



# Joint Attention and Vocabulary Development: A Critical Look

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## Abstract

Joint attention – parents’ and children’s coordinated attention to each other and to a third object or event – is believed to play a causal and critical role in early word learning. However, joint attention, as conventionally defined and measured, relies only on overt indicators of attention, is studied predominantly in the visual modality, and varies by culture. Moreover, word learning can occur without joint attention in typical development, in autistic development, and in Williams syndrome, and joint attention can occur without commensurate word learning in Down syndrome. Thus, the assumption that joint attention is a necessary and sufficient precursor to vocabulary learning is not universally supported.

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Joint attention – parents’ and children’s coordinated attention to each other and to a third object or event – is claimed by many researchers to play a critical role in early word learning. Indeed, several studies have shown positive correlations between the amount of joint attention in which parent–child dyads engage and the size of children’s early vocabularies. Our goal in this article is not to dispute the reports of a correlation between joint attention and vocabulary development, but to critically examine the generality of that correlation and to subsequently question the assumption that the relation between joint attention and vocabulary development is causal.

In this article, we first define joint attention as it has been operationalized in studies of child language development. Then, we extend three caveats concerning the traditional definition of joint attention: it relies on overt indicators of attention, it is predominantly studied in only the visual modality, and it most likely varies by culture. Next, we raise empirical challenges to the assumptions of a causal relation between joint attention and vocabulary development by reviewing briefly four literatures: studies that demonstrate word learning without joint attention in typical development, studies that demonstrate word learning without joint attention in autistic development, studies that demonstrate word learning without joint attention in Williams syndrome, and studies that demonstrate joint attention without commensurate word learning in Down syndrome. We conclude by

suggesting that the assumption that joint attention is a necessary and sufficient precursor to vocabulary learning is not universally supported.

### *What Is Joint Attention?*

Joint attention refers to moments when a child and adult are focused on the same thing, but for most researchers it also includes the notion that the participants are both aware that the focus of attention is shared (Baldwin 1995); that is, joint attention involves the child and adult coordinating mutual engagement with their mutual focus on a third entity (Tomasello 1995). The term *joint attention* has also been used to refer to a whole complex of putatively 'social cognitive' behaviors that emerge toward the end of the first year of life (e.g., social referencing, pointing, and gaze following). Although some researchers have reported positive relations among these behaviors and, therefore, concluded that they all manifest an emerging understanding of others as intentional beings (Carpenter et al. 1998), other researchers have found no association among various joint attention behaviors (Slaughter and McConnell 2003).

In most studies that correlate measures of joint attention with vocabulary development, children's attentional focus is indexed by their gaze direction, and children's understanding of shared focus is indexed by their gaze alternation (i.e., alternation of gaze between an adult and an object of interest). Thus, the mere fact that the adult and child are looking at the same stimulus has generally not been taken as evidence of joint attention; the child must alternate his or her gaze between the third entity and the adult to show that he or she is not only focused on the same thing as the adult but is also coordinating this joint focus with joint engagement. As children get older they may be able to manifest mutual engagement with words (see Adamson et al. 2004, on 'symbol-infused joint engagement'), but in the earliest stages it is gaze alternation that has been used to index the child's coordination of attention to an adult and an object or event of mutual focus.

Following Bruner (1983), many longitudinal studies have found positive correlations between the amount of joint attention in which parent-child dyads engage and children's subsequent vocabulary development (e.g., Tomasello and Farrar 1986; Smith et al. 1988; Carpenter et al. 1998; Markus et al. 2000; Morales et al. 2000). The magnitude of the relationship appears to decrease (Carpenter et al. 1998) or disappear (Morales et al. 2000) over the second year of life, leading some theorists to suggest that experiencing joint attention is particularly important in the earliest stages of vocabulary development (Tomasello 1999). Indeed, Tomasello (1995) has hypothesized that 'to acquire a new word . . . the child *must* enter into a joint attentional focus with an adult' (p. 117, emphasis ours).

To understand why Tomasello and others think joint attention is necessary for early word learning, we need to recognize that the emphasis on joint attention is part of a larger social-pragmatic approach to language learning

that traces back to Bruner (1983: 68), who explicitly linked attention and the development of reference: 'The problem of how reference develops can . . . be restated as the problem of how people manage and direct each other's attention by linguistic means.' Essentially what one is doing when one labels or refers to something is calling the listener's attention to what one is labeling. If this goal is achieved, then one has achieved joint focus with the listener.

