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SHARING AND FAIRNESS IN DEVELOPMENT

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Introduction

Issues of sharing and fairness pervade human life. They are a central piece of the human social mind puzzle. From a developmental perspective, natural observations of family life show that more than 80% of all conflicts among young siblings revolve around issues of possession and resource distribution (Dunn, 1988). Looking at political history, the same is true for all major conflicts among adults across cultures and since the ancestral time. So, what is the psychology behind such recurrent sources of conflicts and group disharmony? What mechanisms allow humans to resolve recurrent conflicts around possession, values, and resource distribution? Aside from the sheer power of coercion attached to Darwinian selection and other lion's share principles pervading Nature, a major question is what are the origins of the ways humans manage to cooperate in sharing values and resources without automatically resorting to force? How do we manage sometimes to agree on the value of things and how do children learn to somehow compromise with others? That is the general question discussed in this chapter, in light of recent developmental research.

Our goal is to review existing theoretical ideas and empirical evidence regarding the development that leads each individual child across a large variety of cultural and often highly contrasted demographic contexts to understand reciprocity in social exchanges. A second goal will be to understand how children systematically end up building some principled notions of equivalence and shared values with others, fostering cooperation, and somehow transcending competition or any forms of coercion.

In the first part of the chapter we discuss sharing in development. We review evidence on the primordial development of shared and reciprocated experience, documenting what would be the universal chronological development of three forms of intersubjectivity between birth and 24 months. This development leads the child toward the first expression of an ethical stance by the third year of life.

In the second part of the chapter, we then turn toward the development of fairness proper, construed as equity norms that guide exchanges with peers and others. We view this development as co-emerging with self-consciousness, in particular with a new care for reputation and the onset of a propensity to construe oneself through the evaluative eyes of others (Rochat, 2009; 2014).

Before concluding and providing a general summary of the main ideas, in a third part we consider the degree to which culture plays a role in the development of fairness in sharing with

a particular focus on the expression of inequity aversion by young children from around the world growing up in highly contrasted socio-economic and cultural circumstances.

Sharing in development[1]

Progress in infancy research during the past 40 years has debunked many classical theoretical assumptions; assumptions revolving around the ill-informed intuition of a starting state characterized by un-differentiation and an initial state of emotional, social, perceptual, and cognitive incompetence in newborns.

It is now well established that we are not born in a blooming, buzzing confusion, in some state of undifferentiated fusion with the environment, as proposed by William James over a century ago, and assumed also by many pioneer child psychologists such as Piaget, Wallon, Baldwin, and Freud and many of his followers like Mahler or Klein (Rochat, 2011). We now know that newborns perceive their own body as a differentiated entity among other entities. For example, they root significantly more toward the finger of someone touching their cheek (single touch), than toward their own fingers touching their cheek (double touch; Rochat & Hespos, 1997). Furthermore, research shows that hour-old infants are already sensitive to distal objects and not just proximal stimulations hitting the senses (Slater et al., 1990; Kellman & Arterberry, 2006). Infants from birth show remarkable attunement to particular features in the environment. They discriminate among and show a preference for animate as opposed to inanimate things; face vs. non-face entities (see Rochat, 2001 for a review); and familiar as opposed to unfamiliar people based on even pre-natal experience of the maternal voice and the taste of maternal amniotic fluid (Marlier, Schaal, & Soussignan, 1998).

In the following, we want to discuss and present some evidence regarding marked changes in the form and content of sharing in early development. By at least six weeks, if not earlier, infants are sensitive to eye gaze, 'motherese', and turn-taking contingency. As pointed out by Csibra (2010), this sensitivity shows that infants are able, from a very early age, if not from birth, to recognize that they are being addressed by someone else's communicative intentions long before they are able to specify what those intentions are. The basic ability by which the young child distinguishes between persons and inanimate things allows them to develop various levels of experiential sharing, which we would like to review first.

This development follows the marked and rapid expansion of children's awareness of being with others in the world. In what follows, we describe three major levels unfolding in development between birth and five years. These levels are in turn primary, secondary, and tertiary levels. Each of these levels emerging in development determine ways and forms of sharing that are fundamentally different in both content and function. At each level, and from the earliest age, children engage in dynamic co-regulation with others that amounts to an open-ended system of negotiation, where this includes the dynamic process of constant affect monitoring and emotional alignment with others, i.e., a mutual adjustment between self and others' experience.

As will be proposed next, each of these three basic levels adds a new layer of meaning to sharing, progressively expanding from the individual to the group. This enlargement follows a path that parallels and echoes the development of self-consciousness (cf. Rochat, 2009), leading children, from the exchange of gazes and smiles (primary intersubjectivity), to the sharing of attention toward objects, including the actual offering and request for physical things (secondary intersubjectivity), and ultimately to the negotiation with others of the relative value of *things*, be they material (e.g. bartering exchanges of prized

possessions; see Faigenbaum, 2005), or immaterial (e.g. agreement on rules and what is right or wrong; see Rakoczy, Warneken, & Tomasello, 2008). This latter level of sharing (tertiary intersubjectivity; see Rochat & Passos-Ferreira, 2009 for further discussion), leads children from the second year toward the development of an ethical stance in reciprocal exchanges with others.

Level 1: affective sharing *(2 months and up)*

By approximately six weeks postpartum, a new kind of mutuality emerges that is distinct from the primeval biological and instinctive co-regulation we find already at birth. It is from this time onwards that infants engage in face-to-face interaction, and display the first socially elicited smiling. It is this first active sharing of affects in proto-conversation with others that amounts to the so-called *primary* intersubjectivity (Trevarthen, 1980). It is the original ground for sharing in the literal sense of reciprocal exchanges. Infancy researchers have documented and characterized this sharing in terms of rhythmical *turn taking* (Gergely & Watson, 1999), and *two-way shared mutual gaze* (Stern 1985; Stern et al. 1985). It goes beyond mere affective mirroring or emotional contagion as such exchanges take place for the first time within open-ended, *co-created* transactions made up of successive emotional bids. To share an experience with someone else is not to have an experience of one's own and then simply to add knowledge about the other's perspective on top; rather a shared experience is a qualitatively new kind of experience, one that is quite unlike any experience one could have on one's own. The other's presence and reciprocation makes all the difference.

