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# THE DEVELOPMENT OF INDIVIDUAL AND SHARED INTENTIONALITY<sup>1</sup>

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Intentionality, according to many philosophical accounts since Brentano, is the mark of the mental. The present chapter will approach varieties of intentionality from the point of view of developmental and comparative psychology. How do different forms of intentionality develop in human ontogeny? In particular, how do most basic forms of it emerge in early childhood? How does this development compare to that of other species, notably non-human primates? How far do commonalities go, and where might uniquely human capacities begin? And which of the latter might be foundational for uniquely human forms of social and cultural life? In pursuing such questions, the chapter will focus on shared intentionality and explore the idea that shared intentionality lies at the heart of uniquely human cognitive capacities and is an essential foundation of uniquely human social and cultural life.

### **The developmental and comparative psychology of different forms of individual intentionality**

#### *First-order intentionality*

Intentionality, in the broad philosophical sense of “aboutness”, is the capacity of agents to entertain contentful attitudes (beliefs, desires, intentions etc.) towards the world and to be guided by these in reasoning and rational action. The paradigmatic form of intentionality is individual intentionality: the capacity of an individual to believe, think, judge, hope, reason, intend etc. From the point of view of developmental and comparative psychology, while many forms of such individual intentionality may be cognitively very complex and derived, dependent upon the acquisition of complex linguistic and other skills (think, for example, of mathematical cognition), it seems clear that basic forms of individual intentionality develop early in ontogeny and are widely shared among humans and other animals. To illustrate, let us briefly look at two fundamental milestones of intentionality: the capacity for objective thought, and the capacity to think about and act towards ends.

All thinking requires a minimal notion of objectivity: the objects thought about exist independently from the perceiver and enduringly out there in the world. Regarding human ontogeny, Piaget has described infants’ development from initial undifferentiated sensation without

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any notion of persisting objects (“out of sight, out of mind”) to what he called “object permanence” – the appreciation that objects continue existing objectively whether perceived or not. In their actions infants begin to display object permanence from (at the latest) the end of their first year; they begin to search for occluded and hidden objects they previously perceived. Furthermore, infants from around 1 year not only track objects as chunks of matter continuously existing in space and time; they also individuate objects as objects of certain kinds, e.g., this chair, that table, that rabbit. Recent findings suggest that by 1 year of age infants begin to apply our commonsense metaphysical framework of objects as enduring substances, individuated under sortal (kind) concepts – and thus share the rudiments of our adult conceptual architecture of objective thought (Xu, 2007).

Many other animals are on a par with infants; many primate species, and dogs, for example, reach the highest levels of Piagetian object permanence (indicated in active and systematic search behavior), levels typically reached by infants in the second year (Tomasello & Call, 1997). Recent research suggests that some monkeys and great apes also individuate objects *qua* objects of certain kinds much in the same ways as human 1-year-olds do (Mendes, Rakoczy & Call, 2008, 2011; Phillips & Santos, 2007).

Concerning the capacity to think about and act towards ends, clear instances of intentional instrumental action, i.e., actions done purposefully and in a planned way in order to achieve some end in mind, appears in human ontogeny at the latest towards the end of the first year: infants organize their behavior in means–ends structures and indicate an awareness of the relations between means and ends. In a classic example, infants remove barriers in order to reach a desired object or pull a cloth, on which a desired object is placed, towards them in order to be able to grasp it. And they persist until they achieve their end, varying their means if necessary (Piaget, 1952; Willats, 1985, 1999). These phenomena are also widespread in the non-human animal kingdom. Many species, notably primates, show instrumental problem-solving of remarkable complexity – Köhler’s apes perhaps being the most famous examples.

### ***Second-order intentionality***

Much of our intentionality is not restricted to first-order intentional attitudes vis-à-vis the world but ascends to second-order intentional attitudes about others’ and our own intentionality. We do not only perceive cats on mats, but perceive others perceiving cats on mats etc. Second- and higher-order intentionality has been hypothesized to play foundational roles for many crucial aspects of human social and cultural life such as communication (Grice, 1975), cooperation (Bratman, 1992), conventionality (Lewis, 1969) or free will (Frankfurt, 1971). As a consequence, second-order intentionality has become the focus of much empirical work in developmental and comparative cognitive science in the last four decades. Human children, much of this work has shown, develop sophisticated and explicit forms of higher-order intentionality from around age 4 when they begin to use concepts of “belief” and other propositional attitudes (Wellman et al., 2001). And more basic forms of second-order intentionality, such as understanding perception and intentional action, and more implicit forms of understanding propositional attitudes develop already very early in infancy (Baillargeon et al., 2010; Tomasello et al., 2005). From a comparative point of view, it was long thought that second-order intentionality as such was an important, perhaps even the single most important, fundamental cognitive divide between humans and other animals; and that this divide explained why only humans came to develop linguistic communication, conventional culture and sophisticated cooperation (e.g. Tomasello, 1999). However, recent evidence led to qualifications of this proposal. It has been found that chimpanzees and other great apes manifest some basic forms of second-order





