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Maternal Practices that Influence Latino Infants' Health and Cognitive Growth

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Maternal Practices that Influence Latino Infants' Health and Cognitive Growth

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Maternal Practices that Influence Latino Infants' Health and Cognitive Development

ABSTRACT

OBJECTIVES. Earlier investigators have found that infants born to immigrant mothers, including Latinas, display birth weight and mortality advantages, compared with other disadvantaged groups. We examine (prenatal) biological factors and maternal practices that account for this advantage. Then, we estimate the magnitude to which healthy birth outcomes, along with maternal and family factors, contribute to the health and cognitive functioning of Latino infants.

METHODS. A representative U.S. sample of 8,114 newborns was randomly drawn in 2001, including 1,450 newborns of Latina mothers. We compare the mean attributes of infants born to subgroups that vary in maternal practices, family attributes, and acculturation levels. We account for variation in newborns' gestational age and size-for-gestational-age, and their health status and cognitive functioning at 9 months of age.

RESULTS. Mexican-heritage and less acculturated mothers are no more likely to bear premature or SGA babies, compared with white mothers, despite large social-class disparities, explained in part by Latinas' low prenatal use of tobacco. Parenting practices and lower class status of Latina mothers begin to slow infants' cognitive development, compared with whites, due to weaker maternal education and cognitive facilitation during interaction tasks, and larger family size.

CONCLUSIONS. These findings extend earlier research, detailing healthy births among most immigrant Latinas. Robust birth outcomes contribute to the early health and cognitive growth of Latino infants, but risk factors linked to maternal and home practices overtake these early protective factors by late infancy. Robust births and early health indicators displayed by Latino infants should not distract pediatricians from attending to uneven cognitive growth.

This study did not involve a clinical trial. The authors have no financial relationship relevant to this article. Third revision for *Pediatrics*, August 12, 2009.

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[**MAIN TEXT**]

Earlier epidemiological studies reveal comparatively strong birth outcomes for newborns of Latina mothers, despite large average social-class disparities relative to middle-class populations. This "epidemiologic paradox" is evidenced by the lower infant mortality rate for Latino newborns, equaling 5.4 per 1,000 live births in 2001, compared with 5.7 for (non-Latino) whites and 13.5 for African Americans.[1] In 2001, 6.5% of live births to Latina mothers were of low birth weight (LBW, < 2,500 grams) and 1.1% of very low birth weight (VLBW, <1,500 grams), compared with 6.8% and 1.2% for whites, respectively.[2]

Little is known about whether the epidemiologic paradox operates differently across Latino subgroups, perhaps stemming from selective in-migration by healthier members of populations, or from protective benefits of culturally-bounded parenting practices. We do know that more acculturated Mexican adults use tobacco products more frequently and rely heavily on cheese and fried foods, compared with the nutritious diets of first-generation immigrants, consuming fresh vegetables and fruits.[3, 4, 5] The causal pathway – linking healthy prenatal practices and robust births by immigrant mothers – appears to weaken for later-generation Latinos.[6,7]

Beyond the benefits of the epidemiologic paradox for newborns, little is known about whether these benefits persist in health and cognitive domains during infancy. Social factors related to maternal practices and the family poverty , especially for immigrant populations, may come to may outweigh the biological advantages stemming from healthy births. We focus on five sets of intervening factors, including the mother's (a) intention to become pregnant and knowledge of prenatal care,[8,9] (b) early parenting practices that facilitate the infant's cognitive growth,[10,11] (c) the mother's mental health and relationships with family members,[12,13,14] (d) ethnic membership, and (e) the mother's level of acculturation.[15,17]

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We investigate whether these home and social factors reinforce or begin to eclipse the benefits of healthy births displayed by many Latino newborns. Specific maternal practices may pertain only to certain developmental periods, and these practices likely vary between Latino and white populations, and among Latino subgroups.