Infants at birth open their eyes and orient their gazes toward faces, preferring faces to non-face objects. Even though they are documented to imitate facial gestures and emotional expression (like tongue protrusion or sad faces; Meltzoff & Moore, 1997; Field, 1984), the gaze of newborns remains often sluggish and hard to capture, as if it is passing through you. Staring straight at a newborn with open eyes often gives the impression that the child is looking through you rather than at you. By six to eight weeks, however, the gaze becomes unmistakably *shared and mutual*, inaugurating a proto-conversational space of genuinely open-ended social exchanges made of turn taking and a novel sensitivity. Mothers commonly report that they now discover a person in their baby. Whereas eye-to-eye contact is often a threatening sign and tends to be avoided in other primate species, it is a major attractor in humans and becomes a critical index of engagement in proto-conversational and early intersubjective exchanges. It is a variable picked up by the child as a measure of the relative degree to which others are socially engaged and attentive, affectively attuned and effectively 'with' them. It gives rise to prototypical narrative envelopes co-constructed in interaction with others, made, for example, of tension build-ups and sudden releases of tension, like in peek-a-boo games that are universally compelling to infants starting in the second month (Stern, 1985; Rochat, 2001). Such exchanges are primarily scaffolded by strong affective marking and compulsive affective amplification on the part of the caretaker producing high-pitched inflections of voice and exaggerated facial expressions ('motherese'), tapping into the child's attentional capacities and perceptual preferences (Gergely & Watson 1999; Stern et al. 1985; Rochat 1999, 2001). The adult's systematic tendency toward affective scaffolding and amplification, a running emotional commentary that is attuned to the child's expressed emotions, combined with the novel attentional capacities of the child by the second month (Wolff, 1987), makes such proto-conversation more than mere complementary actions between adult and child. Play and sharing games give children privileged access to their own limits and possibilities as agents in their environment. It is in such affective, face-to-face, playful exchanges of gazes and smiles that infants first gauge their social

situation: the impact they have on others, and the quality of social attention they are able to generate and receive from others.

It is from this point on that we can talk of sharing as a process that rests on reciprocation and putative co-creation of affects in interactions with others. Importantly, in relation to our topic, this is a process in which for the first time self and other are engaged *together* in an open-ended, emotional bid building process. This emergence defines a novel horizon for development that leads the child toward symbolic functioning, explicit self-consciousness as opposed to implicit self-awareness, linguistic competence, and ultimately the development of an ethical stance toward others (i.e., strong reciprocity in sharing; see Robbins & Rochat, 2011). It also provides a basis for infants to become socially selective and sensitive to social identity markers like language, manifesting already from approximately three months relative preference and affiliation with particular others that are more familiar. For example, recent research shows that by six months, infants prefer strangers who speak with no foreign accent (Kinzler, Dupoux, & Spelke, 2007), who respond to them in a familiar temporal manner (Bigelow & Rochat, 2006), or who act in prosocial as opposed to antisocial ways (Hamlin, Wynn, & Bloom 2007).

Level 2: referential sharing *(7–9 months and up)*

If by two months infants begin to share experience in face-to-face, open-ended proto-conversation with others, things change again by seven to nine months when infants break away from mere face-to-face reciprocal exchanges to engage in referential sharing with others *about* things in the world outside of the dyadic exchange. This transition is behaviourally indexed with the emergence of social referencing and triadic joint attention whereby a triangular reciprocal exchange emerge between child and others in reference to objects or events in the environment (Striano & Rochat, 2000; Tomasello, 1995). By triangulation of attention, objects become jointly captured and shared. Objects start feeding into the exchange. This is the sign of a 'secondary' intersubjectivity (Trevarthen, 1980) adding to the first exchanges of 2–6-month-olds.

Prototypical instances of triadic joint attention include not only cases where the child is passively attending to the other, but also cases where the infant, through acts of protodeclarative pointing, actively invites another to share its focus of attention. In either case, the infant will often look back and forth between adult and object and use the feedback from his or her face to check whether joint attention has been realized. Importantly, the jointness of the attention is not primarily manifest in the mere gaze alternation, but in the shared affect that, for instance, is expressed in knowing smiles. One proposal has been that interpersonally coordinated affective states may play a pivotal developmental role in establishing jointness (Hobson & Hobson, 2011). Another suggestion has been to see joint attention as a form of communicative interaction. On this proposal, it is communication, which for instance can take the form of a meaningful look (i.e., it does not have to be verbal), that turns mutually experienced events into something truly joint (Carpenter & Liebal, 2011).

This new triangulation emerging by seven to nine months is also, and maybe more importantly, about social affiliation and togetherness. Like the optical parallax that gives depth cues to viewers, first signs of joint attention gives children a new measure of their social affiliation, a novel social depth. By starting to point to objects in the presence of others, by presenting or offering grasped objects to social partners, infants prey for others' mental focus by creating and advertising for a shared attention. Psychologically, it also corresponds to the first *appropriation* of an object as topic of social exchange, in the same way that in the course of a conversation someone might spontaneously appropriate an object (pen, stick of wood, any small object) to help in the telling of a story. The object, used as a conversational prop in early bouts of joint

attention, becomes the infants' new 'fishing hook' to capture, gauge, and eventually possess others' attention against which they can gauge further their relative agentive role, control, and impact in relation to others: their situation and place in the social environment.

It is reasonable to state that in joint attention we find the roots of the child's first socially shared mental projection of control over an object (i.e., possession in the literal sense). In starting to bring other people's attention onto things in the environment, the infant opens up the possibility of claiming ownership of both the initiation of a conversation about something and the thing itself. Pointing, offering, or presenting objects to others are all new social gestures becoming prominent in the healthy child from seven to nine months.

An object that is presented or offered can now be retrieved or taken away by others, given back or ignored by them. It gives rise to all sorts of new, complex, and objectified social transactions. It is in these new objectified social transactions that the child consolidates the concept and idea of what eventually will become in a few months of developmental time and with the emergence of language the explicit claim of ownership: the assertion of "that's mine!" and "not yours!"; an explicit assertion of ownership that on its part allows for new forms of sharing.

