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ABSTRACT

This study examined (1) the effects of onset of timing for early nonparental care patterns on later child development, and (2) the effects of length of daily enrollment in care on later cognitive attainment and socioemotional behaviors. Preschool teachers rated 105 middle-class children on the Preschool Behavior Questionnaire (PBQ) and the Preschool Behavior Rating (PBR) instrument. Socioemotional behaviors of preschoolers who had been in full-time care from infancy onward were rated on the PBR as more intellectually competent than children who had not had full-time care. They were also rated on the PBQ as more hostile-aggressive than children who had never had full-time care. A hierarchical aggression analysis revealed that both observed and teacher-rated aggression were predicted more by sex of child, quality of the day-care center (teacher education and employment stability), and family socioeconomic factors, than by length of enrollment in full-time, nonparental care. A reference list of 26 items is included. (BC)

# Infant Child Care Patterns and Later Ratings of Preschool Behaviors[1]

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Running Head: Infant daycare - preschool ratings

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Abstract

Preschool teachers (blind to infancy care experiences) rated 105 middle-class children (mean age 53 months) on the 30-item Preschool Behavior Questionnaire (PBQ) and the Preschool Behavior Rating (PBR) instrument. Social-emotional behaviors of the preschoolers during indoor free-play sessions were videotaped and analyzed. Preschoolers who had been in full-time nonparental care from early infancy onward were rated on PBR items as more competent intellectually. But they were also rated by their teachers on PBQ and were observed as more hostile-aggressive than were children who had never had full time non-maternal care as infants or toddlers. In a hierarchical regression analysis, observed and teacher-rated aggression was predicted more by sex of child(male), quality of the center( teacher education and employment stability) and family SES factors. Group status accounted, then, for only 1-2% of the variance in aggression ratings.

Key words: infant daycare; preschool ratings; socioemotional behaviors

# Infant Child Care Patterns and Later Ratings of Preschool Behaviors

The question of potential short-term and long-term sequelae of early nonparental care on the later development of young children has been of focal interest and concern for decades. The concept of attachment has provided a base for research regarding the impact of day care upon children's socioemotional development. The value of the construct of attachment (especially security of attachment with the primary caregiver as measured in the Ainsworth Strange Situation) for child development literature in general, and for the study of nonparental care in particular, rests on two important elements. First, the quality of infant-mother attachment has been found to be stable over time from 12 to 18 months, at least for middle-class populations, despite the fact that specific attachment behaviors such as contact seeking, amount of distress at separation, etc. are not. For example, Waters(1978) revealed that 48 of the 50 middle-class infants, whose attachment status to their mothers was assessed at 12 months, were independently reassigned to the same attachment category at 18 months.

The second, and perhaps more valuable feature of this construct of attachment lies in its predictive implications. An increasing number of studies support the validity of a relationship between quality of attachment in infancy and individual differences in subsequent socioemotional development. Researchers have reported that security of attachment is related

to: an infant's ability to use the mother as a secure base for exploration of the environment (Ainsworth, Blehar, Waters, & Wall, 1978); a toddler's ability to request help from and comply with suggestions from a mother in a problem-solving situation where compliance with the mother has clear adaptive advantage (Matas, Arend, & Sroufe, 1978); an infant's sociability with an adult stranger (Main & Weston, 1981), a toddler's sociability with peers (Pastor, 1981); an infant's attractiveness as an interactive partner to an unfamiliar peer (Jacobson & Wille, 1986); an infant's ability to negotiate the environment (Cassidy, 1986). Secure infant attachment has also been associated with later ego-resiliency and ego-control in 4 - 5 year olds (Block & Block, 1980), and free ranging access to affect, memory, and plans among 6 year olds (Main, Kaplan & Cassidy, 1985). Higher maladjustment, difficulties in peer relations, as well as less compliance have been found for third graders with a history of full time nonparental care in infancy (Vandell & Corasaniti, 1988).

Results to date of research on this issue are controversial, and interpretation of the results has been acutely debated among child development specialists. Such questions have important implications for conformation or modification of Bowlby's ethological theory and Ainsworth's attachment theory concerning the central importance of infant-caregiver relationships (Bowlby, 1988; Ainsworth et al., 1978).

In the early stages of infant day care research, infant day care was characterized as a boon for employed parents and as posing no threat to the social emotional or intellectual development of young children (Belsky & Steinberg, 1978).

Recently, researchers interested in issues concerning potential effects of infant daycare have focused more specifically on whether full-time nonmaternal care which begins before the first year of life of a child has negative effects on later child relationships with peers as well as adults. After reviewing extensive studies on day care effects, Belsky(1988) concluded that "entry into (nonmaternal) care in the first year of life for 20 hours or more per week is a `risk factor'(p. 257)" for the development of insecure-avoidant attachments in infancy and heightened aggressiveness, non-compliance, and withdrawal in the preschool and early school years. Belsky speculated that later behaviors of infants who have experienced full-time day care reflect an underlying doubt or mistrust about the availability of the mother to meet the baby's needs; they reflect an insecure relationship.