intentionality as those found in human 1-year-olds. First, they reveal a simple understanding of intentional action; for example, they systematically distinguish between unfulfilled acts where the actor is unwilling from those where the actor is unable (Call et al., 2004). Second, they also are capable of understanding perception and thus perspective taking, in that they take into account what conspecifics have and have not seen (Hare et al., 2000).

### The development of shared intentionality

In recent years, these new findings on continuities in individual first- and second-order intentionality shifted the focus of comparative and developmental cognitive science away from purely individual forms of intentionality. Perhaps basic cognitive differences between humans and other primates were not so much to be searched for in any form of individual intentionality of whatever order, but in shared or collective intentionality (Tomasello & Rakoczy, 2003; Tomasello et al., 2005)?

Now, what is shared intentionality? In the case of individual intentionality, empirical cognitive science starts from our pre-theoretical commonsense notions of intentional attitudes even if more technical approaches in philosophy disagree massively about the right way of analyzing intentionality. Similarly, when investigating the development of shared intentionality, what we start from are our pre-theoretical concepts of shared intentionality even if philosophical accounts disagree massively over how to best analyze it (Bratman, 1992; Gilbert, 1990; Searle, 1990; Tuomela & Miller, 1988). Intuitively, in shared intentionality two or more agents form a joint “we” attitude in a way that is not straightforwardly reducible to mere sums of individual intentional attitudes. When you and I meet and agree to take a walk together, to use an example from Margaret Gilbert (1990), we form and then pursue the joint we-intention “*We* walk together”, which is not reducible to the sum of my individual intention “I walk” plus your analogous one. When I pursue my individual intention to walk and you pursue yours, we might end up walking beside each other, even responding in coordinated ways to each other so not to bump in each other, but not together. Philosophical accounts differ with respect to the question whether shared intentionality is reducible to more complex aggregates of coordinated and interlocking individual attitudes (Bratman, 1992) or involves some or other irreducibly collective element such as specific forms of “we”-contents (Tuomela, 1995), “we”-attitudes (Searle, 1990) or “we”-agents (Gilbert, 1989) (see Pacherie, 2007 for a very helpful overview).

On the one hand, empirical cognitive science approaches to shared intentionality have been drawing much inspiration from these different philosophical accounts. On the other hand, starting off from the pre-theoretical folk notions of collective intentionality, cognitive science remains theoretically neutral vis-à-vis the different philosophical accounts. But while the cognitive science of the development of collective intentionality thus needs neither to wait for agreed upon philosophical analysis to come forth (if this should ever happen) nor to commit to any one of the current accounts on offer, empirical results of developmental and other cognitive science research might well have implications for the philosophical debates. For instance, it might turn out that developmental or comparative research documents certain forms of shared intentionality in children or animals that some accounts are more suitable for describing than others.

So, where does shared intentionality, ontogenetically, begin? According to a widespread picture of the mind (e.g. Searle, 1983), the logically and ontogenetically most basic forms of the mental are the most world-directed ones at its fringes, so to speak, namely perception (on the cognitive side) and intentional action (on the conative side). Following this picture, primary forms of shared intentionality should be found in the forms of shared perception and shared





intentional action. The early development of shared perception (joint attention) and shared action, respectively, will therefore be the focus of the next sections.

