Original Investigation

Maternal Depressive Symptoms and Children's Emotional Problems

Can Early Child Care Help Children of Depressed Mothers?

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IMPORTANCE Maternal depression is a major risk factor for the development of children's mental health problems. No population-based study to date has examined whether early child care spanning the full preschool period from infancy onward is protective for children of depressed mothers.

OBJECTIVE To examine whether early child care moderates associations between maternal depressive symptoms (MDSs) and child internalizing problems (emotional problems [EPs], separation anxiety symptoms, and social withdrawal symptoms [SWSs]) during the preschool period.

DESIGN AND SETTING Population-based prospective cohort study within the Québec Longitudinal Study of Child Development.

PARTICIPANTS Québec Longitudinal Study of Child Development participants (n = 1759) assessed repeatedly between ages 5 and 60 months.

MAIN OUTCOMES AND MEASURES High-level trajectories of EPs, SWSs, and separation anxiety symptoms between ages 17 and 60 months.

RESULTS Child care age at entry moderated associations between MDSs and child internalizing problems. Among children of mothers with elevated MDSs, reduced odds ratios for EPs and SWSs were found for those entering child care early (0.24; 95% CI, 0.09-0.66 for EPs and 0.29; 95% CI, 0.09-0.92 for SWSs) or late (0.29; 95% CI, 0.11-0.77 for EPs and 0.21; 95% CI, 0.07-0.65 for SWSs) compared with those remaining in maternal care. Child care type moderated the association between MDSs and child EPs; children of mothers with elevated MDSs who received group-based child care had lower odds ratios for EPs than those who remained in maternal care (0.21; 95% CI, 0.09-0.48) or those who were cared for by a relative or babysitter (0.40; 95% CI, 0.17-0.94).

CONCLUSIONS AND RELEVANCE Regulated early child care services reduced the risks for internalizing problems for children of mothers with elevated MDSs. Regulated child care services may be used as a public health intervention to buffer the negative effect of maternal depression on children's internalizing problems.

JAMA Psychiatry. 2013;70(8):830-838. doi:10.1001/jamapsychiatry.2013.1361
Published online June 19, 2013.

Supplemental content at jamapsychiatry.com

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Depression, featuring prominently in a list of the most common mental health disorders,[1-3] is highly prevalent among women of childbearing age (30%-40% meet *DSM* criteria for lifetime diagnosis).[4-7] Children of depressed mothers are at increased risk for a range of persistent mental and physical health problems,[8-17] including internalizing problems (ie, symptoms of depression and anxiety) during childhood and affective disorders in adolescence.[12,18,19] It is important that we gain a better understanding of how maternal depressive symptoms (MDSs) are associated with child outcome over time and of the steps that can be taken to minimize long-term consequences.

Previous studies[20,21] have reported that treatment or remission of depression helps to minimize negative effects in the child, demonstrating that environmental changes can positively influence the outcome of the child. Little is known about whether child care moderates the association between maternal depression and child mental health outcome. Because most children today attend child care services during the preschool period,[22] child care can be regarded as a public health intervention that may benefit families, particularly high-risk families, during the long term.[23] *Child care* typically refers to regularly occurring care (ie, ≥8 hours per week) provided by an individual other than the parent, normally during the day, during the preschool years. This can include child care arrangements with a relative or babysitter or family-based or center-based care.[24] Research on the effects of child care on children's emotional and cognitive development has yielded mixed results, dependent on factors such as child care age at entry and type and the quality and the intensity of exposure.[25] Although some studies[26-29] have raised concerns that early child care, particularly within the first year of life, negatively influences children's social and cognitive development and mother-child attachment, other studies have shown that, among children from low socioeconomic status families, child care during the preschool years is associated with reduced physical aggression[24,30] and improved cognitive abilities.[31,32] Because children of depressed mothers may be more likely to experience disturbed parent-child interactions and attachment and elevated exposure to maladaptive or negative maternal affect, cognitions, behavior, or stressful environments,[29,33,34] child care could be associated with a more positive mental health outcome for the child by reducing the intensity of his or her exposure to maternal depression and providing a range of social interactions that may prevent the development of internalizing problems.