Some researches suggest that full-time nonparental care for infants under one year of age may result in an increased probability of avoidant interactions of babies with mothers in the Ainsworth Strange Situation (Barglow, Vaughn, & Molitor, 1987; Belsky & Rovine, 1988). In addition, there are indicators that while preschoolers who have been in infant day care on a full-time basis show satisfactory social development, their

preschool teachers tend to rate them as more aggressive with peers (Field, Masi, Goldstein, Perry, & Parl, 1988). Parental concerns and social policy decisions make it urgent that any potential relationships between child development (cognitive and socioemotional) on the one hand and infancy and post-infancy child care patterns on the other hand be clarified.

The present study examines preschool children's intellective achievements and their prosocial and antagonistic interactions as rated by teachers thoroughly familiar with each child but blind to the status of the child's history of care. In addition, social interactions with peers and teachers during indoor free-play sessions were studied. The preschool ratings were studied in relation to the child care patterns that the children had experienced both prior to and subsequent to one year of age (as reported to the investigators by the parents).

The purpose of this retrospective study of early nonparental care patterns is to examine (1) effects of onset of timing for early nonparental care patterns on later child development, (2) and effects of length of daily enrollment in nonparental care during early infancy on later cognitive attainment and socioemotional behaviors.

## Methods

### Subjects

Subjects of this study were 105 children, 3 1/2 to 5 years of age, from middle- to upper-middle-class families. The mean age of the children, 53 boys and 52 girls, was 53 months old.

The children attended nine different middle-class child care centers in a medium-sized urban area. For each child, a parent signed a consent form permitting study of the child.

Children were assigned to one of three study groups according to their care history from birth up to the present study period. Group 1 children are those who have had continuous, full-time (more than 20 hours per week) nonparental care which started before the age of nine months. Group 2 children had full-time nonparental care after nine months of age. Group 3 consists of children who never had full-time nonparental care during the first three years of life, but some of the children had part-time care. Of 117 families contacted, only two children could be found who had full-time nonparental care during the first year and part-time or no nonparental care subsequently. Thus, the three groups studied represent normative patterns in the urban middle-class daycare centers contacted for this study. The mean Hollingshead index ($\underline{M}$ = 55) of social class for the parents in groups 1, 2, and 3 respectively was 56, 51, and 57. Group 2 differed significantly from groups 1 and 3. The groups did not differ on mean child age, educational level and age of father or mother, and intactness of family (the families were almost all two-parent families).

Procedure

In each classroom, head teachers, who had known each child for an average of 12 months, rated each child's social-emotional behaviors according to two instruments. One was the Preschool

Behavior Questionnaire (PBQ, Behar & Stringfield, 1974). The PBQ is a 30-item questionnaire on which head teachers rate each child's socioemotional problematic behaviors and personality difficulties. Ratings range from 0 (does not apply) to 2 (certainly applies). Teachers also rated the children on the Preschool Behavior Rating instrument (PBR; Schwarz, Strickland & Krolick, 1974) on a 5-point Likert-type scale. In order to ensure blind ratings for each child, teachers were not informed about either 1) the purposes of this study or 2) the group status of each child.

The preschoolers' positive and antagonistic social interactions with peers and with teachers were videotaped for five minutes per day in the classroom during unstructured indoor free-play for four days, total of 20 minutes. Each observation was coded using a time-sampling technique in which behavior was coded for 20-second intervals. Any and all of the preschoolers' social activity that occurred within a time interval was coded into 16 observational categories.

## Results

### Preschool Behavior Questionnaire

A significant group difference was found for the total PBQ score ($F = 3.09$, $p < .05$). The group difference came from a comparison of means of groups 1 ($M = 10.0$) and 2 ($M = 9.8$) children versus group 3 children ($M = 6.8$), $F\ (1, 99) = 6.17$, $p < .05$. Preschoolers with full-time nonparental care whether it

started before or after nine months of age were rated by their head teachers as having more social-emotional behavior problems than children with no full-time nonparental care experiences.

Furthermore, significant differences among the three study groups were found for seven of the 30 PBQ items at $p < .05$ level. Groups differed on the following items: fights, is destructive, is disobedient, lies, soils self, blames others, and kicks/hits. The three groups, in addition, differed on one item, unhappy, at $p < .10$ level. A closer look at these items revealed that group differences appeared mainly for aggressive behaviors (fights, destructive, and kicks/ hits) and for antisocial behavior items (disobedient, lies, blames others) rather than for other mental health or behavior problem items on the PBQ. Prior to this study, the authors had initially designated, with 100% agreement, these six plus three more (bullies, does not share, and inconsiderate) as aggressive/antisocial items. Children who had experienced full-time nonparental care, whether it started before nine months of age (group 1) or after nine months of age (group 2) were rated higher than children in group 3 on six of these nine specifically aggressive/antisocial items on the PBQ (See Table 1).

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Insert Table 1 about here

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Post-hoc tests (Scheffe tests) were performed for these items in order to pinpoint significant between-group differences.

