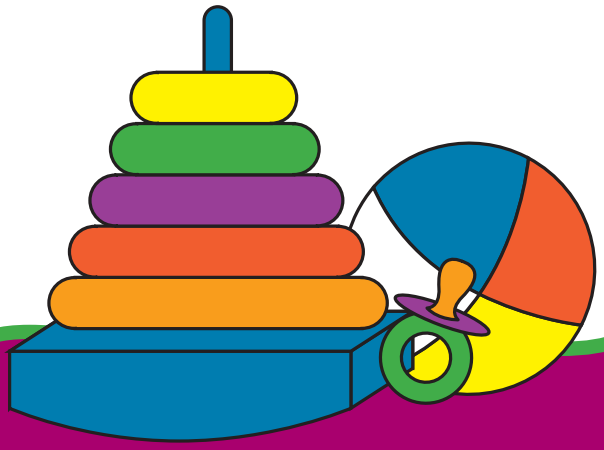
NCES
National Center for Education Statistics

Early Childhood Longitudinal Study, Birth Cohort (ECLS-B)

Early Childhood Longitudinal Study
Birth Cohort

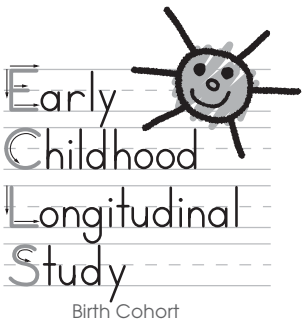
User's Manual for the ECLS-B Nine-Month Public-Use Data File and Electronic Code Book

U.S. Department of Education
Institute of Education Sciences
NCES 2005-013



This page intentionally left blank.

National Center for Education Statistics



U.S. Department of Education
Institute of Education Sciences
NCES 2005-013

Early Childhood Longitudinal Study, Birth Cohort (ECLS-B)

User's Manual for the ECLS-B Nine-Month Public-Use Data File and Electronic Code Book

January 2005

Christine Nord
Brad Edwards
Richard Hilpert
Laura Branden
Carol Andreassen
Anne Elmore
Desrene Sesay
Philip Fletcher
Jim Green
Ray Saunders
Rick Dulaney
Westat

Lizabeth Reaney
Kristin Denton Flanagan
Education Statistics Services Institute

Jerry West
National Center for Education Statistics

Notice of Copyrights and Permissions

Materials Copyright Notices:

Bayley Short Form–Research Edition. Copyright © 2001 by The Psychological Corporation, a Harcourt Assessment Company. Adapted from the *Bayley Scales of Infant Development: Second Edition*. Copyright © 1993 by The Psychological Corporation. Adapted and reproduced by permission of the publisher. All rights reserved.

"*Bayley Scales of Infant Development*" is a trademark of The Psychological Corporation, registered in the United States of America and/or other jurisdictions.

Parent CAPI instrument items CD 120a through 120g (P1FUSSY, P1WHMPR, P1ATTN, P1WAKES, P1HLPSLP, P1STRTL, and P1NOWAIT) are from the *Infant/Toddler Symptom Checklist*. Copyright © 1995 by The Psychological Corporation. Reproduced by permission. All rights reserved.

"*Infant/Toddler Symptom Checklist*" is a trademark of The Psychological Corporation registered in the United States of America and/or other jurisdictions.

Interviewer Observation Materials developed for the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B). Adapted from the *Bayley Scales of Infant Development: Second Edition, Behavior Rating Scale*. Copyright © 1993 by The Psychological Corporation, a Harcourt Assessment Company. Computer adapted and reproduced by permission of the publisher. All rights reserved.

The Nursing Child Assessment Teaching Scale (NCATS) is used with permission from its developer, Dr. Kathryn Barnard (agreement dated January 28, 2003) who granted NCES permission to include 9-month NCATS item-level scores, the Total Scale Score, Total Parent Scale Score, and the Total Child Scale Score in the public-use files of the Early Childhood Longitudinal Study, Birth Cohort.