### ***Joint attention***

Children begin to operate with a basic grasp of other agents' intentionality, often termed "perception-goal psychology" (in contrast to the later developing fully fledged belief-desire folk psychology) from around 9 months: they understand what others perceive of their surroundings and what intentions they pursue in their actions (Tomasello et al., 2005; Wellman, 2002). And it is from around this time that earliest forms of joint attention emerge as well (Bakeman & Adamson, 1984). Intuitively, joint attention involves two (or more) subjects looking at some object or situation together. For example, at a Californian beach A and B might decide to go and look at the sunset together ("Let's see how it sets over the sea"). What makes such an episode one of truly joint attention? It is neither sufficient that each of them look at the same target nor that, asymmetrically, one sees the other looking at a given target and follows her gaze there. Not even is it sufficient, more symmetrically, that both look at the same target, each knowing that the other looks at the target as well (otherwise my neighbor and I would be jointly watching our favorite TV show whenever we hear through the wall that the other is watching it). Rather, in some intuitive sense, notoriously difficult to spell out in more precise conceptual ways, both agents have to attend to the same target in joint and coordinated ways.

When in development does joint and coordinated attention-sharing emerge? Here, as in many other areas of developmental and comparative research, we are faced with a fundamental methodological problem: when it comes to adults and older children, linguistic data (such as "Let's see how it sets") usually disambiguate whether a given episode reflects merely parallel or truly joint attention. In very young, pre-verbal children and in non-verbal animals, however, we have to rely on purely pre-verbal indicators and manifestations of joint attention.

Empirically, earliest forms of social coordination of attention that have been considered to manifest joint attention emerge from around 9–12 months of age (Carpenter, Nagell & Tomasello, 1998). Children begin to passively follow the gaze of others and actively direct it to objects and situations. This is not asymmetrical following or directing of individual attention, however, since infants alternate their gaze between partner and object, check the partner's attention and actively coordinate and align the partner's attention and their own by communicative (gestural) means. Furthermore, some studies have directly analyzed "sharing" and "knowing" looks by the infant towards the partner that intuitively appear to be pre-verbal analogues of "Let's look . . ." or "We're looking . . ." (Hobson & Hobson, 2007).

Additional evidence suggests that the social gaze coordination emerging at this time manifests truly joint attention rather than mere attention following or manipulation. In their proto-declarative pointing (pointing out situations or states of affairs without any further instrumental ends in mind but simply for the sake of "telling" the social partner), infants expect certain – joint attentional – responses (Liszkowski, Carpenter, & Tomasello, 2007a, 2007b): when an infant points out a situation to a partner (e.g. that there is a ball over there), she will only be satisfied (and thus stop pointing) when the adult not only looks at the specific situation, but alternates gaze in coordinated ways between the situation and the infant (as if saying, "Yes, I saw it, it's the ball we're talking about"). And infants keep track of what was in the focus of joint attention with a given partner (a proxy of what was mutual knowledge among them) over time: they understand one and the same ambiguous communicative act (such as "Can you give it to me?" vis-à-vis several objects) systematically differently as a function of the previous joint experience they had with the interlocutor (Moll et al., 2008): when one interlocutor and







the child previously jointly engaged with object A, they give this object to the interlocutor, but give to another interlocutor object B to which they both had previously jointly attended.

Later in development, children have been found to use joint attention in systematic and sophisticated ways for coordinated and rational action planning. In a recent study, the child and a partner (in a Stag Hunt coordination game) each faced the choice of pressing button A to get a moderate reward, or to press button B to get a higher reward, but this reward could only be achieved if both pressed B. In this situation, 4-year-old children actively alternated gaze with the partner and decided for B only when the partner emitted alternating, coordinated and “knowing” looks between the child and the apparatus (Wyman, Rakoczy & Tomasello, 2012).

To summarize, children from around age 1 begin to engage in sharing attention with others that plausibly reflects true joint attention given the systematic interpersonal coordination at a time and over time – and thus a primordial form of perceptual we-intentionality. From the perspective of comparative psychology, children’s relations to others’ perceptual intentionality reveal very interesting commonalities and differences with the cognitive capacities of non-human primates. Commonalities are found in second-order individual intentionality: great apes and some monkeys reliably engage in gaze-following and manipulate others’ gazes for instrumental purposes in proto-imperative pointing. And they take into account what others see or have seen for strategic individual action planning (e.g. foraging food that competitors cannot see; Hare et al., 2000). There are crucial differences, however, in that non-human primates seem not to enter into any form of truly joint attention given the absence of systematic gaze alternation and coordination, “knowing” looks, proto-declarative pointing and the like (Carpenter & Call, 2013; Tomasello et al., 2005).

### ***Joint action***

The paradigmatic case of collective intentionality is acting together. Cooperative activities are what most philosophical accounts of collective intentionality focus on. And it is cooperative activities that present the clearest case for the development of collective intentionality.