Results of the Scheffe tests showed that when there were significant between-group differences, they were most likely to be differences between group 1 (who had full-time nonparental care before 9 months of age) and group 3 (who never had full-time nonparental care from birth to three years). Teachers rated group 1 children as significantly more: disobedient, lying, blaming others, and unhappy than group 3 children.

Comparison between group 1 and group 2 (who had full-time nonparental care after nine months of age) showed that group 1 children were rated by their teachers as lying more than group 2 children. Similarly, in a comparison between groups 2 and 3, a Scheffe test revealed that group 2 children were rated as blaming others more than group 3 children.

PBQ Factor Analytic Differences. In initial work with this instrument, Behar extracted three factors from the PBQ by factor analysis: hostile-aggressiveness, anxious-fearfulness, and hyperactive- distractibility. Tests for group differences on these factors can be carried out after adding item scores for each factor. ANOVA tests on the factor scores then can highlight for which areas group differences, if any, are manifested. Thus, with the present study sample, separate ANOVAs were carried out for each of the three factors (See Table 2).

The results of the analyses on the three PBQ factors revealed significant group differences only for the hostile-aggressive factor ($F = 3.81$, $p = .03$). Comparisons of means showed that children from groups 1 ($M = 3.9$) and 2 ($M = 3.5$)

scored significantly higher than group 3 children ($\underline{M}$ = 2.0) on the hostile-aggressive factor.

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Insert Table 2 about here

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Thus, preschoolers with varying degrees of experience of nonparental care were perceived as being different, especially with respect to hostile-aggressive behaviors, indexed by items such as: fights with other children, destroys, kicks/bites/hits other children, and blames others. In addition, group differences were observed for the categories of disobedient, lies, and soils self. Even though not all of the between-group comparisons were significant, differences among children who had full-time nonparental care, whether it started before or after the first year of life, and children who had not experienced full-time nonparental care since birth were distinct and the trends to be seen in Table 1 suggest less optimal social functioning for group 1 preschoolers. The teacher ratings reflected higher behavioral difficulties (particularly antisocial/aggressive interactions) for the children who had experienced full-time non-parental care during the infant/toddler period.

Preschool Behavior Ratings(PBR)

The Preschool Behavior Rating instrument consists of nine behavioral traits. Each head teacher rated each preschool child on a 5-point Likert-type scale for each trait.

In terms of early child care history, significant group differences were observed for two of the nine PBR traits: successful problem solving ($F = 6.20$, $p < .01$), and ability to abstract ($F = 4.91$, $p < .01$). Further analysis by Scheffe post-hoc tests revealed that group 1 was rated as significantly superior ($p < .05$) to group 3 on problem solving ($M = 4.1$ vs. $M = 3.4$). Differences in teacher ratings between group 1 and group 3 on ability to abstract were also significant ($M = 3.9$ vs. $M = 3.1$; See Table 3).

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Insert Table 3 about here

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PBR Factors. Schwarz and his associates extracted three factors from the 9 PBR traits by factor analysis: social compatibility, social assertiveness, and intellectual competency. Separate ANOVAs for the three PBR factors revealed that the three study groups differed significantly only on the intellectual competency factor ($F = 4.79$, $p = .01$). Results of a post-hoc Scheffe test showed that group 1 children ($M = 11.5$) were rated significantly higher than group 3 children ($M = 9.7$) on the intellectual competency factor by their teachers who were blind to the children's early care history ($F = 4.79$, $p < .01$). No between-group differences on the other two factors- social compatibility with peers or social assertiveness- were found.

Social Interactions: Observations

Observations of preschoolers' social interactions were

grouped and were analyzed by MANOVAs: positive social interactions with peers, antagonistic interactions with peers, positive interactions with teachers, signs of emotional distress, compliance and noncompliance to teachers.

Results from the MANOVAs showed that preschoolers with varying experiences (during infancy and toddlerhood) in nonparental care were not observed to differ in their positive social interactions with peers and teachers. No significant multivariate effect of group were found on four measures of positive peer interactions; positive physical contact, affective attention, verbal interactions, and prosocial behaviors (cooperation, helping, sharing) with peers. No significant multivariate effect of group were obtained on positive interactions with teachers; physical contact, affective attention, and verbal interactions.

However, results of a MANOVA on four different measures of aggression behaviors (instrumental, physical, verbal aggression, rejection/exclusion) revealed a significant multivariate group effect, with Wilks' lamda = .82, $\underline{F}(8, 192) = 2.42$, $\underline{p} < .05$ (See Table 4). Preschoolers who had had nonparental care more than 20 hours per week whether it had started before nine months of age (group 1) or after nine months of age (group 2) were observed to manifest more aggressive behaviors toward peers than preschoolers who had not had full-time nonparental care during the first three years of age (group 3). Comparisons of means between groups 1 and 2 combined versus group 3 showed that groups 1 ($\underline{M}$ = 1.3) and

2 ($\underline{M}$ = 1.0) children manifested significantly more instrumental aggression than group 3 children ($\underline{M}$ = 0.6), $\underline{F}(1,99) = 4.03$, $\underline{p} < .05$. A group difference was observed also in rejection/exclusion of peer(s) from play. Preschoolers of groups 1 ($\underline{M}$ = 0.5) and 2 ($\underline{M}$ = 0.8) were observed to reject/exclude their peers significantly more than group 3 children ($\underline{M}$ = 0.2; $\underline{F}(1, 99) = 4.52$, $\underline{p} < .05$).

