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Predictors of early person reference development: Maternal language input, attachment and neurodevelopmental markers

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ABSTRACT

In a longitudinal natural language development study in Germany, the acquisition of verbal symbols for present persons, absent persons, inanimate things and the mother–toddler dyad was investigated. Following the notion that verbal referent use is more developed in ostensive contexts, symbolic play situations were coded for verbal person reference by means of noun and pronoun use. Depending on attachment classifications at twelve months of age, effects of attachment classification and maternal language input were studied up to 36 months in four time points. Hierarchical regression analyses revealed that, except for mother absence, maternal verbal referent input rates at 17 and 36 months were stronger predictors for all referent types than any of the attachment organizations, or any other social or biological predictor variable. Attachment effects accounted for up to 9.8% of unique variance proportions in the person reference variables. Perinatal and familial measures predicted person references dependent on reference type. The results of this investigation indicate that mother-reference, self-reference and thing-reference develop in similar quantities measured from the 17-month time point, but are dependent of attachment quality.

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1. Introduction

Mental representations are cognitive entities that allow humans to operate integrative concepts of the self, significant others and abstract social constellations. A theoretical framework for mental representations of persons conjectured that usage of verbal referents for persons enables social-cognitive functioning, along with reflection about mental states (Lemche, 2003). The formation of mental representations for persons is conceived to originate in early mother–child interaction, but to become gradually encoded by language symbols (Karmiloff-Smith, 1992; Tarabulsy, Tessier, & Kappas, 1996). It is hereby assumed that situational models of interactions with other persons provide the basis of cognitive person representations (Radvansky & Copland, 2000). Symbolic person references later become part of the reflective function of person representations, which has been shown to be a prerequisite of perspective-taking abilities in children (Adrian, Clemente, Villanueva, & Rieffe, 2005; Lubinski & Thompson, 1993).

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Investigations of person referent uses were already contained in the earliest accounts of psychological development. Darwin (1877), Preyer (1882), and Baldwin (1895) all made unsystematic observations of their own children, and described the uses of person symbols in their infants. Darwin noted the equivalence of a feeding request toward a wet nurse with the use of *mum* at nine months of age (Darwin, 1877, p. 293). Because of the assumption of the onset of consciousness with self-pronoun use in psychological theorizing of the time, this particular achievement became of specific interest to both Preyer (1882, p. 377) and Baldwin. The observation of a parallel use of self and other-denotation led Baldwin then to his well-known conclusion "the Ego and the Alter are thus born together" (Baldwin, 1895, p. 321).

This issue, namely whether children develop symbolic referents for significant others or themselves first, was also at the core interest of most subsequent linguistic single-case or multiple case studies (Bain, 1936; Budwig, 1985; Budwig & Wiley, 1995; Cooley, 1908). Surprisingly little quantified research was hitherto undertaken on person reference by nouns and pronouns in early childhood development. Experimental investigations into the uses of self- and other-person reference (Deutsch, Wagner, & Masche, 1994) indicated that early self-reference is present from 17 months onward. Other-person reference appeared to be more advanced at 17 months of age, whereas self-reference at this early stage was rather infrequent and solely based on nouns (Wagner, Burchard, Deutsch, Jahn, & Nakath, 1996). Several multiple case studies suggest that children must learn a reversal of pronouns from parents in the case of first person and second person input before they can themselves produce these pronominal forms (Oshima-Takane, Takane, & Shultz, 1999; Smiley, Chang, & Allhoff, 2011).

Recent quantified studies also focused on pre-linguistic precursors relevant to the development of person referents. It appears that communication of caregiver absence (12–16 months) (Saylor, 2004; Saylor & Baldwin, 2004), thing absence (14–18 months) (Gräfenhain, Behne, Carpenter, & Tomasello, 2009) and references to toys mentioned in preceding conversations (15–18 months) (Ganea & Saylor, 2007) could be related to presumed underlying advances in long-term memory during this span (Gopnik & Meltzoff, 1984). We now turn to presentations of attachment, and the overall study rationale.

Attachment in humans is considered the evolutionary equivalent to filial imprinting in higher vertebrates (Lemche et al., 2006). The construct implicates that exclusive relationships with the primary caregivers are elaborated from early bonding onwards, and maintained throughout the lifespan once stable attachment organizations have emerged at the end of the first year of life. Attachment quality can then be experimentally assessed in terms of secure, insecure or disorganized main classifications. The assumption of a representational nature of the attachment relation (in terms of *Internal Working Models*) (Bretherton, 1997) between child and caregiver gives rise to the expectation that cognitive concepts of persons and their verbal symbols should be predictable by attachment qualities. To our knowledge, this expectation has never previously been tested.

Previous studies (Huttenlocher, 1998; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991) support the assumption of a close relationship of maternal word input and children's usage of words, both in non-specific verbosity, as well as for the acquisition of specific word classes. We therefore expected a similar close relation between referent uses of mothers and children. Neurodevelopmental variables are measures that are conceived to reflect the maturity status of the nervous system in children. The perinatal Apgar test, which also comprises activity, muscle tone, reflexes and grimacing, is an index of neurological functioning and risk. Although language development is generally regarded to be subserved by cortical modules, no studies yet attempted to predict language acquisition from the maturity of the central nervous system at birth. Further neurodevelopmental maturity markers are e.g. body length and weight at the time of birth. Upright locomotion onset can also be seen as reflecting the state of central nervous system growth. Developmental researchers also generally assume a certain relation of upright locomotion with first language utterances or attachment organization. Finally, certain familial circumstances, such as single mothering or staying at home may influence reference uses.

Three main hypotheses were thus envisioned, (i) that attachment security fosters referential capacities and (ii) that maternal reference input determines referent use of children. We also assumed (iii) longitudinal effects of neurodevelopmental maturity indices and familial variables. To test the magnitude of the respective influences, computation of relative variance explanation by predictor variables was planned.

2. Method

2.1. Overall strategy

Dialogic situations are the experimental situation of choice in the study of referent uses in spoken language (Knutsen & LeBigot, 2012). In the present study, children's (and also mothers') verbal references from spoken discourse were recorded, which included both nouns and pronouns pertaining to the own person, mother present, mother absent, other persons, objects, and the dyadic community from transcripts of observed mother–toddler play situations. To provide a challenge to the children's attachment systems (by induction of *separation distress*), these semi-experimental conversation situations included a brief separation episode, following determination of children's attachment organization at twelve months. The two classes of predictors were finally compared to other perinatal (such as the Apgar score for neurodevelopmental integrity) and concurrent familial context markers.