The father question that appears in the parent CAPI instrument as P1FTHSLF–P1 PA057, the resident father questionnaire as F1FTHSLF–F1 Q18, and the nonresident father questionnaire as N1FTHSLF–N1 Q12 is adapted and reproduced from the *Parenting Stress Index–Short Form* by Richard R. Abidin, Ed.D. by special permission of the publisher, Psychological Assessment Resources, Inc., 16204 North Florida Avenue, Lutz, FL 33549. Copyright 1990 by PAR, Inc. Further reproduction is prohibited without permission from PAR, Inc.

SPONSORING AGENCIES

EARLY CHILDHOOD LONGITUDINAL STUDY, BIRTH COHORT (ECLS-B)

- National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education (ED)
- National Center for Health Statistics, U.S. Department of Health and Human Services (HHS)
- National Institutes of Health (NIH), U.S. Department of Health and Human Services

  National Institute of Child Health and Human Development
  National Institute on Aging
  National Institute of Mental Health
  National Institute of Nursing Research
  National Institute on Deafness and Other Communication Disorders
  Office of Behavioral and Social Sciences Research
  National Center on Minority Health and Health Disparities

- Economic Research Service, U.S. Department of Agriculture (USDA)
- Administration on Children, Youth and Families, HHS
- Maternal and Child Health Bureau, Health Resources and Services Administration, HHS
- Office of Special Education Programs, ED
- Office of the Assistant Secretary for Planning and Evaluation, HHS
- Office of Indian Education, ED
- Centers for Disease Control and Prevention, HHS
- Office of Minority Health, HHS

This page intentionally left blank.

ACKNOWLEDGMENTS

Over the past five years, many individuals and organizations have contributed to the design and conduct of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B). While it is not possible to name all the individuals who have made significant contributions to this study, we would like to recognize some of those who played a critical role during the development and implementation phases of the ECLS-B.

First, we would like to thank the 10,688 children and their parents who participated during the first wave of the study. The parents of these children invited us into their homes and allowed us to work with their children. We would also like to thank the more than 200 field staff and 16 field managers and supervisors who conducted the home visits both during the national data collection and as a part of several earlier field tests of the study design and instrumentation. And, we would like to express our appreciation to the State Vital Registration and Statistics Executives who provided the sample of 2001 birth certificates on which the study is based.

We gratefully acknowledge Marian MacDorman of the National Center for Health Statistics (NCHS) for all her efforts to make the ECLS-B a success. Her tireless work on the project's behalf to help gain the cooperation of the states and her review of the many sets of review documents submitted to the NCHS and State Institutional Review Boards were invaluable.

We wish to thank Natasha Cabrera of the University of Maryland at College Park (and formerly with the National Institute of Child Health and Human Development) for all her work in support of the health, special population, and father components of the study. We are especially grateful for her suggestions and encouragement in developing the father questionnaires of the ECLS-B, along with the assistance from the other members of the Developing a Daddy Survey (DADS) group.

Several others have consistently given their time in support of the study including: Vic Oliveira (Economic Research Service, U.S. Department of Agriculture); Michael Lopez, Louisa Tarullo, and Rachel Cohen (Administration on Children, Youth and Families, U.S. Department of Health and Human Services); Michael Kogan (Maternal and Child Health Bureau, U.S. Department of Health and Human Services); Linda Mellgren and Martha Moorehouse (Office of Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services); Karen Bourdon (National Institute of

Mental Health, National Institutes of Health); and Howard Hoffman (National Institute on Deafness and Other Communication Disorders, National Institutes of Health).