Effects of infant/toddler care history on compliance and noncompliance to teacher were tested by ANOVAs. No differences were observed among three groups on compliance to a teacher. However, a significant group difference was found for noncompliance to their teachers between group 1 versus groups 2 and 3 combined, $\underline{F}(1, 99) = 3.96$, $\underline{p} < .05$. The preschoolers who had had full-time nonparental care before nine months of age ($\underline{M}$ = 0.2) were observed to be more noncompliant to their teacher than preschoolers whose full-time nonparental care started after nine months of age ($\underline{M}$ = 0.2) or who never had full-time nonparental care for the first three years of life ($\underline{M}$ = 0.03).

A MANOVA test on preschoolers' comfort-seeking and crying/whining resulted no significant multivariate group effects. No significant difference was obtained for instrumental help-seeking among the three groups.

## Discussion and Conclusions

This study raises some interesting problems for day care policy. Timing of onset of full-time non-parental care as well

as length of daily separation affected preschoolers' subsequent socioemotional and cognitive developmental achievements.

Results of this study provide both positive news as well as a reason for a concern with respect to full-time daycare during the first year of life. On the positive side, the teachers, blind to the children's care status in infancy, rated preschoolers who had had full-time nonparental care before their first birthday as significantly more competent intellectually, such as more successful at problem solving and more able to abstract. Unfortunately, it was also found that full-time infant non-parental care increased the risk of aggressive behaviors in preschool youngsters. Teacher ratings as well as free-play observations yielded significantly higher proportion of aggressive behaviors among preschoolers with early nonparental care experiences. A higher proportion of noncompliance to a teacher was observed among children with full-time nonparental care during infancy.

For full-time nonparental care children, research findings of an increased risk of an Ainsworth avoidant attachment(Sroufe, 1988) have been interpreted positively as an example of increased emotional maturity (Clarke-Stewart, 1988). In this study, the increased hostile-aggressive responses observed, as well as the noncompliance to teachers can in no way be given a positive interpretation.

Our findings are consonant with those of Vandell and Corasaniti (1990) who found that third-grade teachers rated

children who had had extensive early infancy full-time nonparental care as less compliant with more negative social peer nominations. The results raised some critical issues for day care policy. Haskins (1985) reported that low-income kindergartners who had attended a full-time cognitively-oriented care program from early infancy were cognitively superior but also far more likely to be aggressive in a variety of school settings. However, when a prosocial program was implemented in the child care center, then subsequent waves of graduates did not exhibit higher aggression rates than controls. We are therefore hopeful that a concerted and deliberate policy to promote a prosocial curriculum in the infancy and preschool classrooms may ameliorate such negative behaviors while leaving potential cognitive advantages of an enriching early education experience intact.

## Study 2

In previous studies with infant day care children, some researchers suggested that aggressive behaviors differentiated children with a history of early full-time nonparental care in the first year of life from children without first year full-time nonparental care (Belsky, 1988; Field, et al., 1988, for example). It has been speculated that heightened aggression associated with full-time infant nonparental care reflects an insecure attachment relationship to mother (Belsky, 1988). Thus, further analyses of the preschoolers' aggressive behaviors with peers in relation with contemporary attachment security to mothers were undertaken. Especially, relative importance of family characteristics, child care center quality, attachment security with mother, sex of child, and maternal parenting practices on preschoolers' aggressive behaviors was the focus of the second study.

In this research, aggression was measured by two different methods: (1) the hostile-aggression factor from the PBQ, computed from teacher ratings and (2) the amount of peer aggression by the target child observed by the investigator during indoor free-play session and coded from videotapes. The two measures of aggression from different instruments used in this research were moderately related ($r$ = .52, $p$ = .001). Significant group differences on both aggression measures were found for children with differing child care history in infancy. Specifically, the group differences were found whether indexed by a) head teachers'

rating for the hostile-aggression scale, or b) observers' blind coding of indoor free-play observations. All coders were unaware of each preschooler's infancy care history and all coded group 1 children as more aggressive than group 3 preschoolers.

Given the results that children in three study groups, and boys and girls differ on aggression, a multiple regression is necessary to explain how much variance of the aggressive behaviors can be accounted for by group status, child sex, and preschooler current attachment security to mother.

Hierarchical regression model

In this analysis, a hierarchical regression model was used to evaluate contributions of early care group, sex of child, current attachment security as well as relevant covariates on aggression measures. In a hierarchical regression model, two sets of regression equations are compared in each step. The change in $R^2$ from two models is regarded as the percentage of variance of dependent measure that can be explained by variables that entered into the second model. A hierarchical regression model was used by Phillips and her associates (1987) to test effects of center quality after controlling for selection factor, and proved to be a very powerful test of relevant effects of each variable. In the hierarchical regression analyses that follow, variables that covary with preschoolers' aggression are entered prior to regressions of aggression measures.