Only 2 previous studies to date have investigated the modifying role of child care on the association between MDSs and child mental health outcome. A US study,[35] observing 1216 children at ages 2 and 3 years, demonstrated that child care reduced the risk for internalizing problems among children of depressed mothers. A recent study[36] supported this finding among 438 Australian mothers and their children and extended the moderating effect of child care to children's internalizing, externalizing, and total behavior problems at age 5 years. Furthermore, child care type differentially affected child outcome, with positive results being strongest for formal child care compared with informal care provided by a relative or babysitter.[36] Yet, these studies are limited in the following ways: (1) child care was reported from age 2 years onward, so it is unclear whether earlier entry into child care affects the results; (2) they focused on broadband internalizing scores without investigating whether the effects are specific for certain subscales; (3) they did not account for family functioning variables, such as parenting; and (4) they did not directly address the important methodological issue of social selection. Children who attend child care often differ from children who do not. Among a group of depressed mothers, less severely depressed mothers may be more likely to enroll their child in child care. It then becomes unclear whether child care per se is responsible for beneficial effects or whether the results are explained by the fact that children who attend child care have less severely depressed mothers.

Using data from a large-scale prospective population-based study, we investigated whether child care is associated with better mental health outcomes for children of mothers with elevated MDSs during the full preschool period spanning the ages 5 months to 5 years. We extend previous findings by examining the following 3 separate internalizing syndrome profiles to look at the specificity of the effects: emotional problems (EPs), separation anxiety symptoms (SASs), and social withdrawal symptoms (SWSs). Furthermore, we study whether child care age at entry and type and the intensity of use differentially affect child outcome, while carefully controlling for social selection by (1) adjusting for relevant risk factors (eg, parenting practices,[37] perceived social support, and socioeconomic status) and (2) using propensity score weighting to ensure that mothers with elevated MDSs who use child care do not differ from those who do not.

We hypothesized that children of mothers with elevated MDSs would demonstrate higher rates of internalizing symptoms (particularly EPs) compared with children of nondepressed mothers. We anticipated that the association between MDSs and children's EPs would be modified by child care experiences, such that children of mothers with elevated MDSs who received child care during the preschool years would experience lower levels of EPs compared with those in maternal care. In line with previous findings,[36] we predicted that the protective role of child care would be most pronounced for regulated group-based child care. Finally, we hypothesized that an earlier age at entry (before age 17 months) into child care would be most beneficial for children of mothers with elevated MDSs.

Methods

Participants

Participants were enrolled in the Québec Longitudinal Study of Child Development, a representative sample of 2120 infants born in Québec, Canada, in 1997 and 1998 and followed up yearly at ages 5, 17, 30, 42, 54, and 60 months. The initial sample was selected from birth registries. Written informed consent was obtained from the primary caregiver (mostly mothers) at each data collection. Home interviews about maternal, parental, family, and child characteristics were conducted yearly with primary caregivers. The mean response rate

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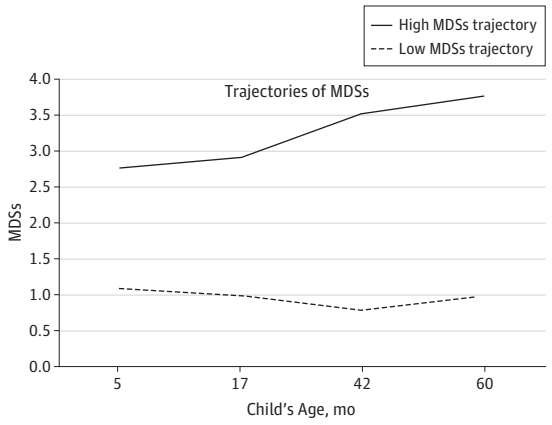
Figure 1. Trajectories of Maternal Depressive Symptoms (MDSs)



Trajectories estimated on the basis of Center for Epidemiologic Studies Depression Scale scores at children's ages 5, 17, 42, and 60 months. The low MDSs trajectory represents the 80.6% of mothers with minimal depression during the time assessed. The high MDSs trajectory represents the 19.4% of mothers with elevated symptoms of depression during the time assessed.