From this point on, and at this pre-linguistic stage of development, objectified and socially shared centrifugal and centripetal forces are the new playing field created by children (Tomasello et al., 2005, Rochat & Striano, 1999). It is a crucial step in the development of sharing. Feeding their basic affiliation need, children learn from then on that with objects, others' attention and recognition can be earned and shared. Note that what develops are new forms and objects of reciprocation all presupposing the same basic self–other differentiation and empathic stance that appear to be expressed and maintained from the outset.

By 11–12 months, the child adds a novel layer of meaning to referential sharing. This layer corresponds to a novel understanding of the *manners* in which sharing and exchange games are played. They begin to modulate their ways of sharing and reciprocating, becoming more selective of the person they share with, trying to imitate or to coordinate actions in attempts of cooperation.

From 12 months of age, infants also begin to show significantly greater modulation and flexibility by engaging spontaneously in role reversal imitation (Ratner & Bruner, 1978). For example, imagine a situation where an adult engages the infant to play a collaborative game where the adult holds a basket and the infant throws toys into it. If the adult suddenly stops holding the basket and now wants to throw, 12-month-olds seeing this are able to switch roles to continue the joint game: the infant will spontaneously stop throwing, grab, and hold the basket to let the adult throw the toys (Carpenter et al., 2005).

Typical development of social experience leads children toward an inclination to identify with others. Indeed, Hobson argues that in affective sharing the process of 'identifying-with' plays a very early and pivotal role in typical social development by structuring "social experience with polarities of self-other differentiation as well as connectedness" (Hobson 2008, p. 386). From 12 months, infants can follow through and maintain the sharing, collaborative game by taking the role of the other, that is, the child begins to show some rudiments of perspective-taking and the budding ability to get into the shoes of others.

The investigation of joint attention suggests that we to a large extent come to understand others by sharing objects and events with them. Moll, Carpenter, and Tomasello (2007) have argued that by the second year infants in situations of joint engagements where they are directly being addressed by the adult and involved in her actions are able to learn things and display skills they otherwise could not. Indeed, it has been suggested that infants come to learn about the social world, not "from 'he's' or 'she's' whom they observe dispassionately from the outside" but "from 'you's' with whom they interact and engage in collaborative activities with

joint goals and shared attention" (Moll & Meltzoff, 2011, p. 294). By 14 months, the infant becomes explicit in discriminating the shared experience of an object as special. They are able to discriminate objects experienced by 'we' as opposed to 'I' alone (Tomasello et al., 2005; Moll et al., 2008).

Level 3: co-conscious sharing *(21 months and up)*

The expletive "Mine!" that children utter from around the same age (approximately 21 months; Bates, 1990; Tomasello, 1998) is symptomatic of a major transition happening at this stage. The explicit assertion of ownership parallels the emergence of explicit self-recognition and self-objectification in the mirror (Rochat & Zahavi, 2011), but also novel expressions of self-conscious emotions like blushing, shame, envy, or pride. The awareness of being evaluated by others starts to shape toddlers' social and affective lives. It is from this point on that children show first signs of systematic self-management, starting to care about their own reputation in relation to others as both individuals and groups of individuals (Rochat, 2013). Related to self-management and audience awareness, it is also from then on that children develop a renewed ability to conceal their mental states, manipulating what they expose of themselves to others. As part of this major developmental step, children become particularly sensitive to approbations or dis-approbations from others, constantly gauging and promoting their own social affiliation. They probe and see what works and what doesn't in sharing with others, starting a new era of bartering and endless negotiation of permissions that parents of two- and three-year-olds know too well. They properly start to have others in mind in the sharing process, while never confounding their own perspective with that of others. This transition toward tertiary inter-subjectivity is briefly illustrated below with empirical findings on (a) the development of an ethical stance taken by children toward others between three and five years, and (b) the parallel emergence of a sensitivity to group norms and affiliation, including explicit ostracism from six to seven years and beyond.

(a) When asked to split a small collection of valuable tokens with another, three-year-olds tend to self-maximize in their distribution, becoming significantly more equitable by five years of age. This developmental phenomenon is robust and has been documented across at least seven highly contrasted cultures (Rochat et al., 2009; Robbins, Starr, & Rochat, 2016). Between three and five years, children start to act toward others according to some ethical principles of *fairness* they internalize and seemingly hold for themselves. They become 'principled', sensitive to the moral and ethical dimension of sharing possession with others and try to reach 'just' decisions. More generally speaking, children typically develop as autonomous moral agents as opposed to strict conformists who simply obey and abide the greatest, more powerful majority in order to feed a basic social affiliation need. From this point on, they start to show signs that they care about their moral identity and reputation by actively claiming their own view and perspective in moral space (Taylor, 1989). They begin to show clear signs that they try to maintain self-unity (i.e., own moral stance) and coherence in instances of justice distribution. They start avoiding dissonance when facing a moral dilemma such as splitting an odd number of desirable goods between two individuals. From then on, children tend to show increasing signs of inequity aversion, including expressions of costly sacrifice to enforce principled equity (Robbins & Rochat, 2011).

(b) Parallel to the development of principled sharing, children also become progressively more sensitive to what people think of them. Sharing is the primary context in which children

establish their own moral perspective and moral identity in the evaluative eyes of others. Beyond six years of age, further layers are added, where children increasingly refer and abide to trade rules and the pragmatics of what become ritualized exchanges sanctioned by *institutions* (group norms, collective ways of being, school or playground culture). They become progressively more sensitive and aware of the cultural context: the institutional or consensual collective order that transcends and ultimately governs personal wants and inclinations (Rochat, 2014). In contrast to the referential sharing of secondary intersubjectivity, which remains a form of dyadic *we*-experience, the co-conscious sharing occurring at the tertiary level of intersubjectivity becomes normative at a larger collective scale. It is not only limited to dyadic communication about objects and events (i.e., pointing and joint attention), marking a new (ethical) level of *we*-experience referring to collective rules and norms. This transition corresponds to the predictable development of two successive forms of shared intentionality that Michael Tomasello coins as *joint intentionality* and *collective intentionality*, respectively (Tomasello, 2014).

