

JOINING INTENTIONS IN INFANCY

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*Abstract*

In order to understand how infants come to understand others' intentions we need first to study how intentional engagements occur in early development. Engaging with intentions requires that they are, first of all, potentially available to perception and second, that they are meaningful to the perceiver. I argue that in typical development it is in the infant's responses to others' *infant*-directed intentional actions that others' intentions first become meaningful. And that it is through the meaningful joining of intentions that understanding continues to develop.

I use three common arenas in the first year to illustrate this claim: infants' anticipatory adjustments to being picked up, infants' emerging compliance to others' directives, and infant teasing. Even by the age of two months infants adjust their postures appropriately, gazing at the adult's face as they approach with arms outstretched. From the middle of the first year infants come to recognise the meanings of verbal directives and start to comply with them, being drawn further into the cultural worlds of their families. In the last quarter of the first year infants start to playfully tease and foil others' intentions in a variety of ways, actively re-directing the course of intentional engagements. Others' intentions are thus increasingly available to infants, allowing cooperation, challenge and further elaboration. Joint intentional actions are best understood as the processes through which intention awareness develops rather than just as the products of such awareness.

## Joining Intentions in Infancy

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Intentional actions are largely about effecting change in the world – whether pushing a door shut or looking around for food or calling someone to come. This quality of expectation or ‘incompleteness’ – of waiting for a completion or effect or response - not only allows the intentionality of actions<sup>1</sup> to be perceived by others, but more crucially, it has the potential to invite others to engage with the incompleteness. While the majority of others’ intentional actions may be directed to the material world, the most salient in terms of an awareness of intentions are those directed towards other people and in particular those directed towards *us*. There is an irresistible quality to others’ intentional actions directed towards us – a demand to respond and engage. It is in such intentional engagements – in the joining of our intentions with others’ in some way – that the crucial clues to explaining how we come to understand others’ intentions lie. I argue that they arise in the responses others’ intentional actions evoke in us, and in the responses others give to our own intentional actions. Thus, in the study of social cognition our first focus must be to study how intentional engagements occur in early development.

However, in order to study such naturally occurring processes we need to re-think what we mean by intentions. The common assumption that intentions, like any other aspect of

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<sup>1</sup> I do not mean, by the term intentionality, here or throughout the paper, the Brentano sense of intentional inexistence, i.e., the relation between the action and a mental thing that the action is about. I use the term in the second of the two senses it invokes (Malle, Moses & Baldwin, 2001) - that quality of actions that is not merely accidental or reflexive or coerced, but which answers a ‘Why?’ question at its simplest level – its purposiveness. As the next section makes clear, however, my use of this second sense of intentionality is not distinct from the term ‘intention’.

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mentality, are hidden mental entities, unavailable to perception and accessible only through conceptual representations and inferences hinders the study of early engagements. By focusing on the theoretical or conceptual watersheds that need to be developmentally breached to legitimate any discussion of intention awareness, many approaches to early social cognition either completely neglect early intentional engagements or dismiss them as irrelevant (Perner, 1991; Barresi & Moore, 1996; Tomasello et al, 2005), thus missing the very data needed to understand how such understanding emerges and confirming the internalist and spectatorial assumptions they begin with. A re-thinking of the perceptual availability of intentions in engagement seems necessary in the face of growing data from early infancy.

The distinction is sometimes made in the developmental literature between intentionality (in the sense of purposefulness rather than intentional inexistence) and intention (as “an agent’s mental state that represents” and “often precedes its corresponding action” (Malle, Moses & Baldwin, 2001, p.3). Within this scheme, both intentions and intentionality are qualities that are ascribed to agents (intentionality is a judgement about an action that typically already implies intention, but the ascription of an intention does not imply intentionality). This distinction and its implied hierarchy of complexity, assumes that intentions are internal and hidden entities which guide the movements of the body without any fundamental or necessary concordance between them, and which can only be accessed through ascription and inference. This assumption has been challenged on both philosophical and psychological grounds. At the philosophical level it is clearly a deeply problematic Cartesian legacy, perpetuating a now abandoned mind-body dualism into a dualism of mind versus behaviour and a methodological behaviourism (Costall, 2012; Leudar & Costall, 2004; Gallagher, 2008; Ratcliffe, 2007). Such a mind-behaviour dualism necessitates a specific developmental model – that the early perception of (mindless) behaviour precedes the