Westat, under the direction of the National Center for Education Statistics (NCES), designed and conducted the 9-month wave of the study. NCES received day-to-day support from the Education Statistics Services Institute (ESSI), American Institute for Research. NCES would like to recognize the contributions and efforts of several members of these two organizations' staffs. Carol Andreassen and Christine Nord of Westat led the instrument development activities. While the design of the ECLS-B child assessment battery and in particular the design of the Bayley Short Form–Research Edition were a team effort, no one invested more time, thought, and energy into these products than did Dr. Andreassen. Christine Nord contributed in a similar way to the parent interview and father questionnaires. NCES appreciates the work and dedication of each. They left a lasting imprint on the study that analysts will benefit from for many years to come. NCES would also like to thank Rick Dulaney and Ray Saunders of Westat for the leadership they provided to the programming, systems development, and data processing tasks associated with the study; Richard Hilpert of Westat for overseeing the field operations of the study; and Laura Branden for her tireless work with the NCHS and state Institutional Review Boards.

Kristin Denton Flanagan of ESSI and Liza Reaney (formerly of ESSI and now at Columbia University) supported NCES during the design and conduct of the ECLS-B and deserve special recognition. Each played an important role in the development of the ECLS-B and their efforts are reflected in the study instrumentation, data processing activities, and data products. NCES wishes to thank both of them for their years of service to the study.

A special thank you to Kendra Chandler Webb, age 9 (1994), for designing the ECLS logo.

TABLE OF CONTENTS

Chapter			Page
	SPONSORING AGENCIES		iii
	ACKNOWLEDGMENTS		v
	DATA ANOMALIES AND ERRATA		xxiii
	GETTING STARTED		xxix
1	INTRODUCTION		1-1
	1.1	Background	1-4
	1.2	Conceptual Model	1-5
	1.3	Study Components	1-7
	1.4	ECLS-B Data Files	1-8
		1.4.1 Availability of ECLS-B Nine-Month Data Files, Documentation, and Questionnaires	1-9
		1.4.2 Differences Between ECLS-B Restricted-Use and Public-Use Files	1-10
	1.5	Contents of Manual	1-11
	REFERENCE		1-13
2	DESCRIPTION OF DATA COLLECTION INSTRUMENTS		2-1
	2.1	Direct Child Assessments	2-2
		2.1.1 Bayley Short Form–Research Edition (BSF-R)	2-3
		2.1.2 Nursing Child Assessment Teaching Scale (NCATS)	2-7
		2.1.3 Physical Measurements	2-8
	2.2	Parent Instruments	2-9
		2.2.1 Parent CAPI Instrument	2-9
		2.2.2 Parent Self-Administered Questionnaire	2-13
	2.3	Father Self-Administered Questionnaires	2-14
		2.3.1 Resident Father Self-Administered Questionnaire	2-17
		2.3.2 Nonresident Biological Father Self-Administered Questionnaire	2-18

TABLE OF CONTENTS (CONTINUED)

Chapter				Page
	2.4	Child Observations and Interviewer Remarks		2-19
	2.5	Birth Certificate Data		2-20
	REFERENCES			2-21
3	ASSESSMENTS, SCALES, AND OTHER MEASURES IN THE NINE-MONTH DATA COLLECTION			3-1
	3.l	Direct Child Assessments		3-2
		3.1.1	Bayley Short Form–Research Edition	3-2
			3.1.1.1 Choosing the Appropriate BSF-R Score for Analysis	3-14
			3.1.1.2 Additional Information on the Computation and Reliabilities of the BSF-R Scores	3-16
		3.1.2	Nursing Child Assessment Teaching Scale	3-18
			3.1.2.1 NCATS Supplemental Contextual Variables	3-23
			3.1.2.2 Reliability of NCATS Coding	3-24
		3.1.3	The Child Observations During the Bayley Short Form–Research Edition	3-25
		3.1.4	Physical Measurements	3-29
	3.2	Indirect Child Assessments		3-32
		3.2.1	Selected Items from the Child Development Inventory (MN-CDI)	3-34
		3.2.2	Selected Items from the Infant/Toddler Symptom Checklist	3-35
	3.3	Parent and Home Environment Measures		3-39
		3.3.1	Items from the Knowledge of Infant Development Inventory (KIDI)	3-39
		3.3.2	Quality of the Home Environment: Items from the National Household Education Survey and the Home Observation for Measurement of the Environment	3-42
		3.3.3	Additional Subsets of Questions	3-46

