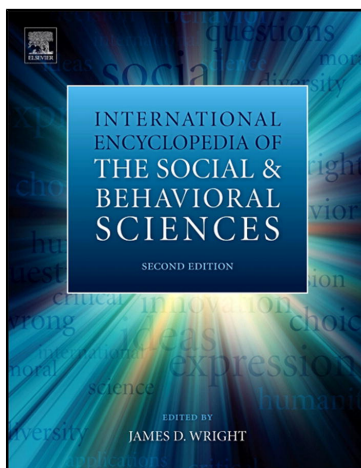


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Intentionality in Language and Communication, Emergence of

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Abstract

The attribution of intentionality is the ability to view another's actions, behaviors, gestures, or speech as having a purpose. The emergence of intentionality in infants is thought to be a foundational feature of human communication and language. We will first discuss those issues, then trace children's developmental pathway from preverbal cognitive skills such as eye contact, joint attention, intention reading and sharing to attribution of mental states (Theory of Mind), and their link to language use. We will finally focus on the role of the input and of adult scaffolding in the development of those social-cognitive abilities.

Introduction

Following Piaget (1962) and Vygotsky (1962), nonnativist scientists agree that language emerges from nonverbal cognitive and social development in infancy. The subsequent research has strived to investigate how early perceptual-cognitive capacities pave the way for language and communication. Even though children have innate biological and cognitive capacities, they need to learn conventions and formal patterns from communication and language in their environment. They gradually become fully bloomed interacting speakers building on such cognitive and social skills as the ability to follow another's gaze, to draw and maintain their attention, to imitate, to read others' intentions, to make analogies, to categorize, and to symbolize.

A wealth of studies have shown that it is the interaction and complementarity between basic perceptual, cognitive, affective processes and a favorable environment that involves caring adults or older siblings constantly adjusting their behavior to the infants' that seem to trigger and guide the emergence of shared attention and intentionality which will then lead the child into symbolic communication.

We will first present the notions of intentionality and Theory of Mind as possible foundational features for human communication and language; we will then describe the child's developmental pathway from preverbal cognitive skills to language use and finally focus on the role of the input and of adult scaffolding.

Intentionality and Theory of Mind

Definitions

The word 'intentionality' comes from the Latin 'intendere' which means to aim in a certain direction for a target. The attribution of intentionality is the ability to view another's actions, behaviors and production of gesture or speech as having a purpose. Toddlers can exhibit the understanding of intentions for example by handing over his car keys to their father who has just said 'good-bye' in the morning and is restlessly looking everywhere as he does almost every morning. The repetition of the same scenario enables the child to memorize the sequence of events and to provide the missing keys. Infants can also show that they have an intention when communicating the need to be given the ball, which is out of reach by looking and pointing at the ball as well as pulling the adult's sleeve.

According to Baron-Cohen (1991), the infant's understanding of intentions in others, a social skill found by 7–9 months of age, is a 'critical precursor' to the development of 'Theory of Mind' (ToM). ToM is the ability to attribute mental states, such as beliefs, intentions, memories, and desires to oneself and to others. It enables us to understand that mental states can be the cause of others' actions or behaviors. We only assume that others have minds based on analogy to ourselves and thanks to our participation in social interactions.

Theory of mind develops over time. It is constructed on the basis of precursor skills all the way to the understanding of mental states and their link to behaviors. Those precursor skills include joint attention (the ability to attend to or direct attention to a common object), intention reading, understanding that other people have different perspectives, use of cognitive and mental state verbal expressions, of pronoun reversals, and pretend play. Communication itself is triggered by the intention to share objects, properties, or states of affairs that are in our minds. Intentionality in communication corresponds to the encoding of messages for others.

A Foundational Feature of Human Communication and Language

Since the influential article by primatologists David Premack and Guy Woodruff entitled "Does the chimpanzee have a theory of mind?" (1978), much empirical research has been undertaken in investigating whether nonhuman primates can ascribe psychological states with intentionality to others and how human children develop this capacity. At the end of the twentieth century, human cognition and animal cognition were shown to differ in one important respect: our ability to understand intentions and to "take another's perspective." For Tomasello (1999), it is the very crucial biologically determined factor that distinguishes humans from primates and could also be deficient in autistic children. The emergence of intentionality is viewed as foundational because it provides the matrix to understand what others are doing.

