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Developmental stimulation in child care centers contributes to young infants' cognitive development

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ABSTRACT

This study examined whether the quality of caregiver behavior in child care centers contributes to infant cognitive development at 9 months of age. Sixty-four infants (34 boys) were observed with their primary caregivers in child care centers at 3, 6, and 9 months of age. Caregiver behavior was rated for sensitivity and for stimulation of infant development during one-to-one caregiving interactions. Infant cognitive development was assessed using the Bayley Scales of Infant Development-II (Mental Development Index). Higher levels of developmental stimulation in the centers predicted higher levels of infant cognitive development at 9 months, beyond infant cognitive development at 3 months (just before entering child care), parental education, and maternal sensitivity. The results suggest that even small increases in developmental stimulation provided in child care centers in the first year of life may foster infants' cognitive development.

1. Introduction

In the past decades, more and more research has been conducted on the effects of child care on children's development. These studies have consistently shown that good child care quality – especially in center based child care – is associated with better cognitive and language development (for reviews see Lamb & Ahnert, 2006; Vandell & Wolfe, 2000). Most of these studies measured child outcomes at toddler or preschool age, or even later. The question remains whether high-quality child care contributes to child cognitive development already in the infancy period. Given the substantial number of infants attending child care centers from as early as 3 months of age, this is an interesting question to examine. The present study aimed to shed more light on the relation between child care quality and child cognitive development in the very first year of life.

Because it is widely acknowledged that high-quality caregiver–child interactions constitute the core component of high-quality child care for very young children (see Lamb & Ahnert, 2006), we observed the quality of infants' interactions with their primary professional caregivers in child care centers repeatedly during the first half year after entering child care at 3 months of age. We examined the extent to which different qualities of caregiver behavior contributed to the infants' cognitive development between 3 and 9 months of age.

Only two studies to date have reported the effects of child care quality on children's cognitive development in the infancy period. The first study, conducted by Burchinal, Roberts, Nabors, and Bryant (1996) included 79 infants from predominantly low-income African-American families. The infants attended community based child care centers full-time, starting at an

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average age of 5 months. The quality of child care was assessed using the overall quality score of the Infant Toddler Environment Rating Scale (ITERS; Harms, Cryer, & Clifford, 1990); this score summarizes the quality of caregiver–child interactions, the child care environment, and the curriculum. The ITERS measures quality at the level of the child care group and does not focus on the experiences of individual children. In the Burchinal et al. study, the quality of the child care groups ranged from poor to mediocre in terms of the ITERS scores. The infants' cognitive development was assessed at 12 months of age with the Bayley Mental Scale of Infant Development (Bayley, 1969). The overall quality of child care (ITERS) was shown to independently and positively contribute to the infants' cognitive development beyond the quality of the home environment.

The second study examining the effects of the quality of center based child care on child cognitive development in the infancy period used data from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care (Tran & Weinraub, 2006). The sample included 419 children from the community sample of 1364 families that were initially enrolled in the NICHD Study of Early Child Care. The quality of non-maternal child care was assessed at 6 and 15 months of age with the Observational Record of the Caregiving Environment (ORCE; see NICHD Early Child Care Research Network, 1996). The ORCE yields a large number of scores reflecting the quality of individual children's interactions with their caregivers. In the study by Tran and Weinraub (2006), the scores on the ORCE observations were used to create a composite measure of *positive caregiving behavior* at 6 and 15 months, including, among others, caregiver positive affective behavior, responsivity to the child's behaviors, and stimulation of the child's development. Infant cognitive development was assessed at 15 months of age using the Bayley Mental Scale of Infant Development. Neither the 6-month nor the 15-month composite measure for positive caregiving behavior contributed to the prediction of the infant cognitive development at 15 months of age beyond the quality of the home environment. It should be noted that the effect of quality of child care on infant cognitive development was not examined separately for center care, but for non-maternal care in general, also including care by fathers, grandparents, in-home sitters, and family day care homes.

With the present study, we aimed to extend the knowledge yielded by the earlier studies in two ways. First, we measured infant cognitive development at an earlier age than previous studies, namely at 9 months of age. This may elucidate whether effects of child care on children's cognitive development that have been found at later ages are already emerging during the very first year of life. Second, we aimed to unravel the effects of different aspects of child care quality. These aspects were taken together in more global quality measures in the earlier studies. We observed different theoretically relevant qualities of caregiver behavior and kept these qualities apart in the analysis to examine their independent and interactive contribution to infant cognitive development. We focused on two qualities of caregiver behavior that are generally deemed important for fostering infant development, namely sensitivity, and stimulation of infant development.

Caregiver *sensitivity* or the extent to which the caregiver responds appropriately and promptly to infant cues and signals is generally acknowledged as the most basic quality of good caregiving in infancy. Parental sensitivity has been shown to be related to early infant–parent attachment security (Ainsworth, Blehar, Waters, & Wall, 1978; De Wolff & Van IJzendoorn, 1997) and to better developmental outcomes in various domains (e.g., Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008; Kochanska, Barry, Aksan, & Boldt, 2008; Smith, Landry, & Swank, 2006; Wakschlag & Hans, 1999). *Stimulation of development* refers to the extent to which a caregiver engages in activities presumed to enhance the child's development, achievement, and learning, such as showing, demonstrating, and labeling things for the child. Stimulation of infant development by mothers at home has been shown to contribute to infant cognitive development at 15 months of age (NICHD Early Child Care Research Network, 2000), but stimulation of infant development in child care centers has not yet been examined in relation to children's cognitive development in the infancy period. We expected caregiver stimulation of development to positively contribute to infant cognitive development, provided that the stimulating activities were sensitively attuned to the infant's needs. In other words, we expected the relation between caregiver stimulation of development and infant cognitive development to be moderated by caregiver sensitivity.

In addition to the two aforementioned measures of caregiver behavior, we also included another feature of the child care environment in the prediction of infant cognitive development, namely the child–caregiver ratio or the number of children per caregiver. A smaller number of children per caregiver have been found related to various favorable behavioral and developmental outcomes for young children in child care centers (for a review see Lamb & Ahnert, 2006). This relation may be partly explained by the fact that a larger number of children per caregiver reduce the time available for high-quality caregiver–child interactions for the individual child. A recent experimental study in child care centers showed that reducing the number of children per caregiver from 5 to 3 significantly increases the quality of caregiver–child interactions and child well-being, particularly for younger infants (De Schipper, Riksen-Walraven, & Geurts, 2006). Including the child–caregiver ratio as a predictor in the present study made it possible to examine whether the caregiver–child ratio contributes to the prediction of infant cognitive development through and beyond the quality of caregiver behavior.

To control for possible parental influences, we also included parental education in the prediction of infant cognitive development. Parental education is an important predictor of children's cognitive competence (e.g., NICHD Early Child Care Research Network, 2002; Sellers, Burns, & Guyrke, 2002). In an earlier study on Dutch infants, parental education – which was highly correlated with parental intelligence – was found to predict 15-month-olds' cognitive development both indirectly, through the quality of the parent–child interaction, and directly, probably through genetic influences (Van Bakel & Riksen-Walraven, 2002). As an additional indicator of the quality of the infants' home environment we also included a rating of maternal sensitivity toward the infant as a control variable. The inclusion of parental education and maternal sensitivity in the prediction of infant cognitive development also controls for possible selection effects, i.e., higher educated parents and more sensitive mothers selecting higher quality child care for their children.