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developmentally later inference of mind. As has sometimes been argued, the cognitivism of such a developmental model incorporates the very same dualist assumptions of behaviourism (Coulter, 1977; Costall, 2004; Reddy, 2008). In this paper I adopt a non-inferential approach, arguing that intentions are perceptually available within engagement. Within such an approach, there is no room for a distinction between intentionality (the ‘that’ of an action) and intention (the ‘what’ of an action); perception that an act is intended and perception of the specific intention are the same - equally clear or equally opaque. More problematically, the assumption that intentions can only be accessed through inference hinders our study of the emergence of intentional engagements in infancy by legitimating it only after various inferential competences have been achieved. A welcome alternative to the obsession with ‘mental state thresholds’ by Uithol and Paulus (2013) suggests that we reserve the term intention for conscious, explicit and high level attributions (not inferences), and talk instead of a plurality of forms of action understanding for both infants and adults. However, while their focus on action understanding rather than intention inference seems to bypass the standard dualisms, it still preserves the idea of intentions as in need of attribution. The intentional quality of action, in the Ryle-ian sense of mind as manner or style, available to what I would call ‘engaged perception’ rather than inference or attribution, is not accessible in this model. We are dealing with a choice of semantic divisions to some extent; but the challenge remains for us to explain how (and why) our perceptions of the actions of a ‘person’ differ from merely predicting patterns of movement, and why, long before we can make explicit attributions of intentionality, our embodied responses involve us in inter-intentionality (Stern, 1985). In a similar manner Butterfill (2012) attempts to separate talk about ‘shared intentions’ (reserving the term for Bratman’s usage of intentions as propositional attitudes) from ‘shared goals’, and succeeds in shifting attention to simpler phenomena of joint action. However, this attempt too maintains a sharp developmental

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boundary around awareness of things mental. By highlighting an apparent logical contradiction in assumptions that joint action presupposes as well fosters mind knowledge, Butterfill paradoxically risks treating mind knowledge as an either/or phenomenon in development; as something that either underpins joint action or that emerges from it. If, on the other hand, awareness of mind (and intentions) is seen as gradually expanding in scope, then joint action can both reveal and foster mind (intention) awareness. I argue that rather than beginning around the first birthday, both joint intentional action and knowledge of mind continue to expand in complexity from the start of life.

Within empirical psychology today there is a growing acceptance of the embodiment, and therefore the potential transparency, of mind. The most common challenge to any perceptual (or even engaged perceptual) access approaches to intention and intentionality is what has been called the many-to-many relation between intentions and actions; that is, the argument that identical actions may be driven by different intentions (Baird & Astington, 2005; Malle, Moses & Baldwin, 2001). However, several studies have begun to show persuasively that supposedly hidden prior intentions are in fact available in the kinematics of actions (Ansuini, Cavallo, Bertone & Becchio, 2014). This evidence has undermined the frequently made conceptual separation between the ‘what’ and the ‘why’ of actions (Jacobs & Jeannerod 2005; Tomasello et al, 2005). The argument has been that while the ‘what’ (its form and direction and so on) is available to perception, the ‘why’ (its motive and prior plan) is not. However, it has become clear that prior intention influences the planning of preparatory actions (Becchio, Sartori, Cavallo & Castiello, 2008a, b; Becchio, Manera, Sartori, Cavallo & Castiello, 2009) even before the influence is apparently needed. It is no longer easy to assume that intentions are unavailable to perception. Intentions occur in material space (with a shape and directedness that can be perceived by others), and in developmental time (with a past that can be remembered and a future that can be anticipated).

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The perception of intentionality, however, emerges in action and engagement. Merleau-Ponty, famously, claimed that we become aware of attention not through cogitation and reflection, but through seeing it in action in the material world.

I discover vision, not as a “thinking about seeing”, to use Descartes’ expression, but as a gaze at grips with a visible world, and that is why for me there can be another’s gaze (Merleau-Ponty, 1961, p. 410)

One could extend this claim to the awareness of intentions by arguing similarly, that it is actions at grips (literally and figuratively) with the visible or tactile world, rather than a ‘thinking about intending’ that makes intentions meaningful and available to the perceiver.