for our outcome variables during the 5 years of data collection was 91.4% (range, 83.0%-96.5%). Multivariate analyses were conducted on a subsample of 1759 participants (83.0%) for whom data on behavior outcome were available. Analyses used weighted scores to ensure that our sample was representative of the target population, despite attrition. Details on participant recruitment, selection, and attrition have been published.[38]

Measures

Predictor

Maternal depressive symptoms were assessed at 5, 17, 42, and 60 months using a shortened version of the Center for Epidemiologic Studies Depression Scale[39] (12 of 20 items were administered). This scale measures the occurrence and severity of depression symptoms during the previous week. Response categories range from 0 (none) to 3 (all the time), with the total score varying between 0 and 36. This shortened version has good cross-sectional validity with the original Center for Epidemiologic Studies Depression Scale[40] and has been used in several studies.[41-45] To maximize our repeated measurements of MDSs during the preschool period, we calculated trajectories using group-based trajectory modeling.[46] A 2-group MDSs trajectory model was selected based on consideration of model fit (according to Bayesian information criteria), better group classification, and statistical power. Membership in the most elevated symptom trajectory was coded as 1 and in other trajectories as 0. Women in the high MDSs trajectory (19.4%) were compared with those in the low MDSs trajectory (80.6%) (**Figure 1**).

Moderating Variable of Child Care Use

At the child's ages 5, 17, 30, 42, 54, and 60 months, mothers reported on child care use and the weekly number of hours their child spent in child care. We considered that a family used child care if there was a regular child care arrangement for at least 8 hours per week. We derived the following 3 child care variables: (1) age at entry, (2) child care type, and (3) intensity of use.

Age at Entry | Age at entry was separated into the following 3 categories: (1) maternal care (these children never entered child care during the preschool years) (n = 102), (2) early entry (before age 17 months) (n = 1098), and (3) late entry (age 17 months or older) (n = 552). Data were missing for 7 of our 1759 participants.

Child Care Type | The following 3 categories of child care type were created: (1) maternal care (ie, no regular child care arrangements) (n = 600), (2) relative or babysitter (ie, care in the child's or relative's home, usually individual care) (n = 609), and (3) regulated group-based child care in a family environment or day care center (n = 546). Many children change child care type with age. The most frequently occurring child care type during the preschool period (ie, the mode), if this mode was unique, was deemed the primary child care arrangement, as previously reported.[32] Otherwise, child care type was determined by the total number of hours spent in each arrangement by summing the weekly number of hours at ages 5, 17, 30, 42, 54, and 60 months. Children in maternal care could have experienced child care at some point, but the most time was spent in maternal care. Data were missing for 4 of our 1759 participants.

Intensity of Use | Trajectories based on the mean number of hours per week spent in child care during the preschool period were calculated using a nonparametric approach for determining trajectories with difficult-to-specify data distributions (R; KmL).[47] The following 3-level model was chosen, reflecting the intensity of use during the preschool period: (1) low child care use (ie, <8 hours per week) (34.0%), (2) increasing child care use (ie, the child may start off with low use, but use increased during the preschool years) (29.5%), and (3) regular child care use (ie, close to 40 hours per week) (36.5%) (**Figure 2**).

Outcome Variables of Child Internalizing Symptoms

The person most knowledgeable about the child, mothers in 98.0% of cases, indicated whether the child never (score, 0), sometimes (score, 1), or often (score, 2) exhibited several internalizing symptoms in the past 12 months. Items used in the Québec Longitudinal Study of Child Development come from the Canadian National Longitudinal Study of Children and Youth,[48] which incorporates items from the Child Behavior Checklist,[49] the Ontario Child Health Study scales,[50] and the Preschool Behavior Questionnaire.[51] Three internalizing problems subscales were examined separately to look at the specificity of the effects for EPs (5 items), SASs (3 items), and SWSs (3 items). A continuous score was obtained by summing items to range from 0 to 10 for EPs and from 0 to 6 for SASs and for SWSs. Ratings of children's EPs and SASs were obtained at ages 17, 30, 42, 54, and 60 months and at ages 42, 54, and 60 months for SWSs. Trajectories of child EPs were previously calculated and published on these participants.[52] Briefly, a 3-level model of child EPs was identified. We dichotomized this model by

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merging the low and moderate trajectories (85.2%) and comparing them with the high EPs trajectory (14.8%). Similar trajectories were calculated for SASs (high [10.0%] vs low and moderate [90.0%]) and SWSs (high [8.6%] vs low and moderate [91.4%]).

