues, and then I provide my interpretation, based on the idea that expressive pointing is, often enough and especially at an early age, an instance of **explorative** behaviour.

Liszkowski and colleagues (2004, 2007a, 2007b) performed a series of experiments with 12-months-olds[121] to exclude that, by pointing excitedly at, say, a funny dancing puppet, the infant merely wants the adult to express a positive emotion toward the infant herself, or that the infant merely wants the adult to look at the target object, or that the infant is pointing for herself, without intending the adult to either look at the object or express excitement. For instance, in the 2004 experiment there are four conditions: JOINT ATTENTION (the experimenter alternates gaze between the infant and the target object while expressing excitement, also verbally), FACE (the experimenter responds with excitement to the infant, uttering a few or no words and without looking at the object), EVENT (the experimenter alternates gaze between the infant and the object, but does not express excitement), and IGNORE (the experimenter neither expresses excitement nor looks at the object). Each infant undergoes 10 trials in only one of the four conditions, and each trial sees a different exciting object or event.[122]

The results are as follows: infants typically point more often within the same trial in the FACE, EVENT and IGNORE condition, as opposed to the JOINT ATTENTION condition. According to Tomasello and colleagues, repeating the pointing gesture within the same trial signals dissatisfaction with the adult's response on the side of the

---

[121] Here as in every other experiment performed by Tomasello and colleagues, only infants who were already reported to point by their parents were admitted to the experiment.
[122] There is a mild cruelty to this experimental design. A pilot study with a within-subject design in which each infant underwent two trials in each condition did not yield significant results, which is noteworthy. The experimenters resorted to a between-subject design to see more clearly the effect of conditions on infants' successive pointing and looking behaviour.

infant. The other finding is that the average number of trials with a point is higher in the JOINT ATTENTION condition than in any other condition (no difference in frequency of pointing across trials in these other conditions was found). This second finding is supposed to signify that the infant tends to give up on interlocutors that do not respond appropriately or are not excited about the event. Finally, infants were found to look longer at the experimenter in the EVENT condition, namely, when she looks at the object but does not respond with excitement, as opposed to any other condition. This finding can be regarded as signalling surprise, presumably because the adult has looked at the object, but without either commenting on it or manifesting any recognisable emotion (this experiment does not discriminate the relative weight of these two factors, verbal and emotional). Similar results were obtained in the other two experiments, although it should be noticed that some details of the conditions are unclear, and the results obtained in superficially similar conditions are not directly comparable.[123]

     These experiments do not provide a reason to think that, in pointing excitedly at a dancing puppet, the infant is acting with a communicative intention in Grice's sense, and as far as I can see neither Tomasello nor the authors of the experiments suggest so. Setting the worry about higher-order intentions aside, it is not completely clear what these experiments show. On one hand, in pointing at a distal object or event with excitement, infants expect a suitably engaged adult to look at the pointed-to object or event, and to respond to them. Beyond this, it is unclear which more specific expectations infants may have.[124] The infant is with an unfamiliar adult, and the object or event is supposed to be unfamiliar as well. There can be little doubt that affect sharing is a pervasive feature of infants' interactions, but it is not obvious that the infant, by pointing, intends to elicit a specific kind of response in the adult (if this is what the authors of the experiment have in mind when they claim that the infant intends to share an emotion about something with the adult).

     Other experiments, including those reviewed in Chapter 3, section 1.3 (e.g., Kovács et al. 2014), reinforce this impression. In those experiments, it was found that what encourages infants to point again in the face of novel objects or events is the adult's active verbal participation to the joint activity (on top of the appropriate attentional orienting), but not the valence of the emotion expressed. The experiments by Liszkowski and colleagues do not allow discrimination of the relative weight of

---

[123] In the 2007b experiment, it was found that considering only trials with a point, infants tend to repeat their pointing gesture more often only if the adult looks at an object which is different from the pointed-to object, but not if the adult shows disinterest in the object, where 'disinterest' is an emotion with a negative valence, as opposed to the neutral expression used in the 2004 experiment. The measures used for looking behaviour in the 2007b experiment (number of looks to either target object or experimenter) are different from the ones used in the 2004 experiment (looking time at the experimenter), which makes drawing comparisons across experiments quite difficult. In the 2007a experiment, the experimenters adopted a mixed between/within-subjects design, totalling 8 conditions and 4 trials per infant, thus making the significance of the results drop, and comparisons with previous experiments close to impossible.

[124] To be clear: I am not claiming that infants do not act intentionally, or that do not often enough expect others to respond to them in specific ways. They clearly do. I am only claiming that, as an explorative behaviour guided by the adult's response, a wide range of instances of pointing are not underpinned by very specific expectations that the infant has regarding the adult's response.

these two factors. To make sense of these disparate findings, it is convenient, once again, to distinguish the communicative function of pointing gestures from the psychological or cognitive reality of the individuals engaged in the joint activity of pointing.

From the point of view of the interaction, a pointing gesture which is addressed and responded to creates a shared commitment between the infant and the adult to attend to something. This description of the interaction contributes to explain the stability of adults' responses,[125] which in turn grounds expectations on the side of the infant. When addressing their pointing gesture to the adult, the infant expects, first and foremost, the adult to orient toward the pointed-to object or event and to respond to her. It is convenient to now trace the origins and modulation of this and other expectations that the child might have in, say, pointing excitedly at a funny dancing puppet or at a curious novel object.

From around when they are 6 months of age, and so before they have started pointing, when expressing excitement at an event they do look up at the adult, as in checking whether the adult is with them.[126] From an emotional point of view, infants this age have already had hundreds of hours of dyadic interactions in which they have come to, *inter alia*, regulate their own expressions of emotions onto how these expressions are responded to by the adult. Therefore, the infant might not intend the adult to display a specific kind of emotion, but they might be surprised if a familiar adult responds to them in an emotionally incongruous way. Perhaps, the emotional valence of the adult's response affects the child's dispositions toward a subset of the kind of things that, say, she finds exciting, or perhaps it affects her categorisation of these things.

Presumably, pointing emerges as a way, for the infant, to focus her own attention onto something, namely, as a more active form of distal exploration. When addressed and attentive, adults typically respond to infants' pointing gestures as they usually respond to other (tactile or more heavily sensori-motor) explorative behaviours, namely, verbally (on top of being sensitive to how the infant feels toward the pointed-to object). From a cognitive point of view, it is plausible to think that, *inter alia*, the adult's response helps the infant in stabilising categories for objects and events, where this categorisation might include the emotional valence of the response received by the adult. All this can happen even if (and perhaps because of), in some instances of pointing, the infant does not intend to elicit any very specific response in the interlocutor.

In sum, what the infant and the adult do (and expect that the other does) can be described by saying that pointing creates a shared commitment to attend to something. From this description of their behaviour, it is possible to embark on the quite different endeavour of explaining the significance of these activities for the child's

---

[125] Sometimes people have bad days, so it is fair to assume that adults are not always super eager to engage in the pointing game, and that sometimes they respond partly because they feel obliged to.
[126] This phenomenon is often called 'attentional referencing' or 'social referencing'. For further references, see Reddy 2008: 112-113.

psychology, as well as the function that pointing (and the response to the pointing that the infant receives) might subserve infants' cognitive development.

2.2 Requestive Pointing

It is not explicitly suggested by Tomasello that expressive pointing is an instance of Gricean communication, and there is no good reason to think that it is. What is explicitly suggested by Tomasello is that requestive and informative pointing are cases of Gricean communication. I offer reasons to reject this claim, starting in this subsection with requestive pointing.

According to Tomasello,[127] pointing gestures produced with a requestive motive do not constitute a homogeneous category, but rather range over a continuum of cases. On one end of the spectrum, there are 'commands': sometimes the infant points with the intention of having someone do something for them. According to Tomasello and many other theorists in the field,[128] 'commanding' others in this sense could be premised, at least in principle, on an understanding of others as 'socio-causal tools', namely, animated things which infants use to make things happen for their own benefits. At the other end of the spectrum, there are 'cooperative requests': sometimes the infant intends to make what they want known to the other, in the expectation that the other will be happy to provide, if the request is a reasonable one. The analogy is with polite and indirect requests issued verbally, as when one says: 'I would like the door closed', or: 'The window is closed', implicating that one would like it to be open.

If understood in Gricean terms, the idea seems to be that when producing a command, the infant merely intends someone to do something, while when producing a cooperative request,

> **(Req)** The infant intends the other to know that the infant intends the other to do something.

I suggest that there are a number of problems with Tomasello's view here. First, his proposed taxonomy of directive communicative acts is neither clear nor compelling. It entails that in commanding someone to do something by pointing, one is not communicating (or at least not communicating in Grice's sense), and it assumes that a command must be underpinned by self-serving motivations. If you caught a cold, but I'm enjoying the breeze, in telling you 'Close the window!' I would not be issuing a command. This taxonomy systematically equivocates between the illocutionary force, the perlocutionary effects, and the motives with which a communicative act might be produced. Bracketing these and other concerns regarding the taxonomy itself, I agree with Tomasello that infants' directive communicative acts are often *not* premised on an understanding of others as 'socio-causal tools'. In fact, I think that this is not the case at *any* point in development, at least for typically developing infants. At

---

[127] E.g., 2008: 122-123, 2019: 101.
[128] For a list of references see, e.g., Grosse et al. 2010a: 1711.

the same time, I find the Gricean rendering of infants' 'cooperative requests' unconvincing. It sets the bar too high while, at the same time, glossing over, rather than accounting for, the complexity of infants' interactions. It is convenient to illustrate these points by reviewing the key experiment proposed by Tomasello as evidence in favour of the Gricean construal.

According to Tomasello, the experiment performed by Grosse and colleagues (2010a)[129] supports the conclusion that infants intend others to know what it is that they intend them to do, because, in this experiment, infants repeat their requests when the adult misunderstands them but happens to give them what they want by luck. In general, the inference from repairing attempts to Gricean communicative intentions is not valid: in the preverbal case, detecting a 'misunderstanding' may only amount to detecting an incongruity in the other's response following one's own request. One can be motivated to rectify this incongruity, even upon getting the sought-for effect, without thereby intending the other to know that one intended the other to do something. Moreover, it is not at all obvious to what extent the repairing attempts detected by Grosse and colleagues are independent of infants' already acquired linguistic competency: most of the 18-month-olds[130] tested by Grosse and colleagues already had the linguistic means for expressing most of the target requests verbally, as noticed by the authors themselves (Grosse et al. 2010a: 1713).[131] Setting these worries aside, it is worth examining the experiment performed by Grosse and colleagues (2010a) to see why it is supposed to provide evidence in favour of the claim that infants perform requests in Grice's sense.