However, while their engagement with the world can make actions meaningful and perceivable, this meaningfulness is still a spectatorial and non-participatory meaningfulness. Perceiving cannot be understood outside of its relevance to the organism; the relation of the infant perceiver to the actions of a specific actor, and the salience of the action itself must be crucial (Heinrichs, Elsner, Elsner & Gredeback, 2012). That is, it is not just the observed relation between an act and its object, but the relation of the act and its object *to the perceiver* that is likely to be fundamental to intention understanding. ‘Direct perception’ needs engagement and most crucially, relevance to the perceiver; and the most relevant of engagements are those that involve ourselves.

Visual attention directed to the self certainly has a privileged perceptual, emotional and neurological position. Newborn infants of between 2 and 5 days of age are sensitive to and prefer, direct gaze to averted gaze even in still photographs (Farroni, Csibra, Simion & Johnson, 2002) and find it distressing if they are unable to disengage from others’ gaze because of their own neurological or motor immaturity (Brazelton, 1986). By two months of age mutual gaze leads to a range of emotional reactions including pleasure (Wolff, 1984),

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and ambivalent coyness (Reddy, 2000); and by four to six months of age arouses different neurological responses (Grossman, Johnson, Farroni & Csibra, 2007), enhances subsequent gaze following (Farroni, Massaccesi, Menon & Johnson, 2007; Senju & Csibra, 2008) and word learning (Parise, Handl, Palumbo & Fredrici, 2011). Such complex and meaningful reactions to others' attention directed to self long precede similar complexity and meaningfulness of reaction to others' attention when it is directed elsewhere. During the first year the scope of others' attention (of what sorts of objects, in addition to the self, it is perceived as being directed to) gradually expands: developing from awareness of attention directed to the self, to parts of one's body, to acts by the self, to objects in space and eventually to objects in time (Reddy, 2003, 2008, 2011). Thus, second-person attentional engagements (where the perceiver is addressed as a You) are crucial in typical developmental chronology and Merleau-Ponty's (1961) claim is better adapted to read:

I discover vision, not as a "thinking about seeing," to use Descartes' expression, but as a gaze at grips with *me*, and that is why for me there can be another's gaze. (ibid, p. 410; the phrase 'with a visible world' replaced here by '*me*')

The causal (rather than just chronological) role of second-person attentional engagements is suggested by two sets of evidence from developmental disorders such as ASD where triadic joint attentional engagements are known to be problematic. There are also impairments in the typically earlier dyadic attentional engagements, both in face to face attention exchanges (Ramsden & Leekam, 2006) and in proximal and action-based triadic engagements such as clowning, showing-off and teasing (Reddy, Williams, Vaughan & Lang, 2002).

Intention awareness too, I argue, must have its roots in second-person engagement with others' intentions. From the moment of birth infants are intentionally acted upon by others - prodded and poked and pulled and lifted and fed and cleaned. The infant's early

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experience of others' intentions is necessarily most vivid, complex and meaningful when the intentional actions of others are directed towards the infant. Further, even more than with attention directed to the self, others' intentional actions towards us can be impossible to avoid (by turning away or shutting the eyes, for instance). There is nothing you can do to shut out awareness of someone who is picking you up by the heels to change your nappy, or who is approaching your face with a wash cloth. Intentions have a presence that demands response – even if the response is to suppress any response. It is more than plausible, therefore, that the meaning of others' intentions emerges from the experience of emotional and embodied responses to intentional actions directed towards the self. One can further adapt my adaptation of Merleau-Ponty's claim to apply to the awareness of intention

I discover intention, not as a “thinking about intending,” ..... but as an action at grips with *me*, and that is why for me there can be another's intention.

To substantiate this argument, we need to know how the intentional actions of infants and others become entangled from the first moments of life and what the naturally occurring intentional engagements are which infants typically experience. We need, in other words, a natural history (in the Darwinian sense) of the joining of intentions. We are not close, however, to having such a natural history. Our knowledge of intention awareness in infancy seems to lie in detailed and disparate pockets of experimentation and observation, with very different methods, assumptions, ages and contexts. Most research on infants' awareness of others' intentional actions only studies infants as observers of others' actions towards something else in the world (Woodward, 1998; Bellagamba & Tomasello, 1999; Meltzoff, 1995; Baldwin, Baird, Saylor & Clark, 2001). Infant awareness of others' intentional actions towards *them* is rarely studied and little understood.