Children begin to reliably engage in intentional cooperative activities with others in the course of the second year, both in joint instrumental action aimed at some further end, and in joint playful actions that serve as ends in themselves (Tomasello & Hamann, 2012). Initially, from around 14–18 months, children coordinate and communicate successfully with others in simple collaborative actions involving some basic division of labor (for example, retrieving a reward from an apparatus where one needs to open a door so that the other can reach and retrieve the object; Brownell & Carriger, 1990; Warneken, Chen & Tomasello, 2006). Subsequently, in the second and third year, the joint-ness of the actions becomes much clearer, and the interpretation of children’s social coordination as true shared intentionality much less ambiguous. Cooperation now manifests a suite of features all pointing towards true we-ness: children not only coordinate and communicate in acting with one another; they also reveal some grasp of the basic structure of complementary roles underlying the division of labor in their so-called “role reversal imitation”: when they learn a novel collaborative activity comprising the complementary roles A and B by performing A (while the partner performs B), they do not just acquire egocentric information about A. Rather, after having learned to perform A, they then spontaneously switch roles and perform B as well (Carpenter, Tomasello & Striano, 2005). Concerning roles, children do not just coordinate in taking up complementary roles, but respond in sophisticated ways when a partner fails in her fulfillment of the role: they then try to re-assign the role to her communicatively (by pointing out to her the object to be acted upon or the location where to act), help her to fulfill it and generally try to re-engage her for the



cooperation (Warneken et al., 2006). Interestingly, they do so in flexible and context-sensitive ways, specifically when the partner is still generally willing to participate in the cooperation yet unable to fulfill the role, but not when the partner is unwilling to cooperate (Warneken, Gräfenhain & Tomasello, 2012). From around age 3, children show explicit signs of feeling committed to the pursuit of a cooperative activity. A recent study involved children in a mildly interesting cooperative activity with a partner, and then seduced them by the option of doing something much more exciting. What happened was that children often hesitated and then excused themselves (“Sorry, I gotta go”) before leaving the joint action (Gräfenhain et al., 2009). Children this age also reveal a sense of commitment to pursuing joint projects in other ways: Hamann and colleagues (Hamann, Warneken, & Tomasello, 2012) had pairs of peers cooperate by operating an apparatus with complementary roles such that successful fulfillment of the roles resulted in rewards for each player. What was crucial, however, was that player A’s reward was issued earlier than player B’s reward. From the individualistic perspective of A, she could basically stop at that point. And this is exactly what happened in a control condition in which the two players acted separately in parallel (each fulfilled a role, yet in independent and uncoordinated ways). In the cooperation condition, however, player A did not stop after receiving her reward but still continued her part until player B received her reward as well. Similarly, when the apparatus issued a joint reward for the two players together, children took great pains to distribute it equally (but again did not do so in a control condition in which two agents acted individually, independently and in parallel; Hamann et al., 2011).

Children’s grasp of cooperative activities, their underlying division of labor, role structure and their normative aspects become more and more sophisticated in subsequent development. For instance, 4-year-olds have completely agent-neutral conceptions of complementary action such that a given role (like a variable) can be filled by any agent at any time; and they flexibly use such a conception for planning future joint activities and their parts therein (Fletcher, Warneken & Tomasello, 2012; Rakoczy et al., 2014). In general, however, the development of shared intentional activities from children’s earliest joint games to fully fledged adult cooperation is currently not well understood yet and stands in need of systematic further investigation.

Recently, novel approaches in cognitive and neurosciences have begun to explore the cognitive structures involved in cooperative activities at different levels of analysis. Theoretical work has introduced distinctions between a hierarchy of representations of shared intentions at different levels, ranging from personal-level conceptualized future-directed intentions to act together to sub-personal motor representations of coordinated social behavior such as how to move one’s vocal muscles in relation to a duet partner’s singing (Pacherie, 2008, 2011). Experimental adult research has shown that such sub-personal motor representations of shared activities form and operate quickly, swiftly and spontaneously mostly below the threshold of subjects’ awareness (Sebanz, Bekkering & Knoblich, 2006). From an ontogenetic perspective, little is currently known about the development of the cognitive underpinnings of shared action. But one recent pioneering study has suggested that similar kinds of fine-grained sub-personal motor representations of shared actions might be in operation even in preschool-aged children (Milward, Kita & Apperly, 2014).