According to Tomasello, at an important point in his/her cognitive development, between 9 and 12 months old, the child comes to experience himself/herself as an intentional agent – that is he/she views his/her behaviors as structured by goals. As he/she identifies with the adults around him/her, he/she automatically views them as intentional agents as well. Tomasello's theory, developed thanks to a wealth of

experimental studies, consists of a demonstration that all kinds of human cognitive abilities emerge from the exploitation of this basic human capacity and are transmitted culturally. Communication and language are part of those specifically human cognitive abilities that develop on the basis of this capacity. It is only because young children understand others as intentional agents that they can acquire and learn linguistic symbols: they begin to understand that their conversational partners are using these symbols to direct their actions and attention to outside entities. These symbols are organized according to conventional patterns and mutually shared rules and can only be transmitted through social learning.

Since 1999, a series of experiments has shown that though autism involves significant difficulties in understanding mental states that might be related to difficulties in processes as basic as on-line perception, which hamper their ability to respond to social stimuli such as vocal and facial expressions, autistic children and great apes understand intentions better than what was expected. They do not however engage socially with others in the way that typical children do. In more recent work, Tomasello et al. have attenuated their monolithic depiction of social cognition by giving a more gradual view (Tomasello and Rakoczy, 2003) and have suggested that an additional capacity was needed: shared intentionality (Tomasello et al., 2005). They suggest that only human beings can cooperate with each other and that it is that unique feature that allows humans to engage in the creation and use of linguistic symbols.

Children's awareness of other people's intentions, thoughts, and beliefs can only be inferred through what they do in experimental and naturalistic situations and there could be contradicting interpretations of their behaviors. Most of the evidence involving relationships between language development and theory of mind is built on correlations. It is probably premature to say that certain milestones are necessary for Theory of Mind development. But there might be an important impact of the lack of symbolic input on deficits in intentionality sharing and Theory of Mind. Indeed deaf children with no cochlear implant who do not have sign language as their first language perform very poorly as early as 18 months old in very basic tasks (Meristo et al., 2012) and at later ages perform similarly to autistic children in false belief tasks (Peterson and Siegal, 2000), whereas deaf signers perform to the same level as their hearing peers. Though the actual link between the tasks testing false beliefs and Theory of mind itself can be questioned, ToM seems to be highly dependent on specific interactive experiences during which adults behave and adjust to their infants' inferred mental states as well as they comment verbally about them. The major factor in explaining late-signing deaf children's delayed ToM development seems to be the reduced early experience of conversation and its role in perspective taking and mind sharing.

There seem to be complex interdependencies between language and Theory of Mind. It begins in infancy with joint attention and awareness of intentionality, and it continues with children's increasing use of mental state terms.

Mirror Neurons, Intentionality, and Theory of Mind

Researchers noted that certain neurons located in the prefrontal motor cortex of monkeys fired when the animals carried out an

action and when they observed the same action carried out by another individual, suggesting that these neurons are important for encoding the intentions of others (Gallese et al., 1996). Since then, a number of researchers have underlined that the mirror-neuron system is an important component of the social-cognitive network. There is some evidence for impaired functioning of this system in autism. In order to understand the relationship between the processes involved in the mirror-neuron phenomena (such as imitation and empathy) and other aspects of communication and language, including theory of mind, it is now necessary to conduct longitudinal studies beginning before the onset of language and communication and of autism symptoms. Systematic neuroimaging studies should also be conducted to explore the deficits implicated in autism.

The Developmental Pathway

From Eye Contact to Shared Goals

Infants prefer their parents' faces and voices to other stimuli. They attend to their interaction partner and make eye contact almost from birth. They understand self-produced motion just a few months after birth (Bertenthal, 1996). They soon turn to look in the same direction as the adult. Woodward (1999) explains that around the age of 6 months, children make a difference between what can be expected from human beings who can reach for an object, and inanimate objects, who are not expected to reach for the same objects in similar circumstances. By 10 months, children can segment streams of continuous behavior into units (Baldwin et al., 2001). In studies involving obstacles, infants are shown to understand trying (Gergely et al., 1995). They also understand that when they succeed, adults will stop trying (Tomasello et al., 2005). Between 9 and 10 months, children engage in triadic situations involving themselves, an adult, and an object: activities such as giving and taking an object, throwing a ball to each other, putting toys away together, pointing-and-naming games. Children's gaze and actions demonstrate that they are coordinated with the other. The adult and child create a shared goal that they are going to reach together. However it is not until 12–15 months that children become involved in active joint engagement, sometimes taking the lead for they seem to understand the actual goal of the activity (Bakeman and Adamson, 1984). Not only are children able to share goals and coordinate their actions to the adults', they can also coordinate or reverse roles and take initiatives. It is around the same period that children try themselves to establish joint attention with others through pointing or other types of gestures.