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### *Three arenas of intentional engagement in the first year of infancy*

I will focus on three arenas of interaction in the first year of infancy where intentional engagement and a mutuality of process are apparent. These three arenas are: anticipatory adjustments by two to four month old infants to being picked up; compliant infant responses to others' commands for the infant's actions from 6 months onwards; and three, playful teasing by infants from 9 months onwards by disrupting, provoking or setting up others' intentional actions.

### *Anticipatory adjustments*

There are two very common methodologies for studying awareness of others' intentions in early infancy: one uses a habituation or familiarisation method with increases in looking time as the measure of the infant's awareness that one action is directed towards a different goal than the habitual one, and the other uses either eye movements or some other more direct bodily action method where the anticipatory timing of the response is the measure of infant prediction of the goal of the other's action. The first method, most strikingly used by Amanda Woodward and her colleagues, is generally 'easier' than the second, since it only requires what have been called 'off-line' responses. After the test action has happened, the infant's surprise, puzzlement, interest and so on may occur at leisure. Thus, 5 month-old infants have been shown to detect the difference between arms reaching for a different object versus reaching to a different location (looking longer when the arm reaches for a different goal), and to differentiate between reaches in which the palm faces the goal object and those in which the hand reaches with its back towards the goal object (Woodward, 1998, 1999). Dramatically, even by 3 months of age, infants who have been given active 'grasping' experience (e.g., through velcro-covered mittens which 'grasp' an object upon contact), but not those who haven't, can appropriately differentiate reaches towards new

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goals (Somerville, Needham & Woodward, 2005). The conclusions that can be drawn from the use of this method are, however, less direct than those that can be drawn from anticipation methods, requiring the crucial inference that longer looking time implies awareness of the intentional object-directedness of the action. Methods using anticipatory reactions are thought to be more demanding, requiring real-time anticipation about its directedness *before* the action is completed (Cannon & Woodward, 2012; Gredeback & Melinder, 2010). Studies using this method have shown the anticipation of others' intentional actions at somewhat older ages, at 6, 8, 10 and 12 months (Ambrosini, Reddy, de Looper, Costantini, Lopez & Sinigaglia, 2013; Falck-Ytter, Gredeback & von Hofsten, 2006; Kanakogi & Itakura, 2011; Rosander & von Hofsten, 2011). However, all of these studies have focused on infants' anticipations of others' intentional actions towards *objects* in the world. Despite the primacy and ubiquity of others' actions towards the infant, no studies, probably for reasons of methodological complexity, have looked at infant anticipation of others' actions directed towards the infant. One of the most common actions directed towards infants is picking them up, and anticipatory adjustments of the body to this action have been reported to be problematic in young children with autism (Kanner, 1943; Njikiktjen, Verschoor & de Sonnevile, 2012).

In one study (Reddy, Markova & Wallot, 2013), we found that when infants as young as two months of age were observed being picked up by their mothers from a flat surface in the laboratory, the infants were making specific adjustments of their bodies which assisted in the smoothness of the pick-up. Leg and arm adjustments were the most common. Leg adjustments involved either extending and stiffening the legs, raising them slightly above the surface, or tucking the legs up into the body; both these adjustments serve to make the body more of a single, more rigid, unit. Arm adjustments involved raising them up behind the head, spreading them far apart on the surface or even partly lifting them in the air towards the

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mother; these movements serve to increase the space for the mother's hands to grasp the infant around the chest, but might also serve to steady the infant's body after the lift. Other adjustments involved the head and neck – either raising the chin upwards (which serves to arch the back) or turning the head sideways (which could increase neck tension) – again enhancing body rigidity. All these specific adjustments occurred most often during the period where the mother's arms were approaching the infant and before actual contact with the infant's body was established. Further, during this period, thrashing or excited general movements by the infants decreased. Thus these were real-time anticipations of, and appropriate adjustments to, the specific action of being picked up; and they were evident significantly earlier than any other anticipatory responses to intentional actions shown thus far, and even earlier than looking time discriminations. Between 2 and 4 months of age there were no increases in the type of adjustments infants were making; what did change was their fluency. It is likely, therefore, that these reactions emerge in repeated interactions earlier than 2 months of age. One striking feature was that at all ages while making the adjustments infants' gaze was directed largely to the approaching adult's face, suggesting that the anticipation was that of an action by a person, not of the specifics of the hand shape. The focus on the face of the approaching person suggests that the infants perceive their action as being *theirs* – that of the person – rather than just an event that is about to happen. In a second study, infants responded to delays in the adult's completion of the pick up, by decreasing their bodily adjustments (Fantasia, Fasulo, Costall & Reddy, under review).