From a comparative perspective, much recent research suggests that great apes (and perhaps other non-human primates) share basic forms of individual second-order intentionality with us: they have some basic understanding of others’ individual intentionality and systematically use this understanding of what others perceive and intend for strategic purposes in competitive interactions (Call & Tomasello, 2008). Yet whether they go beyond such individual intentionality of the second order and engage in truly shared intentionality in the form of joint action is highly controversial. Various experimental findings suggest that apes are quite skillful in



social coordination with others, perhaps even involving something like division of labor (Melis, Hare & Tomasello, 2006). But whether such coordination amounts to true cooperation remains questionable, in light of the fact that apes do not show the characteristic signatures of acting together present in children such as re-engagement of partners, re-assignment of roles, sharing of rewards, helping others to fulfill their role or excusing oneself (Tomasello & Hamann, 2012). Future research will need to shed more light on the question whether/to which degree fundamental forms of joint action are a distinctively human or a more widespread capacity.

### **The development of institutional reality and normativity**

There is a particular and peculiar sub-form of collective intentionality that, according to many conceptual analyses, underlies our institutional and societal life. Unlike basic forms of cooperative action such as, say, walking together, this form of collective intentionality is inherently conventional, rule-governed and fact-creating. According to one influential analysis, the logical structure of this form of collective intentionality is to be captured by the complementary notions of status function assignment and institutional fact (Searle, 1995). Status functions are such that they pertain to objects or actions exclusively in virtue of the fact we collectively treat them as having these functions: nothing in paper money is inherently valuable, nothing in a given person inherently makes her a teacher. Things are money or teachers in virtue of our collective practices. The corresponding institutional facts (that a given object is money or a teacher) of the form “This X counts as Y in a given context X” are socially constructed facts – facts that only hold relative to our social creation, much in contrast to so-called raw facts that hold independently of any collective practice or perspective. Status functions are essentially normative: the status collectively assigned to an object licenses certain forms of acting on the object while rendering other actions inappropriate. That something is a knight in chess, say, entitles one to use it in certain ways but not in others. Being a teacher or a president entitle both holders of the role and interactors to specific forms of actions but not to others.

When we turn to human ontogeny, when and where do we find the primordial forms of such collective intentionality with status assignment? For most of the standard examples of institutional facts such as those related to political power, linguistic meaning or economic matters, it seems evident – given their complexity and holistic embedding in larger institutional networks – that they are far beyond the cognitive grasp of young children. In a rather different domain, though, children from very early on do engage in activities that seem to share the basic logical structure of status assignment and institutional reality, namely different types of games. From their second year on, children begin to engage in pretend play and in simple non-pretense rule games. In pretend play – say, in pretending that a wooden block is an apple – objects are assigned fictional status (“The block counts as ‘apple’ in the context of our pretense”) in much the same way objects are assigned serious status (this X counts as Y in context C) in institutional practices generally. And children from around ages 2 to 3 grasp the basic logical structure of fictional status assignment in joint pretense and its inferential and normative consequences. They do not only engage in solitary and isolated acts of pretending, but they track, understand and respect the stipulations of joint pretense scenario set up by a play partner (such as “This wooden block is our ‘apple’, and this pen is our ‘knife’”) and guide their own actions in the course of the pretense accordingly. In particular, they produce acts that are normatively appropriate, inferentially licensed by the fictional status assignment. For example, they pretend to cut the wooden block with the pen, handle the pen “carefully” because it is “sharp” etc. (Harris & Kavanaugh, 1993; Rakoczy, Tomasello & Striano, 2004). Crucially, they not only follow the pretense stipulations in their own inferentially appropriate actions, but also