In this experiment, at the beginning the infant is sitting on her parent's lap at a table, with one experimenter sitting in front of her (E1), and another one sitting at her right (E2). There are two 'target locations': one is a shelf on the left-hand side of E1, and the other is a marked location on the table, on the right-hand side of E1 and within reach for the infant. In the familiarisation phase, there are five toys on the shelf, and the infant is encouraged by E2 to request these objects from E1, one by one. For the last two objects, E1 turns around pretending to be busy, and the infant is encouraged by E2 to call E1 and then request the next toy. In the experimental phase, E1 sets up a game which consists, for instance, in putting four coloured toy balls in the corresponding holes of a board. E1 gives the infant one ball at a time. She always names the object she hands over, smiles, and always invites the infant to play with it by asking questions such as: "which hole does this ball go in?", just as one would normally do. The last of the four objects is always missing. E2 addresses the infant and starts looking

---

[129] The other experiment (Grosse et al. 2010b) was performed with 21-months-old infants, who could issue their requests verbally, so I will not discuss it. It is also worth noticing that Tomasello (2019: 101-102) misreports the task of the first experiment (2010a).

[130] The experiment was conducted with children of 18, 24 and 30 months of age.

[131] The authors (2010a: 1718-1719) claim that there is no correlation between children's linguistic abilities and the patterns of responses that children at different ages produce. They use a 'compound language measure' without specifying how they arrived at this measure or what this measure is supposed to reveal regarding linguistic competency. The measure is too rough to reveal anything of interest regarding any relation between relevant aspects of children's linguistic competency and skills for pragmatic reasoning.

for the missing object in a box. At the same time, E1 turns around, takes out a writing pad and pretends to be busy reading it, while holding an object in her right hand. Depending on condition, the object in the hand is either the target object (e.g., the ball) or a distracter object (which is always something in itself unattractive for the infant, like a cloth or a piece of cardboard paper). There always is another object (target or distracter, depending on condition) on the shelf.

There are five conditions in total. Each child receives one trial in each of them,[132] always with a different game.[133] Only two of these five conditions are relevant for current purposes, namely, the ones labelled by the authors CORRECT and HAPPY ACCIDENT.[134] In both conditions, the experimenter holds the target object in her hand. In the CORRECT condition, she gives the requested object to the child, in the same engaging way in which she has done so with the previous objects. In the HAPPY ACCIDENT condition, the experimenter pretends to misunderstand the infant's request, turns her head toward the shelf and says to the child: "Oh! You want the piece of paper!", while at the same time surreptitiously placing the target object (the ball, already in her right hand) at the target location on the table, within reach for the infant. The experimenters found that, in the HAPPY ACCIDENT condition, where the desired object is within reach for the infant but not as a result of successful communication, roughly half of the infants either points to the object again or say something like 'ball'.

The authors of the experiment also coded the infant's latency to turn away from the experimenter, in both conditions. The reason why they did so is that roughly half of the infants apparently did not attempt at repairing the message. The authors argue that this might be due to lack of communicative means for performing the reparation attempt, rather than lack of interest in doing so. I do not understand this line of reasoning, and it is unclear to me why looking longer at the experimenter ought to count as a substitute measure for repairing attempts. It would be more plausible to take this measure as an indication of infants' puzzlement, which by all accounts infants are expected to manifest in the HAPPY ACCIDENT condition. In fact, older children, who

---

[132] There are several problems with this experiment that are worth mentioning. The total number of infants is 20 for each age group. Each infant is exposed to all the five conditions in successive trials, and there is no obvious way of controlling for carry-over or confounding effects. The statistical significance of the results is thus dubious. This problem could be avoided by having more participants and adopting a between-subject design. Finally, trials in which infants did not produce any request or accepted the distracter object were conveniently excluded from the statistical analysis, thus threatening even more directly the statistical validity of the results.

[133] Games and conditions are counterbalanced across infants.

[134] In the other three conditions, labelled by the authors WAITING, WRONG REFERENT, and WRONG INTENT, E1 holds the distracter object in her hand, and the target object is on the shelf. In WAITING, the adult agrees to give the infant the desired object, but pretends to be busy, and during the waiting she makes the distracter object available for the infant. It is worth noticing that in this condition, infants behave just as they do in the HAPPY ACCIDENT condition, namely, half of the time they produce their request again. The authors claim that in this condition the infant understands that the adult has understood the request, but they are less patient than older toddlers. Since infants behave in analogous ways in both conditions, it is hard to tease apart this explanation from the alternative one, according to which, in this condition, infants have not understood that the adult got their request right.

are also quicker at turning away from the experimenter, produce more repairing attempts.

According to the authors, the results show that infants attempt at repairing the message when they get what they want by luck, but the adult appears to have misunderstood them. The Gricean reading of this finding is that the infant does not merely intend to have the object, but she also intends the adult to know that she intends to have the object. The inference from repairing attempts to the presence of Gricean communicative intentions is not warranted, but there is a more important reason why this experiment does not show what it purports to show: it is not true that the infant gets what she wants by luck, because getting the object is a poor description of what the infant expects. The adult has set the standard for how the game is to be played by handing to the infant one object at a time in a very engaging way. In the CORRECT condition, the experimenter simply plays the game as the infant presumably expects her to. In the HAPPY ACCIDENT condition, the adult pretends to misunderstand the infant (she verbally agrees to comply to a different request, namely, a request for a different object), and then does not *give* the infant *any* object at all (neither the distracter nor the target). Surreptitiously placing an object within reach is not the same thing as giving an object.[135] The importance of the act of giving is revealed by the fact that, in other conditions in which the adult gives the infant the distracter object, often enough the infant accepts it and plays with it.[136]

In sum, in the experiment performed by Grosse and colleagues (2010a) the infant expects the other to give her the target object in a specific way, partly because this is how the game is played. Often enough they seem more interested in the giving rather than in the object. The fact that the desired object is within reach does not entail that the infant got what she wanted by luck, because 'getting the object' is a poor description of what the infant expects. They are puzzled when the adult 'agrees' to give them an object that was never requested, and then does not give them any object. Those infants who are quick in overcoming their puzzlement point again to the target object or name it, while looking at the adult, thus manifesting their expectations of being given the object. So, the infant's pointing gesture can be seen as an instance of **regulative** pointing, namely, as a way of regulating expectations regarding the adult's contribution to the game according to how the adult responds to the pointing gesture. I have no doubt that there is an important sense in which infants aim at being understood, but their actions and expectations do not mandate a Gricean reading of their requests.

---

[135] As noticed in the previous chapter, the giving of objects is a game in itself for much younger infants, and there is ample experimental evidence on the different expectations that infants form regarding acts of giving.

[136] As noticed in footnote 132, the experimenters conveniently excluded these responses from the statistical analysis of the results.

2.3 Informative Pointing

Informative pointing plays a pivotal role in Tomasello's theory of prelinguistic communication. According to Tomasello, when pointing with an informative motive, one acts with an intention which has the following structure:[137]

> **(Inf)**   A intends B to recognise that A intends B to know that *p*.

Correlatively, according to Tomasello, understanding a pointing gesture produced with an informative motive requires the recipient to recognise the communicator's intention. Tomasello's main claim is that infants point informatively in this sense and understand when others do so as well.

On the comprehension side, the paradigm example is one in which the adult and the infant are playing a hiding game. The adult first hides a toy in one of two boxes, and then points for the infant to one of the boxes, expecting the infant to look for the toy in that box. According to Tomasello, the infant comes to know that the toy is in the pointed-to box because she recognises that the adult intends her to know that she intends her to know where the toy is ('socially recursive inference'). The infant then comes to identify the pointed-to box *as* the location of the hidden object ('quasi-propositional content'), and then proceeds onto opening the box to retrieve the object. On the production side, the paradigm example is one in which the adult, in some way or other, loses track of an object that she might need. It is not entirely clear why infants' *production* of informative pointing gestures ought to count as Gricean in the first place. I argue that, in doing what they do, infants need not communicate informatively in Grice's sense in neither production nor comprehension.

'Informative pointing' is, often enough, an instance of what, in the previous chapter, I called **helpful** pointing. It is worth deepening the construal of **helpful** pointing a bit. If the infant has a goal and assumes that a suitably engaged adult will contribute to this goal, then the adult's pointing gesture, if addressed to the infant, can be relied upon as one such contribution. To be effective, this contribution necessitates the infant to act upon it. It is a well-established fact that infants preferentially follow others' gaze or pointing gestures after having established eye-contact, that they expect to find something lying in the direction of one's gaze or pointing finger, and that they preferentially attend to what they find there.[138] If the infant is familiar with boxes, how they afford the hiding of objects and how they can be opened, preferentially attending to the box (as a response to a pointing gesture produced in the context of a hiding game) leads the infant to open the indicated box in the expectation of finding the toy there. In principle, to be effectively informed by the adult, the infant does not need to

---

[137] Tomasello is systematically equivocal on what exactly this structure is. Sometimes he holds that there must be a communicative intention in Grice's sense (2008: 130-132), sometimes he holds that informing is only a matter of intending someone to know something (2019: 102-104), and some other times (2014: 50-54, 2019: 104-106) he holds that there indefinitely many layers of what he terms 'socially recursive inferences'.

[138] Importantly, the alignment of attentional states achieved with pointing is the goal of a mini joint enterprise. The adult and the infant seem to achieve this goal together, partly by tracking patterns of accepted or rejected contributions to this mini joint activity.

recognise that the adult intends her to know that the adult intends her to know that the ball is in the box. Rather, successfully coordinating actions in this and other similar ways contributes to foster an understanding of what it is to act informatively.

There is a parallel description available for the production side. The adult might have a goal which the infant is in a position to detect. On many occasions, and especially within the context of interactions, infants are keen on facilitating adults achieving their goals. Pointing to a needed object that has fallen out of sight is one such contribution that the infant might give, and this contribution works only if it is acted upon by the adult. Of course, helping by pointing to an out of sight object still requires the infant to ascribe goals and informational states to the adult, and it also presupposes that the infant is motivated to contribute to the adult's goal. In general, however, it does not require acting with a communicative intention in Grice's sense.

From an empirical point of view, preliminary evidence for the claim that infants act with an 'informative intent' is that, sometimes, they point to an object which the adult has lost track of, and they do not seem to want the object for themselves, nor do they express any enthusiasm about it. For the reasons outlined above, this is not a strong basis for inferring the presence of a Gricean intent to inform others. In the below, I argue that the experiments performed to verify the presence of informative motives in infants' pointing yield a highly fragmented picture which, in fact, discourages a Gricean construal. When the results are consistent (which is the case almost only for 18-months-olds), they can be explained with the construal of **helpful** pointing outlined above.