TABLE OF CONTENTS (CONTINUED)

Chapter			Page
	REFERENCES		3-56
4	SAMPLE DESIGN, WEIGHTING, AND VARIANCE ESTIMATION		4-1
	4.1 Sample Design		4-1
	4.1.1	Analytic Domains and Effective Sample Sizes	4-2
	4.1.2	Core Sample Design	4-9
	4.1.3	American Indian Supplemental PSU Sample Design	4-12
	4.1.4	Consent Processes and Restrictions	4-13
	4.1.5	Substitution and Alternative Frames	4-14
	4.1.6	Sampling Birth Certificates Within Primary and Secondary Sampling Units	4-16
	4.2 Calculation and Use of Sampling Weights		4-17
	4.2.1	Four Types of Sampling Weights	4-17
	4.2.2	Base Weights	4-21
	4.2.3	Weighting Adjustments	4-22
	4.3 Variance Estimation		4-26
	4.3.1	Paired Jackknife Replication Method (JK2)	4-26
	4.3.2	Taylor Series Linearization Method	4-27
	4.3.3	Standard Errors and Design Effects for Selected ECLS-B Variables	4-28
	REFERENCES		4-38
5	DATA COLLECTION METHODS AND RESPONSE RATES		5-1
	5.1 Data Collection Methods		5-1
	5.2 Field Staff and Field Staff Training		5-3
	5.2.1	Field Supervisor Training	5-4
	5.2.2	Field Interviewer Training	5-5
	5.2.2.1	Training on the Parent CAPI Instrument and Other Nonassessment Instruments	5-7
	5.2.2.2	Training on the Assessment Instruments	5-7
	5.2.2.2.1	Training on the Bayley Short Form–Research Edition	5-8

TABLE OF CONTENTS (CONTINUED)

Chapter				Page
			5.2.2.2.2 Training on the Nursing Child Assessment Teaching Scale	5-10
			5.2.2.2.3 Training on the Physical Measurements	5-10
		5.2.2.3	"Live Practice" of the Child Assessments	5-11
	5.2.3		Certification on the Bayley Short Form–Research Edition	5-11
	5.2.4		Interviewer Certification on the Nursing Child Assessment Teaching Scale	5-15
	5.2.5		Certification on the Physical Measurements	5-18
5.3			Nine-Month Data Collection Procedures	5-19
	5.3.1		Advance Mailings	5-19
	5.3.2		Initial Contact	5-20
	5.3.3		Conducting the Home Visit	5-22
	5.3.4		Conducting the Parent Interview	5-23
	5.3.5		Conducting the Child Assessments	5-24
		5.3.5.1	Overview of the Child Assessments	5-25
		5.3.5.2	Standardization in Conducting the Child Assessments	5-26
	5.3.6		Data Collection for Resident and Nonresident Fathers	5-27
	5.3.7		Data Collection Protocol by Component for Spanish-Speakers and Speakers of Other Languages	5-30
	5.3.8		Child Observations and Interviewer Remarks	5-33
5.4			Nine-Month Response Rates	5-34
	5.4.1		Steps to Improve Response Rates	5-36
		5.4.1.1	Incentives	5-36
		5.4.1.2	Refusal Conversion	5-37
		5.4.1.3	Locating Activities	5-37
		5.4.1.4	Procedures for Other Nonresponse Cases	5-38
	5.4.2		Overall Response Rate	5-39
	5.4.3		Component Response Rates	5-40
5.5			Quality Assurance for Data Collection Activities	5-51