Confounding Variables

We searched for confounding variables from the following 3 key domains: child characteristics, family demographics, and family functioning and parenting. Confounding variables were reported by the mother except child care quality, which was observed.

Child Characteristics | Child characteristics included sex, low birth weight (<2500 g), and difficult infant temperament. The latter was rated by the mother at 5 months using 7 items from the difficult temperament subscale of the Infant Characteristics Questionnaire.[53]

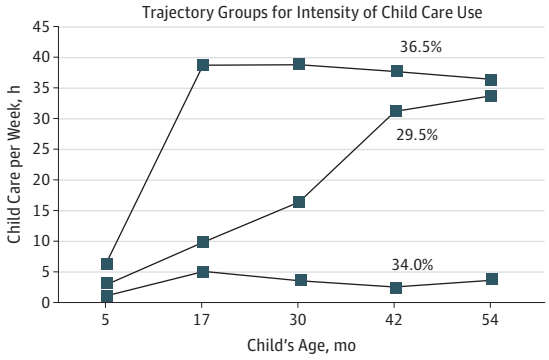
Mother Characteristics | The mother's age at the target child's birth was categorized as younger than 21 years or not, reflecting risk in the Québec population.[24,54] Maternal antisocial behavior before the end of high school (present or absent) was assessed by asking mothers whether they had exhibited 5 different conduct problems.[52,55]

Family Demographics | The presence of a sibling, maternal education (high school diploma or not), and family income (sufficient or not, based on thresholds established by Statistics Canada for poverty[56]) were assessed. These demographics were based on when the child was age 5 months.

Family Functioning and Parenting | Perceived support was assessed at 5 months using 5 items reflecting support with household chores, emotional needs, and from family or friends. Family functioning was assessed at 5 months using 12 items measuring communication, problem resolution, expression of affection, and control of disruptive behavior.[48] Parenting practices were assessed using the following 4 dimensions of the Parental Cognitions and Conduct Toward the Infant Scale[57]: coercive parenting (3 items), perception of self-efficacy (4 items), perception of parental impact (5 items), and overprotection (4 items). The mean scores across 5, 17, and 30 months were calculated for all dimensions except overprotection (assessed at 5 months).

Child Care Quality | Observational measures were available for a subsample of participants at ages 30, 42, and 54 months. We created a variable for each age, whereby we allocated child care quality to 1 of the following 4 groups: (1) high quality (148 at 30 months, 272 at 42 months, and 149 at 54 months), (2) low quality (148 at 30 months, 282 at 42 months, and 138 at 54 months), (3) no child care or care by a relative or babysitter (612 at 30 months, 492 at 42 months, and 410 at 54 months), and (4) quality data missing (851 at 30 months, 713 at 42 months, and 1062 at 54 months). We included this variable to ensure that the results did not simply reflect differences in child care quality.

Figure 2. Trajectories of Child Care Intensity of Use Estimated



Trajectories estimated on the basis of the mean number of hours of child care per week at ages 5, 17, 30, 42, and 54 months using a nonparametric clustering software package algorithm (R; KmL) because of the complexity of child care hours. The top trajectory represents the 36.5% of children with maximal child care during the 5 time points (ie, close to 40 hours per week of child care). The bottom trajectory represents the 34.0% of children with no or minimal child care attendance. The middle trajectory represents the 29.5% of children with increasing attendance over time during the preschool years. Trajectory lines are to the means of observed data.

Statistical Analysis

Identification of Covariates

Bivariate analyses were conducted to identify confounding variables. Variables were included as covariates if they were significantly associated with MDSs and/or child outcome (EPs, SASs, and SWSs).

Testing the Modifying Role of Child Care

Logistic regression analyses were conducted using statistical software (SAS, version 9.2; SAS Inc). We first tested the main effect of MDSs on child outcome (EPs, SASs, and SWSs), adjusting for relevant covariates. We then tested whether boys or girls were differentially affected by MDSs by including the interaction between sex and MDSs. This interaction was not significant and was dropped from our final logistic models. To examine the modifying role of child care on the association between MDSs and child internalizing problems, relevant covariates were entered, followed by the main effects of MDSs and child care and then the interaction between MDSs and the child care variable of interest. Analyses were conducted separately for each child outcome (EPs, SASs, and SWSs). Models were run separately for each child care facet (ie, age at entry, child care type, and intensity of use), such that each model included both the main effect of this child care facet and its interaction with MDSs.