According to Tomasello, the strongest piece of evidence in support of the claim that infants point with an informative motive comes from a series of studies performed by Liszkowski and colleagues (2006, 2008) and Behne and colleagues (2012). The experiment performed by Liszkowski and colleagues (2006) aims at showing that, when an adult needs an object but has lost track of it, infants point to the sought-for object more often than to a distractor object, which the adult has similarly lost track of but does not need. The problem with this experiment is that the results are weak, and there are too many conditions for too few participants for the results to be of any significance, so there is no point in trying to interpret them.[139] It is unclear in which circumstances infants point to the out of sight object more often than to the distracter object, and why they do so. I detail this argument before considering the other experiment performed by Liszkowski and colleagues (2008).

The participants to the 2006 experiment were 32 infants; half of them were 12 months of age, and the other half were 18 months of age. Each infant underwent 12 trials. In each trial, the infant sees an adult demonstrating the performance of a task, like punching holes in a piece of paper. On the table where the adult operates, there always is another object which is unrelated to the task that the adult is performing. The experimenters employed 8 different triplets of objects, half of which were adult objects (as the hole-puncher), while the other half were toys. In 9 out 12

---

[139] Here, I consider only the second study reported in Liszkowski et al. (2006). By the authors' own admission, the results of the first study are not reliable, because the task could be seen by the infant as a naming game.

trials, the infant sees the adult losing track of the object employed to perform the task (e.g., the hole-puncher) as well as of a distracter object that is present on the table. Importantly, in different trials the adult loses track of the objects in different ways. For instance, by

1. Inadvertently pushing away both the target and the distracter object; or
2. Distractedly misplacing the objects while keeping them on the table; or
3. Being absent while another experimenter misplaces the objects.

In the other 3 trials,[140] the adult does not lose track of the objects at all. She just uses them, and there are other objects behind a barrier between the infant and the adult, which only the infant can see.

The results of the experiment are the following: almost all infants pointed at least once across trials, but, overall, they pointed in only a fourth of the trials. When they pointed, they preferentially pointed at the target object as opposed to the distracter. However, the trials in which they pointed were more often the ones in which the adult either inadvertently pushes away the objects or does not lose track of them at all, as opposed to the trials in which she distractedly misplaces them or, in her absence, someone else misplaces them. Since in this experiment there are more conditions than participants, there is no point in trying to interpret the results, because it is impossible to determine which features of the situation do in fact encourage infants to point to the target object.

The other main experiment performed by Liszkowski and colleagues (2008) with 12-months-olds has yielded results which are similarly hard to read. In the first study, the experimenter demonstrates the performance of a task (e.g., using glue to attach two ends of a cloth, while another object is at hand), just as she did in the previous experiment. In one condition, she drops an object and makes it fall down a slide at one side of the table. After a couple of seconds, she covertly pushes a lever which makes the other object fall down another slide on the other side of the table, while she is not looking. In the other condition, the order in which the two objects (seen and unseen) fall is reversed. She orients toward one side of the table holding one object, but before making it fall down the slide, she operates the lever, thus making the other object fall. In this experiment, when infants produced a pointing gesture, they most often indicated the object that fell last, regardless of whether the experimenter saw it falling or not. In this experiment, it is unclear in what sense infants, in pointing to objects, are acting informatively at all.

In a follow-up study, the experimenters tried to simplify the experimental design so to elicit a genuinely informative pointing gesture. The experimenter sits on the floor, in front of a table which has a bent side for making objects slide down. There are drawers on each side of the experimenter. The 'game' is played by the experimenter alone and proceeds as follows: she takes out five uninteresting 'adult

---

[140] From the authors' description of the experiment, it is unclear how the counterbalancing of conditions and pairs of objects was conducted across trials.

objects', and places them on the table. She puts the first two in the drawers, places two other objects on the plain side of the table, and the target object close to the bent side. The infant is sitting in front of the experimenter. She is only allowed to pay attention to what the experimenter does and she is not allowed to play with the objects that the experimenter uses.[141] In one condition (UNSEEN), the experimenter covertly makes the target object slide, while she is not looking at it. In the other condition (SEEN), she covertly makes the object slide as well, but while paying attention at the object sliding down. In both conditions, the experimenter then looks up at the child and expresses puzzlement, both verbally[142] and by raising her hands. In this experiment, each infant undergoes four trials in either one of the two conditions. The important result is that, in the UNSEEN condition, infants point at the target object in almost half of the trials, while in the SEEN condition, they do so in only 10% of the trials.

Given the utterly uninteresting nature of the game for infants, most of them either did not point or dropped out becuase of fussiness. Of course, the experimenters made the task uninteresting for the infant to decrease the chance that the infant would point to the target object out of interest, or as a way of requesting it. However, and tellingly, this also makes infants much less likely to point. Bracketing these concerns, what infants do in these occasions can plausibly be explained with the alternative model proposed above. The adult addresses them while tidying up the objects and addresses them again after having lost track of one of the objects. Assuming that the infant is minimally engaged in this interaction, pointing to the sought for object is a way of responding to the adult which facilitates the adult in achieving her goal. It is relatively easy to identify the goal because it is the outcome of an action that has been demonstrated, repeatedly performed, and always the same for several objects; there is no other adult on the scene; and the object falls out of sight in the exact same manner on every trial without the intervention of other adults. In the other condition, the infant is less likely to point simply because the adult is already attending to the object that fell.

The experiment performed by Behne and colleagues (2012) aims at establishing a correlation between 12-months-old infants' comprehension and production of informative pointing gestures. According to Tomasello, this experiment is the best piece of evidence showing that, by the time they are 1 year of age, infants point informatively in Grice's sense, and likewise understand others' informative pointing. In this experiment, the infant is supposed to play a hiding game with an experimenter and an assistant. In the comprehension task, the experimenter hides a toy in either one of two shallow containers, covered by a cloth, and then insistently points at the location where the toy is, alternating gaze with the infant. In the production task, the roles are reversed. The assistant hides an object in either one of the two containers.

---

[141] In all the experiments designed to test for the presence of informative motives in infant pointing, the experimenters take great care in making the situation as unexciting as possible for the infants, who unsurprisingly become fussy beyond redemption on one third of the trials.

[142] By asking two different questions in the two conditions: 'Where is it?' and 'How can that happen?'. This experiment was done in Germany. In German, the first word in both questions is the same ('Wo').

The infant, who is sitting on her parent's lap to the side of the assistant, is invited to look at where the assistant hides the object. During the hiding process, the experimenter covers her eyes with her hands, and turns away from the table. After the hiding process, the experimenter turns around, looks surprised, and repeatedly asks the infant questions such as "Where is the [object]?", referring to the object by using its name.[143]

In this experiment, each infant is supposed to undergo 8 trials in the comprehension task, and 4 trials in the production task, always in this order. As per the previous experiments, there is no clear rationale for both the number and the ordering of trials. Only *one* out of thirty infants completed all trials. In the comprehension task, in each trial less than 20 out of 30 infants searched for the sought-for toy in the indicated location. Individually, 10 out of 30 infants searched for the object in the indicated location above chance. In the production task, 10 infants out of 30 pointed for the object on at least 1 trial out of 4.

If the results of this experiment were reliable, they could be explained with the model proposed above. However, it is unclear to me what this experiment shows in the first place. In analogous tasks where boxes are used, instead of shallow containers, only 18-months-old search for the toy in the indicated location above chance (Behne et al. 2005, reviewed in the next section, and Gräfenhain et al. 2009). This raises the suspicion that playing the hiding game is not an obvious thing to do for younger infants and reinforces the impression that the experiment performed by Behne and colleagues is replete with confounding factors. Moreover, the conditions for success in the production task are not even specified, which makes the significance of correlations between comprehension and production arbitrary. Strictly speaking, only one infant out of thirty completed all trials and thus performed above chance.

Collectively, the findings reviewed in this section suggest that, on most of the occasions in which the experimenters expected the infant to point informatively, the infant did not do so. Often enough, when infants point in these contexts it is not clear that they point informatively for the adult, and it is still not clear which features of the situation prompt infants to point to the target object. One could argue that the opacity in the results is due to the specific experimental design employed, and that better experimental techniques will reveal that there is an interesting set of circumstances in which infants' pointing gesture, prior to when they are 18 months of age, can plausibly be construed as informative. I agree, but what this suggests is that pointing informatively, and understanding when others do so, seems to be a piecemeal acquisition, which partly depends on infants' own familiarity with the activity in which they are engaged. By construing 'informative pointing' in terms of **helpful** pointing it is easier to account for this lack of uniformity because this construal of pointing incorporates the infant's own familiarity with the activity in question.

---

[143] The suspicion, as we will see confirmed by the sparsity of the results, is that this experimental design is replete with confounding factors.

3. Overtness and Common Ground

In the previous section, I argued that infants' communication needs not be underpinned by Gricean communicative intentions, in neither production nor comprehension, for any of the motives individuated by Tomasello. Tomasello (2008: 129) acknowledges that the studies reviewed in the previous section may provide only indirect evidence in favour of the Gricean construal. Tomasello and colleagues thus performed further experiments with the aim of providing direct evidence in favour of the Gricean construal. In this section, I argue that these experiments are premised on an unclear theorisation of the very notion of communicative intention, and that there is no obvious way of showing experimentally that infants communicate in Grice's sense.

Tomasello (2008: 88-96) characterises communicative intentions as intentions to make one's own intention mutually known, or mutually manifest, or overt. Some other times, he characterises communicative intentions as intentions to make a social and a referential intention recognised. Recognition that others act with an overt intention (in one sense or the other) is supposed to lead infants to rely on common ground to get at the communicated content. The notion of common ground plays a pivotal role in Tomasello's conception of prelinguistic communication, but, like that of overtness, it is never appropriately worked out. The experiments performed to show that infants rely on 'common ground' and recognition of 'overtness' are, accordingly, of difficult interpretation, as it has been widely acknowledged in the literature (see, e.g., Bohn and Köymen 2018).

In Chapter 1, I argued that the very notions of overtness and common ground are best understood in terms of shared commitments, and what is made overt may, but needs not be, a set of intentions in Grice's sense. In this section, I scrutinise three key experiments performed by Tomasello and colleagues designed to provide support for the claim that infants communicate in Grice's sense. I argue that where a description of an interaction in terms of recognising higher-order intentions is available, a description of that same interaction in terms of shared commitments is also available. This alternative description often scores better than its Gricean counterpart, and it does not license the inference that infants go through the recognition of communicative intentions in Grice's sense. In a nutshell, the proposed Gricean rationalisation is of dubious validity, and drawing inferences regarding infants' cognition based on this rationalisation is not a good move to make.