Motor Control in Vocal and Gestural Productions

Children's ability to imitate adults in vocal and gestural productions shows that they make connections between their perceptions and their own actions and between their own bodies and the others'.

Before children produce their first words, they are able to systematically use prosodic cues to express a set of distinct pragmatic meanings. Thus, children at 0;9 and 0;11 are able to distinguish expressions of discontent and requests from responses and statements by means of prosody. Recent findings also report the use of adultlike intonational contours to convey

specific pragmatic functions in the one-word period (Marcos, 1987; for French; Prieto et al., 2012; for Catalan and Spanish).

Pointing gestures play an important role in the language acquisition process. They are grounded in joint attention, they trigger interaction, and they may also facilitate children's entry into word combination and syntax. Numerous studies have tackled this issue in the development of spoken language. The 'founding fathers' of the study of child development and language had great intuitions about the importance of gestures and their relation to language. In his notes on his son's development, Darwin (1877) stresses the importance of observing the transition from uncontrolled body movements to intentional gestures. Romanes (1889) compares human and animal gestures and makes fine observations on qualitative differences. He mentions the gestural language of deaf people as a sign of the universality of symbolic gestures. Stern (1924) considers pointing in particular as a precursor of intentional marking. For Werner and Kaplan (1963), pointing represents children's ability to discriminate between external objects and their own person. Communicational pointing then becomes the basis for referential behavior and reciprocity established in common activities between children and their parents (Bruner, 1975). As Tomasello et al. (2007, p. 720) underline, "pointing may thus represent a key transition, both phylogenetically and ontogenetically, from nonlinguistic to linguistic forms of human communication."

Not long after these first gestures produced to share attention with the adults, children engage in more complex communication and start using multimodal constructions including words. By doing so, they continue to share an intense collaborative activity, to enact roles now embodied as speaker and listener and to share conventional coordinating devices in conversation. Conversation is an activity in which the goal is to orient the listener's attention and to align intentions. The meanings expressed are constantly negotiated through dialog: adults scaffolding the children toward adult wording, children requiring clarification when they need it (Golinkoff, 1993). This takes place in communicative formats (Bruner, 1983). Linguistic interactions involve the exchange of communicative intentions through a multimodal symbolic system transmitted to children by their care-givers in daily activities and are built in the intertwining of language and action.

Children's cognitive and linguistic development centers on learning how to act and interact in the context of events, which serve as the basic unit of experience. The continuous and dynamic flow of sensation and experience is structured in terms of discrete events, which involve various participants and objects, temporal structure with a flow from beginning to end, and significant defining moments. It is the regularity and predictability of these events that allow children to master them as basic building blocks of experience; not only can they start recognizing typical and less typical examples of events, but they can gradually use them to make sense of much more complex sequences of events. They will eventually themselves learn to construct sophisticated mental structures and verbalize them. Indeed, when an event occurs repetitively in the child's daily experience, the predictable nature of the event structure provides a convenient entry point to language (Nelson, 2007). Joint parent-child action/interaction provides the scaffold for children's growing ability to grasp both what is happening around them, and what is being said in the situation. They learn to understand language and action together,

each providing support for the other. The well-established language associated with simple events might provide the conceptual scaffold for the child to grasp more complex events.

A Complementary View: The Role of the Adult and the Input

Affect and Social Interaction

Tomasello et al.'s account (2005), for which cultural cognition is already founded at around 14 months, attributes complex cognitive skills to very young infants. Children's participation in interactions might be overinterpreted by scientists who could be underestimating the role of the input. For Hobson (2005), emotionally grounded sharing of experiences is primordial in order for interpersonal understanding and perspective shifting to develop. As described by Werner and Kaplan (1963), infants start from a primordial sharing situation and come to understand others' mental states as both similar to and distinct from their own, as they respond to and assimilate others' behaviors and attitudes.