Family demographic variables, center quality, and maternal

childrearing practices were considered as possible covariates. In order to select variables from a large number of variables which enter into the hierarchical regression, a stepwise multiple regression was conducted to identify the specific variables among family demographics, center quality, and maternal parenting practices, that showed a strong relation to teacher-rated and observed aggression[2]. Specifically, the hostile-aggression factor score from the PBQ was regressed on the measures of family demographic variables, four proxy measures of center quality, and nine measures of maternal childrearing practices. The procedure was repeated with the composite observed aggression score as a dependent variable by adding 4 different observed aggression measures. This conservative approach was used in order to remove the maximum variance in the preschoolers' aggression measure attributable to differences in the children's family background, quality of day care center, and parenting practices prior to examining the influence of infant/toddler care pattern, sex of child, and attachment security.

Among the family demographic variables, the Hollingshead four factor social index, parents' marital status, and mother's education were the three variables that emerged from the stepwise regression as contributing relatively high variances to the two aggression measures.

Among four measures of center quality, years of teacher

[2] For detailed descriptions of each measure, see K. Park (1991).

education, and years of teaching at the specific center (in which a child was observed) emerged as having relatively strong relationships with preschooler aggression. The amount of control mothers practiced, and maternal responsiveness dimensions emerged as two variables of relative significance among maternal childrearing practices.

Thus, in the hierarchical regression model, three proxies of family background (the Hollingshead Social Index, parents' marital status, and mother's education), obtained from the stepwise regression, entered first in the equation. Two proxies of center quality, teacher education, and stability of teacher, entered into the second equation. Maternal responsiveness and the amount of control entered into the third equation. The three equations were used to control covariate effects, if any, on preschoolers' aggression measures.

Having controlled covariates, the next equations were entered to examine relative contributions of each variable to child aggression measures. Children's group status, reflecting history of early nonparental care, entered as fourth, and sex of child as the fifth equation. Child's contemporaneous attachment security entered as the sixth and final equation. The hierarchical model was regressed separately for teacher-rated aggression from the PBQ and for observed aggression. Changes in $R^2$ at each step of the regression model due to specific variables that entered into the equation in that model, total $R^2$ from all

the variables in the model, and F statistics to test significance of the $R^2$ increases in each model are reported in Table 5.

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Insert Table 5 about here

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Teacher-rated aggression

Results of the hierarchical regression analysis with teacher-rated aggression will be discussed first. Table 5 shows that after controlling all the covariates, the preschoolers' group status contributes only 1% of the variance of teacher-rated aggression.

Sex of child contributed another 11% of the variance for teacher-rated aggression, $F[1, 93] = 14.50$, $p < .01$. Boys were rated as exhibiting higher aggression than girls. The preschooler's current attachment status to the mother added less than 1% of the variance for the teacher-rated aggression.

Table 5 shows that prior to removing the variance accounted for by the preschoolers' teacher-rated aggression, several predictors yielded significant contributions. The preschoolers' family background accounted for 11% of the variance of teacher-rated aggression which was significant at $p < .01$ ($F[3, 103] = 4.28$). Specifically, the Hollingshead Social Index, parents' marital status, and mother's education were the variables that affected teacher-rated hostile-aggression.

Teacher education and teacher stability contributed another

8% to the preschoolers' teacher-rated aggression, $F(2, 103) = 4.53$, $p < .01$. Children whose teacher had higher education ($r = -.22$, $p < .05$) and had taught in the same center longer ($r = -.25$, $p < .01$) had lower aggression scores.

Maternal responsiveness to child's input and amount of control mothers practiced accounted for an additional 7% of the variance of teacher-rated aggression, $F(2, 93) = 3.94$, $p < .01$. The more the mothers controlled their children, the higher the children's aggression was rated by the teachers.

Observed aggression

Analysis of the hierarchical regression model with observed aggression as a dependent measure exhibited similar results with the teacher-rated aggression. The first regression model showed that the Hollingshead Social Index, parents' marital status, and the mother's education contributed 5% of the variance to the preschoolers' observed aggression, but the F-statistic indicated that this was not an significant contribution (See Table 14).

Teacher education and teacher stability added 7% of variance, $F(2, 103) = 3.82$, $p < .01$. Mother's responsiveness to child's input and amount of maternal control contributed another 6% of the variance to the observed aggression, $F(2, 93) = 3.24$, $p < .01$. Children whose teacher had a higher education level($r = -.12$) and had stayed at the specific center longer($r = -.24$) were observed to manifest less aggressive behavior(instrumental, physical, verbal aggression, and rejection/exclusion of a peer).

The preschoolers' early care patterns added 2% of the

variance to the observed aggression, which was not significant. Sex of child contributed an additional 7% of the variance to the preschoolers' observed aggression, $F(1, 91) = 8.01$, $p < .01$. Boys were observed to be more aggressive.

The preschoolers' current attachment security to their mothers significantly contributed to the observed aggression, adding 4% more to the variance, $F(1, 91) = 4.23$, $p < .01$. Children who were currently perceived by their mothers as having more secure attachment relationship with them exhibited less aggression, $r = -.13$.