As children start manifesting an ethical stance between the ages of three and five, they also start to expand their experience of being part of a larger *we* by becoming sensitive to group affiliation and its necessary counterpart: the potential of being socially excluded. Entering institutions that extend the family environment to peers (i.e., preschools and other kindergarten), children develop a new sense of group belongingness. They start to identify with the group, they show in-group biases, and they start to endorse group attitudes. They come to share the view and preferences of the group. Classic instances of strong group conformity (Ash, 1956) are replicated in three- to four-year-old children who tend to reverse their own objective perceptual judgments to fit a peer group majority opinion (Corriveau & Harris, 2010; Corriveau et al., 2013; Haun & Tomasello, 2011; Haun, van Leeuwen & Edelson, 2013). From five years and beyond, sharing drastically expands, and begins to map onto the social psychology of individuals in their relation to the group, in particular the in-group/out-group dynamic described in adult social psychology experiments. Multiple experiments show that children are quick to affiliate with particular groups based on minimal criteria (blue team vs. red team). By four years, they are prompt to manifest out-group gender or racial stereotypes and other implicit group attitude biases toward others (Cvencek, Meltzoff, & Greenwald, 2011). From approximately seven years, children also begin to manifest active ostracism and social rejection in order to affirm one's own group affiliation and identity (Aboud, 1988; Nesdale, 2008).

From the time children become aware of and start to internalize the other's evaluative attitude towards themselves, the content of what they identify as their own characteristics (who they are as persons in the larger social context) become increasingly determined by how they compare to the perceived and represented (belief) characteristics of others as individuals but also as particular groups of individuals (e.g., siblings vs. peers, parents vs. strangers). This is evidenced by the inseparable development of self-conceptualizing and the early formation of gender identity and social prejudice, the way children construe their relative *affiliation* and manifest affinities to particular groups by ways of self-inclusion and identification, as well as by social *exclusion*: the counterpart of any social identification, affiliation, or group alliance (Dunn, 1988; Nesdale et al., 2005).

Extending the original cognitive-developmental work of Kohlberg (1966) on sex-role concepts and attitudes, research shows that by the middle of the third year (i.e., 31 months), children correctly identify their own gender (Weintraub et al., 1984). Interestingly, the degree of gender identity expressed by three-year-olds depends on parental characteristics. Weintraub and colleagues found that, compared to other parents, fathers who have more conservative

attitudes toward women, who tend to engage less in activities that are stereotyped as feminine, and who score low on various femininity scores have children scoring higher on the gender identity task. These findings demonstrate the early onset of group identity (i.e., gender) and the role of social influences in the determination of early group categorization and identification. In relation to social prejudice, research investigating children's social identity development suggests that, contrary to gender, it is only by age four to five years that children are aware of their own ethnic and racial identity. Only then do they begin to show identification with and preference for their own ethnic group (see Gibson-Wallace, Robbins, & Rochat, 2015).

Early on, children derive self-esteem, and hence a conception of self-worth, from group membership and group status. According to Nesdale (2004), for example, ethnic and racial preference manifested by five-year-olds is based on a drive to assert their own in-group affiliation, and not yet focusing on the characteristics of out-group members that they would eventually discriminate or exclude. Social prejudices, whereby some children might find self-assertiveness in focusing on negative aspects of out-group members, are manifested in development no earlier than seven to eight years of age based on Nesdale's research and interpretation.

From seven years on, the self and social identity begin to be conceptualized on the basis of combined social affiliation and exclusion processes. These combined processes are contrasting or 'bringing out' the self *positively* by association with some persons and *negatively* by dissociation with others. From then on, children are subject to group norm influences. They begin to construe their social identity through the looking glass of the group they affiliate with, as well as the members of other groups they exclude. In this dual complementary process, combining affiliation and contrast or opposition to selected others, children manifest new ways of asserting and specifying who they are as persons, for themselves as well as for others as individuals and groups of individuals.

Fairness in development

So far, we examined three levels of sharing as they relate to the child's experience of intersubjectivity. We demonstrated that sharing does not involve only persons and objects, but more broadly, the relationships between persons, and with respect to objects. Here we consider in further detail the cognitive capacities that might subtend children's sharing at the level of *tertiary intersubjectivity*. The question we would like to explore is how children develop into moral agents, moving from the detection of sameness and inequity into a more prescriptive 'ethical stance' about how things *ought* to be shared. Central to this question is inequity aversion, a description of the malaise individuals experience when they have more (advantageous inequity) or less (disadvantageous inequity) than another.

What is inequity aversion?

The basic tenant of inequity aversion is that individuals may be motivated by both self-interest *and* other-regarding preferences. According to Fehr and Schmidt (1999), inequity aversion is characterized by two parameters: envy, or the distaste for disadvantageous outcomes (e.g., having less than one's partner), and compassion, or the distaste for advantageous outcomes (e.g., having more than one's partner). This position has been substantiated through the use of exchange games, where experimental evidence indicates that adults make offers that are very close to the equitable solution of an even split, and reject offers that are perceived as too stingy, typically less than 20%–30% of the shared good (Camerer, 2003; Murnighan & Saxon, 1998; Camerer & Thaler, 1995). This tendency is pervasive in Western settings, although

cross-cultural evidence suggests it might also depend on market inclusion and social context (Henrich et al., 2006; Dwyer, 2000). Such findings are not unique to humans. Growing evidence suggests that equity norms are important for cleaner fish (Raihani & McAuliffe, 2012), canines (Horowitz, 2012; Range et al., 2009), and non-human primates (Burkart et al., 2007; Lakshminarayananan, Chen, & Santos, 2008; Brosnan & de Waal, 2003; but see however Silk et al., 2005, as well as Jensen, Call, & Tomasello, 2007, for examples of antisocial reactions to inequity in chimpanzees). The roots of inequity aversion extend deep into phylogeny and, as we shall demonstrate, ontogeny.