However, contemporary conceptions of joint attention embrace considerably more than just joint focus; contemporary conceptions require mutual engagement between speaker and listener, overt manifestations of that mutual engagement, and overt manifestations of the joint focus. We are not arguing against the importance of joint focus in early word learning; indeed, we agree with Bruner and Tomasello that for a child to learn to words he or she needs to attend to the speaker and to what the speaker is attending. But we are raising questions about the overt manifestation of mutual engagement, as well as the overt manifestation of attention. While overt manifestations make more transparent what the speaker is focused on (Tomasello and Farrar 1986; Dunham et al. 1993) and what the child is attending to, the child may not need to be overtly engaged with the speaker in order to discern the speaker's focus. In short, joint focus (which may be established covertly by the child on his or her own) may be critical for learning early words, but mutual engagement may not.

#### INITIATING VERSUS RESPONDING TO JOINT ATTENTION

Joint attention can be initiated by either member of the dyad, and likewise it can be responded to by either member of the dyad. Some studies have focused on parents' initiation of joint attention and their children's response to bids for their joint attention, but joint attention can also be initiated by children. Even typically developing children vary widely in their tendency to initiate joint attention interactions (Markus et al. 2000). Therefore, it is important to distinguish between children's propensity to initiate joint attention and their propensity to respond to others' initiations, because these two propensities may not be related to vocabulary development in the same way.

For example, Mundy (2006) reported that typically developing children's propensity to initiate joint attention remains rather constant across the ages of 9 months to 18 months, while their propensity to respond to bids for their joint attention increases during this period. It should therefore not be too surprising that typically developing children's frequency of initiating joint attention is not highly correlated with their frequency of responding to joint attention. Of the two child-based behaviors – initiating versus responding to joint attention – it is responding to joint attention that Mundy finds to be most correlated with vocabulary development in typically developing children.

## OVERT VERSUS COVERT JOINT ATTENTION

We know from experimental studies that even young infants can engage in covert shifts of visual attention (Hood 1993; Richards 2000), which are probably quite difficult to detect in the naturalistic contexts of most joint attention studies. In most studies of the link between joint attention and early vocabulary, researchers generally observe infants interacting with their caregivers in a play context, and researchers examine how often infants and caregivers coordinate gazing at each other with gazing at some third entity. However, because looking is not equivalent to attending and not looking is not equivalent to not attending (Posner et al. 1980), it is probably unwise to rely solely on overt gaze shifts as indicators of joint attention.

## JOINT ATTENTION IN DIFFERENT MODALITIES

Although Tomasello (1995: 124) has noted that ‘attention goes beyond visual orientation and so joint attention goes beyond simultaneous looking,’ in the empirical studies correlating joint attention with vocabulary size, joint attention has been operationally defined as joint visual attention; that is, the child and adult must alternate gaze between themselves and the object of interest to be credited with engaging in joint attention. Not only is the indicator of the child’s attention restricted to the visual modality, the coordination of attention to caregiver and object is measured only through overt shifts of gaze, in particular gaze to the caregiver’s face. The fallacy of measuring attention solely by eye gaze is perhaps nowhere better manifest than by behaviorist Foxx’s (1997) rather outrageous claim that blind children must be taught eye contact – indeed that teaching eye contact to a blind child was ‘perhaps even more important’ than teaching eye contact to a sighted child because ‘the facial orientation of a blind person toward the speaker provides at least some indication of [the blind person’s] listening behavior’ (p. 489).

We know that children (and adults) attend to events and objects that they hear, touch, and sense in ways other than solely through the visual modality; for example, Akhtar and Carpenter (unpublished data) demonstrated that typically developing 24-month-old children can use auditory cues in word learning. Children heard invisible toys (hidden in an opaque bag) making sounds as the experimenter labeled them. The children were able to retain the sound–word association until they later played with the toys and determined that ones made which sounds.

Research on blind individuals is particularly relevant here. The case study of two blind parents and their sighted infant by Adamson et al. (1977) highlighted the various ways in which parents can establish joint attention with an infant – ways that obviously do not involve vision. For example, the parents monitored their baby’s breathing and touched her face to monitor the direction she was facing. They often engaged in games involving coordinated touching and vocalizing (e.g., touching and naming body parts).

Matsuda (1985), following the advice of Fraiberg (1977), recommended training sighted parents to attend to their blind infants' hands as indicators of what infants are focused on or interested in.

Bigelow's (2003) case study of two congenitally blind infants identified two categories of joint attention behaviors: liberally construed joint attention behaviors and conservatively construed joint attention behaviors. Liberally construed joint attention behaviors involved the infants' comprehension or production of language (e.g., labeling an object that the infant was involved with or acting on an object at an adult's request); liberally construed joint attention, therefore, resembles symbol-infused joint attention (Adamson et al. 2004), a somewhat late-appearing form of joint attention in sighted children. Conservatively construed joint attention behaviors involved children acting in ways that clearly demonstrated awareness of an adult's role in some mutual interaction involving objects (e.g., repeated giving and taking of an object in a game-like context).