Summary of Children's Aggression by the Two Hierarchical Regression Analyses

Results from the two hierarchical regression analyses of aggression measures show that the preschoolers' infant/toddlerhood nonparental care group status does not contribute a significant amount of variance to their measured aggression scores after the removal of variances from covariates.

Sex of child remains as a significant variable even after controlling covariates, and accounts for 11% (teacher-rated) to 7% (observed) of variance of aggression measures. The preschoolers' current attachment security to the mothers reveals a mixed result. The preschoolers' current attachment security was insignificant for teacher-rated aggression, explaining virtually no variance. For the observed aggression, current attachment security explained a small but significant amount of the variance (4%).

In addition to the effects of early nonparental care pattern, sex of child, and current attachment security to the mother, there were other variables that accounted for a significant amount of variance of the preschoolers' aggression measures. Families' socioeconomic status, measured by the Hollingshead four-factor index, parents' marital status, and mother's education explained a considerable amount of variance for both aggression measures (11% for the teacher-rated aggression and 5% for the observed aggression).

Quality of the center in which the children were enrolled at the time of the study, especially in terms of teacher quality, was also significant in relation to children's aggressive behaviors. Eight percent (teacher-rated) and 7% (observed) of the variance for children's aggressive behaviors were explained by teacher education and teacher employment stability.

Maternal childrearing style affected children's aggressive behaviors. Specifically, maternal responsiveness to child input and the amount of maternal control contributed 6% (observed) to 7% (teacher-rated) of variance to the children's aggression measures.

## Conclusions

This extensive study of preschoolers with varying infancy care experience has delineated many of the complexities that are inherent in studying any differential effects of non-parental care in infancy. The time of entry for infants ( prior to or after 9 months of age) and the length of weekly time ( full-time

versus part-time care) seemed to be quite influential when just group differences were examined. That is, preschoolers who had been in early full-time care looked both more cognitively competent ( by teacher ratings in preschool) and more aggressive (by observations in free play and by teacher ratings) in comparison with preschoolers who had begun non-parental care after the first year of life. However, the hierarchical regression analyses revealed that other factors accounted more for the differences than did group membership. For example, males were far more likely to be rated as aggressive . Sex of child accounted for 11% of the teacher-rated and 7% of the observed aggression. Preschoolers' current attachment security to mothers explained 4% of the variance in observed aggression but virtually no variance for teacher-rated aggression . Family SES , parents' marital status, and maternal education accounted for 11% of teacher -rated aggression and 5% of observed aggression.

Most important for public policy are the findings about the influence of the quality of child care on aggression. When infants entered child care and how long they spent in care per week only accounted for 1% of teacher-rated aggression and 2% of observed aggression. However, teacher education and teacher stability accounted for 7% of the variance in observed aggression and 8% of teacher-rated aggression. Whitebook, Howes, Phillips, & Pemberton (1989) reporting on the results of their National Child Care Staffing Study, found that teachers'

working conditions affected the caliber of center-based child care available in the United States today. Teachers who were earning higher wages , were more stable in their jobs , and children in those centers spent less time in aimless wandering and had higher Peabody Picture Vocabulary Test scores.
In this national survey," staff provided more sensitive and appropriate caregiving if they completed more years of formal education, received early childhood training at the college level...and worked in centers devoting a higher percentage of the operating budget to the teaching personnel" (p. 44). Thus, the quality of federal and community support for staff training and salary supports may be critical in mitigating any negative influences of very early infant entry to full-time care.

A second finding with important implications for educators and for community policy is that maternal childrearing style did affect children's aggression ratings: 6% of the observed and 7% of the teacher-rated aggressions. Thus, if more parent-education courses were available in the community and in high-school classes, then more parents and parents-to-be could acquire : widespread knowledge of positive discipline techniques, responsive parenting, effective communication styles, skills in helping children become more prosocial ( Honig, 1982), and effective strategies for enhancing child self-esteem and cognitive competence. Since we know from Howes and colleagues' work (1987) that family stress and interaction patterns affect not only appropriateness and efficacy of child rearing but choice

of better or poorer centers, then educational efforts to provide more classes and give more prominence and prestige to teaching child development and parenting skills in public schools on a more regular and state-supported basis would seem highly appropriate. Families need to learn better how to choose high quality care and to value superior levels of caregiver training in the facility they choose. Given support for families, for parenting, and for high-quality child care, we can, as a nation, optimize the outcomes for our children regardless of age of entry into non-parental care.