Here we briefly review the developmental evidence regarding the socio-cognitive capacities that would support inequity aversion and that we conjecture are necessary pre-requisites. This would include children's general understanding of numeracy and proportionality (what constitutes the *what* of sharing); their understanding of self and other including perspective-taking and social evaluation (what constitutes the *who* of sharing); and their reasoning about ownership, possession, and exchange relationships (what constitutes the *how* of sharing).

The 'what' of sharing

Inequity aversion presumes that there are quantifiable *things* that can be distributed. To understand the 'what' of children's sharing, it is useful to address children's understanding of *quality* as well as quantity. What are the dimensions that children value? Four- to five-year-old children attach value to perceptual features of objects, such as size, colour, and attractiveness (Fox & Kehret-Ward, 1990). These perceptual features can be graded, so that the quality of them becomes a relevant dimension by which children value objects. Given the choice between stickers, for example, children will pick those that are the *biggest* or the *most* colourful, and not necessarily those that are the most numerous (see Rochat et al., 2009 for a similar manipulation of this kind).

The value of an object may also be derivative of the relative effort it takes to produce it, and this valuation may be grounded in how children understand ownership. As early as three years, children recognize that creative labour implies ownership over objects (Kanngiesser, Gjersoe, & Hood, 2010). Valuation also stems from the *attainment* of objects. Three- to five-year-olds report liking better objects that they already own versus identical objects that they do not own (Lucas, Wagner, & Chow, 2008) in what are signs of an early endowment effect. Between five and seven, abstract properties feature into children's determination of value. These are often pragmatic affordances of an object (i.e., it is easy to use or play with; it is durable or strong), but associative affordances take on importance as well. At this age children value objects that create a shared sense of group (e.g., we are friends because we both have the same shirt; see Faigenbaum, 2005 for a comprehensive discourse analysis on the topic).

Especially relevant to discussions about inequity aversion, the concept of 'half' seems to subtend children's earliest understanding of proportion. By six years children are capable of computing proportions with both discrete and non-discrete quantities (Spinillo & Bryant, 1991), and by seven years children grasp the inverse relation between the number of parts into which a quantity is divided and the size of those parts (Sophian, Garyantes, & Chang, 1997). Such competencies may be evident in even younger children (three to four years old) if they are presented as analogies between conceptual referents (e.g., a half pizza came from a whole pizza, therefore a half bar of chocolate must come from a whole bar of chocolate; Singer-Freeman & Goswami, 2001).

Finally, judgments of equity and fairness often involve more than assessments of absolute quantity. Sharing can be *relative*, involving what one has *in comparison* to another. Adam's (1963)

theory of equity, for example, maintains that egalitarian preferences depend on proportional reasoning in the sense that individuals compare and weight the relative wealth, contributions or attributes of others (which need not necessarily be material) to determine what payoffs each person should receive. Whether young children are capable of this level of transitivity has been contested in developmental literature. Studying 5–14-year-olds, Piaget (1970) argued that the ability to transform values in one domain (e.g., speed) to another (e.g., distance) did not emerge until relatively late, around 12 years. Accordingly, young children would be unable to make conversions between another's initial wealth, need, or effort and their deserved amount of payoff, praise, or rebuke. Notably, in the social domain, it seems as though proportional reasoning emerges earlier, depending on which attributes of a child's sharing partner are highlighted. In studies that manipulate the relative effort of a sharing partner, for example, data routinely demonstrate that children younger than nine years eschew sharing proportionally (e.g., giving the lion's share to the party who has worked more) in favour of splitting resources in a strict egalitarian fashion (Leventhal & Anderson, 1970; Anderson & Butzin, 1978; Hull & Reuter, 1977; Nisan, 1984). In general, this developmental trend remains even after other factors are manipulated, including the nature of the shared resource (Peterson, Peterson, & McDonald, 1975; Larsen & Kellogg, 1974), the standards for determining relative effort, and the child's status in the game (i.e., worker and potential recipient vs. observer deciding how to split goods between labouring third parties; see Olejnik, 1976; Sigelman & Waitzman, 1991; Thomson & Jones, 2005). In the cases where children do deviate from strict egalitarianism, some evidence suggests they allocate greater rewards for their own labour over that of a partner. In other words, their considerations about individual effort may be constrained by a self-serving bias (Kanngiesser & Warneken, 2012).

In contrast, if the relative need or prosociality of partners is manipulated, children are much more likely to engage in proportional sharing. Children associate value with the act of portioning things, and they factor proportional resource distribution into their social evaluation of sharing partners. Cooperation and collaboration seem to be particularly salient features upon which children assess merit: when children as young as three labour jointly toward an outcome, their sharing is significantly more likely to be proportionally equitable (Ng, Heyman, & Barner, 2011; Hamann, Bender, & Tomasello, 2014). Unlike manipulations of effort, appeals to relative wealth ("this person is poor") or emotional status ("she is sad because she doesn't have a lot of candy") routinely produce consistent preferences for proportional equity, even in preschool children. Four- to eight-year-olds reliably distribute proportionally more of their resources to partners described as needy than to themselves in first-party sharing (Streater & Chertkoff, 1976; Malti et al., 2015) or to the more needy of two partners in a third-party context (McGillicuddy-de Lisi et al., 1994; Zinser, Starnes, & Wild, 1991; Paulus & Moore, 2014). Information about a partner's prior prosocial acts is also relevant to young children, and by five years, they judge as being 'nicer' partners who give proportionally more resources, above and beyond the absolute number of goods given (e.g., 3 of 4 coins vs. 6 of 12 coins; McCrink, Bloom, & Santos, 2010).

There are other kinds of computations children must consider in addition to relative wealth or deservingness. A certain amount of uncertainty and risk are inherent to exchange relationships. In iterative exchange games, participants can weigh what they know of a partner's behaviour against the probability that they will continue to act this way. And, of course, the very nature of indirect reciprocity – the notion that if I help you now, someone else may help me at some undetermined time in the future (Nowak & Sigmund, 2005) – is a gamble in the most abstract sense. The issue of uncertainty begs the question of who should shoulder the burden of risk in an exchange. It also brings to mind issues of reputation and trustworthiness.

Such considerations of self and other are at the heart of social evaluation, in what we deem the *who* of sharing.