Social interaction in infancy is dependent on the interplay between infants' affects, their neural learning processes, their perceptual and motor limitations and the structure of their social and affective environment. Social information helps infants decipher the meaning of others' language acts. Their drive to attend to the same objects helps them enter the language community.

Affectively valued outcomes are thought to trigger the infants' development of cognitive skills. The repetition of those outcomes facilitates the infant's attention shifting toward interesting social objects and people in the visual environment. Initially, infants prefer social stimuli such as the caregiver, but when the caregiver looks away at an object, it will habituate the infant to follow the same direction and get them attracted to other stimuli that might be positively endowed by the caregiver. The child will learn that it is often beneficial to follow caregivers' gaze shifts and learn to shift their own gaze to the same location, driven by pleasure (Triesch et al., 2006). Infants use their caregivers' emotional expressions toward objects to finely discriminate between them, something that so far, even sophisticated machines cannot do. Attention sharing will thus help children infer the mental states of their caregivers. They will use the information to shape their own communicational acts. Therefore, it is the interaction and complementarity between basic perceptual, cognitive, and affective processes that seem to trigger and guide the emergence of shared attention, which will then lead the child into symbolic communication.

When giving a bath a parent whose experience with water has been positive, who is safely holding the baby and preventing any kind of danger, whose knowledge about the sensation of the water with its right temperature provides confidence, expects the baby to enjoy the bath and its various elements. The parent can manipulate the meaning of the bath and its sensation for the child and set up a sequence of experiential histories that will provide a background for the subsequent bath experiences (Nelson, 2007). Verbal and gestural expressions convey a meaning that will come to be shared. Because they share their attention, to the same elements, that will minimize the differences between experiences (being in the bath itself as opposed to looking over the child). Sharing attention ensures that both participants experience some common

aspects of the event. Language during these experiences is an essential tool used by the caregiver to go beyond attention, and share meaning. The utterance “oh it feels so good” produced by Théophile’s mother when he is 7 months old and giggling in his bath (*Paris Corpus*, Morgenstern & Parisse, 2012) makes sense of the child’s individual experience and transforms it into a communal experience. It’s through the repetition of the scene associated to the words that it becomes a script and that the words are transformed. In a similar fashion, Madeleine and her mother smell various flowers in their garden when the child is 11 months old (*Paris Corpus*). Mother and child are sharing sensations together; the mother actually takes the child’s exact place in order to create some kind of community of sensations with her daughter. This is the basis of the building of transcendental intersubjectivity as Husserl would call it, the condition for a shared objective world and for some interdependence between those two specific individuals. Experience results from the encounter of the children with the environment, involving perception through smell, touch, taste and then action and interaction via communication. In those two examples, the children’s sensations and experiences are entirely social because the adults spend considerable efforts to discern what they are feeling and thinking. However the child’s experience still remains totally private, inaccessible in a way, since all the adults can do until the child expresses herself through conventional semiotic means such as gesture and speech is to make interpretations.

Adults’ Interpretations

Kaye (1982) suggests that in order to understand intentions, infants must themselves be treated by adults as intentional beings. Adults must interpret their every move and action as having some meaning or some goal and provide various types of feedback to this effect. They therefore give meaning to the child’s every gaze, gesture, facial expression, vocal production, projecting some kind of agency onto the infant. This begins very early on and creates the mental context for the emergence of the infant’s intentional action. In the first months of life, parent–infant synchrony has a formative role in brain maturation. It was found to be predictive of children’s self-regulation, symbolic play and more general cognitive skills (Feldman and Eidelman, 2004). Indeed, infants engage in ‘protoconversations’ from as young as 2 months old (Bateson, 1975; Trevarthen, 1974), which involve rhythmic attunement of adult and infant vocalizations. However the caregivers’ role is not symmetrical as they produce amplified enhanced versions of their child’s sounds (Papousek, 1989). Those exchanges are accompanied with smiles, mutual gaze, gestures that Stern (1985) has called “supportive emotional colored atunements(-sic)” and are therefore enriched with affect.

Parents might attribute intentionality to their infants but be deceiving themselves and contributing all the meaning in the exchange. When the child moves and seems to change her focus of attention, she might not be gazing at anything in particular, and the movement might not be intentional. However, the parent’s illusion could be essential for the child’s development as it bootstraps the child into our social and cultural world. Through repetition of similar situations and interpretations, the child can grow into a full-blown intentional agent.