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Table 1

Means and SDs of Each PBQ Item by Study Group

| | 1(n=37) M(SD) | 2(n=34) M (SD) | 3(n=34) M (SD) | F |
|---|---|---|---|---|
| 1. Restless | .68(.75) | .82(.83) | .59(.61) | - |
| 2. Squirmy | .51(.65) | .71(.84) | .47(.56) | - |
| 3. Destructive | .30(.52) | .32(.47) | .12(.33) | 3.07* |
| 4. Fights | .54(.56) | .47(.61) | .29(.46) | 3.50* |
| 5. Disliked | .08(.28) | .09(.29) | .03(.17) | - |
| 6. Worries | .59(.76) | .53(.61) | .38(.49) | - |
| 7. Solitary | .50(.65) | .56(.61) | .44(.61) | - |
| 8. Irritable | .24(.43) | .32(.64) | .21(.41) | - |
| 9. Unhappy | .35(.48) | .25(.50) | .10(.29)[c] | 3.00+ |
| 10. Twitches | .11(.46) | .06(.34) | .00(.00) | - |
| 11. Bite nails | .08(.3[illegible] | .03(.17) | .00(.00) | - |
| 12. Disobedient | .51(.65) | .29(.52) | .18(.39)[c] | 4.26* |
| 13. Poor concentration | .35(.54) | .41(.61) | .32(.59) | - |
| 14. Fearful | .57(.60) | .62(.65) | .65(.65) | - |
| 15. Fussy | .49(.69) | .32(.59) | .26(.45) | - |
| 16. Lies | .24(.43)[a] | .06(.24) | .03(.17)[c] | 5.00** |
| 17. Soils itself | .30(.52) | .32(.64) | .06(.24) | 3.10* |

(continued)

(Table 1 continued)

| | | | | |
|---|---|---|---|---|
| 18. Stutters | .00(.00) | .12(.33) | .09(.29) | - |
| 19. Other speech difficulty | .11(.39) | .15(.44) | .18(.46) | - |
| 20. Bullies | .32(.53) | .29(.58) | .24(.43) | - |
| 21. Inattentive | .43(.60) | .41(.61) | .38(.49) | - |
| 22. Does not share | .43(.50) | .47(.61) | .35(.49) | - |
| 23. Cries easily | .43(.65) | .35(.60) | .21(.48) | - |
| 24. Blames others | .46(.56) | .47(.66)[b] | .12(.33)[c] | 5.70** |
| 25. Gives up | .32(.63) | .21(.41) | .41(.61) | - |
| 26. Inconsiderate | .43(.50) | .32(.47) | .32(.47) | - |
| 27. Sexual problem | .05(.33) | .06(.24) | .00(.00) | - |
| 28. Kicks, hits | .30(.46) | .38(.60) | .12(.33) | 4.12* |
| 29. Stares into space | .08(.28) | .24(.55) | .15(.44) | - |
| 30. Behavior problems | .19(.46) | .18(.52) | .09(.29) | - |
| Total | 9.97(6.91) | 9.82(8.46) | 6.76(5.02) | 3.09* |

Note. Grand total PBQ mean across groups: $M = 8.9$($SD = 7.0$).

a Mean difference between Group 1 and Group 2 is significantly different at $p < .05$ level by Scheffe post-hoc test.

b Mean difference between group 2 and group 3 is significant.

c Mean difference between group 3 and group 1 is significant.

$^{+}$ $p < .10$. $^{*}$ $p < .05$. $^{**}$ $p < .01$.

Table 2

Means and SDs of Each PBQ Factor by Group and Child Sex

| Factor | Group | | | F | Sex | | F |
|---|---|---|---|---|---|---|---|
| | 1 (n=37) | 2 (n=34) | 3 (n=34) | | boys (n=53) | girls (n=52) | |
| I. Hostile-Aggressive | 3.9 (3.8) | 3.5 (4.3) | 2.0 (3.0) | 3.81* | 4.4 (4.2) | 1.9 (2.8) | 15.30** |
| Inconsiderate with others | | | | | | | |
| Fights with other children | | | | | | | |
| Destroys own or others' belongings | | | | | | | |
| Bullies other children | | | | | | | |
| Kicks, bites, hits other children | | | | | | | |
| Does not share toys | | | | | | | |
| Blames others | | | | | | | |
| II. Anxious-Fearful | 3.1 (2.9) | 2.7 (2.7) | 2.3 (2.1) | - | 2.5 (2.7) | 2.9 (2.5) | - |
| Tends to be fearful or afraid of new things | | | | | | | |
| Appears miserable, unhappy, tearful, or distressed | | | | | | | |
| Stares into space | | | | | | | |
| Cries easily | | | | | | | |
| Gives up easily | | | | | | | |

(continued)

(Table 2 continued)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| III. Hyperactive- | 2.0 | 2.4 | 1.8 | - | 2.4 | 1.7 | - |
| Distractible | (2.0) | (2.5) | (1.8) | | (2.1) | (2.1) | |
| Inattentive | | | | | | | |
| Has poor concentration or short attention span | | | | | | | |
| Restless, runs about or jumps up and down, does not keep still | | | | | | | |
| Squirmy, fidgety child | | | | | | | |

Note. Numbers in parentheses are SDs.

* $p < .05$. ** $p < .01$.