indicate an awareness of the normative structure of such practices more directly and actively by third-party norm-enforcement: when a third person joins the game, but makes a “mistake” by not respecting the pretense status of an object (confusing the fictional identities of several objects, for example), they protest and criticize her (Rakoczy, 2008; Wyman, Rakoczy & Tomasello, 2009a). And young children’s awareness and enforcement of the normative structure and implications of fictional status assignment is already sensitive to the context-relativity typical of status assignment. One form of context-relativity pertains to multiple statuses: that an  $X$  counts as a  $Y_1$  in a given context  $C_1$  leaves open the possibility that the very same object can have some other status ( $Y_2$ ) in some other context ( $C_2$ ). A given card may be a trump in one kind of card game but a lousy card in another. Similarly, one kind of object may at the same time have one kind of fictional status in one pretense game, and a different one in another game. Children at age 3 do understand this multiple fictional status, flexibly switch between contexts and adapt their actions accordingly (Wyman, Rakoczy & Tomasello, 2009b). Another, related form of context-relativity is the following: given  $X$  counts as  $Y$  in  $C$ , within the context  $C$  there are normative implications as to how to treat  $X$  such that a given action may constitute a mistake that do not hold outside of the context  $C$  so that the very same kind of act may be perfectly fine. Again, recent research has found that children aged 2–3 understand this form of context-relative normativity: they protest against the very same kinds of act when performed in a context in which it constitutes a mistake in light of a given status assignment, but do not do so when the same kind of act is performed outside of this context (for example, when the agent had announced to not take part in this specific joint fictional game prior to acting; Rakoczy, 2008; Wyman et al., 2009a).

By the third year of life, then, children have entered into basic forms of this remarkable practice of games of pretending, collectively treat objects they know to be  $X$ s as  $Y$ s, follow and respect the implications of the proto-constitutive rules of the game and normatively criticize deviations from the rules. In embryonic and isolated form, one can thus see the basic structure of institutional reality in the games of 2-year-olds. Of course, this is a long way from money, marriage and universities, but the seeds are there, and so joint pretending quite plausibly can be considered the central cradle for, and the entering gate into, institutional life. There are good reasons, in fact, to assume that it may be no coincidence that pretense and other games constitute one, perhaps even the, cradle for growing into institutional reality more generally. A fundamental problem in coming to participate in institutional life is its holistic structure: most forms of status (e.g. political) cannot be understood without understanding many other forms of status intimately connected (e.g. economic, power relations etc.). It is thus a major challenge for the child to break into this circle. Games may be well suited do the trick. First of all, they are in some intuitive sense “non-serious”, and however this elusive notion is to be spelled out, one crucial aspect of it is that games are quarantined from the rest of institutional life to a considerable degree. Second, whereas the contexts of many forms of institutional reality are abstract and far-reaching on both spatial and temporal dimensions (think of currency areas etc.), the contexts of simple joint pretense games are very tangible, short-lived and action-based (“in this very pretense we’re engaged right here and now . . .”). Third, setting up fictional status, even in very young children, is intimately linked with language in a way typical for institutional reality more generally. One (if not the) paradigmatic form of status assignment are declarative speech acts of the form “This ( $X$ ) is now a  $Y$ ” such as “You are now husband and wife” or “From now on, you are called Peter” (Searle, 2010). In their joint pretense, children routinely set up the scenario by declaring things like “This (block) is now the apple, and this (pen) is the knife”, often with specialized grammatically marked construction that signal the non-literal force of the speech act (Kaper, 1980). From an ontogenetic point of view, thus,







pretense declarations such as “This is now the apple” may constitute the foundation for serious status declarations such as “You are now husband and wife”. Such a general picture of pretense as an ontogenetic foundation for institutional reality is in the spirit of a fascinating account by Kendall Walton (Walton, 1990) that ascribes a similar foundational role to pretense as a basis for all kinds of representational art.

From the perspective of comparative psychology, we do not have any convincing evidence in any non-human species for any kind of social practice with the structure of status function assignment. With regard to play, rough and tumble and other kinds of sensorimotor play are a widespread phenomenon in non-human primates and other mammals. But there is no solid and convincing evidence (that would go beyond highly ambiguous anecdotes from natural observations) for pretend play proper or other types of rule-governed games (Gómez, 2008). It might be objected, though, that many animals seem to respect social status in some serious domains, for example, in the form of dominance hierarchies etc. Is this not incompatible with the above claims, then? The problem here is that there are at least two radically different notions of dominance and social status. According to an institutional reading, dominance status – in a corporation, for example – indeed is a matter of convention and collective assignment. In contrast, however, there is a brute reading according to which dominance status is a purely causal notion (ultimately to be cashed out in terms of physical force and the like). Now, while there is much evidence that non-human animals are sensitive to social status in the latter sense, there is basically no evidence to suggest they respect the former.

## Conclusion

The empirical study in the cognitive sciences of collective intentionality and its development is a relatively recent phenomenon. In some respects, we surely have learned from this investigation more about potential roots, earliest forms and developmental courses of different forms of collective intentionality; yet in many respects this inquiry has just begun to scratch the surface. Future research will be faced with many fundamental conceptual and empirical challenges to tackle.