Sometimes Tomasello suggests that infants' communicative interactions may well have a structure which infants themselves mostly do not understand, and he often refers to features of this structure in normative terms (e.g., 2008: 91-92). It is hard to keep hold of this idea if one adopts a Gricean construal of infants' communication. The suggestion can be preserved by rejecting the Gricean construal and by describing infants' interactions in overtly normative terms. Doing so makes room for the claim that infants' grow into the complexities of the interactions in which they participate.

3.1 Overtness: Hide and Seek Game

In the experiment performed by Behne and colleagues (2005) the infant plays a hiding game with an experimenter. The infant is sitting in front of the experimenter, and between them there are two equidistant and clearly visible containers. While exchanging glances with the infant, the experimenter hides a fascinating toy in one of the containers.[144] The first study has two experimental conditions, which I collectively label OSTENSIVE. In the first condition, after having hidden the toy, the experimenter repeatedly alternates gaze between the infant and the container which contains the toy (target container), while raising eyebrows. In the second condition, she follows the same script while also pointing at the target container, holding her wrist in the midline of her body.[145] In both conditions the infant is then encouraged to search for the toy.[146] In this study, each infant undergoes 4 consecutive gaze-trials and 4 consecutive point trials.[147] The second study, conducted with different infants, has two conditions as well, which I collectively label NON OSTENSIVE. The experimental design is the same, except that in these two conditions the experimenter either gazes at the container 'absentmindedly' and without engaging the infant's attention; or protrudes her finger in the direction of the target container, holding her hand at the midline of her body, but again without engaging the infant's attention, and behaving as if she were checking her wrist.

Each of these studies was conducted with three groups of participants aged 14, 18 and 24 months. For present purposes, the first two groups are the important ones. The authors coded as a dependent measure which box the infants first attempted to open. The results show that 18-months-old infants went for the indicated box significantly more often in the OSTENSIVE conditions and did so above chance from the first trial, while their choice of box was at chance in the NON OSTENSIVE conditions. Results are less clearcut for the younger infants. On their first trial of the OSTENSIVE conditions, their choice of box was at chance. Even though as a group and considering all trials they performed above chance (64%) in the OSTENSIVE conditions, but not in the other conditions, considered individually their behaviour differed significantly from chance only for 7% of infants.

Bracketing concerns on the number of trials and choice of task, which I already expressed in section 2.3, this experiment does not provide evidence in favour of the Gricean construal of infants' communication. From an interpersonal point of view, one

---

[144] The infant can see that the experimenter is holding the toy but cannot see where the experimenter then puts the toy, because both boxes have a lid that can be opened from the experimenter side and that hide her hands (for 14-months-olds), or there is a screen that is raised to cover the experimenter's hands (for 18 and 24-months-olds).

[145] This constraint is added to exclude that the infant goes for the container that is closer to the pointing finger (what the authors term 'distance cue' (Behne et al. 2005: 494)). The problem is that this constraint also has the potential to make the pointing gesture completely irrelevant for the infant, and there is no control for this possibility in the experimental design.

[146] The encouragement is done verbally by the experimenter, who said 'Where's the [toy]? Can you go and get the [toy]?' (Behne et al. 2005: 494).

[147] The ordering was randomised across infants. There are four different kinds of containers, each of which is used in a single gaze-trial and a single point-trial. The order of the containers was randomised across trials.

can assume that, for 18-months-olds, looking at someone who looks at you and points creates a shared commitment to attend to what lies in the direction of the pointing gesture. If it is appropriate to speak of overtness at all, the overtness of the communicative act consists in the shared commitment being common ground. The adult expects the infant to attend to the box. This is what 14-months-olds tend to do, and that 18-months-olds consistently do. It has already been established experimentally that infants preferentially follow others' gaze only after having established eye-contact; that in these circumstances they expect to find something lying in the direction of the others' gaze; and that they preferentially attend to what they find there. Moreover, while boxes are in themselves intriguing objects for younger infants, they are familiar objects for older infants. Familiarity with the affordances of boxes is what puts some flesh on the bones of what it is to attend to a box within the context of a hide and seek game. This set of dispositions, which becomes more robust with age, needs not be underpinned by a recognition of the adult's communicative intention. Rather, its very presence and increased robustness, which is enough to explain the empirical finding, is a necessary precondition for acting consistently with a shared a commitment created by way of pointing and, later in ontogeny, possibly reason about the presence of a communicative intention in Grice's sense.

3.2 Overtness: Using the Key to Open the Box

Tomasello and colleagues later acknowledged that the results of the first experiment could be explained without postulating that infants recognised a communicative intention. In an attempt at remedying to the shortcomings of the first experiment, Schulze and Tomasello (2015) performed another experiment with 18-months-old infants.[148] In this second experiment, the pragmatic inference that the infant is supposed to draw is more complex and, instead of having a choice between two objects, there is a single object which is supposed to be equally salient for the infant in an ostensive and a non-ostensive condition. I argue that this experiment falls short of showing that infants recognise that the adult is acting with a communicative intention in Grice's sense. The argument is essentially the same. The object is equally salient in the different conditions only in the sense of being equally visible for the infant. It is already established that infants preferentially attend to what others direct their attention to upon having established eye-contact. The 'pragmatic inference' is more complex but drawing it successfully does not require recognising the presence of a communicative intention. Rather, it is again, in part, a matter of being familiar with the affordances of the target object and, in part, of behaving consistently with the shared commitment to attend to the object.

      In the experiment performed by Schulze and Tomasello (2015), the infant sits at a table with an experimenter (E1), playing a game which consists in making cubes slide down in a "pling-machine" to produce funny sounds. When there are no more cubes on the table, the experimenter guides the infant to another table at the opposite

---

[148] The experiment was performed also with 26-months-olds.

corner of the room, where another experimenter (E2) is sitting. On this second table, there is a box containing more cubes. The box is closed with a latch, and there is also a key to open it. E2 then demonstrates to the infant how to use the key to open the box and makes sure that the infant tries for herself to use the key in this way.[149] E1 and the infant take the new cubes, leaving the box empty, and go play with the pling-machine. Importantly, unbeknownst to the infant, E1 keeps the key, and E2 fills the box with new cubes.[150] At this point, the familiarization phase is over, and the experimental phase starts.

There are three experimental conditions, which the authors label OSTENSIVE, INTENTIONAL, and ACCIDENTAL. The experimenters decided to employ a between-subjects design in which each infant receives only a single trial in either one of the conditions, and 20 infants were assigned to each condition. After there are no more cubes available again, E1 verbally points this out to the infant. In the OSTENSIVE condition, E1 calls the infant's name, holds up the key in front of the infant, and alternates gaze between the key and the infant. In the INTENTIONAL condition, E1 calls the infant, then drops the key, and marks this happening as accidental by saying 'Oops!'. She then retrieves the key and holds it up in front of the infant as if she were examining it, without ever looking at the infant.[151] In the ACCIDENTAL condition, E1 calls the infant and points to the pling-machine, while surreptitiously sliding the key in front of the infant. In this condition, E1 only looks at the pling-machine, and not at the infant nor the key.

In both the INTENTIONAL and OSTENSIVE conditions, the key is made clearly visible to the child. The only difference between conditions is that, in the OSTENSIVE but not in the INTENTIONAL condition, the adult directs the child's attention to the key. According to the authors, if children come to use the key to open the box significantly more often in the communicative scenario, they do so as a result of having recognised that the adult is acting with a communicative intention in Grice's sense. I find this argument in many ways unclear. I detail my reasons to reject it right after having illustrated the results of the experiment.

The experimenters coded how many infants in each condition used the key in some way or other, and how many of them used it to open the box. The coding employed by the experimenters is in many ways questionable. First, if an infant first used the key on the pling-machine and then used it to open the box, this behaviour is coded as 'using the key to open the box'. Second, the experimenters also coded whether in the intentional condition infants saw that 'the experimenter was not

---

[149] The key is a wooden disc. The unusual shape is to avoid that the infant relies on any knowledge of keys acquired prior to the interaction (Schulze and Tomasello 2015: 96). This feature of the experimental design is puzzling and suggests an unclear background theorising. If the infant does not know how she is supposed to use the key, she will not come to use the key in the manner intended *as a result of recognising* that this is what the adult intends her to do. It is the other way round: persisting in using the key and looking for adult's feedback may be conducive to recognising what the adult expects her to do.

[150] This feature is also puzzling. If the infant could see that there were some cubes left in the box, in the following phase of the experiment she would be more likely to go get them. If the infant assumes that there are no cubes left in the box, why should she expect to find some?

[151] According to the authors, what is intentional in this condition is the inspection of the key.

106

communicating with them'. This measure begs the question with respect to the aims of the experiment and, what is worse, it was used by the experimenters to sieve the results: only the infants that in the INTENTIONAL condition have recognised that the adult was *not* trying to communicate with them were included in the analysis, and it is assumed that all infants in the OSTENSIVE condition always recognise when the adult is acting communicatively. Keeping these concerns regarding the coding in mind, the results are as follows: in the OSTENSIVE condition, most infants (18 out of 20) used the key in some way, while in the other two conditions half of the infants did so (11 and 12 out of 20, respectively). Regarding how infants used the key, almost half of them in the OSTENSIVE condition used it to open the box (9 out of 20), either straightaway or after having tried to use the key on the pling-machine in various ways, while in the other two conditions only few infants used the key to open the box (2 and 1 out of 20, respectively).

Regarding infants who do not use the key appropriately in the OSTENSIVE condition, Schulze and Tomasello claim that they nonetheless recognise a communicative intention, but then assign a 'more generic content' to the embedded intention. The problem is that drawing the right pragmatic inference is the only independent criterion used by Schulze and Tomasello to determine whether infants recognise the presence of a communicative intention. It is then problematic to claim that infants have recognised a communicative intention even if they do not draw the right sort of pragmatic inference. Half of the infants in the control conditions *did* use the key in some way or other, and by the authors' own lights, these infants could not recognise the presence of any communicative intention in this condition.

There is a deeper problem in the adoption of the criterion, namely, that the reasoning that infants allegedly go through does not need to be grounded in the recognition of a communicative intention. The target object is equally visible for the infant in the INTENTIONAL and OSTENSIVE condition. When the adult makes the object visible but without alternating gaze, infants sometimes use it and sometimes do not, at chance, as they would normally do with objects available for exploration. By contrast, when the adult directs their attention to the target object by calling them and alternating gaze, infants preferentially attend to it, namely, they try to use it in various ways. So, when addressed the infant stops exploring and preferentially attends to the gazed-at object, just as in the other experiments reviewed above. Some infants use the object to open the box, and some of them even do so straightaway. Infants come to use the target object as a key partly because they have been demonstrated how to do so, and partly because they persist in using it, consistently with the assumption that they have come to share a commitment to attend to the key.[152] No need to go through the recognition of a Gricean communicative intention.