METHODS

Population

A total of 10,700 (unweighted) households were visited in 2002 and 2003 by field staff of the National Center for Education Statistics (NCES), drawn from a nationally representative sample of hospital births in 2001 as part of the Early Childhood Longitudinal Study (ECLS-B), conducted with the National Institutes of Health. This home visit occurred about 9 months following the birth, conducted by field staff matched by ethnicity and language in most cases. The number of child cases for our starting sample with complete data at 9 months equals 8,100 children (7,450 births counting twins; rounding to the nearest 50 cases pursuant to NCES reporting rules).[16]

Measures: Child Outcomes at Birth and 9 Months

The child's gestational age was reported from birth certificates, along with whether the newborn was small (<10 percentile), appropriate, or large (>90 percentile) for gestational age (SGA, AGA, LGA), or born prematurely.[17] At the 9-month home visit the maternal interview asked the standard child health question, "Would you say [child's] health is…", yielding a five-level set of response categories, ranging from "excellent" to "poor." The infant's weight in grams was measured by field staff at 9 months. The mother was asked whether the child had experienced an ear infection or respiratory illness. We only report descriptive results for the latter two measures, given prior concerns over under reporting by some ethnic groups.[2, 15]

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Two observational measures of the infant's cognitive proficiency were assessed at 9 months. A reduced form of the Bayley Scales of Infant Development included 31 mental development items focusing on use of words and comprehension, purposeful action with objects, and simple "problem solving" (e.g., putting toys in a cup).[18] The second measure was derived from the researcher's assessment of the child's engagement and attentiveness during the Bayley tasks, yielding five items in a single factor solution (Cronbach's α=0.55, moderately correlated with the Bayley scale, r=0.39).

Measures: Biological and Social Factors

We tested for possible effects from maternal attributes, including the mother's age and her family's social-class status, reflected in a 10-point scale devised by NCES statisticians that incorporated data on the mother's and father's (if present) education levels and occupational status.[11] Biological and prenatal factors proximal to the health of the fetus and newborn included the consumption of cigarettes during the third trimester, three levels of alcohol consumption in the third trimester, whether the mother participated in a fertility intervention, and whether the focal child was a member of a multiple birth.

When estimating *child health* and *cognitive proficiency at 9 months* we included five blocks of predictors, moving from proximal biological to more distal family and social factors. These predictors included questions regarding the mother's use of birth control, whether she stopped using contraception to become pregnant, and the extent to which she read about pregnancy and child development (that is, *intentionality* of the pregnancy and *planning* for child rearing).[19]

To assess *early parenting practices*, the mother reported on the frequency of breastfeeding and daily provision of nutritionally "balanced meals" (not defined in the protocol). Five maternal practices were derived from knowingly videotaped interactive tasks with her infant, including the

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Nursing Child Assessment Teaching Scale (NCATS).[20] This assessment involves mother-led teaching and gross-motor tasks. Scoring for the NCATS tasks yielded five factors, derived from principal components analysis: praise and encouragement of the child's effort (NCATS-1, α=0.80); responsiveness when the child is distressed (NCATS-2, α=0.76); display of warm affect and emotional support (NCATS-3, α=0.79); cognitive fostering and verbal specificity (NCATS-4, α=0.57); and avoidance of negative utterances or affect (NCATS-5, α=0.59).

Measures of the *mother's relationships and home setting* included questions pertaining to parenting efficacy, indicating whether the infant was "very difficult" or of "average difficulty" to raise; the scaled closeness of the mother's relationship with her own parents; and the ratio of children under age 5 to adults (age 18 and over) resident in the home. The short version of the Center for Epidemiological Studies-Depression Scale was administered to assess the mother's depressive symptoms.[21]

To test the effects of *Latino or Mexican ethnic membership* we included dichotomous flags for Mexican origin, distinct from other Latina mothers. As indicators of *acculturation* status we included whether the mother's home language was Spanish or another non-English language (reference group, English speakers), native- or foreign-born, and years residing in the U.S.

Statistical Analyses

We employed logistic regression for estimating the likelihood of dichotomous birth or child health outcomes (SGA, LGA, prematurity, and health status); weighted least-squares regression was employed to estimate continuous child outcomes. NCES calculated sample weights, given the sampling frame and depending on the protocol employed. To properly estimate regression coefficients and compute standard errors, given sampling weights and the clustering of families

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in 114 primary sampling units (PSUs), we used the suite of "svy" commands in Stata statistical software.[22] PSUs were sometimes combined to weight means and calculate standard errors.

RESULTS

Differences in Birth and 9-month Outcomes by Mother's Ethnicity and Acculturation

Table 1 reports small to insignificant differences in birth outcomes, including the incidence of SGA or LGA status, between Mexican and (non-Latina) white mothers, consistent with the epidemiologic paradox.[23] Infants are more likely to be LGA when born to more acculturated Latina mothers (English, dominant language). Mean birth weights are significantly lower for newborns of Mexican and other Latina mothers (3.3 and 3.2 kgs.), compared with whites (3.4 kgs., both, $p<.05$). Yet by 9 months of age infants in each Latino subgroup weigh significantly more than whites ($p<.01$), indicating rapid weight gain and later risk of obesity.