TABLE OF CONTENTS (CONTINUED)

Chapter				Page
		5.5.1	Nine-Month Validations	5-51
		5.5.2	Home Visit Observations	5-52
		5.5.3	Audiotapes of Home Visits	5-53
		5.5.4	Quality Control Procedures for the Direct Child Assessments	5-54
		5.5.5	Assessor Effects	5-57
	5.6		NCATS Coder Training and Certification	5-59
		5.6.1	Quality Control Procedures for NCATS Coders	5-61
	REFERENCES			5-63
6	DATA PREPARATION			6-1
	6.1		Coding and Editing Specifications for Computer-Assisted Interviewing	6-1
		6.1.1	Range Specifications	6-1
		6.1.2	Consistency Checks (Logical Edits)	6-2
		6.1.3	Coding	6-2
			6.1.3.1 Review of “Other, specify” Items	6-2
			6.1.3.2 Parent Occupation Coding	6-3
			6.1.3.3 Race/Ethnicity Coding	6-5
			6.1.3.4 Language Coding	6-6
			6.1.3.5 Partially Completed Parent Interviews	6-7
			6.1.3.6 Household Roster in the Parent CAPI Instrument	6-7
	6.2		Coding and Editing Specifications for Hard-Copy Instruments and NCATS Tapes	6-8
		6.2.1	Receipt Control	6-8
		6.2.2	Coding	6-9
			6.2.2.1 Review of “Other, specify” Items	6-9
			6.2.2.2 Parent Occupation Coding	6-9
			6.2.2.3 Physical Measurement Coding	6-10
		6.2.3	Data Entry	6-10
		6.2.4	Data Editing	6-10

TABLE OF CONTENTS (CONTINUED)

Chapter				Page
		6.2.4.1	Range Specifications	6-10
		6.2.4.2	Consistency Checks (Logical Edits)	6-11
		6.2.4.3	Frequency and Cross-Tabulation Review	6-11
	REFERENCE			6-12
7	DATA FILE CONTENT AND COMPOSITE VARIABLES			7-1
	7.1	Identification Variables		7-2
	7.2	Missing Values		7-2
		7.2.1	Exceptions to the Standard Scheme for Missing Values	7-5
		7.2.2	Other Special Codes	7-5
	7.3	Variable Naming Conventions		7-7
	7.4	Birth Certificate Data		7-8
	7.5	Composite Variables		7-14
		7.5.1	Child Composite Variables	7-14
			7.5.1.1 Child's Age in Months at Assessment (X1ASAGE)	7-15
			7.5.1.2 Child's Age in Months at Assessment Adjusted for Prematurity (X1BSIDAG)	7-15
			7.5.1.3 Child's Race/Ethnicity (X1CHAMIN, X1CHASN, X1CHPCIL, X1CHBLCK, X1CHWHT, X1CHHISP, X1CHMLRC, X1CHRACE)	7-16
			7.5.1.4 Child's Length (X1CHLENG)	7-17
			7.5.1.5 Child's Weight (X1CHWGHT)	7-18
			7.5.1.6 Child's Middle Upper Arm Circumference (X1MUAC)	7-18
			7.5.1.7 Child's Head Circumference (X1CHCRFM)	7-18
			7.5.1.8 Primary Nonparental Child Care Arrangement (X1PRIMNW)	7-19
			7.5.1.9 Hours Per Week in Child Care (X1HRSCAR)	7-20
			7.5.1.10 Earliest Age Child Received Nonparental Care (X1AGCARE)	7-21
		7.5.2	Family and Household Composite Variables	7-22
			7.5.2.1 Number of Siblings (X1NUMSIB)	7-22

TABLE OF CONTENTS (CONTINUED)