It might be argued that, in acting as they do, infants implicitly come to understand what the adult intended them to do. Even assuming that this is true, infants' understanding of the adult's intention in pointing would be an outcome of, rather than

---

[152] It would have been useful to code whether infants who initially do not use the key to open the box looked up at the adult to seek approval of what they were doing.

a prerequisite for, the dispositions that enable them to act consistently with the shared commitment. What infants do does not need to be grounded in the recognition of the adult's communicative intention.

It might be argued that the infant and the adult presumably also share a commitment to play the game, so under this reading the infant is expected to use the key to open the box also in the other conditions. There are several reasons why this expectation is not warranted. The more general reason is that what counts as playing the game in the infant's eyes might not be determinable independently of how the adult guides the infant in playing the game. One can assume that in the eyes of the child the game consists only in using cubes with the pling machine. Does the child believe that there are no more cubes in the box? Does the child know that the other adult can refill the box with new cubes? Does the child expect to find more cubes in the box no matter what? It is unclear whether, in the eyes of the child, the game of using cubes with the pling machine is over, and whether a specific game is over for the child might essentially depend on what the adult does. In the OSTENSIVE condition, the adult invites them to use the key, so there is a move to be made with the key. In the INTENTIONAL and ACCIDENTAL conditions, the adult allows the child to use the key but does not invite her to do so, and the infants' behaviour reflects this much: they use the key half of the time (as they would normally do in explorative contexts), and in a fraction of cases even to open the box.

<div align="center">***</div>

The more general conclusion that I would like to draw from these two experiments is that there is no obvious way of demonstrating, from an experimental point of view, that infants recognise communicative intentions in Grice's sense. Making pragmatic inferences virtually more complex and the same objects equally 'salient' does not help in overcoming the difficulty. The difficulty is a deep one, and points to problematic unclarities in the background theorising. Findings that perhaps can be explained by postulating that infants recognise communicative intentions can always be, at least in principle, better explained by postulating that infants share commitments, and progressively come to regulate their own behaviour accordingly. Understanding what adults intend them to do on an occasion might be a result of having developed these dispositions, rather than being a prerequisite for having them.

3.3 Common Ground: Different Games with Different Adults

The best piece of evidence presented by Tomasello in favour of the claim that infants understand communicative acts according to the common ground is the experiment performed by Liebal and colleagues (2009). I argue that here again the results can be interpreted in terms of shared commitments.

In the experiment by Liebal and colleagues (2009) each of the 14-months-old and 18-months-old infants play two different games with two different adults (E1, E2). The first game is a puzzle, and one piece is missing. E1 realises that the piece is missing but cannot find it, then leaves the room, telling the infant that they will continue playing

later. The second game consists in placing a few toys in a basket in a funny way and is played with E2 at the opposite side of the room. Toward the end of the game, E2 surreptitiously places the missing piece of the puzzle at the centre of the room and goes toward the corner. At the same time, E1 comes back, and stays in the opposite corner. By turning toward the centre, the infant has one adult standing in the corner at her right, and the other adult standing in the corner at her left. The two experimental conditions differ only in the following respect: in the first (PUZZLE), E1 points at the target object. In the second (BASKET), E2 points at the target object, which is the same object in both conditions. In PUZZLE, infants are supposed to use the object as a piece of the puzzle, while in BASKET they are supposed to put the object in the basket.

18-months-olds clearly satisfied this prediction. 14-months-olds' responses did not exhibit any significant pattern. In both conditions, sometimes they used the object as a piece of the puzzle; some other time they placed it in the basket; and some other times they did various things with it in ways unrelated to either activity, like laughing and walking around the room while holding the target object in their hand. Given the lack of results, the experimenters simplified the experimental design as follows: the infant is playing the basket game with an adult. In one condition, this same adult points to a toy out of sight for the infant. In the other condition, a different adult comes into the room and points to the very same object in the same position. While in the first condition roughly 40% of the infants placed the target object in the basket, in the other condition only 20% of them did so. The other infants played with the object in various ways with no detectable pattern.[153]

The interpretation offered by Liebal and colleagues is the following:[154] 18-months-old infants interpret a pointing gesture according to the experience they have shared with the producer of the pointing gesture, rather than interpreting it from their own egocentric perspective. I do not doubt that shared experiences constitute part of the common ground that an adult and an infant might happen to have. The interpretation provided by Liebal and colleagues is unsatisfactory mainly because it is left unspecified: criteria for identifying the infant's egocentric perspective are never provided, and it is never said in what sense the infant relies on a shared experience in reacting to the adult's pointing gesture.

---

[153] Tomasello (2008: 127-128, 2019: 60) claims that, in the second condition, infants mostly offered the object to the newcomer, suggesting that there is a pattern to infants' responses in this condition as well, but this is not what the results show.

[154] Tomasello is systematically equivocal on how to interpret these findings. He often adopts a conception of common ground as an indefinite number of iterations of nested knowledge states attributions. From the arguments that I proposed in Chapter 1, it follows that this hybrid notion is not a viable option. There is a set of findings by Henrike Moll and colleagues (e.g., 2006, 2007, 2008, Moll and Tomasello 2007, Tomasello and Haberl 2003) to which Tomasello often refers to in support of the claim that infants rely on the 'common ground' they have with others in interpreting pointing gestures. In fact, there is only one detectable pattern in the experiments by Moll and colleagues, namely, that in many situations in which the infant and the adult are supposed to mutually know that p in Schiffer's sense (meaning that they are in the same room, close and oriented toward each other, and some object is visible to both, …), the infant does not rely on this knowledge in communication, unless she has been directly interacting with the adult. This set of findings strongly discourages adopting Tomasello's proposed conceptualisation of common ground.

This finding can receive a plausible interpretation in terms of shared commitments. One can assume that the infant and E1 had shared a commitment to complete the puzzle game. Commitments to goals persist until the goal is achieved or the commitment is reneged, and one piece of the puzzle is missing. E1 comes back to the room and points to the piece of the puzzle, which creates a commitment between the infant and the adult to attend to it. By picking up the piece and taking E1 to complete the puzzle, infants act consistently with the commitments they have come to share with E1. An analogous explanation could be given for the other condition: being committed to play the basket game with E2, when the infant comes to share a commitment with E2 to attend to the toy she is eager to pick it up and to then place it in the basket.

It might be argued that, since the infant has shared commitments to different adults to play two different games, and the pointed-to object *could* be used to play either game, the infant should be at chance in how to use the pointed-to object.[155] I am eager to concede that infants this age are unlikely to recognise this and other analogous potential conflicts. However, the conflict is only potential: the infant shares a commitment with the adult who does the pointing to attend to the object, but she does not share an analogous commitment with the other adult, and they fulfil this commitment in light of the commitment that they share with that particular adult to the goal of the wider activity. To investigate whether infants recognise the presence of the potential conflict, it would be important to know whether, for instance, in using the object to play the basket game with E2, the infant also checks what E1 does (as in seeking permission). It is also important to notice that a crucial control condition is missing from this experiment: what would have the infant done if she were to play the basket game first, the puzzle game second, and then the basket-related adult did the pointing? The complexities to be further teased apart do not end here: the puzzle game has a clear end, and thus it is easier to see what it is to fulfil the commitment to play it, while the basket game does not have such a clear end. These complexities notwithstanding, I think that conceptualising common ground in terms of shared commitments and investigating infants' growing preparedness to act in light of the commitments that they share, is a promising way to study the development of infants' communicative and cognitive capabilities.

Regarding 14-months-olds, the fact that they often behave in funny ways is aligned with several other findings reviewed in the previous sections. It is also worth noticing that the experimenters never code how younger infants play the two games, whether they play these games in the way the experimenters expect them to, and if they are engaged in the play. If infants do not play the game in the manner expected, there is no reason to assume that they will recognise a specific toy as a piece of the game, regardless of who does the pointing. The results obtained in the follow-up experiment only show that infants preferentially attend to the pointed-to toy, and that if the adult with whom they were previously engaged is the one doing the pointing,

---

[155] I would like to notice that, if one were to conceptualise common ground in terms of mutual knowledge, this objection would be even more problematic.

they tend to keep doing what they were doing before with that adult (we do not know to what extent, nor do we know what exactly they were doing before, because again no description of how the infant plays the game is provided). In the other condition, some infants keep playing the basket game, some others offer the object to the newcomer, and some other infants play with it in various ways. The newcomer starts a new interaction and points with excitement at the target object. Apart from attending to the object, which is what infants do in any case, no rule has yet been established and no pattern of accepted and rejected contributions has yet been laid out, and infants' responses reflect this much.

Conclusion

In this chapter, I reviewed the key experiments that, according to Tomasello and colleagues, lend support to the claim that prelinguistic infants, when communicating with pointing gestures, are communicating in Grice's sense. I detailed the construal of infants' pointing proposed in the previous chapter, and I argued that there are plausible ways of explaining what infants are doing with pointing gestures that do not require them to go through sophisticated forms of psychological reasoning. These explanations can, at the same time, be part of an explanation of how infants develop important skills for, later in ontogeny, engaging in sophisticated psychological reasoning. For instance, **helpful** pointing may gradually foster an understanding of what it is to communicate informatively.

I also argued that there is no good direct evidence in favour of the claim that infants act, and understand others as acting, with a communicative intent in Grice's sense. There is no obvious way of producing such evidence in the first place, and suggestions to the contrary come mainly from unclarities in the background theorising. With respect to common ground, where problems in the background theorising are even more apparent, I argued that, by the time they are 18 months of age, infants are already in a position to act consistently with some of the commitments to specific goals that they can be said to share with others. This is enough to explain why they act as they do when they deal with pointing gestures and, as I argued in the previous chapter, it is possible to explain how they become able to do so.

Conclusion

The overarching aim of the present work was to show that, in many respects, the Gricean explanatory strategy gets things back to front. Sophisticated forms of psychological reasoning are enabled by, rather than being a prerequisite for, the acquisition of a language. The way in which I proposed to make sense of this inversion of perspective is by adopting the commitment-based view of communication defended by Geurts and by developing it further, so to tell a story about prelinguistic communication and cognitive development. I defended this move on several fronts, and I feel reasonably comfortable with the story I ended up telling. In this conclusion, I would like to offer a bird's eye view on the work done so far.