Table 1 about here

At 9 months we see a lower percentage of Mexican mothers reporting that their infant is in excellent health, compared with whites (52% and 67%, respectively, $p<0.01$). Non-Mexican Latina mothers reported lower incidences of respiratory illness and ear infections, compared with whites (both tests, $p<.01$ or stronger). No significant differences were observed for Bayley cognitive scores. Yet Mexican-heritage infants scored significantly lower on the task engagement rating vis-à-vis whites at 9 months ($p<.05$, 0.18 *SD* gap based on raw scores).

Differences in Maternal Practices and Family Attributes

Table 2 reports differences in the maternal attributes and practices, along with family attributes.[24] Latina mothers were significantly younger at the 9-month home visit, reflecting earlier child bearing. Differences in proximal biological and prenatal factors (block 1 predictors) include striking and beneficial prenatal practices among Mexican and less acculturated mothers (home language, Spanish), compared with whites. The incidence of smoking in the last trimester

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was low for Mexican mothers (11 packs per 1,000 mothers per day) and less-acculturated Latina mothers , compared with white mothers (66 packs; both mean differences, $p<0.001$), and differences in alcohol consumption during pregnancy are similarly low for Mexican mothers.

Table 2 about here

Parenting practices differ for Latina mothers (block 3), including lower levels of praise for their infant during problem-solving tasks, and less responsiveness to the infant when in distress among Mexican dyads, compared with whites ($p<0.001$ and $p<0.01$, respectively). Latina mothers scored lower in their knowledge of child development, compared with whites (a gap equal to 1.2 *SD* for Mexican mothers).

Risk factors are quite apparent when focusing on the social-class status of Latino families (block 4 predictors). Just 28% of Mexican mothers had completed any college courses, compared with 65% of whites. Mexican families fell 0.77 *SD* below the mean (standardized) SES index for whites. More children resided in Mexican families (2.3) than in white families (2.0, $p<.001$).

Accounting for Variation in Birth Outcomes

Latino newborns benefit from mothers' prenatal practices in terms of lower rates of prematurity and SGA (Table 3). The likelihoods of a premature or SGA birth are twice as great for mothers who smoked in the third trimester. This benefits infants born to Mexican and less-acculturated Latina mothers, given low rates of tobacco use. The likelihoods of prematurity or SGA status are lower for mothers who had previously given birth –benefiting Latinos whose mothers display higher mean fecundity rates.

The likelihood of giving birth to a SGA newborn is 24% less for Mexican-heritage mothers. Yet newborns of other foreign-born Latina mothers are at risk of SGA status (interaction of the two odds ratios: 1.31 x 1.97 = 2.58).

Table 3 about here

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Accounting for Variation in Infant Health and Cognitive Proficiency

To examine whether the early protective factors manifest in robust births also advance development during infancy, we regressed the likelihood that infant health was rated as "excellent" and estimated the child's weight at 9 months of age (Table 4). Infants of higher gestational age at birth and LGA were significantly more likely rated as being in excellent health. Mothers with higher levels of depression, lower efficacy in raising the infant, and poorer relationships with their own mother were less likely to rate their infant's health as excellent. With all covariates included, Latina mothers in Spanish-speaking homes were still 38% less likely to rate their infant as being in excellent health.

Infants of higher gestational age or LGA at birth weighed more at 9-months of age, while SGA newborns weighed less than the reference group (appropriate for gestational age). Breast-fed infants weighed less than non-breast-fed babies. Infants with mothers scoring higher on the maternal depression scale also weighed less, as did infants in families with more resident children per adult. Infants weighed more when their mother participated in the WIC program.

Table 4 about here

Risk factors become more prevalent for Latino infants when estimating Bayley cognitive scores at 9 months (Table 5). Maternal practices, including the consistency of praise, warm affect, and cognitive facilitation during the interactive tasks, are significantly related to cognitive scores (Mexican mothers fell below white mothers, Table 2). When estimating task engagement, we see that maternal praise and encouragement, along with warm affect, are associated with higher cognitive scores. Infants in families with larger child-to-adult ratios showed lower on the Bayley scores and task engagement, further disadvantaging Mexican children. Infants of Mexican mothers scored lower on task engagement, even with all covariates in the model, suggesting additional negative effects from unobserved risk factors.