Addressing Selection Bias

To ensure that child care modified the association between MDSs and child outcome rather than reflecting initial differences between children who attended child care vs not, we repeated analyses for significant results using propensity score weights[58-61] for the subsample of children of mothers with elevated MDSs. This method creates weights based on several covariates assessed before entry into child care (at age 5

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Table. Descriptive Data

Variable	Full Sample (N = 1759)	MDSs Trajectory Low (n = 1441)	MDSs Trajectory High (n = 318)	*P* Value
Child Characteristics, %				
Male sex	50.3	49.2	52.2	.33
Low birth weight	3.37	2.9	5.4	.03
Difficult infant temperament at 5 mo	24.8	22.8	34.0	<.001
Mother Characteristics				
Maternal age at birth of child <21 y, %	8.6	8.4	9.4	.55
Maternal antisocial behavior present, %	20.8	19.7	25.8	.02
CES-D score, mean (SD)	1.38 (1.13)	0.96 (0.61)	3.30 (0.94)	<.001
Family Demographics, %				
Maternal education less than high school diploma	14.6	13.0	22.0	<.001
Presence of sibling	57.7	57.3	59.4	.49
Family income insufficient	21.0	17.7	35.9	<.001
Family Functioning and Parenting, Mean (SD)				
Perceived social support at 5 mo	9.14 (1.36)	9.27 (1.21)	8.53 (1.79)	<.001
Family functioning	1.67 (1.01)	1.48 (1.31)	2.54 (1.68)	<.001
PACOTIS score				
Coercive parenting	2.92 (1.66)	2.80 (1.63)	3.47 (1.70)	<.001
Efficacy of parenting	8.47 (1.01)	8.54 (0.97)	8.14 (1.11)	<.001
Perception of parental impact	8.40 (1.52)	8.52 (1.43)	7.84 (1.77)	<.001

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; MDSs, maternal depressive symptoms; PACOTIS, Parental Cognitions and Conduct Toward the Infant Scale.

months) that could predict child care attendance. The propensity score weight, used as a sampling weight, corrects bias from child care selection patterns according to these covariates. In addition to these covariates, the mean score for MDSs (ie, proxy for severity of depression) was included in the calculation of these weights. This provides a robust test of our hypotheses.

Results

The **Table** gives descriptive information for our sample in relation to MDSs. No significant sex differences were observed for children's EPs, SASs, or SWSs.

Identification of Covariates

Analyses for our final models were based on 1759 participants and included the following covariates: (1) child characteristics (male sex and difficult infant temperament at age 5 months), (2) mother characteristics (maternal antisocial behavior in adolescence and maternal age at birth of child), (3) family demographics (presence of siblings, single parenthood, insufficient family income, and maternal education less than high school diploma), (4) family functioning and parenting (perceived social support at 5 months, parenting, and family functioning), and (5) child care quality.

Testing the Modifying Role of Child Care

The significant main effect of MDSs emerged for children's EPs and SASs. Depending on which facet of child care was included in the model, the results indicated that children of mothers with elevated MDSs were almost 2 times more likely to develop elevated EPs and SASs during the preschool years compared with children of nondepressed mothers.

eTables 1 to 3 in Supplement give the results for the final models. These include relevant covariates, main effects of MDSs and child care, and interactions between each child care facet and MDSs.

Emotional Problems

Emotional problems were evaluated. Interactions between MDSs and each facet of child care (ie, age at entry [P = .002], child care type [P = .001], and intensity of use [P = .007]) were significant for child EPs.

Age at Entry | Among children of mothers with elevated MDSs, early (odds ratio [OR], 0.24; 95% CI, 0.09-0.66; P = .006) or late (OR, 0.29, 95% CI, 0.11-0.77; P = .01) entry into child care was associated with reduced risk for EPs compared with children receiving only maternal care. Children entering child care late did not differ from those entering child care early (P = .52) (**Figure 3**).