Broadly, these findings support the theoretical claim of this paper: that the intentionality of actions directed to self is perceived earlier (by 2 months at least) than of actions directed elsewhere (typically by 5 months). The goal-directedness of others' actions towards ourselves has a different phenomenal quality from that of actions towards the world: they are directly and unavoidable *relevant* to the infant (in typical development). And, being

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relevant, they arouse bodily and emotional responses (i.e., appropriate *responsive* acts rather than just matching ‘motor resonances’, Gallese, Rochat, Cossu & Singaglia, 2009) which get the infant’s actions engaged with the other’s. This process of engagement of the other’s act and the infant’s responses allows the developing awareness of the intentionality of the other’s act as well as of one’s own response. This may be precisely why understanding and anticipating self-directed actions is easier (emotionally and cognitively). More importantly, active participation in simple joint intentional actions is thus evident very early in life, and must constitute as well as reveal the infant’s developing awareness of others’ intentional actions. Pick up engagements, interestingly, fulfil most of the features of joint action identified by Butterfill (2012): they show evidence of an activity accomplished together rather than in parallel, arguably directed together towards a single goal (that of easy pick up) with voluntary (and variable) participation by each agent and modification of actions by each in response to the ongoing actions of the other (such as infant decrease in adjustments if the other delays during the pick up).

### *Complying with directives*

There is another level of awareness of intentions, and indeed, another level of joint action, which requires being aware of what others explicitly ask us to do. Complying with others’ explicit directives for our actions is generally understood to appear (albeit in a tentative fashion) around 10 months or so, in the last quarter of the first year (Stayton, Hogan & Ainsworth, 1972). There is considerable evidence of the development of compliance and of the factors influencing it, during the second year of life (Kopp, 1982; Kochanska, Coy & Murray, 2001). However, we know very little about how infants *become* aware of and become able to understand, others’ intentions for the infant’s actions in such explicit directives. How do infants come to know that others want us to do something, or want us to stop acting in a certain way?

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Some theorists argue that communicative intentions are a special - and more difficult - form of intentional understanding and require a recursive process of representational understanding (Tomasello, 1999; Tomasello, Carpenter, Call, Behne & Moll, 2005; Tomasello & Camaioni, 1997). This would imply that directive intentions cannot be grasped by infants until well into the second year of life. Tomasello draws a clear distinction between intentions for other people's actions which are achieved through physical means (such as pushing a person into a chair) and those that are achieved through communicating them (e.g., through saying 'Sit down') for the other to perform the action themselves. He argues that the different forms require categorically different types of understanding: being pushed into a chair he argues requires a recognition of the other's intention that one sits down, but being told to sit down requires a recognition of the other's intention that one attends to the other's verbal proposal in order that one sits *oneself* down. From this view, awareness of others' verbally stated directive intentions should not be possible until well into the second year when recursive representational skills develop. However, although this distinction is clear from the point of view of the person who wants the other to sit down, from the point of view of the *receiver* of the act both actions need require no more than a recognition that the other person wants me to sit down, thus both need involve only a simple recognition of intentionality directed towards the self. It is thus possible that long before the second year of life, and given the evidence of awareness of others' intentional action even before the so-called 'cognitive revolution' of the 9 month-old, infants can begin to understand that other people not only have their own intentions, but want and expect the infant to act in certain simple ways.