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Table 5 about here

DISCUSSION

This study corroborates earlier findings showing that Latina mothers display healthy prenatal and early nutrition practices, on average, although we show how these protective factors operate mainly among Mexican and less acculturated Latinas.[2,6] These factors contribute to robust births and normal levels of physical growth, despite the fact that Latino infants often are raised in poor households. Less acculturated Latina and Mexican-heritage mothers generally avoid tobacco and alcohol use during pregnancy at levels far below whites. Healthy birth outcomes, in turn, contribute to the early health and cognitive growth of Latino infants.

But these early protective factors tend to be eclipsed by maternal practices and home dynamics during the infancy period, disadvantaging infants of Mexican and less acculturated mothers. Robust newborns, including Latino babies, display stronger cognitive skills at 9 months. But for cognitive growth is then suppressed by low maternal education, weaker cognitive facilitation, and the presence of more children per resident adult. Latina mothers displayed less praise and encouragement during interaction tasks with their infants.

These social dynamics resemble the home environments of other low-income populations, along with the subsequent slowing of children's cognitive growth and deteriorating health indicators.[11,15,25] Still, many Latina mothers appear to sustain warm and supportive environs for their infants and toddlers, even as local exigencies and certain practices slow the child's development in cognitive domains.[10, 11]

Future work should address the present study's limitations. Child health data is sorely needed for undocumented immigrant families. Legal status likely constrains access to health care and parents' ability to sustain the benefits initiated by robust births. Cultural groups also vary in their sometimes naïve diagnoses of child illness, which may bias responses to standard interview

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questions. We must learn more about the conditions that constrain maternal practices related to young children's cognitive growth. Why the epidemiologic paradox benefits birth outcomes of Mexican-heritage newborn but fails to carry over to cognitive development is a pressing topic for investigation . How the weight of Latino infants surpasses the weight of white infants by 9 months (after Latinos are born lighter) also invites future work.

CONCLUSIONS

Health care providers should recognize that many Latina women approach pregnancy with strong prenatal practices. Rather than being at risk across domains, protective factors initially predominate, especially for less acculturated Latinas and those of Mexican descent.

However, these same subgroups are less knowledgeable of child development on average. The often robust physical health of Latino infants does not necessarily imply that cognitive growth is keeping pace with trajectories of white infants. Child health providers should be sensitive to the impact of lower levels of maternal education, weaker cognitive facilitation, and larger family size – factors that appear to override the benefits of prenatal factors in shaping infants' cognitive proficiencies. The epidemiologic paradox represents a head start for newborns of certain Latino subgroups, but maternal practices and home dynamics often constrain cognitive growth during the infancy period.

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[17] Scores for the five-minute APGAR assessment of heart rate, respiration, reflex response, and muscle tone were available for most newborns, although mean differences among ethnic groups proved

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insignificant. Walton G, Bower T. Newborns form 'prototypes' in less than one minute. *Psychological Science.* 1993;4:203-205. Given the skewed distribution (most babies tend to score high), scale scores were recoded as a three-level ordinal variable (0-6, 7-8, 9-10), but results were insignificant among groups.

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[24] Infants of Mexican mothers and those in Spanish-speaking homes were slightly younger (10.4 months) at the 9-month home visit than those of non-Mexican mothers and mothers in English-speaking homes (10.7 months), justifying the child-age controls in each multivariate model.

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Table 1. Child health and cognitive-proficiency outcomes at birth and 9 months by mother's ethnicity and home language (weighted means and standard deviations reported; significance of mean differences reported between Latino subgroups and whites)