Child Care Type | Among children of mothers with elevated MDSs, children attending regulated group-based care had lower rates of EPs compared with children receiving maternal care (OR, 0.21; 95% CI, 0.09-0.48; P = .002) or those cared for by a relative or babysitter (OR, 0.40; 95% CI, 0.17-0.94; P = .03). Notably, children of mothers with elevated MDSs cared for by a relative or babysitter did not significantly differ in rates of EPs compared with those receiving maternal care (OR, 0.53; 95% CI, 0.24-1.16; P = .11) (**Figure 4**).

Intensity of Use | The interaction between MDSs and the intensity of child care use was significant (P = .007). However, among children of mothers with elevated MDSs, rates of EPs were not significantly different for low vs high inten-

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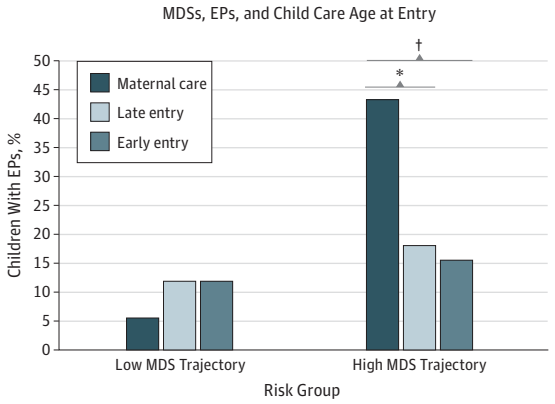
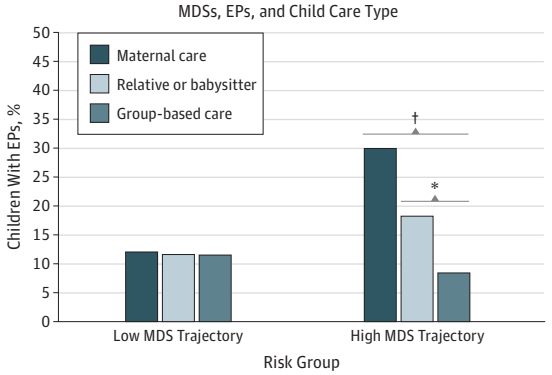
Figure 3. Maternal Depressive Symptoms, Child Care Age at Entry, and Child Emotional Problems



Percentage of children within the high trajectory of emotional problems (EPs) in relation to maternal depressive symptoms (MDSs) and child care age at entry. The results indicated that among children of mothers with elevated MDSs, those who entered child care early or late were significantly less likely to be in the high EPs trajectory compared with those children of mothers with elevated MDSs who did not enter child care during the preschool years. The asterisks represent the level of significance for differences in percentages of children demonstrating EPs between the 2 groups: *$P < .05$ and †$P < .01$.

Figure 4. Maternal Depressive Symptoms, Child Care Type, and Child Emotional Problems



Percentage of children within the high trajectory of emotional problems (EPs) in relation to maternal depressive symptoms (MDSs) and child care type. The results indicated that among children of mothers with elevated MDSs, those who attended a regulated group-based child care arrangement were significantly less likely to be in the high EPs trajectory compared with those children of mothers with elevated MDSs who remained at home during the preschool years. Children of mothers with elevated MDSs who were cared for by a relative or babysitter were more likely to demonstrate elevated EPs compared with children who attended a regulated group-based arrangement. Child EPs did not significantly differ for children of mothers with elevated MDSs who were cared for by their mothers compared with those who were cared for by a relative or babysitter. This highlights the specific benefits of regulated group-based care. The asterisks represent the level of significance for differences in percentages of children demonstrating EPs between the 2 groups: *$P < .05$ and †$P < .001$.

sity of use. Rather, among children in the lowest trajectory for the intensity of use (maternal care), children of mothers with elevated MDSs had higher levels of EPs compared with children of nondepressed mothers (OR, 3.24; 95% CI, 1.94-5.43; $P < .001$).