In one longitudinal study (Reddy, Liebal, Hicks, Jonnalagadda & Chintalapuri, 2013) we observed infants and their families in their homes, once a month, between 6 and a half and 12 and a half months of age in two different countries (UK and India) and video-taped about an hour of unstructured everyday interactions at each visit. We expected that directives would

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be rare until around 9 or 10 months of age. They were, however, remarkably frequent even from the earliest period we studied – i.e., 6 and a half months of age – with their frequency steadily increasing with age in all families. Surprisingly, given the speculation that communicative intentions delivered verbally rather than physically are hard to grasp (Tomasello, 1999), we found that distally delivered directives were significantly more frequent than those delivered with physical pressure at all ages and in both groups. Parents (at least in the first utterance of the directive), appeared to be using their directives as distal communications for the infant to respond to. This finding is consistent with other studies which show that directives in verbal communications from parents are common even to three month-old infants (Chen, Green & Gustafson, 2009). We also found that by far the majority of directives in both groups were positive directives – requesting that new actions be performed – rather than negative directives or prohibitions, requesting the cessation of some activity. This finding, too, was somewhat surprising, given arguments in the field of compliance research that positive directives are more challenging than negative ones since they require a shift from one state of being to the performance of something new while prohibitions require only the cessation of an act (Kochanska et al, 2001).

Perhaps the most surprising finding of all was that even at 6 and a half months, infants were on some occasions performing the requested actions on the first utterance of the directive. In both groups, the frequency of such compliance increased with age, but increased gradually, with no clear leap in frequency at 9 or 10 months. The idea of a stage-like shift in understanding directives was, in these data, simply not supported. At 6 and a half months compliance was most evident to requests for attention, to take or hold objects and to eat. The visual and situational prompts (e.g., the proffered object or spoon or a pointing finger) might have been sufficient to elicit the required action and to frame the event by tightening the link between the affordances of the situation, the adult's verbal utterances and the infant's action.

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What was particularly significant was the extent to which parental directives were used in repetitive fashion and as part of routines and games. These involved family specific games, standard uses of toys, new motor skills, standard or family specific gestures and typical location requests to show-off infant comprehension of vocabulary. Overall, and in both groups, there was a strong positive relation between directive frequency and infant compliance. The upward slope (increasing rate of change over age) of parental directive frequency was much higher than the slope for infant compliance, suggesting that parental changes served either to 'pull' infant responses or to accommodate to infant changes (or both). The much higher frequency of parental directives in the Indian group was accompanied by higher frequencies of compliance, but not, however, by higher proportions of compliance. In other words, the infants in the Indian group experienced directives much more often, and experienced their own compliant responses much more often, than did the infants in the English group. As proportions of response, however, directive frequency and group had no effect at all.

Compliance, it would seem, develops as a practice, with infants being drawn into recognition of the communicative intentions in directives addressed to them. As is the case with understanding reference (Churcher & Scaife, 1981), the developing awareness of directive intentions cannot be fixed to a single point in time. Both the emergence and the increase in compliance seems gradual and imperceptible within routine family engagements, and completely specific to contexts. These findings are surprising in the context of a cognitive model of inferring intention– i.e., that communicative intentions need a recursive representational awareness. However, in the context of findings about early awareness of object-directedness of actions even in the first half of the first year (Woodward, 1998, 1999; Reddy, Markova & Wallot, 2013), and of early word learning abilities at 6 months of age (Friedrich & Frederici, 2011) the fact that compliance emerges early, gradually and within

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specific routines is entirely consistent. It is also consistent with the findings about non-verbal cooperation and motor coordination in the first 6 months of life (Lock, 1984; Trevarthen & Hubley, 1978).

Shotter's argument (1983) that people always act *into* their environments, enlarging that which their acts are a response to, allows us to make sense of the emergence of infant compliance. Infants are drawn into the adults' world of intentional actions within a large and supportive framework of context, routine and repetition. Their awareness of the adult's communicative intention in a specific directive can be seen to emerge within the 'response space' created by their parents' directives. Intention awareness – even in the case of communicative intentions – is early, gradual, specific rather than abstract, and expands within the direct joining of intentions.

### *Teasing intentions*

Our engagement with others' intentions is often more complex than shown in the examples so far: we don't always adjust to them, or always easily get drawn into doing what others are setting us up to do. We sometimes resist others' intentions when we don't want to fit in. And even more interestingly from the point of view of intentional engagements, we sometimes set others up – to draw them out and then deliberately foil *their* intended actions. We tease.