Parents therefore seize and take up the sounds and movements produced by their children, in order to endow them with as much meaning as possible, and shape them into a form that could be compatible with the adult communicative system. In the following example taken from the Forrester corpus (CHILDES database, MacWhinney, 2000; Forrester, 2008), the father takes up his daughter’s gesture, which could be interpreted as not being intentional and communicative at all, and transforms it into a game that serves as a transition toward meaning.

Example 1. Ella 1; 02

The father and the daughter are having breakfast
 *FAT: Are you tired?
 Ella whimpers and rubs her face.
 *FAT: Oh a little bit.
 She then makes a very unexpected gesture. Her hand goes down along her hair. She hits her head and looks at her father as she produces a short vocalization.
 *ELLA: eh!
 He takes up his daughter’s gesture and points to her head
 *FAT: baby’s head.
 He then points at his own head.
 *FAT: daddy’s head.

The father takes up what seems to be a nonintentional non-communicational gesture and transforms it by shaping it into a conventional pointing gesture, through which he can designate alternatively his own head and his daughter’s head. He has changed it into a social gesture which is part of the string of routinely used pointing gestures of the various members of the family that Ella will take up and replay herself in the following sessions in the data.

The meaning of a large amount of communicative exchanges in general emerges from the collaborative process involved between the participants. This is even more obvious in the case of children and adults. A child might accidentally make a vocal or gestural production with no specific intention. Or she might endow it with a specific communicative intent, and not be understood by the adult. If the adult misinterprets the production, the child might refuse that interpretation but she might also accept this misconstrual and follow the adult’s lead toward new directions. Conversation is therefore wholly collaborative and reanalysis of children’s intentions can emerge and lead to new meanings.

Psychological states and interpretations expressed by parents interacting with children could facilitate their Vygotskian internalization by children who simultaneously directly experience events and states and the adult’s perspective on those same experiences. They therefore progressively acquire both a first- and a third-person perspective. There seems to be a collaborative engagement between adults and children in which multimodal communication and language do more than direct attention but serve as a mediation of children’s mental lives and help them process complex representations (Clark, 1998). The Vygotskian account underlines the importance of inner speech as the result of what is semiotically mediated in interaction with others. Dialogic exchanges are incorporated by the child and form inner speech. The multiple perspectives represented in dialogs or in multiparty conversations are thus internalized and construct the child as a dialogic being.

Cultural Variations

However, there are wide cultural variations in how adults interact with infants. In some cultures, adults do not treat infants as being fully intentional. Still, all typically developing children in all cultures develop an understanding of others as intentional agents. There are not enough cross-cultural studies to measure the correlation between adults' scaffolding and the development of intentionality sharing.

Ochs (1984, p. 338) argues that "the emphasis on personal intentions in Anglo society and scholarship is tied to a cultural ideology in which persons are viewed as individuals, i.e., coherent personalities who have control over and are responsible for their utterances and actions." The idea that we can have access to another person's mental life and beliefs is not shared across cultures. In the Samoan culture for instance, responsibility for people's actions is attributed to interpersonal relationships and situations.

Conclusion

The developmental path that goes from gaze following, joint attention, reading of intentions to cooperative communication including reversing perspectives expressed in the use of personal pronouns and of mental terms, involves complex connections between language, emergence of intentionality and theory of mind. Children are born into a social world in which they participate in daily conversations. In Western communities at least, adult conversationalists anticipate and explain behaviors based on desires, feelings, or beliefs. As studies based on analyses of primates as well as autistic, deaf, and typical children illustrate, the development of intentionality, of a theory of mind and of language skills therefore seem to be mutually supportive and intertwined processes.

See also: Conscious Control During Childhood, Development of; Empathy During Early Childhood Across Cultures, Development of; Executive Functions During Childhood, Development of; Intentionality During Infancy and Early Childhood, Development of; Intentionality and Rationality; Logical and Hypothetical Reasoning in Adolescence, Development of; Mind, Theories of; Neo-Piagetian Theories of Cognitive Development; Scientific Concepts During Childhood, Development of; Theory of Mind During Infancy and Early Childhood Across Cultures, Development of.

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