Social Withdrawal Symptoms

The interaction between MDSs and child care age at entry was significant ($P = .03$). Among children of mothers with elevated MDSs, entering child care early (OR, 0.29; 95% CI, 0.09-0.92; $P = .04$) or late (OR, 0.21; 95% CI, 0.07-0.65; $P = .01$) was associated with lower levels of SWSs compared with not entering child care. Interactions between MDSs and child care type or intensity of use were not significant in predicting SWSs.

Separation Anxiety Symptoms

Interactions between MDSs and child care were assessed. The results were not significant.

Addressing Selection Bias

Because our results suggested a protective influence of child care for EPs and SWSs, we examined whether child care remained protective for children of mothers with elevated MDSs once we applied propensity score weights for these specific outcomes. Propensity score weighting has been used to reduce selection bias by reweighting observations for individuals who received a treatment (eg, child care) and those who did not (eg, maternal care) but have similar probabilities of being treated based on measured characteristics.[62] Significant results obtained for the full sample demonstrated that the modifying effect of child care age at entry for children's risk for EPs and SWSs remained significant and in fact seemed even stronger once we applied propensity score weights and reanalyzed data for children of mothers with elevated MDSs. Similarly, the results for these children remained significant for the beneficial effect of regulated group-based care on child EPs.

Discussion

Using data from a population-based longitudinal study of children followed up prospectively from infancy to 5 years, we found that children exposed to MDSs during the preschool years were at elevated risk for internalizing symptoms but that their risk for EPs and SWSs was significantly reduced if they received early child care services. Given that most of today's children experience child care during the preschool years,[22] child care could potentially serve as a public health intervention strategy for high-risk children.[23]

Our first hypothesis, that children of mothers with elevated MDSs throughout the preschool years would demonstrate higher levels of internalizing symptoms compared with children of nondepressed mothers, was supported. These children were at increased risk for developing elevated EPs and SASs during the preschool period.

Our second hypothesis, that child care modified the association between MDSs and child internalizing problems, was also supported. This modifying effect of child care was most pronounced for EPs and emerged for SWSs, depending on the particular child care facet examined. For children of mothers with elevated MDSs, those entering child care at some point

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during the preschool period had lower levels of EPs and SWSs compared with those who did not enter child care at all. Benefits of child care for EPs and SWSs applied to children of mothers with elevated MDSs regardless of whether they entered child care earlier (ie, before age 17 months) or later. Most important, the results for EPs depended on child care type: regulated group-based care (within a family or center setting) reduced the risk for EPs, but child care provided by a relative or babysitter did not.

Our results for child care type are consistent with those of an Australian study[36] demonstrating that as little as half a day in formal child care at age 2 years modified the effects of maternal depression on children's total behavioral problems. We extend this work by examining the effect of child care in a much larger sample of children, while also considering age at entry into child care and the intensity of use, syndrome profile subscales of internalizing problems, and the patterns of MDSs and child internalizing problems during the full preschool period, as well as using robust measures to account for social selection (ie, propensity score weighting) and potential confounding factors (eg, family functioning, parenting, and perceived social support). We further examined whether the results could be attributed to the quality of child care services. These analyses, conducted on a subsample, indicated that process quality (eg, the quality of child care activities and the relationship between children and caregivers) could not explain the findings.

Benefits of regulated group-based child care were greater than those of other types of child care (ie, care by a relative or babysitter), which could be due to specific features of this type of care, including a more structured setting, care provided by a trained professional, and the child being out of his or her home or being exposed to other children of a similar age. For care by a relative or babysitter, the protective effect for EPs, SASs, or SWSs was not significant. This difference between regulated group-based care and care by a relative may be attributable to the fact that correlations between maternal depression and risk for EPs in the environment provided by relatives of depressed mothers are greater than correlations between maternal depression and the environment provided by nonrelatives (ie, in regulated group-based care).

Our results for the intensity of child care use did not support our hypotheses. Trajectories were based on the number of hours of use and did not distinguish between child care types (except that it could not be provided by the mother). We anticipated that high intensity of use (regardless of whether this was provided by a relative or a regulated group-based center) would be beneficial for children of depressed mothers compared with children who remained at home. Yet, although the interaction between MDSs and the intensity of child care use was significant for child EPs, the results were not as anticipated. Among children of mothers with elevated MDSs, the intensity of use did not differentially affect child EPs. Rather, among children in the lowest trajectory of use (ie, maternal care), higher rates of EPs were evident for children of mothers with elevated MDSs compared with nondepressed mothers. Possibly, our hypothesis concerning the intensity of use was not upheld because of the lack of significant effect of care by a relative or babysitter for children of mothers with elevated MDSs. Therefore, although a child may receive more hours of child care, our results suggest that the type of child care he or she receives is most crucial.