	Black	White	Mexican	Non-Mexican heritage Latinas	Latina mothers, home language:	
					Spanish	English
BIRTH OUTCOMES						
Subsample	*n*=1,200	*n*=3,750	*n*=950	*n*=450	*n*=500	*n*=300
Gestational Age (weeks)	38.2(0.11)	38.8(0.04)	38.6(0.09)	38.5(0.16)	38.6 (0.11)	38.3 (0.17)
Premature newborns per 1,000 births	127	59	65	101	70	80
Birth weight (kgs.)	3.1(0.21)	3.4(0.11)	3.3(0.29)*	3.2(0.42)*	3.3 (0.29)	3.3 (0.43)
SGA per 1,000 births	117	90	96	140	110	80
LGA per 1,000 births	106	119	120	120	110	140
CHILD OUTCOMES AT 9 MONTHS						
Subsample	*n*=1,350	*n*=4,200	*n*=1,000	*n*=500	*n*=550	*n*=350
Weight (kgs.)	9.5 (0.07)	9.4 (0.06)	9.7 (0.06)**	9.8(0.11)**	9.7 (0.08)	9.6 (0.10)
Bayley's infant cognitive score	76.8 (0.43)	77.4 (0.30)	76.7 (0.46)	77.3(0.45)	76.6 (0.41)	77.5 (0.72)
Task engagement, responsiveness (standardized factor score)	0.11 (0.08)	0.33 (0.06)	-0.04 (0.10)*	0.19(0.08)	0.09 (0.08)	0.04 (0.18)
Child's health (% rated excellent)	59	67	52***	62	52	60
Respiratory illness (%)	15	15	13	8**	12	12
Ear infection (%)	39	45	39*	33***	38	40

Notes: NCES weighting rules (rounding to nearest 50) applied. Sampling strata combined in some cases to perform statistical tests for mean differences. *p<.05, **p<.01, ***p<.001. Asian children excluded for brevity; data available from authors. Revised June 2009

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Table 2. Attributes of mothers and children by ethnic group and acculturation status (home language) at 9-month home visit (weighted means and standard deviations, except when percentages; significance of mean differences reported between Latino subgroups and whites)

	Black	White	Mexican	Non-Mexican heritage Latinas	Latina mothers, home language:	
					Spanish	English
Subsamples	*n*=1,200	*n*=3,750	*n*=950	*n*=450	*n*=500	*n*=300
Block A – Background controls						
Child's age (months)	10.3 (0.10)	10.3 (0.06)	10.3 (0.09)	10.3 (0.17)	10.1 (0.13)	10.4 (0.20)
Mother's age (years at visit)	26.4 (0.23)	29.3 (0.18)	26.3 (0.27)***	28.3 (0.53)***	26.9 (0.36)	27.3 (0.53)
Block 1 – Proximal biological and prenatal factors						
Smoking in last trimester (packs daily per 1,000 mothers)	18	66	11***	21***	0	10
Drinking alcohol at least once per week (per 10,000 mothers)	20	177	2***	115	0	99
Mothers, fertility treatment (per 10,000 mothers)	12	94	8***	47***	0	0
Block 2 – mother's intentionality and information						
Pregnancy intended (%)	24	60	46***	43***	47	43
Read prenatal care or parenting books, magazines (%)	59	76	69***	76	70	76
Given birth before focal child (%)	61	58	58	51*	57	57
Block 3 – Early parenting practices, social interaction						
Observed interaction task						
NCATS 1 – praise effort and encourage child	1.7 (0.06)	2.1 (0.05)	1.7 (0.10)***	2.0 (0.12)	1.75 (0.14)	2 (0.17)
NCATS 2 – responds to child distress	3.8 (0.09)	3.9 (0.04)	3.7 (0.10)**	3.7 (0.15)*	3.73 (0.12)	3.83 (0.12)
Early nutrition practices						
Breastfeeding in last 7 days (% yes)	8	22	19	18	24	14
Fed child cow's milk in last 7 days (% yes)	20	23	19*	19	16	21

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Mother able to provide balanced meals to child (% yes)	94		97		92**		98		93		97	
Knowledge of child development	5.9	(0.06)	7.7	(0.08)	5.4	(0.10)***	6.0	(0.17)***	4.95	(0.16)	6.29	(0.17)
Block 4 – Maternal support, social class, relationships												
Father resides at home (% of families)	43		91		84**		78***		84		75	
Mother completed some college (%)	39		65		28***		45***		27		42	
Social-class index (standardized z-score)	-0.44	(0.03)	0.25	(0.03)	-0.52	(0.04)***	-0.13	(0.07)***	-0.55	(0.04)	-0.16	(0.07)
Maternal employment												
Full-time (%)	43		32		27**		36		27		35	
Part-time (%)	16		25		15***		19*		14		20	
Count of children under 18 years in household	2.4	(0.05)	2.0	(0.03)	2.3	(0.07)***	2.0	(0.08)	2.32	(0.11)	2.29	(0.12)
Child covered by health insurance (% yes)	97		98		91		95		92		96	
Depressive symptoms	18.4	(0.23)	16.6	(0.12)	16.7	(0.25)	16.2	(0.28)	16.37	(0.31)	16.86	(0.44)
Mother's closeness to own mother (% reporting close, high)	95		93		90		91		40		28	
Mother's efficacy in raising focal child (% very difficult)	5		6		9		10		11		4	
Block 5 – Ethnic membership												
Block 6 – Acculturation status												
Mother is foreign born (% yes)	9		3		57***		56***					
Primary home language:									-		-	
English (%)	97		98		37***		44***		-		-	
Spanish (%)	0		0		61***		51***		-		-	
Other non-English (%)	3		2		2		5		-		-	