To determine where objects and people are located, 'blind children depend on tactile and kinesthetic information and memory, sound changes, air currents, and echolocation . . . as well as the verbal comments of others,' and to determine other people's attentional focus blind children rely on auditory and tactile information (Bigelow 2003: 271). Interestingly, blind children's earliest words tend to label their experiences of touch, taste, and smell (Bigelow 1987).

It is probably the case that typically developing children also use multiple perceptual modalities (visual, auditory, tactile, kinesthetic) to establish joint attention with others. Moreover, 2-year-old typically developing children can also go beyond the immediate perceptual context and use knowledge of the discourse context (Tomasello and Akhtar 1995; Akhtar 2002), as well as their memory for routine events as cues for learning new words (Tomasello and Kruger 1992; Akhtar and Tomasello 1996; Tomasello et al. 1996).

In one study (Akhtar and Tomasello 1996), 24-month-old children participated in a routine in which an adult experimenter repeatedly found four nameless objects in four separate locations. One object served as the target, and the locations of all objects remained constant for a given child, enabling the children to form expectations of which object would be found in each location. After finding three of the four objects, the experimenter announced her intention to find the fourth object (e.g., 'Now let's find the toma!'). In the Visible Referent condition, the experimenter proceeded to find the target object. In the Absent Referent condition, the experimenter attempted to open the target location but told the child that it was locked; thus, children in this group never saw the target object after hearing the novel word. Nonetheless, children were able to learn the object label – even when they had not seen the object physically paired with the new word. In a subsequent study, 18-month-old children were also able to learn object labels in this way (Tomasello et al. 1996). It remains to be investigated

whether even younger children can use cues other than gaze to establish joint attention with others but our guess is that they can.

#### CULTURAL VARIATIONS IN JOINT ATTENTION

Cultures vary in the types of interactions in which infants and young children typically engage. While members of all cultures engage in both dyadic (one-on-one) and polyadic (group) interactions, some cultures spend more time in one type of interaction than the other. For example, in many Western middle-class communities, dyadic interactions are very common. Because practically all studies of joint attention and vocabulary development have examined children in communities in which dyadic interactions are considered the norm, joint attention has been conceived primarily as something that takes place between two individuals, and dyadic joint attention has been examined almost exclusively. Only a handful of studies (Tomasello et al. 1986; Barton and Tomasello 1991) have examined joint attention in triads (two siblings and their mother), but it is surely the case, given the increasing participation in group child care (National Institute of Child Health and Human Development Early Child Care Research Network 2003), that even in Western middle-class communities most children do not spend most of their waking hours in one-on-one interactions. Thus, studies of joint attention and early language need to take account of the real-life and often polyadic contexts in which young children interact with others.

Studies of the link between joint attention and vocabulary development also need to account for cultural variation in attention patterns. For example, Guatemalan Mayan toddlers (and their mothers) are more likely to maintain smooth simultaneous attention to multiple events and objects, whereas middle-class American toddlers are more likely to pay attention to one thing at a time, alternating attention between two events (or people) of interest (Rogoff et al. 1993; Chavajay and Rogoff 1999). One example of simultaneous attention provided by Rogoff et al. (1993) involved a 12-month-old boy who skillfully interacted with his sister putting things in a jar, while he operated a toy whistle and watched a passing truck with interest. These patterns of attention are related to mothers' beliefs about how children learn: very young Mayan children are expected to be keen observers and to be able to coordinate attention to multiple participants, whereas American parents tend to think their children are not attending to a task if they are not exclusively focused on that task alone.

Of course, there are individual differences within cultural groups, but cross-cultural studies of joint attention have also shown that American and British caregivers are more likely to follow their infants' attentional focus compared to Chinese and Mexican caregivers who tend to be more directive (Vigil 2002; Vigil et al. 2006). While directiveness is often negatively correlated with vocabulary development in American and British samples,

Vigil (2002) has found no differences in 18-month vocabulary sizes between her Chinese-immigrant and British samples. In addition, Mexican-immigrant children tend to learn words better in an attention-directing rather than attention-following style (Vigil et al. 2006). Thus, any model of joint attention, particularly one that proposes joint attention as the only route for learning first words, must be flexible enough to subsume these and other cross-cultural differences – or be faced with the unattractive task of positing that children raised in some cultures are, by nature of their culture, disadvantaged in word learning (Akhtar 2005a).