I offered two main reasons to motivate the elaboration of an alternative to the Gricean explanatory strategy. The first concerns the distinctions between theories of communication and theories of the psychology of communicators. In general, a theory of communication should capture the potential complexity of communicative interactions, and this complexity is not, and could not, be straightforwardly mirrored in the psychology of each interactant. It is hard to keep hold of this distinction within a Gricean framework, and the outcome is a problematic picture of human psychology. It is easier to draw the desired distinction by adopting the commitment-based framework. The rationale of communication is, primarily, to enable action coordination by way of creating commitments and entitlements. Communicating is not necessarily a matter of recognising, and acting with, communicative intentions. It is generally possible to undertake a commitment without knowing *that* a commitment has been undertaken. Even in these cases, which I think constitute the rule rather than the exception, shared commitments do govern interactions, in ways that are analogous to how the rules of a game may govern the behaviour of its players. Common ground, that which we constantly update and rely upon in our interactions, can be plausibly characterised in terms of shared commitments. Most facts pertaining to the common ground are not even surveyable, and they need not be.

The distinction between theories of communication and theories of the psychology of communicators becomes especially important when investigating the psychology of prelinguistic communicators. For communicating in Grice's sense, infants should be capable of reasoning in terms of intentions and beliefs in sophisticated ways. However, and contrary to a widely held opinion, there are good reasons to believe that they are not. Experiments in infants' mindreading do not show that infants can engage in the relevant kind of psychological reasoning. What these experiments show is how, in many important ways, infants are building up part of the competence required for engaging in the relevant kind of psychological reasoning. This

distinction is an important one for the Gricean theorist too. Identifying the 'mindreading' uncovered in the key experimental studies with 'psychological reasoning' makes things *harder*, not easier, for the Gricean theorist. Often in attempted replications of the key findings, infants do not engage in 'mindreading', for instance when the adult becomes familiar to them, or when the boxes and toys with which they play are moved closer. If mindreading were the same thing as psychological reasoning, there would be positive evidence to believe that all-too often, infants do not communicate in Grice's sense. I take it that this is not an acceptable outcome for the Gricean theorist.

Chapter 3 was a long journey for me, and I imagine also for the reader. There, I detailed my positive view regarding prelinguistic communication. I argued that a great deal of infants' interactions with adults can be plausibly characterised as governed by implicitly shared commitments to goals. Infants actively seek others' approval. They measure themselves against disapproval, first by complying to commands and then by playing or pushing the boundaries of their entitlements. They have the behavioural means of expressing acceptance and rejection of what the other does, which quickly develop into ways of expressing agreement and disagreement. In several different ways, both the infant and the adult regulate their own behaviours, and form expectations regarding others' behaviour, according to patterns of accepted and rejected contributions to the joint activity in which they are engaged. Playful behaviour, as in withdrawing the offered object, is, *inter alia*, a way of getting acquainted with important aspects of this process.

I offered a re-interpretation of 'ostensive cues' in relational terms. Doing so was functional to detail a story about how infants become increasingly prepared to share commitments with others. Both the infant and the adult actively seek each other's responsivity and attention. Receiving attention is an emotionally significant event for both, though it does not invariably have a positive valence. These dispositions put them in a position of mutual responsivity which naturally leads them both to monitor what the other accepts or rejects. From a cognitive point of view, what the infant makes of the adult's communicative acts provides the infant with the cognitive resources for progressively aligning herself with the adult. However, this process is way beyond either the adult's or the infant's intentional control. It is not plausible to think that ostensive cues signal the presence of a communicative intention. There might not be any informative intention at all. If there is one, it rarely, if ever, matches both the adult's intention and what the infant makes of the communicative act from a cognitive point of view. Even if the two things matched, neither the infant nor the adult would know that they do.

Pointing is a milestone in cognitive development. I argued that it is useful to distinguish between a stable communicative function of pointing (sharing a commitment to attend to something) and the various roles which pointing can play for the infant's own psychological or cognitive economy. These are many and varied, and they are not stable across development. I isolated four important uses of pointing, which I labelled **explorative**, **anticipatory**, **regulative**, and **helpful**. I detailed a story about the different ways in which these different uses of pointing, and the

responses provided by the adult, contribute to early word learning and expectation management, under the assumption that pointing creates a shared commitment to attend to something.

Contrary to a widespread opinion, it seems plausible to talk about normativity for infants and young toddlers. The key is to decouple what it is to share a commitment from what it is to understand, or comply to, some of the consequences of so doing on certain occasions, and then monitor how infants gradually grow into the normative structures of their interactions. I also argued that it is hard to make sense of experimental evidence and naturalistic observations without normative talk. The final section of the third chapter was dedicated to detailing this argument with a close reading of the key experimental findings. These findings concerned: infants' endorsement of normative attitudes; the (appropriate) protests of young toddlers; dispositions to act in light of considerations of fairness; complying to the standards set by shared commitments in the face of distractions and temptations.

Finally, in Chapter 4 I detailed the broadly Gricean rendering of infants' pointing proposed by Tomasello, and I offered reasons to reject it. On the backdrop of the work done in the previous chapters, I argued that the key experimental findings are better interpreted by adopting a commitment-based view of infants' pointing, and I detailed this interpretation further. Where a Gricean explanation is available, a commitment-based explanation is also available, and it often scores better than its Gricean counterpart. There is no obvious way of providing empirical evidence in favour of the claim that infants communicate in Grice's sense.

Gricean communication is not the only game in town. If the conclusions reached in this work are tenable, there are reasons to believe that the Gricean picture is, in many important respects, upside down. There are ways of thinking about prelinguistic communication and cognitive development which do justice to this intuition, and that allow for a radical inversion of perspective. I proposed to start carrying out this inversion by taking normative practices to be explanatory prior from the point of view of the interaction, and from there investigating how infants grow into the complexities and the constraints which these practices create. Of course, an open-ended set of potential problems has been left entirely unexplored in this work. From a conceptual point of view, it might be felt that it is a very narrow ridge the one that I am trying to walk on. It might not even be possible to walk on it at all. I believe it is worth trying, and I hope the reader has enjoyed trying to walk on that ridge as much as I did.

Bibliography

ANDREWS, K.

2009   *Understanding norms without a theory of mind*, «Inquiry», 52 (5): 433–448.

APPERLY, I. A.

2011   *Mindreaders: The cognitive bases of 'Theory of Mind'*, New York: Psychology Press.

Astington, J. W. & Baird, J. A. (Eds.).

2005   *Why language matters for theory of mind*, Oxford: Oxford University Press.

APPERLY, I. A. & BUTTERFILL, S. A.

2013   *How to construct a Minimal Theory of Mind*, «Mind & Language», 28 (5): 606–637.

BAILLARGEON, R.; BUTTELMANN, D.; SOUTHGATE, V.

2018   *Invited commentary: Interpreting failed replications of early false-belief findings: Methodological and theoretical considerations*, «Cognitive Development», 46: 112–124.

BARTELS, A. & ZEKI, S.

2004   *The neural correlates of maternal and romantic love*, «Neuroimage», 21 (3): 1155–1166.

BEHNE T., CARPENTER, M., TOMASELLO, M.

2005   *One-year-olds comprehend the communicative intentions in a hiding game*, «Developmental Science», 8: 492-499.

BEHNE T., LISZKOWSKI, U., CARPENTER M., TOMASELLO, M.

2012   *Twelve-month-olds' comprehension and production of pointing*, «British Journal of Developmental Psychology», 30: 359-375.

BERMÚDEZ, J. L.

2003   *Thinking without words*, Oxford: Oxford University Press.

BOHN, M. & KÖYMEN, B.

2018   *Common ground and development*, «Child Development Perspectives», 12 (2): 104-106.

BORG, E.

2018   *On deflationary accounts of human action understanding*, «Review of Philosophy and Psychology», 9: 503-522.

BRANDOM, R.

1994   *Making it explicit: Reasoning, representing, and discursive commitment*, Cambridge (MA): Harvard University Press.

2009   *Reason in philosophy: Animating ideas*, Cambridge (MA): Harvard University Press.

BRATMAN, M.

2014   *Shared agency: A planning theory of acting together*, New York: Oxford University Press.

BURNSIDE, K; SEVERDIJA, V.; POULIN-DUBOIS, D.

2020   *Infants attribute false beliefs to a toy crane*, «Developmental Science», 23.

BUTTELMANN, D.; CARPENTER, M.; TOMASELLO, M.

2009 *Eighteen-month-old infants show false belief understanding in an active helping paradigm*, «Cognition», 112 (2): 337–342.

BUTTELMANN, F.; SUHRKE, J.; D. BUTTELMAN

2015 *What you get is what you believe: Eighteen-month-olds demonstrate belief understanding in an unexpected-identity task*, «Journal of Experimental Child Psychology», 131: 94–103.

BUTTERFILL, S. A.

2012 *Joint action and development*, «Philosophical Quarterly», 62 (246): 23-47.

2013 *Interactive mindreaders*, «Philosophical Studies», 165 (3): 841-863.

BUTTERFILL, S. A. & APPERLY, I. A.

2013 *How to construct a Minimal Theory of Mind*, «Mind & Language», 28(5): 606–637.

CARPENDALE, J. I. M. & CARPENDALE, A. B.

2010 *The development of pointing: From personal directedness to interpersonal direction*, «Human Development», 53: 110–126.

CARRUTHERS, P.

2020 *Representing the mind as such in infancy*, «Review of Philosophy and Psychology», 11 (4): 765-781.

CARTMILL, E. A.; HUNSICKER, D.; GOLDIN-MEADOW, S.

2014 *Pointing and naming are not redundant: Children use gesture to modify nouns before they modify nouns in speech*, «Developmental Psychology», 50 (6): 1660–1666.

CLARK, H. H.

1996 *Using language*, Cambridge: Cambridge University Press.

COOPER, R. P. & AISLIN, R. N.

1990 *Preference for infant-directed speech in the first month after birth*, «Child Development», 61: 1584–95.

1994 *Developmental differences in infant attention to the spectral properties of infant-directed speech*, «Child Development», 65: 1663–77.

CRIVELLO, C. & POULIN-DUBOIS, D.

2018 *Infants' false belief understanding: A non-replication of the helping task*, «Cognitive Development», 46: 51–57.

CSIBRA, G.

2003 *Teleological and referential understanding of action in infancy*, «Philosophical Transactions of the Royal Society», London B, 358: 447-458.

2010 *Recognizing communicative intentions in infancy*, «Mind and Language», 25: 141-168.

CSIBRA, G., GERGELY, G.

2009 *Natural Pedagogy*, «Trends in Cognitive Sciences», 13(4): 148-153.

DENNETT, D.

2017 *From bacteria to Bach and back: The evolution of minds*, New York: W. W. Norton.

DUMMETT, M.

1996 *The seas of language*, Oxford: Clarendon Press.

FARRONI, T.; CSIBRA, G.; SIMION, F.; JOHNSON, M. H.

2002 *Eye contact detection in humans from birth*, «Proceedings of the National Academy of Sciences of the USA», 99: 9602–05.