Notes: NCES weighting rules (rounding to nearest 50 cases) applied. Sampling strata combined in some cases to perform statistical tests for mean differences. *p<.05, **p<.01, ***p<.001. Asian children excluded for brevity; data available from authors. Revised June 2009.

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Table 3. Estimating birth outcomes from proximal biological factors, maternal information and practices, social-class status, ethnic membership, and acculturation status (logistic regression, odds ratios reported and standard errors in parentheses)

	Premature birth	SGA	LGA
	OR (SE)	OR (SE)	OR (SE)
Predictor Block A - Age	F 8.23 ***	F 6.53***	F 4.73**
Mother's age	0.66 (0.18)	1.05 (0.26)	0.77 (0.33)
Mother's age, squared	1.01 (0.01)	1.00 (0.01)	1.01 (0.01)
Mother's age, cubed	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
Predictor Block 1 - Proximal biological and prenatal factors	F 3.92 **	F 2.99*	F 4.81***
Alcohol consumption 1	1.24 (0.36)	1.61 (0.49)	0.35 (0.15)*
Alcohol consumption 2	1.35 (0.52)	1.21 (0.53)	0.59 (0.31)
Smoking behavior	1.97 (0.27)***	2.00 (0.40)**	0.22 (0.12)**
Multiple births	22.65 (2.41)***	1.04 (0.17)	0.89 (0.17)
Mother, diabetic condition	1.25 (0.21)	1.11 (0.27)	1.73 (0.40)*
Fertility intervention	1.22 (0.29)	1.61 (0.47)	0.56 (0.24)
Predictor Block 2 - Mothers intentionality and information	F 20.34 ***	F 3.57*	F 5.86**
Pregnancy intended	0.80 (0.08)*	1.10 (0.14)	0.95 (0.12)
Previously gave birth	0.54 (0.04)***	0.66 (0.07)***	1.68 (0.22)***
Read pregnancy, child rearing materials	1.02 (0.08)	1.02 (0.11)	1.16 (0.15)
Predictor Block 4 - Support, social class	F 48.02 ***	F 20.73***	F 0.18
Social class index	0.72 (0.04)***	0.68 (0.06)***	1.01 (0.08)
Predictor Block 5 - Ethnic group membership	F 13.77 ***	F 1.78	F 0.26
Latino, Mexican heritage	0.94 (0.14)	0.76 (0.11)	1.32 (0.27)

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Latino, other heritage	0.97 (0.14)	1.31 (0.28)	1.18 (0.27)
Black	1.87 (0.16)***	1.06 (0.14)	1.01 (0.14)
Asian-Pacific Islander	1.22 (0.25)	0.97 (0.16)	1.25 (0.25)
Predictor Block 6 - Acculturation status	F 0.50	F 1.88	F 3.83**
Home language, Spanish	0.80 (0.16)	0.92 (0.25)	1.01 (0.25)
Home language, other non-English	0.86 (0.12)	1.16 (0.22)	0.92 (0.17)
Foreign born	1.18 (0.28)	1.97 (0.51)*	0.68 (0.17)
Years resident in U.S.	1.00 (0.01)	1.02 (0.01)	1.01 (0.01)
N of cases (nearest 50)	7,200	7,050	7,050
F-statistic, complete model	82.05***	3.53***	2.83***
Strata and PSUs with sufficient data	88, 177	88, 177	88, 177

*p<.05, **p<.01, ***p<.001. Revised June 2009.

