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Infant twins' social interactions with caregivers and same-age siblings☆

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ABSTRACT

The study of twin behavior offers the opportunity to study differential patterns of social and communicative interactions in a context where the adult partner and same-age peer are equally familiar. We investigated the development of social engagement, communicative gestures, and imitation in 7- to 25-month-old twins. Twin dyads ($N = 20$ pairs) participated in 10-min, semi-structured play sessions, with the mother seated in a chair completing paperwork for half the session, and on the floor with her children for the other half. Overall, twins engaged more with their mothers than with their siblings: they showed objects and imitated speech and object use more frequently when interacting with their mothers than with their siblings. When the mother was otherwise engaged, the twins played with toys separately, observed each other's toy play, or were unengaged. These results demonstrate that adult scaffolding of social interactions supports increased communicative bids even in a context where both familiar peers and adults are available as communicative partners.

Twins develop in a social environment unique from that of singletons: As infants they spend most of their waking hours together, and thus have countless opportunities to interact with a same-age peer as well as with caregivers (Thorpe, Rutter, & Greenwood, 2003; Vandell, Owen, Wilson, & Henderson, 1988). Studies of singleton infants and their caregivers have suggested that caregivers' contingent responsiveness to infants' communicative bids serves to impart knowledge of the reciprocal dynamics of conversational speech while encouraging infant vocalization (Goldstein, King, & West, 2003; Goldstein & Schwade, 2008; Pereira, Smith, & Yu, 2008). Less is known, however, about the development of infant social-communicative skills in interactions among infant twins and their caregivers. We examined the development of social interaction among 7- to 25-month-old twins and their mothers, focusing on differential patterns of infant engagement,

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gestural communication, and imitation as a function of communicative partner, while varying the amount of maternal involvement in the interactions.

1. Development of social engagement in infancy

Over the first years of life, infants develop the ability to shift their attention flexibly in accordance with situational demands, and become more capable of maintaining their focus of attention on objects, people, and events of interest (Hanania & Smith, 2010; Ruff & Rothbart, 1996). As voluntary control of attention develops, infants initially learn how to sustain dyadic, face-to-face interactions with caregivers, and later become able to respond to caregivers' communicative bids in supported joint engagement where, for example, the caregiver might offer an object of interest to the infant as a means of fostering engagement. Dyadic face-to-face interactions and supported joint engagement provide the foundation for the emergence of coordinated joint engagement—also referred to as joint attention or the infant's ability to coordinate their attention toward an object or event of interest with another individual (e.g., Rochat, 2004; Striano & Reid, 2006). Coordinated joint engagement, which typically emerges between 9 and 13 months, is considered by many to be a critical milestone for the development of referential communication skills, through which infants learn to recognize others' communicative intentions and convey their own using gestures and speech (e.g., Adamson, 1995; Baldwin & Moses, 2001; Eilan, Hoerl, McCormack, & Roessler, 2005; Moore & Dunham, 1995).

2. Early communicative gestures

Infants begin producing a variety of gestures toward the end of their first year of life. Two gestures, *pointing* and *showing*, have received considerable attention in infancy research due to their apparent links with coordinated joint engagement and language development (Brooks & Meltzoff, 2008; Butterworth, 2003; Colonnesi, Stams, Koster, & Noom, 2010; Lock, 1978; Tomasello, Carpenter, & Liszkowski, 2007). These gestures increase in frequency around 8–10 months of age (Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979), and are more likely to occur when infants are involved in episodes of supported or coordinated joint engagement (Bakeman & Adamson, 1986).

3. Imitation

Imitation of another person's actions or vocalizations emerges in infancy (e.g., Meltzoff, 1990; Nadel-Brulfert & Baudonniere, 1982; Piaget, 1962; Užgiris, 1981), and like coordinated joint engagement, begins to occur with substantial frequency around the age of 9 months (Bruner, 1983; Ratner & Bruner, 1978), and increases over the next two years (Carpenter, Call, & Tomasello, 2005; Carpenter, Nagell, & Tomasello, 1998; Meltzoff, 1995). Joint attention during social interaction enhances infants' abilities to imitate their social partners (Brugger, Lariviere, Mumme, & Bushnell, 2007; Carpenter et al., 1998), and through imitation infants expand their behavioral and communicative repertories, and facilitate communication.

4. Early studies of partner effects in infant social interaction

With few exceptions (e.g., Bakeman & Adamson, 1984, 1986), the literature on early social interaction has focused almost exclusively on interactions between singleton infants and their caregivers (e.g., Adamson & Bakeman, 1984; Soderstrom, 2007). Bakeman and Adamson (1984) videotaped infants at 3-month intervals between the ages of 6 and 18 months while they were interacting during two free-play conditions, one with their mother and one with a familiar peer. Videotaped sessions were coded for several distinct engagement states: person engagement (dyadic, face-to-face interaction), passive joint engagement (later renamed supported joint engagement [Adamson, Bakeman, & Deckner, 2004]), coordinated joint engagement (joint attention), object engagement, onlooking, and unengaged behavior. Overall, person engagement and unengaged behavior decreased with age, and coordinated joint engagement increased with age. More importantly for our purposes, infants spent more time involved in coordinated and supported joint engagement with their mothers than with their peers across all ages. Similarly, Bakeman and Adamson (1986) found that infants' communicative gestures and speech were more often directed toward their mothers than their peers across all ages (see also Ninio, 2015). Eckerman and colleagues observed that peer interactions lagged months behind similar interactions involving caregivers, with imitation preceding other kinds of coordinated joint engagement and communication between unfamiliar peers (Eckerman & Didow, 1996; Eckerman & Stein, 1990; Eckerman, Davis, & Didow, 1989).

Regarding partner effects on imitation, Zmyj and colleagues found that 14-month-old infants were more likely to imitate novel actions performed by an adult model than those performed by a same-age peer or older child, but were more likely to imitate familiar actions performed by a peer than those performed by an older child or adult (Zmyj, Aschersleben, Prinz, & Daum, 2012; Zmyj, Daum, Prinz, Nielsen, & Aschersleben, 2012b). These results suggested that infants encountering novel situations may prefer to interact with an adult, who is presumably a more knowledgeable and reliable model, and thus in this context imitation served the cognitive function of helping the infant to acquire new skills. With familiar actions, imitation appeared instead to serve a social function of joining in and sharing an experience with a peer (Zmyj & Seehagen, 2013).

Taken together, these results suggested that caregiver scaffolding of infant attention assisted infants in coordinating joint attention and resulted in increased communicative bids to the caregiver. In contrast, infants seemed to have difficulty