FARRONI, T.; JOHNSON, M. H.; MENON, E.; ZULIAN, L.; FARAGUNA, D.; CSIBRA, G.

2005 *Newborns' preference for face-relevant stimuli: effects of contrast polarity*, «Proceedings of the National Academy of Sciences of the USA», 102: 17245–50.

FARRONI, T.; MASSACCESI, S.; PIVITORI, D.; SIMION, F.; JOHNSON, M. H.

2004 *Gaze following in newborns*, «Infancy», 5: 39–60.

FARRONI, T.; MENON, E.; JOHNSON, M. H.

2006 *Factors influencing newborns' preference for faces with eye contact*, «Journal of Experimental Child Psychology», 95: 298–308.

FENSON, L.; DALE, P. S.; REZNICK, J. S.; BATES, E.; THAL, D. J.; PETHICK, S. J.

1994 *Variability in early communicative development*, «Monographs of the Society for Research in Child Development», 59 (5): 1-173.

FIZKE, E.; BUTTERFILL, S. A.; VAN DE LOO, L.; REINDL, E.; RAKOCZY, H.

2017 *Are there signature limits in early theory of mind?*, «Journal of Experimental Child Psychology», 162: 209–224.

GEURTS, B.

2018a *Conventions and common ground*, «Mind & Language», 33: 115-129.

2018b *Making sense of self-talk*, «Review of Philosophy and Psychology», 9 (2): 271-285.

2019a *Communication as commitment sharing: Speech act, implicatures, common ground*, «Theoretical Linguistics», 45 (1-2): 1-30.

2019b *Commitment continued*, «Theoretical Linguistics», 45 (1-2): 111-125.

2019c *What's wrong with Gricean pragmatics*, Proceedings of ExLing 2019, Lisbon.

2020a *Common ground as a normative condition*, manuscript (date appearing on the manuscript: 31.05.2020).

2020b *Evolutionary pragmatics: From chimp-style communication to human discourse*, manuscript (date appearing on the manuscript: 13.11.2020).

2021 *First saying then believing: The pragmatic roots of folk psychology*, «Mind & Language», 36 (4): 515-532.

GEURTS, B., & RUBIO-FERNANDEZ, P.

2015 *Pragmatics and processing*, «Ratio», XXVIII: 446-469.

GILBERT, M.

2014 *Joint commitment: How we make the social world*, New York: Oxford University Press.

GOLDIN-MEADOW, S. & BUTCHER, C.

2003 *Pointing toward two-word speech in young children*, in *Pointing: Where language, culture, and cognition meet,* S. Kita (Ed.), Lawrence Erlbaum Associates Publishers: 85 - 107.

GRÄFENHAIN, M.; BEHNE, T.; CARPENTER, M.; TOMASELLO, M.

2009 *Young children's understanding of joint commitments*, «Developmental Psychology», 45: 1430–1443.

GRICE, P.

1957   *Meaning*, reprinted in Grice 1989: 213-223.

1968   *Utterer's meaning, sentence-meaning, and word-meaning*, reprinted in Grice 1989: 117-137.

1969   *Utterer's meaning and intention*, reprinted in Grice 1989: 86-116.

1989   *Studies in the way of words*, Cambridge, MA: Harvard University Press.

GROSSE, G., CARPENTER, M., TOMASELLO, M., BEHNE, T.

2010a   *Infants communicate in order to be understood*, «Developmental Psychology», 46 (6): 1710-1722.

GROSSE, G., MOLL, H., TOMASELLO, M.

2010b   *21-Month-olds understand the cooperative logic of requests*, «Journal of Pragmatics», 42 (12): 3377-3383.

HAMANN, K.; WARNEKEN, F.; GREENBERG, J.R.; TOMASELLO, M.

2011   *Collaboration encourages equal sharing in children but not in chimpanzees*, «Nature», 476: 328–331.

HAMANN, K.; WARNEKEN, F.; TOMASELLO, M.

2012   *Children's developing commitments to joint goals*, «Child Devevelopment», 83: 137–145.

HEYES, C.

2018   *Cognitive gadgets: The cultural evolution of thinking*, Harvard: Harvard University Press.

HERNIK, M. & CSIBRA, G.

2015   *Infants learn enduring functions of novel tools from action demonstrations*, «Journal of Experimental Child Psychology», 130: 176-192.

HILDEBRANDT, F.; GLAUER, R.; KACHEL, G.

2020   *Coming from a world without objects*, «Mind & Language»: 1-18.

HYDE, D. C.; APARICIO BETANCOURT, M.; SIMON, C. E.

2015   *Human temporo-parietal junction spontaneously tracks others' beliefs: A functional near-infrared spectroscopy study*, «Human Brain Mapping», 36: 4831–4846.

HYDE, D. C.; SIMON, C. E.; TING, T.; NIKOLAEVA, J. I.

2018   *Functional organization of the temporal-parietal junction for Theory of Mind in preverbal infants: A near-infrared spectroscopy study*, «Journal of Neuroscience», 38(18): 4264–4274.

HUMMER, P.; WIMMER, H.; ANTES, G.

1993   *On the origins of denial negation*, «Journal of Child Language», 20, 607-618.

IVERSON, J. M. & GOLDIN-MEADOW, S.

2005   *Gesture paves the way for language development*, «Psychological Science», 16 (5): 367-71.

YUROVSKY, D.

2018   *A communicative approach to early word learning*, «New Ideas in Psychology», 50: 73–79.

JACOB, P.

2020   *What do false-belief tests show?*, «Review of Philosophy and Psychology», 11: 1–20.

JACOB, P. & SCOTT-PHILLIPS, T. C.

2020   *Is mindreading a gadget?*, «Synthese».

KAYE, K.

1977   *Towards the origin of dialogue*, in *Studies in mother-infant interaction*, by Schaffer, H. R. (Ed.), New York: Academic Press: 89–117.

KAYE, K. & WELLS, A. J.

1980   *Mothers' jiggling and the burst-pause pattern in neonatal feeding*, «Infant Behavior and Development», 3: 29–46.

KIRÁLY, I.; GERGELY, G.; CSIBRA, G.

2013   *Beyond rational imitation: Learning arbitrary means actions from communicative demonstrations*, «Journal of Experimental Child Psychology», 116: 471 – 486.

KISHIMOTO, T.; SHIZAWA, Y.; YASUDA, J.; HINOBAYASHI, T.; MINAMI, T.

2007   *Do pointing gestures by infants provoke comments from adults?*, «Infant Behavior and Development», 30: 562–567.

KNUDSEN, B. & LISZKOWSKI, U.

2012a   *Eighteen- and 24-month-old infants correct others in anticipation of action mistakes*, «Developmental Science», 15: 113–122.

KNUDSEN, B. & LISZKOWSKI, U.

2012b   *18-month-olds predict specific action mistakes through attribution of false belief, not ignorance, and intervene accordingly*, «Infancy», 17, 672–691.

KOVÁCS, A. M.; TAUZIN, T.; TÉGLÁS, E.; GERGELY, G.; CSIBRA, G.

2014   *Pointing as epistemic request: 12-month-olds point to receive new information*, «Infancy», 19 (6): 543–557.

KÖSTER, M. & HEPACH, R.

        Normative expectations in preverbal infants, manuscript submitted for publication.

KULKE, L. & RAKOCZY, H.

2018   *Implicit Theory of Mind – An overview of current replications and non-replications*, «Data in Brief», 16, 101-104.

KULKE, L.; REIß, M.; KRIST, H.; RAKOCZY, H.

2018   *How robust are anticipatory looking measures of Theory of Mind? Replication attempts across the life span*, «Cognitive Development», 46, 97–111.

LEWIS, D.

1969   *Conventions*, Cambridge: Harvard University Press.

LIEBAL K., BEHNE, T., CARPENTER, M., TOMASELLO, M.

2009   *Infants use shared experience to interpret pointing gestures*, «Developmental Science», 12 (2): 264-271.

LISZKOWSKI, U., CARPENTER M., HENNING, A., STRIANO T., TOMASELLO, M.

2004   *Twelve-month-olds point to share attention and interest*, «Developmental Science», 7(3): 297-307.

LISZKOWSKI, U., CARPENTER M., STRIANO T., TOMASELLO, M.

2006   *Twelve- and 18-month-olds point to provide information for others*, «Journal of Cognition and Development», 7(2): 173-87.

LISZKOWSKI, U., CARPENTER M., TOMASELLO, M.

2007a   *Pointing out new news, old news, and absent referents at 12 months of age*, «Developmental Science», 10(2): F1-F7.

2007b *Reference and attitude in infant pointing*, «Journal of Child Language», 34: 1-20.

2008 *Twelve-month-olds communicate helpfully and appropriately for knowledgeable and ignorant partners*, «Cognition», 108 (3): 732-739.

LOEFFLER, R.

2018 *Brandom*, Cambridge: Polity Press.

LOW, J. & EDWARDS, K.

2018 *The curious case of adults' interpretations of violation-of-expectation false belief scenarios*, «Cognitive Development», 46, 86–96.

LUDWIG, K.

2007 *Collective intentional behavior from the standpoint of semantics*, «Nous», 41 (3): 355-393.

MARR, D.

1982 *Vision: A computational investigation into the human representation and processing of visual information*, New York: W. H. Freeman and company.

MASATAKA, N.

2003 *The onset of language*, Cambridge: Cambridge University Press.

MCGEER, V.

2020 *Enculturating folk psychologists*, «Synthese».

MELTZOFF, A. N. & GOPNIK, A.

1993 *The role of imitation in understanding persons and developing a Theory of Mind*, in *Understanding other minds: Perspectives from autism*, by Baron-Cohen, S.; Tager-Flusberg, H.; Cohen D. J., Oxford: Oxford University Press: 335-366.

MICHAEL, J.; SEBANZ, N.; KNOBLICH, G.

2016 *The sense of commitment: A minimal approach*, «Frontiers in Psychology», 6 (1968).

MILLIKAN, R. G.

1984 *Language, thought and other biological categories. New foundations for realism*, Cambridge (MA): MIT Press.

2004 *Varieties of meaning*, Cambridge (MA): MIT Press.

2017 *Beyond concepts: Unicepts, language, and natural information*, Oxford: Oxford University Press.

MOLL, H., CARPENTER, M., TOMASELLO, M.

2007 *Fourteen-months-old know what others experience only in joint engagement*, «Developmental Science», 10 (6): 826-35.

MOLL, H., KORING M., CARPENTER, M., TOMASELLO, M.

2006 *Infants determine others' focus of attention by pragmatics and exclusion*, «Journal of Cognition and Development», 7(3): 411-30.

MOLL, H., RICHTER, N., CARPENTER, M., TOMASELLO, M.