Table 3

Means and SDs of Each PBR Item for Each Child Care Group

| | 1 | 2 | 3 | F |
|---|---|---|---|---|
| | M (SD) | M (SD) | M (SD) | |
| I. Social Compatibility | 11.2(2.4) | 11.5(2.5) | 11.1(2.3) | - |
| gets along(with peers) | 4.0(0.9) | 4.0(1.0) | 3.9(0.9) | - |
| cooperative(with adults) | 3.8(1.1) | 4.1(1.0) | 3.9(1.0) | - |
| tolerance for frustration | 3.3(1.0) | 3.4(1.0) | 3.3(1.0) | - |
| II. Social Assertiveness | 11.0(1.5) | 11.0(1.5) | 10.3(1.3) | - |
| motor activity | 3.7(0.9) | 3.8(1.0) | 3.8(0.9) | - |
| spontaneity | 3.7(1.0) | 3.7(0.8) | 3.4(0.8) | - |
| unaggressive | 3.6(1.1) | 3.6(1.0) | 3.2(1.0) | - |
| III. Intellectual Competency | 11.5(2.4) | 11.0(2.9)[a] | 9.7(2.2)[b] | 4.79** |
| playfulness | 3.6(1.1) | 3.7(1.2) | 3.3(1.0) | - |
| problem solving | 4.1(0.9) | 3.9(0.9) | 3.4(0.8)[b] | 6.20** |
| ability to abstract | 3.8(0.9) | 3.5(1.3) | 3.1(0.8)[b] | 4.91** |

[a] Mean difference between groups 2 and 3 is significant at $p < .05$ by Scheffe post-hoc test.

[b] Mean difference between groups 1 and 3 is significant at $p < .05$ by Scheffe post-hoc test.

** $p < .01$.

Table 4

Means and SDs for Observational Data for Each Child Care Group

| | 1(n=37) M (SD) | 2(n=34) M (SD) | 3(n=34) M (SD) | F |
|---|---|---|---|---|
| Positive interaction (with peers) | | | | -[a] |
| Physical contact | 1.9(3.0) | 0.9(1.2) | 1.4(2.1) | - |
| Affective attention | 4.0(3.9) | 3.6(3.3) | 4.6(4.6) | - |
| Verbal interaction | 6.9(3.4) | 5.8(3.0) | 6.0(3.7) | - |
| Prosocial(cooperation /helping/sharing) | 2.2(1.8) | 1.8(1.8) | 2.1(1.6) | - |
| Positive interaction (with teachers) | | | | -[a] |
| Physical contact | 0.2(0.5) | 0.2(0.6) | 0.2(0.9) | - |
| Affective attention | 0.8(1.6) | 0.9(1.1) | 0.4(0.9) | - |
| Verbal interaction | 2.6(2.8) | 2.6(1.8) | 1.4(1.8)[c] | - |
| Aggression with peers | | | | 2.42*[a] |
| Instrumental | 1.3(1.6) | 1.0(1.5) | 0.6(0.7)[c] | - |
| Physical | 1.6(2.1) | 1.7(2.0) | 1.4(1.5) | - |
| Verbal | 0.6(1.3) | 0.2(0.6) | 0.3(0.7) | - |
| Rejecting/excluding | 0.5(1.0) | 0.8(1.5) | 0.2(0.4)[c] | 3.26* |

(continued)

(Table 4 continued)

| | | | | |
|---|---|---|---|---|
| Compliance(teachers) | 1.2(1.4) | 1.2(1.3) | 1.2(1.2) | - |
| Noncompliance(teachers) | 0.2(0.5) | 0.1(0.4) | 0.03(0.2)[d] | |
| Emotional Distress | | | | 2.46*[a] |
| Seeks comfort | 0.8(2.7) | 0.4(0.9) | 0.3(0.8) | - |
| Cries/whines | 0.2(0.5) | 0.8(1.7)[b] | 0.1(0.6) | 4.34* |
| Seeks instrumental help | 0.5(0.8) | 1.0(1.4) | 0.8(1.3) | - |

[a] F statistic is from the MANOVA test.

[b] Difference between groups 2 and 3 is significant according to Scheffe post-hoc test.

[c] Means of groups 1 and 2 combined are significantly different from group 3.

[d] Means of group 1 is significantly different from groups 2 and 3 combined.

* $p < .05$.

Table 5

Hierarchical Regression Model for Children's Aggression Measures

| | Teacher rated aggression | | | Observed aggression | | |
|---|---|---|---|---|---|---|
| | increase in $R^2$ | total $R^2$ | $F$ | increase in $R^2$ | total $R^2$ | $F$ |
| Family demographic variables: | .114 | - | 4.28** | .045 | - | 1.55 |
| Hollingshead Social Index | | | | | | |
| parents' marital status | | | | | | |
| mother's education | | | | | | |
| Center quality: | .075 | .189 | 4.53** | .069 | .114 | 3.82** |
| teacher education | | | | | | |
| teacher stability | | | | | | |
| Parenting practice: | .068 | .257 | 3.94** | .062 | .176 | 3.24** |
| maternal responsiveness | | | | | | |
| amount of maternal control | | | | | | |
| Care group status | .010 | .267 | < 1 | .017 | .193 | < 1 |
| Sex of child | .109 | .376 | 14.50** | .071 | .264 | 8.01** |
| Attachment security | .007 | .383 | < 1 | .037 | .301 | 4.23** |

* $p < .05$. ** $p < .01$.