Teasing serves, at its simplest level, to entice, draw out, seduce the other person into action. It works as what Groos (1901/1976) calls 'love-play', through ambiguity, as an invitation. Whether in animals play-fighting, kids mucking about, or lovers 'playing', teasing involves actions that give contradictory messages. One action says 'come and get me' and the other says 'don't'. One action says 'take this' and the other says 'no you can't', one action says 'I like you' and the other says 'no I don't'. Evidence of its effectiveness can be seen in lovers playing 'hard to get', in teachers and therapists pretending not to want to teach or

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engage, and in horse and dog trainers learning not to chase after the horse or dog they intend should return, but to pretend disinterest. The motion dynamics of some kinds of teasing are simple and perceivable; the clearest example of this is ‘offering and withdrawing’ something to/from another person. The offer approaches, inviting an action and the withdrawal frustrates that same action, but in doing so, it entices the other into a different action – one of chasing after, of laughing, of taking another look – a deeper level of intentional engagement.

There are (at least) three reasons why playful teasing is crucial for our understanding of infant awareness of others’ intentions. One, to really tease, you need a person who can respond to your intentions, to whose responses you can direct your intentional actions. You need, therefore to know something about them as intentionally responsive beings. Two, detecting intentional actions before they are complete has often been highlighted as crucial evidence for showing the awareness of intentions (or also belief, thus studies focus on incomplete or false beliefs). Although early studies suggested that the ability to understand incomplete intentional actions was not present until 4 years of age (Astington, 1991), more recent work suggests that with the right methods even 6 month olds show awareness of the goals of incomplete intentional actions (Daum, Prinz & Aschersleben, 2008). Teasing, in its very structure, instantiates such a disjunction. To tease someone, therefore, implies not just awareness of intentional action before it is completed but also awareness of the possibility of the action *not* being completed. Three, breaks in intentional engagements may be a crucial point for awareness and development to occur. If someone offers you an object and then whips it back as soon as you reach for it, your consciousness is drawn to both those acts and to your own in a way that would never have occurred if the person had merely given it to you after you reached for it. Heidegger’s hammer which is ready-to-hand gives way to the problematic hammer which suddenly becomes present-at-hand. The act of teasing, in one

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sense, may be less demanding of reflective awareness than is the act of recognising others' teasing as teasing (Nakano & Kanaya, 1993).

In the heyday of theory-of-mind research in the 1990s, the 'theory-theory' predictions about what infants should and shouldn't be able to do with others' intentions didn't allow for infants to tease people, and certainly not in the first year of life. The capacity for inferring prior or not yet completed intentions was argued to be unavailable until sometime after 3 years of age, when children could distinguish between depictions of completed and incomplete intentional actions (Astington, 1991). And yet they do. Infants tease others from around 9 months or so of age (Reddy, 1991, 1998, 2008). The range of playful teasing that infants engage in is wide, suggesting that it is not simply one or two actions that afford such play, but rather that the motivation to twist, trick and distort in some way is a broader one, that can be expressed in different contexts depending on specific engagement histories and patterns. From two longitudinal studies exploring interpersonal playfulness in infancy, several types of teasing emerge in infants. After checking that infants can, in fact, perform the 'straight' versions of the actions, that the action was not accidental or led by some other desire, the most common types of teasing were: Offer and withdrawal of objects (reported in a quarter of 8 month-olds and almost all 11 month-olds), Provocative non-compliance (e.g., deliberately trying to almost touch a hot cup of tea or a plug socket while looking intently at the other's face, reported in nearly two-thirds of 8 month-olds and all 11 month-olds) and Disrupting others' actions (e.g., deliberately – and gleefully - putting objects on the floor which the mother had removed in order to Hoover the carpet, reported in nearly a third of 8 month-olds and over half of the 11 month-olds). In addition, other types of teasing included Hiding/withholding of object (e.g., putting the ball under the leg during a rolling the ball game), False request/ false refusal (e.g., repeatedly asking for and then refusing a beaker of juice until the mother realised that it was play), Playful hurting of other (e.g., watchfully

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pinching the other's skin), and Approach and withdrawal of self (e.g., deliberately refusing the other's kiss until the other is nearly out of the door).

In general infants seem to start to tease in a particular manner soon after they grasp some new interaction – whether it is being able to release objects or being able to comply with a command - suggesting that the teasing is directly related to some new social agreement that the infant is learning or exploring or discovering. The meaning of teasing actions is always – even in adults – a very fragile thing: it rests heavily on the response it gets, and cannot remain the same from one occasion to the next. In these young infants first attempts at teasing often – but not always - turn into games and become different routines, not quite teasing any more. It is these first fragile attempts that are the most interesting in terms of the infant's play with the other's intentions. They often show a clear awareness of the directedness and purpose of the other's acts: that the other's open palm is directed to – and therefore can be elicited by offer of - the object, that the other wants or does not want the infant's actions to occur in a certain manner and so on.