From an empirical point of view, many fundamental questions concerning the ontogeny and phylogeny of collective intentionality remain open: What are the ontogenetic origins and roots of collective intentionality? Once basic forms of collective intentionality in the form of shared perception (joint attention) and shared intentional action are in place in early childhood, how do more complex forms such as collective beliefs develop? Concerning children’s participation in joint status assignment and institutional life: once they take part in such activities and reveal a practical grasp of the structure of status and its normative implications, how do they move on from there to develop more sophisticated and reflective notions of the logical structure of institutional, observer-dependent facts that contrast categorically and sharply with brute facts? More generally, how should development best be described: does it proceed in discrete and qualitatively distinct stages (e.g. Tomasello et al., 2012)? And how should the cognitive underpinnings be characterized: might there be qualitatively different systems and/or processes, for example for minimalist vs. full-blown collective intentionality – much in the same way as often assumed in other areas of cognitive development such as numerical or social cognition (Apperly & Butterfill, 2009; Carey, 2009)?

From a comparative perspective, more systematic research into the commonalities and differences in the development of individual and collective intentionality of human and non-human primates is required. Is collective intentionality as we see it in human ontogeny from the second year per se uniquely human? Or can basic forms of collective intentionality be found in non-human primates as well?





Beyond addressing such empirical questions, future cognitive science research may have interesting broader implications vis-à-vis the – mostly philosophical – projects of conceptual analysis. As mentioned at the outset of this chapter, the empirical cognitive science of collective intentionality and its development usually starts off simply from our pre-theoretic notions of collective intentionality. There is thus no need for the empirical approaches to take sides in the debate between different philosophical proposals for conceptual analysis of “collective intentionality” and related notions. However, the empirical results of developmental cognitive science may well have implications for the plausibility of different such accounts. For example, empirical findings of early competence in collective intentionality present prima facie trouble for Gricean reductionist accounts that analyze shared intentionality in terms of complex forms of higher-order individual intentionality (Bratman, 1992, 2014). This trouble for reductionist accounts, which can be seen in analogous forms in other areas (such as communication), can be captured with the following schematic trilemma (Breheny, 2006; Rakoczy, 2006): First, shared intentionality presupposes higher-order recursive propositional attitudes (the main conceptual premise of reductionist accounts). Second, young children do not yet have such attitudes (as suggested by empirical findings in cognitive development), but third, young children manifest shared intentionality (as suggested, again, by empirical findings). This triad is clearly inconsistent. So, which of the three propositions should be given up or suitably modified? The most plausible solution, it seems, lies in a refinement and qualification of the first: the reductionist accounts might be right about full-blown and complex adult shared intentionality that may in fact presuppose such complex higher-order attitudes. Nevertheless, this still leaves room for developmentally (and evolutionarily) primary and less complex forms of shared intentionality that can be present without the complex higher-order attitudes (Butterfill, 2012; Pacherie, 2013).

Related questions pertain to the conceptual and developmental relations of second-order individual intentionality and collective intentionality more generally. Gricean approaches, Bratman’s (1992) in particular, hold second-order individual intentionality necessary and sufficient for collective intentionality (such that the latter is a complex and coordinated form of the former); in a sense, therefore, the development of collective intentionality, according to this account, just amounts to the development of a certain complex form of individual intentionality. Anti-reductionist accounts such as Searle’s (1995), in contrast, assume that collective intentionality is a primitive phenomenon and thus seems to imply that second-order individual intentionality is not only not sufficient, but also not necessary for collective intentionality. The two kinds of intentionality, according to this reading of Searle, might thus develop without intimate relations to each other. In contrast to both of these positions, there might be an interesting third way: second-order individual intentionality and collective intentionality may be intimately related and thus develop in closely related ways. On the one hand, some form of second-order individual intentionality may be necessary for collective intentionality yet not by itself sufficient. And on the other hand, joint attention and cooperation, as basic forms of collective intentionality, may present the primary contexts in which individual intentionality of the second order (ascribing perceptual perspectives, goals etc. to interaction partners) is put into practice (Moll & Meltzoff, 2011).

### Note

- 1 This chapter draws on some material from previous papers, in particular from “The development of collective intentionality”, forthcoming in the *Routledge Handbook on Collective Intentionality* (edited by Kirk Ludwig and Marija Jankovic).





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