### *Is Joint Attention Necessary for Vocabulary Development?*

#### WORD LEARNING WITHOUT JOINT ATTENTION IN TYPICAL DEVELOPMENT

As discussed above, joint attention, defined as overtly signaled joint (dyadic) focus coordinated with overtly signaled mutual engagement, is assumed to be critical for early word learning. Despite these types of interaction being rare in certain cultural contexts, children growing up in those contexts still learn language. These children probably learn quite a few of their early words as bystanders – that is, without demonstrative joint attention (Rogoff et al. 2003). Recent studies have also empirically demonstrated that young children growing up in Western middle-class contexts can also learn words as bystanders, without demonstrative joint attention.

Akhtar et al. (2001) showed that 2-year-old children can learn novel words from a person who is not interacting with them; that is, they can learn words when they are exposed to those words only in third-party conversation. In each of a series of experiments, children were randomly assigned to one of two conditions: direct or indirect (referred to in the original articles as ‘addressed’ and ‘overhearing’). In the direct condition, the experimenter played a game directly with the child and introduced a novel word for one of four unfamiliar objects. The object was not visible at the time of naming but was extracted from an opaque bucket shortly thereafter. In the indirect condition, the child was a bystander to an identical interaction between the experimenter and a confederate (i.e., the experimenter ignored the child and introduced the novel word to the confederate). Subsequent tests of comprehension showed that children learned the novel word in both conditions – and equally well in the two conditions.

Thus, overt mutual engagement may not be necessary for early word learning. However, it is unclear to what extent the experimental context resembles the real-life contexts in which children learn new words. In the real world, there are often multiple objects and events competing for a child’s attention. To examine how well children might do in the presence of a potentially distracting activity, another set of studies was conducted (Akhtar 2005b). The no-distracter condition was essentially a replication of the indirect condition, in which 2-year-old children simply watched two adults play with four novel objects and label one of them. In the distracter

condition, children were first given an engaging toy to play with while the adults interacted. In both conditions, children were again able to learn the novel word.

One might argue that 2-year-old children are beyond the earliest stages of word learning and by that age they have ways of establishing joint attention without mutual engagement whereas younger children may still require mutual engagement. The most recent studies of word learning through overhearing (i.e., without joint attention, as conventionally defined) have shown that children as young as 18 months can learn novel labels indirectly (Floor and Akhtar 2006). So it is clear that even very young children learning English in a middle-class community can learn new words without joint attention. In these studies, the children were not mutually engaged with the speaker, but nonetheless were able to learn words from that speaker.

We propose that children in all communities most likely learn some degree of their early words without joint attention. Indeed, it is possible that children who grow up in cultural contexts in which they are expected to keenly observe others (and have more practice doing so) may be much better at monitoring third-party interactions than children who are accustomed to having adults solicitously label things for them. These children may therefore not require the episodes of caregiver-initiated joint attention that seem to facilitate vocabulary learning in dyadic contexts, and may actually be better at learning words by attending to third-party conversations (Ochs and Schieffelin 1995).

#### WORD LEARNING WITHOUT JOINT ATTENTION IN AUTISTIC DEVELOPMENT

Autism is defined as atypical social interaction, communication, interests, and body movements (American Psychological Association 1994). There is a robust literature examining the joint attention skills of autistic children (e.g., Mundy et al. 1990) and a smaller literature examining the joint attention skills of parents of autistic children (e.g., Watson 1998). While there is little doubt that autistic children show atypical joint attention, this atypicality is more prominent for their initiation of joint attention than for their response to bids for their joint attention (Mundy 2006).

Recall that in typical development, initiating joint attention remains rather constant across the ages of 9 months to 18 months whereas responding to bids for joint attention increases; in typical development, initiating joint attention is not highly correlated with responding to joint attention, and initiating joint attention is less correlated with vocabulary development than is responding to joint attention. Therefore, it should not be too surprising that autistic children's atypical joint attention appears to be unrelated to their vocabulary development.

In one of the few studies to measure vocabulary development directly, using the Peabody Picture Vocabulary Test (Dunn and Dunn 1997), Morgan



et al. (2003) reported that joint attention and vocabulary development independently distinguished autistic children from typically developing children, and the two measures were uncorrelated. Other studies have also failed to show a relation between vocabulary development and joint attention in autism (Lord and Pickles 1996; Stone and Yoder 2001; Travis et al. 2001).

While it is tempting to attribute other aspects of autistic children's atypical development to their lower rates of conventionally initiating joint attention, without empirical evidence that these other aspects are directly associated with, much less causally related to, joint attention, one runs the risk of reifying spurious relations.