The 'who' of sharing

Social evaluation begins early in development. Infants and children both demonstrate signs of parochialism and in-group bias by preferring to interact with members of their own group. For example, ten-month infants prefer to engage with objects that have been modelled by or associated with a speaker of their native language (Kinzler, Dupoux, & Spelke, 2012). Preference for in-group members may translate to preferential distribution of resources. At 2.5 years, children will share toys with a speaker of their native language over another adult (Kinzler, Dupoux, & Spelke, 2012) while in third-party sharing, three-year-olds asked to assist a doll in distributing resources will give more to partners described as kin or friends, but not as strangers (Olson & Spelke, 2008). And in first-party sharing, three- to seven-year-olds all demonstrate signs of parochialism by sharing equitably with anonymous partners described as classmates versus children labelled as peers from a different class (Fehr, Bernhard, & Rockenbach, 2008).

As mentioned previously, from an early age children are also sensitive to how others elect to distribute resources or act prosocially. Three-month-olds who view a vignette in which an agent is helped or hindered in the attainment of a goal react more negatively (as indexed by longer looking) to an antisocial hinderer (Hamlin & Wynn, 2011). Between 6 and 12 months, infants shift focus and become more inclined toward the prosocial helper (as indexed by preferential reaching tasks; Hamlin, Wynn, & Bloom, 2007). Infants also seem to evaluate how adults interact with third parties. At 19 months they look longer when adults have split resources inequitably between identical animate puppets, and by 21 months they anticipate that collaborators on a task should be equally rewarded by an experimenter (Sloane, Baillargeon, & Premack, 2012). This same negative appraisal of antisocial or unfair others is also evident during the preschool years. Three-year-olds show non-verbal signs of discomfort (i.e., negative affect, averted gaze) when sharing outcomes are inequitable (LoBue et al., 2011), and by five years children selectively share with partners who have previously shown them generosity (Robbins & Rochat, 2011; but see also Baumard, Boyer, & Sperber, 2010 and Kenward & Dahl, 2011 for examples of this in third-party sharing with younger cohorts).

Social evaluation of others is ubiquitous. The question is the extent to which children also understand that *they* may be likewise socially evaluated. Concern for social evaluation (what is also sometimes referred to as reputation effects) has long been considered an important factor in models of prosociality and cooperation. Great apes, for example, prefer conspecifics who have demonstrated competency on a collaborative task (Melis, Hare, & Tomasello, 2006), as well as human experimenters who have been generous versus selfish in previous interactions (Subiaul et al., 2008; Russell, Call & Dunbar, 2008), and there is evidence that such 'reputation effects' are present in canines (Kundey et al., 2011) and certain species of fish (Bshary & Grutter, 2006). As Axelrod (1984) notes, a reputation helps define the 'shadow of the future' by projecting information about prior behavioural consistency and expected future outcomes, including adherence to socially desirable norms for cooperation and reciprocity.

Many developmental studies of reputation effects have focused on peer perceptions of behavioural traits, such as friendliness and popularity (Hill & Pillow, 2006; Gifford-Smith & Brownell, 2003; but see also Zeller et al., 2003 for a review). Children as young as three evaluate others' actions both in relation to normative appeals (e.g., for fairness; Dunn, 2006; Ingram & Bering, 2010) as well as descriptive rules (e.g., discriminating between doing something 'naughty' versus doing something 'different'; see Cosmides, 1989; Harris & Nuntez,

1996; Rakoczy, Warneken, & Tomasello, 2008). Young children also demonstrate an awareness of being evaluated by others. Around 21 months, the same age that they begin to manifest explicit understanding of ownership and reciprocal exchange, children increasingly call attention to their achievements during free-play situations (Stipek at al., 1992). In terms of self-presentation and evaluation, three- to seven-year olds tell white lies in contexts that encourage politeness, such as neglecting to inform an adult experimenter that she has a potentially embarrassing mark on her face (Talwar & Lee, 2008), and have been shown to spontaneously inhibit negative affective displays in the presence of an experimenter who has established an expectation for positive affective reactions (Cole, 1986). Four- to nine-year-olds tend to judge their own behaviour more favourably compared to that of a sibling who has completed identical actions (Ross et al., 2004), and also show evidence of the 'subtle eyes' effect demonstrated in adults by sharing more generously in the presence of a mirror (Ross, Anderson, & Campbell, 2011).

Recent work demonstrates that concern for reputation is explicitly linked to children's egalitarian sharing (Robbins & Rochat, in prep; Leimgruber et al., 2012). Between five to seven years, children distribute resources more equitably if the outcome of their sharing is public. In contrast, if the outcome is private and unobservable to sharing partners, children at this age are more self-maximizing in their distribution of resources. (Note, however, that a sizable portion of five- and seven-year-olds do not show this effect and are egalitarian regardless of context.)

With regard to intersubjectivity, evaluation and appraisal of the self in relation to others has been linked to the so-called moral or self-conscious emotions, including guilt, shame, and empathy (Eisenberg, 2000). Guilt and shame, for example, may be elicited in response to unacceptable impulses and may therefore evoke feelings of responsibility in response to a perceived violation of a moral norm that is presumably shared with others (Ferguson & Stegge, 1998). Of the so-called moral emotions, empathy has arguably received the most attention (for a comprehensive review of its proximate and ultimate causes, see Preston & de Waal, 2002). Broadly defined, empathy is an affective response driven by the comprehension of another's emotional state (Eisenberg, 2000), and so construed, it is associated with prosocial acts such as helping behaviour (particularly oriented toward distressed peers; Eisenberg, 2000; Holmgren, Eisenberg, & Fabes, 1989). If initially infants respond to the pain of others in an attempt to mitigate their own distress or emotional contagion (Zahn-Waxler & Radke-Yarrow, 1982; Ungerer et al., 1990; Sagi & Hoffman, 1976), by 14 months personal distress is not required to motivate prosocial behaviours such as comforting (Eisenberg et al., 1998) or assisting an adult in the attainment of a goal, even when this assistance is not rewarded (Warneken & Tomasello, 2006). In later childhood, around three to four years, this tendency toward helping is tied to both the child's understanding of conventionality as well as their ability to engage in perspective-taking (Gopnik & Wellman, 1992; Wellman, Cross, & Watson, 2001). By 34 months children not only discriminate between conventional and moral transgressions (Smetana & Braeges, 1990) but are more likely to report feelings of guilt and remorse following their own moral transgressions (Stipek, Gralinski, & Kopp, 1990; Zahn-Waxler & Robinson, 1995). Children who report experiencing these emotions frequently are also more likely to accept responsibility and focus on reparation following a transgression event (Kochanska et al., 1994), suggesting that at some level they see themselves as accountable. Later in childhood and with regard to fairness, in *hypothetical* judgments about how a good should be distributed, children frequently provide rationales indicative of empathic concern, such as wanting to make a friend happy (Singh, 1997; Enright et al., 1984; Damon, 1975).