Chapter				Page
			7.5.2.2 Parents' and Household Members' Age (X1HFAGE, X1HMAGE, X1LESS18, and (X118OVER)	7-22
			7.5.2.3 Food Security Status	7-23
			7.5.2.4 Food Security Status: Continuous Measures (X1FSSCAL, X1FSADSC, and (X1FSCHSC)	7-24
			7.5.2.5 Food Security Status: Categorical Measures (X1FSSTAT, X1FSADST, and X1FSCHST)	7-24
			7.5.2.6 Food Security Status: Raw Scores (X1FSRAW, X1FSADRA, and X1FSCHRA)	7-25
			7.5.2.7 Socioeconomic Status and Poverty (X1FTHSCR, X1MOMSCR, X1SESL, X1SESQ5, X1INCOME, X1POVRTY)	7-26
			7.5.2.8 Parent Education (X1PARED, X1FTHED, and X1MOMED)	7-32
			7.5.2.9 Parent Race/Ethnicity (X1HFAMIN, X1HFASN, X1HFPCIL, X1HFBLCK, X1HFWHT, X1HFHISP, X1HFMLRC, X1HFAIBC, X1HFASBC, X1HFPCBC, X1HFBLBC, X1HFWHBC, X1HFHSBC, X1HFRACE, X1HMAMIN, X1HMASN, X1HMPCIL, X1HMBLCK, X1HMWHT, X1HMHISP, X1HMMLRC, X1HMAIBC, X1HMASBC, X1HMPCBC, X1HMBLBC, X1HMWHBC, X1HMHSBC, X1HMRACE)	7-33
			7.5.2.10 Parent Identifiers and Household Composition (X1MOMTYP, X1FTHTYP, X1MOMID, X1FTHID, X1HPARNT, X1HFAMIL)	7-34
		7.5.3	Occupation Codes Used in the ECLS-B	7-36
		7.5.4	Derived and Indicator Composite Variables	7-41
	7.6		Composite Table	7-42
	7.7		Masked Variables	7-73
			REFERENCES	7-85
8			ELECTRONIC CODE BOOK	8-1
	8.1		Introduction	8-1
		8.1.1	Hardware/Software Requirements	8-2
		8.1.2	ECB Features	8-2

TABLE OF CONTENTS (CONTINUED)

Chapter			Page
8.2	Installing, Starting, and Exiting the ECB		8-3
	8.2.1	Installing the ECB Program on Your Personal Computer	8-3
	8.2.2	Starting the ECB	8-7
	8.2.3	Exiting the ECB	8-10
	8.2.4	Removing the ECB Program From Your Personal Computer	8-11
	8.2.5	Title Bar	8-12
	8.2.6	Menu Bar	8-12
	8.2.7	Using Shortcut Keys to Navigate	8-13
8.3	Variable List		8-13
	8.3.1	Searching the Code Book for Variables	8-16
		8.3.1.1 Using the “Go” Button	8-16
		8.3.1.2 Narrowing Your Variable Search	8-17
		8.3.1.3 Expanding Your Variable Search	8-20
		8.3.1.4 Resetting Your Variable List	8-22
8.4	Working Taglist		8-22
	8.4.1	Opening a Taglist	8-23
	8.4.2	Adding Variables to the Working Taglist	8-24
	8.4.3	Removing Variables From the Working Taglist	8-26
	8.4.4	Saving Taglists	8-27
	8.4.5	Exporting Taglists	8-29
	8.4.6	Importing Taglists	8-30
	8.4.7	Using Predefined Taglists	8-32
	8.4.8	Deleting Taglists	8-32
	8.4.9	Viewing Code Book and Variable Information	8-33
8.5	Extracting Data from the ECB		8-41
	8.5.1	Reviewing the Extract Specifications	8-48
	8.5.2	Repairing and Compacting the Database	8-49
8.6	Menu Bar Descriptions		8-50
8.7	Child Catalog		8-51
	8.7.1	Child Catalog Topical Variable Groupings	8-53
	8.7.2	Child Catalog Predefined Taglists	8-58
	8.7.3	Child Catalog Limiting Fields	8-58