2008 *Fourteen-month-olds know what "we" have shared in a special way*, «Infancy», 13 (1): 90-101.

MOLL, H., TOMASELLO, M.

2007 *How 14- and 18-month-olds know what others have experienced*, «Developmental Psychology», 43(2): 309-317.

MOORE, R.

2017a *Convergent minds: ostension, inference and Grice's third clause*, «Interface Focus», 7(3).

2017b *Gricean communication and cognitive development*, «The Philosophical Quarterly», 67: 303-326.

2018 *Gricean communication, language development, and animal minds*, «Philosophy Compass», 13 (12): 1-13.

NEALE, S.

1992 *Paul Grice and the Philosophy of Language*, «Linguistics and Philosophy», 15: 509-559.

OKTAY-GÜR, N.; SCHULZ, A.; RAKOCZY, H.

2018 *Children exhibit different performance patterns in explicit and implicit theory of mind tasks*, «Cognition», 173: 60–74.

ONISHI, K. H. & BAILLARGEON, R.

2005 *Do 15-month-old infants understand false beliefs?*, «Science», 308 (5719): 255–258.

ÖZÇALIŞKAN, Ş. & GOLDIN-MEADOW, S.

2009 *When gesture-speech combinations do and do not index linguistic change*, «Language and Cognitive Processes», 24 (2): 190.

PEA, R. D.

1982 *Origins of verbal logic: Spontaneous denials by two and three-year-olds*, «Journal of Child Language», 9, 597-626.

POMIECHOWSKA, B. & CSIBRA G.

2020 *Ten-month-olds infer relative costs of different goal-directed actions*, Proceedings of the 42nd Annual Meeting of the Cognitive Science Society.

POULIN-DUBOIS, D., RAKOCZY, H.; BURNSIDE, K.; CRIVELLO C.; DÖRRENBERG S., EDWARDS, K.; KRISTE H., KULKE L.; LISZKOWSKI U.; LOWD J., PERNER J.; POWELL L.; PRIEWASSER B., RAFETSEDER E., RUFFMAN T.

2018 *Do infants understand false beliefs? We don't know yet – A commentary on Baillargeon, Buttelmann and Southgate's commentary*, «Cognitive Development», 48: 302–315.

PRIEWASSER, B.; RAFETSEDER, E.; GARGITTER, C.; PERNER, J.

2018 *Helping as an early indicator of a theory of mind: Mentalism or Teleology?*, «Cognitive Development», 46, 69–78.

PYERS, J. E. & SENGHAS, A.

2009 *Language promotes false-belief understanding: Evidence from learners of a new sign language*, «Psychological Science», 20 (7): 805–812.

RAKOCZY, H.

2018 *The development of collective intentionality*, in *The Routledge Handbook of Collective Intentionality*, Ludwig K. & Jankovic M. (Eds.), London: Routledge: 407-419.

RAKOCZY, H.; WARNEKEN F.; TOMASELLO, M.

2008 *The sources of normativity: Young children's awareness of the normative structure of games*, «Developmental Psychology», 44 (3): 875– 881.

REDDY, V.

1991   *Playing with others' expectations: Teasing and mucking about in the first year*, in *Natural Theories of Mind*: 143-158, Whiten A. (Ed.), Oxford: Blackwell.

2008   *How infants know minds*, Cambridge (MA): Harvard University Press.

REDDY, V.; MARKOVA, G.; WALLOT, S.

2013   *Anticipatory adjustments to being picked up in infancy*, «PLoS ONE», 8 (6).

RYLE, G.

1949   *The concept of mind: 60th anniversary edition*, New York: Routledge, with a critical commentary by Tanney, J. (2009).

SANTIESTEBAN, I.; CATMUR, C.; HOPKINS, S. C.; BIRD, G.; HEYES, C.

2014   *Avatars and arrows: Implicit mentalizing or domain-general processing?*, «Journal of Experimental Psychology: Human Perception and Performance», 40 (3): 929–937.

SCHIFFER, S.

1972   *Meaning*, Oxford: Oxford University Press.

SCHMIDT, M. F. H. & RAKOCZY, H.

2018   *Developing an understanding of normativity*, in *Oxford Handbook of Cognition: Embodied, Embedded, Enactive and Extended*, Newen A., d. Bruin L., Gallagher, S. (Eds.), Oxford: Oxford University Press.

SCHMIDT, M. F. H.; RAKOCZY, H.; TOMASELLO, M.

2019   *Eighteen-month-old infants correct non-conforming actions by others*, «Infancy», 24 (4): 613–635.

SCHULZ, L.

2021   BCCCD, Plenary Lecture, accessible at: https://www.youtube.com/watch?v=yTPmpY0amzs.

SCHULZE, C. & TOMASELLO, M.

2015   *18-Month-olds comprehend indirect communicative acts*, «Cognition», 136: 91–98.

SCOTT, R. M. & BAILLARGEON, R.

2009   *Which penguin is this? Attributing false beliefs about object identity at 18 months*, «Child Development», 80 (4): 1172–1190.

SCOTT-PHILLIPS, T. C.

2015   *Speaking our minds: Why human communication is different, and how language evolved to make it special*, London: Red Globe Press.

SEARLE, J. R.

2010   *Making the social world: The structure of human civilisation*, Oxford: Oxford University Press.

SELLARS, W.

1956   *Empiricism and the philosophy of mind*, with an Introduction by Rorty, R. and a Study Guide by Brandom, R., Cambridge (MA): Harvard University Press, (1997)

SPERBER, D.

2019   *Personal notes on a shared trajectory: Reflections on the development of Relevance Theory*, in *Relevance, Pragmatics and Interpretation*: 13-20, Scott, K., Clark, B., Carston, R. (Eds.), Cambridge: Cambridge University Press.

SPERBER, D., & WILSON, D.

1995   *Relevance: Communication and cognition* (1st ed. 1986), London: Blackwell.

1987   *Precis of* Relevance: Communication and cognition, «Behavioural and Brain Sciences», 10: 697-754

2002   *Pragmatics, modularity and mind-reading*, «Mind & Language», 17 (1-2): 3-23.

2012   *Meaning and relevance*, Cambridge: Cambridge University Press.

2015   *Beyond speaker's meaning*, «Croatian Journal of Philosophy», XV (44): 117-149.

STRAWSON, P. F.

1964   *Intention and convention in speech acts*, «Philosophical Review», 73: 439-460.

TATONE, D.; GERACI, A.; CSIBRA, G.

2015   *Giving and taking: Representational building blocks of active resource-transfer events in human infants*, «Cognition», 137: 47-62.

TATONE, D. & CSIBRA, G.

2019   *Minimal cues of possession transfer compel infants to ascribe the goal of giving*, «OpenMind», 3: 31-40.

2020   *Infants infer different types of social relations from giving and taking actions*, CogSci (conference contribution).

TOMASELLO, M.

2003   *Constructing a language: A usage-based theory of language acquisition*, Cambridge (MA): Harvard University Press.

2008   *Origins of human communication*, Cambridge (MA): Harvard University Press.

2014   *A natural history of human thinking*, Cambridge (MA): Harvard University Press.

2018   *The normative turn in early moral development*, «Human Development», 61: 248–263.

2019   *Becoming human: A theory of ontogeny*, Cambridge (MA): Harvard University Press.

TOMASELLO, M., HABERL, K.

2003   *Understanding attention: 12- and 18-month-olds know what's new for other persons*, «Developmental Psychology», 39: 906-12.

TUOMELA, R.

2007   *The philosophy of sociality: The shared point of view*, Oxford: Oxford University Press.

VAN OVERWALLE, F.

2009   *Social cognition and the brain: A meta-analysis*, «Human Brain Mapping», 30: 829–858.

VYGOTSKY, L.S.

1978   *Mind in society: The development of higher psychological processes*, Cambridge: Harvard University Press.

VOROBYOVA, L.

2021   *Infants' early understanding of cooperation: an investigation into the cognitive prerequisites that guide resource distribution, agent individuation and prosocial motivation*, PhD Thesis, Supervisors: György Gergely, Ernő Téglás. Central European University, Department of Cognitive Science.

WARNEKEN, F.

2013   *The development of altruistic behavior: Helping in children and chimpanzees*, «Social Research», 80 (2): 431-442.

WARNEKEN, F.; CHEN, F.; TOMASELLO, M.

2006   *Cooperative activities in young children and chimpanzees*, «Child Development», 77: 640-663.

WARNEKEN, F. & TOMASELLO, M.

2006   *Altruistic helping in human infants and young chimpanzees*, «Science», 311: 1301-1303.

2007   *Helping and cooperation at 14 months of age*, «Infancy», 11: 271-294.

2008   *Extrinsic rewards undermine altruistic tendencies in 20-months-olds*, «Developmental Psychology», 44: 1785-1788.

WELLMAN, H. M.; CROSS, D.; WATSON, J.

2001   *Meta-analysis of Theory-of-Mind development: The truth about false belief*, «Child Development», 72 (3): 655–684.

WERKER, J. F. & MCLEOD, P. J.

1989   *Infant preference for both male and female infant-directed talk: a developmental study of attentional and affective responsiveness*, «Canadian Journal of Psychology», 43: 230–46.

WILBY, M.

2010   *The simplicity of mutual knowledge*, «Philosophical Explorations», 13 (2): 83-100.

WILLIAMSON, T.

2000   *Knowledge and its limits*, Oxford: Oxford University Press.

WILSON, D.

2017   *Relevance Theory*, in *The Oxford Handbook of Pragmatics*, Huang, Y. (Ed.), Oxford: Oxford University Press: 79-101.

WIMMER, H. & PERNER, J.

1983   *Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception*, «Cognition», *13*(1), 103–128.

WITTGENSTEIN, L.

1953   *Philosophical Investigations* (PI), Hacker P.M.S. & Schulte, J. (eds. and trans.), Oxford: Wiley-Blackwell, 2009 (4th edition).

YAZDI, A. A.; GERMAN, T. P.; DEFEYTER, M. A.; SIEGAL, M.

2006   *Competence and performance in belief-desire reasoning across two cultures: The truth, the whole truth and nothing but the truth about false belief?*, «Cognition», 100: 343–368

YIN, J.; TATONE, G.; CSIBRA, G.

2020   *Giving, but not taking, actions are spontaneously represented as social interactions: Evidence from modulation of lower alpha oscillations*, «Neuropsychologia», 139.

YOTT, J. & POULIN-DUBOIS, D.

2012   *Breaking the rules: Do infants have a true understanding of false beliefs?* «The British Journal of Developmental Psychology», 30: 156-171.

ZAWIDZKI, T. W.

2013   *Mindshaping: A new framework for understanding social cognition*, Cambridge (MA): MIT Press.