These subtle engagements with family specific histories show that by 8 or 9 months infants can not only anticipate others' intentional actions and others' instructions, but also that this anticipation and grasp of intentions and instructions is sufficiently robust that they can deliberately disrupt them. Most importantly, teasing at such early ages shows that others' intentions are compelling things for infants – they *want to* engage with them - enough to play with them, elaborate them, foil them, draw out further responses and so on.

In teasing, infants are not only acting *into* adult's intentions (as with compliance), but are setting *adults* up to act into *their* playful and tricking intentions. They are drawing adults into their intentional nets, as it were, and taking the engagement down as-yet-unknown routes.

### *Joining intentions as a process*

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These examples of the increasingly complex ways in which infants join in others' intentional actions – in anticipating and adjusting to them, in complying with directives for action, and in teasing – do not fit comfortably within standard cognitive developmental approaches. If we conceptualise intentions as 'internal plans' which need to be representationally constructed we would not expect 'true' anticipation of others' intentional actions until after 6 months or 'true' compliance with or teasing of others' intentions for action until the second year. The data here would have to be dismissed as 'mere behaviour' conditioned by association and reward contingencies, which only after the cognitive architecture had developed could be given the status of intention awareness. Explanations based on associative learning need not be at odds with explanations based on awareness – these are not either / or phenomena. But within internalist conceptions of intention, there is no alternative but for grand divide interpretations – the same actions done before a watershed is reached have to be explained away in behavioural terms, while those after the watershed is reached are explained in mentalistic terms. Even recent action-based approaches arguing for the importance of processes of joint action argue that joint action requires the prior ability to 'share representations', and that both joint attentional behaviours (providing evidence of the sharing of representations) and joint actions develop at around the same time – that is at around 12 to 18 months of age (Sebanz, Bekkering & Knoblich, 2006). There are two senses in which a representational approach to intentions comes too late in the day: in the immediate sense of having to wait until emergent intentions in single or joint actions are complete enough and concrete enough to be representationally abstracted, and in the developmental sense of having to wait until infants can mentally represent separate and coordinated action plans in the second year. By the time we get to such a competence, if we want to explain how the joining of intentions happens, we've pretty much missed the boat. The joining of intentional actions is a process, building up developmentally in complexity and scope – from

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joining with intentional actions to the self, then to intentions for actions of the body or on objects nearby, and then to intentions for actions on objects or locations at a distance.

Any theory of the emergence of intention awareness needs to grasp the crucial role of *response* to intentional actions in the illumination and constitution of action understanding.

We need, not only to avoid the traps of mental state watersheds and conceptual thought (Uithol & Paulus, 2012; Gallese et al, 2009), but to take seriously the power of responses to intentional actions. We can understand neither the ‘how’ nor the ‘why’ of intention awareness if we do not begin with second-person intentional engagements. John Shotter’s conceptualisation of intention itself as a ‘historical’ process, as something that unfolds in time and is subject, not to a prior plan, but to the vagaries of time and circumstance, might be useful here. As Shotter expresses it:

“the relation of, say, a person’s intention of saying something to their saying it, is much more like the relation of seed to plant, than that suggested by the currently more popular image of a script to its performance. For rather than being the outer expression of something already specified internally, the expression of an intention is, as a process of temporal unfolding, a passage from an indeterminate to a more well-articulated state of affairs” (Shotter, 1983).

The continually unfolding ‘history of the seed’ suggests Shotter, continuing Wittgenstein’s analogy, is the only thing that can specify the structure of the plant. Extending this approach, the joining of intentions too is both a mutually constitutive process - the affective responses and actions and responses to responses unfolding and changing over time - and an illuminating process. It is *in* the process of joining – in the felt reactions to others’ actions, the postural adjustments to an approach, the acquiescence with a directive, or the playful

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disruption of an action, and in their subsequent success or failure - that intentions (others' and our own) become transparent. If you can't join intentions you can't understand them.

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