In short, the 'who' of sharing depends on several factors. Social perspective-taking may provide three- to seven-year-olds a window into the needs and desires of their sharing

partners. Children evaluate their sharing partners, and by five years are sensitive to the fact that they themselves are also evaluated. These evaluations carry affective overtones, the so-called self-conscious or moral emotions, that may be elicited in response to perceived inequity or transgressions.

The 'how' of sharing

As the child's ability to consider multiple perspectives strengthens, value judgments and appeals to norms (i.e., to share equitably) begin to characterize how children determine the appropriateness of societal interactions. Faigenbaum (2005) notes that as children abandon purely instrumental understanding of objects, negotiation (and particularly reciprocal exchange) features prominently in defining and re-defining the value of a good or an act. Here we briefly address how this understanding unfolds in early development. Although a rich literature describes concepts of possession and ownership in infancy, we next address the developmental changes that occur after the preschool years when inequity aversion first begins to manifest in children's own first-party sharing.

In any exchange of resources, children must (at least implicitly) identify *who has what*. Whereas ownership is an intangible, invisible, and abstract property of objects, possession, insofar as it involves physical contact, is visible to others. Early conflicts over resources are therefore conflicts of possession ("who has it?") rather than ownership ("whose is it?"). Prior to three years, children would demonstrate a 'first possessor bias' by which the first person who owns or controls the object retains ownership over it (Friedman & Neary, 2008; Friedman & Neary, 2009). In principle, early conflicts about possession tend to be conventional in nature, disputes about how to use a toy or perform an activity (Dunn, 1988; Faigenbaum, 2005).

Sharing entails both an understanding of ownership and transference of that ownership. Transfer of objects does not imply transfer of ownership. In a sharing game, for example, many individuals may possess a toy, but this temporary state of having does not mean the current possessor owns the toy. Three-year-olds protest partners who do not return objects to their original owner (Hook, 1993) or who usurp possession and claim their own control over an object (Rossano, Rakoczy, & Tomasello, 2011). As a consequence, rules of transfer become important to children starting around age four, when children begin to protest illegitimate acquisition of objects (e.g., theft) or wrongful use of them (e.g., breaking a toy; Vaish, Carpenter, & Tomasello, 2009; Vaish, Carpenter, & Tomasello, 2010). By five years, this conventional understanding takes on normative overtones. Five-year-olds will appeal to rights that owners have over their objects and will describe transgressions of transference rules as 'unfair' (Blake & Harris, 2009; Kim & Kalish, 2009; Rossano, Fiedler, & Tomasello, 2015). By seven years, children engage in restitution following a transfer transgression by either punishing or compensating the wronged party (Hook, 1993).

In brief, the developmental story regarding ownership is one in which children move from notions of possession that have their roots deep in infancy, focusing primarily on individual action like first contact, to an understanding of ownership that is more reciprocal, and in some cases contractual in nature. Considering that the developmental niche of children around the world varies in significant ways, an important question is whether culture plays a role in the early development of sharing and fairness we discussed so far. To tackle this question, the next section presents some relevant cross-cultural research that point to both universal and variable features in this development. In all, they emphasize the importance of factoring culture, something that is not frequently done and fortunately begins to catch the attention of developmental researchers.

Factoring culture

We have advanced the hypothesis that sharing is both about resolving material disparity (e.g., inequity aversion), but also about the creation of shared values and meanings. Such negotiations always occur within a larger framework of institutions, collective rules, and norms that govern exchanges in general.

The studies reviewed above largely represent children from W.E.I.R.D. (Western, educated, industrial, rich, and democratic) populations (Henrich et al., 2010), thus calling into question how generalizable these findings might be outside such contexts. In one of the most direct tests of this question to date, Rochat et al. (2009) presented three- to five-year-old children of seven highly contrasted cultures with a sharing game that manipulated the number of items shared (even or odd), the kinds of items shared (high or low value), and the child's role in the distribution (recipient or non-recipient). In general, and across cultures, three-year-olds tended to be more self-maximizing in their sharing of the resources than five-year-olds. However, the *magnitude* of this developmental trend was culturally variable. Already by three years, heightened egalitarianism and generosity were more common in cultures broadly characterized by collectivism and small-scale subsistence living (e.g., Samoa or rural Peru) relative to individualistic and highly urbanized cultures (e.g., United States) that show a steeper developmental trend between three and five years.

This general developmental trajectory of egalitarian sharing emerging by five years has been observed in other cross-cultural samples including Columbian preschoolers (Pilgrim & Rueda-Riedle, 2002) as well as Indian and Chinese preschoolers (Rao & Stewart, 1999). In these free-play, spontaneous sharing games, the converging evidence seems to support the idea that inequity aversion emerges between three and five years. The story is more nuanced when considering costly sharing, particularly in the context of forced choice games that pit an equitable outcome against an inequitable outcome that is costly to either the child or her partner. Here, egalitarian behaviour comes at a personal expense, and recent evidence suggests that in such contexts, children across highly contrasted populations all tend to be self-maximizing, and that fair-minded behaviour does not emerge until around seven to eight years, when children share in ways that are culturally variable and consistent with the sharing behaviour of adults in their community (House et al., 2013).