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Table 4. Estimating child health outcomes at 9 months of age from birth status, maternal practices, social-class status and support, ethnic membership, and acculturation status (logistic or weighted least-squares; odds ratios or unstandardized coefficients and standard errors reported in parentheses)

	Child in excellent health		Child's weight	
	Logistic	(SE)	WLS	(SE)
Predictor Block A - Basic child attributes	*F* 1.75		*F* 90.51 ***	
Female Child	1.18	(0.09)*	-0.59	(0.05)***
Child's age, 9-10 months	1.15	(0.13)	0.28	(0.07)***
Child's age, 11-12	0.98	(0.15)	0.79	(0.11)***
Child's age, 13-14	1.28	(0.26)	1.21	(0.12)***
Child's age, 15-16	1.50	(0.44)	2.13	(0.16)***
Predictor Block B – Child's birth status	*F* 5.80 ***		*F* 36.96 ***	
Gestational age	1.06	(0.02)***	0.06	(0.01)***
SGA	1.09	(0.13)	-0.69	(0.07)***
LGA	1.31	(0.18)*	0.65	(0.09)***
Multiple birth	1.11	(0.15)	-0.21	(0.07)**
Fertility intervention	0.98	(0.21)	-0.10	(0.10)
Predictor Block 2 – Early parenting practices and social interaction	*F* 6.08 ***		*F* 4.55 ***	
NCATS factor 1 (Praises effort, encouraging)	0.99	(0.02)	-0.03	(0.01)*
NCATS factor 2 (Responds to child distress)	1.03	(0.02)	0.01	(0.02)
NCATS factor 3 (Warm affect, emotional support)	0.91	(0.03)**	0.03	(0.02)
NCATS factor 4 (Cognitive fostering, verbal)	1.18	(0.06)**	0.04	(0.04)
NCATS factor 5 (Avoids negative sanctions)	1.50	(0.35)	-0.12	(0.14)
Breast feeding in last 7 days	1.26	(0.16)	-0.36	(0.09)***
Formula in last 7 days	0.93	(0.13)	-0.06	(0.09)
Milk in last 7 days	0.95	(0.14)	0.11	(0.10)
Ability to provide balanced meals to child	0.92	(0.15)	-0.07	(0.17)
Doctor's visit	0.77	(0.22)	0.09	(0.23)
Knowledge of development	0.96	(0.02)	0.00	(0.02)
Predictor Block 4 – Maternal support, social class, relationships	*F* 14.25 ***		*F* 3.33 ***	
Child of average difficulty to raise	0.65	(0.06)***	-0.05	(0.06)
Child very difficult to raise	0.64	(0.10)**	0.10	(0.14)
Fairly close relationship with own mother	0.80	(0.06)**	-0.06	(0.06)
Not a close relationship with own mother	0.59	(0.08)***	-0.03	(0.09)
Maternal depression	0.98	(0.01)*	-0.01	(0.00)**
Father at home	0.92	(0.12)	-0.05	(0.08)
Social class index	1.12	(0.07)	0.13	(0.05)*
Child's health coverage	0.91	(0.22)	-0.14	(0.17)
Children to adults ratio	0.83	(0.04)***	-0.09	(0.04)*
Maternal employment (full-time)	0.86	(0.08)	0.05	(0.05)
Maternal employment (part-time)	0.85	(0.08)	0.06	(0.07)
WIC benefits	0.86	(0.09)	0.24	(0.07)**
Predictor Block 5 – Ethnic group membership	*F* 3.76 **		*F* 6.36 ***	
Latino, Mexican heritage	0.98	(0.20)	0.15	(0.13)
Latino, other heritage	1.28	(0.20)	-0.06	(0.11)
Black	0.96	(0.11)	0.09	(0.10)
Asian-Pacific Islander	0.65	(0.13)*	-0.41	(0.12)**
Predictor Block 6 – Acculturation status	*F* 8.00 ***		*F* 3.12 *	
Home language, Spanish	0.62	(0.14)*	0.21	(0.16)
Home language, other non-English	1.11	(0.27)	0.13	(0.12)

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Foreign born	1.35 (0.24)	0.21 (0.14)
Years resident in U.S.	1.03 (0.01)***	0.00 (0.01)
Constant	-	7.16 (0.66)***
N of cases (nearest 50)	5,750	5,600
F-statistic, complete model	8.74 ***	22.31 ***
Strata and PSUs with sufficient data	88, 177	88, 177
R-square (WLS model only)	-	.21

* p<.05; **p<.01; ***p<.001. Revised July 31, 2009.