#### WORD LEARNING WITHOUT JOINT ATTENTION IN WILLIAMS SYNDROME

Studies of vocabulary development and joint attention in children with Williams syndrome have also failed to show an associative, much less causal, link. For example, one toddler studied longitudinally from 20 months to 32 months by Bertrand et al. (1993) 'did not engage in co-ordinated joint attention until well after the vocabulary spurt' (Laing et al. 2002: 235). In a group study of children with Williams syndrome, matched for mental age with typically developing 14 months old, the children with Williams syndrome demonstrated significantly larger productive vocabularies than the typically developing children but significantly lower initiations of joint attention (Laing et al. 2002). This dissociation between two skills that should theoretically go hand-in-hand calls into question not only the presumed relation between joint attention and vocabulary development but also the implicit proposal that the former is necessary for the latter.

#### JOINT ATTENTION WITHOUT WORD LEARNING IN DOWN SYNDROME

Studies of language development and joint attention in children with Down syndrome show but yet a different pattern than that in children with autism or children with Williams syndrome. Children with Down syndrome engage frequently in joint attention with their parents; however, their relatively high frequency of joint attention does not result in relatively high language gains. For example, in one study, children with Down syndrome at the one-word stage of language development spent 20% more time engaged in joint attention with their primary caregiver than did mental-age and language-age matched typically developing children. However, a year later, the children with Down syndrome had gained only 4 months of language development whereas their typically developing peers had gained 15 months (Harris et al. 1996). Indeed, frequency of joint attention episodes was negatively correlated with early language development for the children with Down syndrome (but positively correlated for the typically developing children).

In another study, children with Down syndrome engaged in joint attention behaviors, such as pointing to an object of interest and showing an object

of interest, two to three times more frequently than mental-age matched toddlers (Mundy et al. 1988). However, within the Down syndrome group, their high frequency of joint attention behaviors was independent of their mental age and early language development.

### *Conclusion*

In this article, we have questioned the assumed causal link between joint attention, as conventionally defined, and vocabulary development. We have suggested that joint attention as conventionally defined fails to encompass covert attention (i.e., attention that is not overtly signaled by head turns, finger points, or gaze alternations). We have suggested that joint attention as conventionally defined generally fails to encompass non-visual modalities of attention. We have suggested that joint attention as conventionally defined ignores cross-cultural variations in parent-child interaction styles.

But most strikingly, we have reviewed briefly four literatures that challenge the necessary and sufficient nature of joint attention in word learning. Typically developing children can learn words without being directly addressed, much less being explicitly engaged in conventional joint attention. Children with Williams syndrome and autism can learn words, more versus less successfully, without engaging in conventional joint attention, and children with Down syndrome engage frequently in conventional joint attention without commensurate boosts in their vocabulary development.

In addition to challenging an assumed causal link between joint attention and word learning, these observations challenge the notion of joint attention behaviors as necessary precursors to word learning. While for some children in some cultures, joint attention behaviors precede peaks of vocabulary learning, this sequence is far from universal. Thus, the notion of joint attention behaviors as precursors to word learning warrants more qualified endorsement.

### *Short Biography*

Nameera Akhtar is Professor of Psychology at the University of California, Santa Cruz. Before joining the faculty at the University of California, Santa Cruz, in 1995, Akhtar completed a Natural Sciences and Engineering Research Council postdoctoral fellowship at Emory University in Atlanta with Michael Tomasello. She completed her bachelors, masters, and doctoral degrees from Dalhousie University in Halifax, Canada. Akhtar's research interests are language development in children, in particular, word learning in very young children (18–24 months old). Akhtar uses experimental methods that involve introducing novel words in a variety of seminatural interaction contexts. By examining the various social and cognitive skills young children bring to the task of learning words, these studies show that young children are very motivated to understand what others are saying and doing and that they attend strategically to others' interactions.

Morton Ann Gernsbacher is Vilas Research Professor and Sir Frederic Bartlett Professor at the University of Wisconsin–Madison. Gernsbacher's research has for 20 years investigated the cognitive processes and mechanisms underlying language comprehension. She empirically challenged the view that language processing involves language-specific mechanisms by demonstrating many aspects of language comprehension that draw on general cognitive processes. During the past few years (motivated by personal interest), her research focus has shifted to autism, where she has made the significant discovery that some young autistic children cannot speak fluently because of motor planning challenges – not because of intellectual limitations or social impairment as conventionally assumed. Gernsbacher has authored *Language Comprehension as Structure Building* (Erlbaum 1990), has edited seven other books, and has published over 120 journal articles and invited chapters. She is currently the president of the Association for Psychological Science and has served on numerous national and international boards and organizations.

### *Endnote*

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