Important strengths of our investigation include our longitudinal study of a large representative sample of preschool children (n = 1759) and the widespread distribution of child care. However, we faced several limitations. First, mothers rated their depressive symptoms and their child's internalizing symptoms, which could create a shared methods variance problem. This unlikely explains our results because our main findings concern a difference in child EPs and SWSs within the context of child care type and age at entry. Furthermore, the results were specific to 2 of 3 outcomes, suggesting that MDSs do not necessarily lead to a global negative assessment of the child. Second, a selection bias could have affected our results, such that more severely depressed mothers may be less likely to enroll their child in child care. To address this issue, we applied propensity score weights and reanalyzed data for our significant outcomes of EPs and SWSs. The results remained significant following this robust statistical procedure. This gives us confidence that we are not simply demonstrating that child care is associated with reduced EPs in children of depressed mothers because children who attend child care have less depressed mothers. Third, because most mothers who were using child care were working (82.0%), it is difficult to distinguish between what is a positive influence of child care or whether maternal employment is associated with other factors, such as higher maternal competencies. However, examination of our data did not yield significant associations between maternal employment and child EPs, SASs, or SWSs or MDSs. Furthermore, our conservative analyses of the results and the use of propensity score weights should minimize this influence on our conclusions. Fourth, we could not pinpoint which components of regulated group-based child care are important. Fifth, we could not test causal mechanisms. Future studies that test whether family variables serve as mediators for associations and those incorporating detailed measures of child care quality for all participants could help address these issues. Sixth, we calculated trajectories of MDSs using self-reported assessments of depressive symptoms within a community sample. The Center for Epidemiologic Studies Depression Scale is not a clinical diagnostic tool. A meta-analysis[10] on maternal depression and child psychopathology found that the effects are generally stronger when maternal depression is diagnosed using a clinical interview. Nevertheless, finding a modifying effect of child care among potentially less severely depressed women provides a conservative test of our hypotheses.

In conclusion, we found for the first time to date in a population-based longitudinal study spanning the full preschool period that early child care has a protective influence for children of mothers with elevated MDSs, reducing children's risks for EPs and SWSs. Benefits were observed within the context of regulated group-based child care for EPs and applied to early and late entry into child care for EPs and SWSs. Regulated child care services may represent an intervention that buffers the negative effect of MDSs on children's EPs and SWSs. Our results are consistent with pre-

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vious studies[31,32,63] showing beneficial effects of child care for children living in adverse family environments (eg, low parental education or poverty). Access to regulated and structured child care services should be facilitated not only for children exposed to poverty but also for children of depressed mothers.

ARTICLE INFORMATION

Submitted for Publication: July 27, 2012; final revision received October 18, 2012; accepted November 26, 2012.

Published Online: June 19, 2013. doi:10.1001/jamapsychiatry.2013.1361.

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Obtained funding: Tremblay, Boivin, Côté.
Administrative, technical, and material support: Herba, Tremblay, Boivin, Côté.

Conflict of Interest Disclosures: Dr Tremblay is the founding scientific director of the Québec Longitudinal Study of Child Development.

Funding/Support: This research was supported by the Québec Government's Ministry of Health, the Fonds pour la Recherche en Santé du Québec, the Fonds Québécois de la Recherche sur la Société et la Culture, Canada's Social Science and Humanities Research Council, the Canadian Institutes for Health Research, Centre de Recherche du Centre Hospitalier Universitaire Sainte-Justine, and the University of Montréal.

Previous Presentations: Preliminary analyses based on this work were previously presented at the Life History Conference; October 17, 2010; Montréal, Québec, Canada; and at the Society for Research in Child Development Conference; April 1, 2011; Montréal, Québec, Canada.

Additional Contributions: The Québec Institute of Statistics and their partners and the staff of the Research Group on Children's Psychosocial Maladjustment provided data collection and management.

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