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Table 5. Estimating children's cognitive proficiency at 9 months of age from birth status, maternal practices, social-class status and support, ethnic membership, and acculturation status (weighted least-squares; unstandardized coefficients and standard errors reported in parentheses)

	Child's Bayley cognitive score		Child's task engagement	
	WLS	(SE)	WLS	(SE)
Predictor Block A - Basic child attributes	*F* 449.47 ***		*F* 19.86 ***	
Female Child	0.68	(0.17)***	0.13	(0.05)*
Child's age, 9-10 months	4.26	(0.19)***	0.23	(0.08)**
Child's age, 11-12	10.57	(0.31)***	0.58	(0.12)***
Child's age, 13-14	17.19	(0.49)***	0.82	(0.13)***
Child's age, 15-16	22.05	(0.98)***	0.96	(0.18)***
Predictor Block B – Child's birth status	*F* 57.37***		*F* 21.11 ***	
Gestational age	0.33	(0.04)***	0.04	(0.01)***
SGA	-0.74	(0.28)*	-0.18	(0.08)*
LGA	0.60	(0.24)*	0.11	(0.09)
Multiple birth	-0.97	(0.24)***	-0.38	(0.09)***
Fertility intervention	-1.00	(0.41)*	0.06	(0.14)
Predictor Block 2 – Early parenting practices and social interaction	*F* 6.65 ***		*F* 3.05 **	
NCATS factor 1 (Praises effort, encouraging)	0.16	(0.06)**	0.04	(0.02)**
NCATS factor 2 (Responds to child distress)	0.08	(0.04)	0.01	(0.01)
NCATS factor 3 (Warm affect, emotional support)	0.30	(0.08)***	0.08	(0.02)***
NCATS factor 4 (Cognitive fostering, verbal)	0.29	(0.13)*	0.05	(0.04)
NCATS factor 5 (Avoids negative sanctions)	0.77	(0.47)	0.02	(0.18)
Breast feeding in last 7 days	-0.22	(0.26)	0.01	(0.09)
Formula in last 7 days	-0.69	(0.23)**	0.06	(0.10)
Milk in last 7 days	0.77	(0.26)**	0.11	(0.10)
Ability to provide balanced meals to child	0.60	(0.55)	0.12	(0.16)
Doctor's visit	-1.35	(0.93)	-0.33	(0.24)
Knowledge of development	-0.01	(0.06)	0.01	(0.02)
Predictor Block 4 – Maternal support, social class, relationships	*F* 4.08 ***		*F* 3.15 **	
Child of average difficulty to raise	0.20	(0.19)	-0.05	(0.07)
Child very difficult to raise	-0.24	(0.35)	-0.17	(0.11)
Fairly close relationship with own mother	-0.21	(0.18)	0.02	(0.05)
Not a close relationship with own mother	0.01	(0.35)	-0.02	(0.09)
Maternal depression	-0.02	(0.02)	0.00	(0.00)
Father at home	0.16	(0.24)	0.06	(0.09)
Social class index	0.10	(0.14)	-0.09	(0.05)
Child's health coverage	-0.78	(0.55)	0.21	(0.15)
Children to adults ratio	-0.46	(0.12)***	-0.13	(0.04)**
Maternal employment (full-time)	0.33	(0.18)	0.05	(0.06)
Maternal employment (part-time)	0.45	(0.18)*	0.15	(0.06)*
WIC benefits	0.58	(0.24)*	0.14	(0.09)
Predictor Block 5 – Ethnic group membership	*F* 2.26		*F* 3.03 *	
Latino, Mexican heritage	-0.02	(0.41)	-0.42	(0.20)*

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Latino, other heritage	-0.43 (0.37)	-0.28 (0.14)*
Black	-0.54 (0.30)	-0.14 (0.09)
Asian-Pacific Islander	-0.63 (0.40)	-0.22 (0.12)
Predictor Block 6 – Acculturation status	*F* 1.56	*F* 0.61
Home language, Spanish	-0.68 (0.47)	0.18 (0.20)
Home language, other non-English	0.12 (0.47)	-0.11 (0.16)
Foreign born	-0.51 (0.43)	0.05 (0.13)
Years resident in U.S.	-0.01 (0.01)	0.00 (0.00)
Constant	58.12 (1.99)***	-2.27 (0.53)***
N of cases (nearest 50)	5,600	5,600
F-statistic, complete model	156.60***	6.70***
Strata and PSUs with sufficient data	88, 177	88, 177
R-square	.63	.07

* p<.05; **p<.01; ***p<.001. Revised July 31, 2009.

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