Given such findings, what is more likely to vary across cultures may not be an aversion to inequity per se, but rather the means by which equitable outcomes are achieved. Spontaneous requests to share and protests of unfair outcomes are more common in Western contexts, and evidence also suggests that the frequency with which children sanction unfair behaviour may also be culturally specific. Robbins and Rochat (2011) introduced American and Samoan children to a sharing game in which three- to five-year-olds split collections of tokens with identical dolls, one of which shared generously with the child and the other of which was selfish. Children were then given an opportunity to engage in costly punishment by sacrificing one of their own coins to take five away from the puppet of their choosing. By five years, although children in both cultures selectively punished the stingy puppet, the frequency of such costly punishment was significantly greater in US children.

What might be the driving force behind such cultural differences? One possibility is that collectivism and communal living predisposes children to relatively egalitarian or generous ways of sharing. However, in their comparison of six highly contrasted cultures – which included hunter-gatherer, horticultural, foraging, and urban societies – House et al. (2013) found that communal, small-scale populations fell on both sides of sharing norms, exhibiting both hyper-generosity and marked stinginess. Rather than communalism proper, extensive

work on economic reasoning in adults suggests that market inclusion and population density may be more influential in shaping the equity norms of a particular population (Henrich et al., 2006; Dwyer, 2000), and that collectivism in and of itself does not necessarily entail egalitarian ways of resource distribution. Converging on this point, a recent replication and extension of the Rochat et al. (2009) study found that Tibetan children raised in a communal exile community in urban India did not significantly differ in their sharing behaviour from children in any of the other seven cultures. Despite being educated in a context heavily emphasizing traditional Buddhist practices of mindfulness and compassion, these Tibetan children showed comparable levels of self-maximization as children in urban United States, China, and Brazil (Robbins, Starr, & Rochat, 2016). The most notable cross-cultural differences appeared to be driven by Peruvian children who, while they do live in a communal context, also notably live in a region that is not as densely populous or as integrated into Western trade economies as the other societies sampled. Further research on the relative role of these demographic features is surely warranted.

Finally, another good illustration of combined universal and variable features regarding sharing and possession are data we collected cross-culturally on the development of reasoning around the question of who owns what and why (Rochat et al., 2014). We asked three- and five-year-old children of seven cultures to determined ownership of a disputed object between two puppets. Following a simple script, the child was told that the two puppets were friends who, after taking a walk, find a coveted object and end up fighting about it ("This is mine! No this is mine!"), all as enacted by the experimenter. A series of conditions tested different ownership rationales by manipulating the various background of the puppets before the fight: the friends were either rich or poor (equity principle); creator or non-creator of the object (labour principle); familiar or unfamiliar with the object (familiarity entitlement principle); and had or had not previously touched and controlled the object first (precedence principle). After the vignette, children were asked who should have the object of contention and who owned it. We sampled children at both ages of middle and low socio-economic status in North America as well as rich, poor, and very poor street children from Brazil; children growing up in rural and highly traditional small-scale societies of Vanuatu and Samoa in the South Pacific; and Chinese children from a communist preschool in Shanghai.

When the object of contention was splittable in two equal halves, close to 40% of the Chinese as well as middle-class American children spontaneously split the object between the two puppets, independently of conditions, a significant cross-cultural variation that still begs explanation and that future studies should investigate. However, overall and across cultures, we found that children were universally more inclined, from at least five years of age, to attribute the object to the puppet that created it (i.e., laboured for it), vindicating the early recognition of the labour principle put forth by John Locke in the 17th Century as primary principle of property attribution. Across cultures, there is a primacy of the labour principle in child development regarding ownership attribution, seemingly preceding familiarity, ethics (rich vs. poor), and precedence (first contact) with the object (Rochat et al., 2014).

Summary and conclusion

We reviewed existing facts on the development of sharing and emerging signs of a sense of fairness in children, trying also to factor culture in this presentation. Regarding sharing, it appears that its psychological meaning changes radically between birth and five years. We tried to qualify these changes along three major steps: from affective, to referential, and finally co-conscious sharing, each corresponding to radically different levels of intersubjectivity (primary, secondary,

and tertiary intersubjectivity). The tertiary level is inseparable from the emergence of a propensity to construe oneself through the evaluative eyes of others. In general, the idea proposed is that the development toward tertiary intersubjectivity parallels the emergence of self-consciousness, a special trait of our species, as well as a growing sense of self-reputation in relation to others. It is in this general context that children start to adopt an ethical stance, eventually resulting by five years in the manifestation of a principled and contractual sense of fairness.

Within this general context, in the second part we tried to get closer to putative mechanisms driving this development. We reviewed facts regarding what would be the socio-cognitive capacities supporting inequity aversion in development. We considered these capacities as necessary pre-requisites. Among other that have yet to be uncovered, we pointed to developmental changes in the expression of inequity aversion linked to changes in the understanding of numeracy and proportionality (what constitutes the *what* of sharing). We also considered such changes in relation to developing construal of self in relation to others in terms of perspective-taking and social evaluation (what constitutes the *who* of sharing). We then reviewed parallel facts on the development of reasoning around the determination of ownership, possession, and exchange relationships (what constitutes the *how* of sharing).

In all, this review points to important socio-cognitive and self development driving the expression of inequity aversion, in particular the emergence of an explicit ethical and normative stance from around five years of age. In the last part of the chapter, we tried to factor culture in the development of sharing and fairness, pointing to remarkable invariance, at least up to five years, but also to subtle yet marked cross-cultural differences that hopefully more research will investigate in the future and would help in trying to articulate both proximate and ultimate mechanisms that drive sharing and fairness in human development.

In conclusion, sharing and the notion of fairness are both pillars of the social mind, the topic of this philosophically minded book. By focusing on the report of empirical facts and research, the overarching goal of the chapter was to demonstrate the benefits of trying to naturalize these complex aspects of the social mind. Looking at how children come to own and share, how they eventually become cogent and assertive regarding what's fair in the face of sharing sparse resources, help us to construe these highly elusive concepts, both at the core of human social life. We hope to have convinced the reader that by providing an empirical context, the developmental perspective can reveal what is actually at stake and what it takes to have a sense of fairness and equity as we share with others.

Note

1 See also Rochat (2014) and Zahavi and Rochat (2015).

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