TABLE OF CONTENTS (CONTINUED)

List of Tables

Table		Page
3-1	Comparison of numbers of items per set of the Bayley Short Form–Research Edition and the Bayley Scales of Infant Development, Second Edition: 2001–02	3-5
3-2	Bayley Short Form–Research Edition scores: 2001–02	3-13
3-3	NCATS scores in the ECLS-B 9-month data file: 2001–02	3-20
3-4	NCATS supplemental contextual variables in the ECLS-B 9-month data file: 2001–02	3-24
3-5	Cronbach's alphas for Total Parent, Total Child, and Total NCATS Scales: 2001–02	3-25
3-6	Child Observations items in the data file: 2001–02	3-27
3-7	Physical measurement composites in the ECLS-B 9-month data file: 2001–02	3-32
3-8	Developmental milestone questions in the parent CAPI instrument: 2001–02	3-35
3-9	Infant/Toddler Symptom Checklist items in the ECLS-B 9-month data file: 2001–02	3-37
3-10	Differentiation of regulatory disordered children by items of the Infant/ Toddler Symptom Checklist in the ECLS-B: 2001–02	3-38
3-11	Correct responses for KIDI items, 9-month data collection: 2001–02	3-41
3-12	Comparison of frequencies between the ECLS-B and the 1999 and 2001 National Household Education Survey (NHES) for selected items on activities families share with their children	3-43
3-13	Comparison of HOME items in NHES and in the ECLS-B Child Observations, parent CAPI instrument, and resident father questionnaire: 2001–02	3-45
3-14	Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02	3-48

TABLE OF CONTENTS (CONTINUED)

List of Tables (continued)

Table		Page
4-1	Cross-classification of child's sampling and parent report of race/ethnicity, 9-month data collection: 2001–02	4-6
4-2	Number of cases with component data, overall and by domain, in the 9-month data collection: 2001–02	4-8
4-3	Number of 9-month parent completes with children in poverty, by race/ ethnicity, birth weight, and plurality: 2001–02	4-9
4-4	Parent completes, broken down by completed and missing BSF-R and physical measurements components, 9-month data collection: 2001–02	4-18
4-5	Characteristics of cross-sectional weights, 9-month data collection: 2001–02	4-25
4-6	Standard errors and design effects for the full sample, 9-month data collection, child level (overall): 2001–02	4-32
4-7	Median design effects in the 9-month data collection, by component measure and subgroup: 2001–02	4-36
5-1	Final case status of the 9-month data collection, based on parent interview status: 2001–02	5-40
5-2	Unit response rates for the 9-month data collection, by parent CAPI instrument and child assessments: 2001–02	5-43
5-3	Unit response rates for the 9-month data collection, by resident father questionnaire, nonresident father questionnaire, and all fathers: 2001–02	5-45
5-4	Stages in identifying and completing father questionnaires, by father type, 9-month data collection: 2001–02	5-48
5-5	Final case status of the father questionnaires, by father type, 9-month data collection: 2001-02	5-49
5-6	Final case status of the 9-month data collection, based on parent interview status, by child characteristics: 2001–02	5-50

TABLE OF CONTENTS (CONTINUED)

List of Tables (continued)

Table		Page
5-7	Components of variance associated with the child, interviewer, and supervisor for the BSF-R mental scale, scored with publisher item calibrations, 9-month data collection: 2001–02	5-58
5-8	Components of variance associated with the child, interviewer, and supervisor for the BSF-R motor scale, scored with publisher item calibrations, 9-month data collection: 2001–02	5-58
7-1	Levels of the detailed income range in the 9-month data collection: 2001–02	7-27
7-2	Households asked to report income to the nearest $1,000 in the 9-month data collection: 2001–02	7-27
7-3	Item missing data for SES source variables in the 9-month data collection: 2001–02	7-28
7-4	Summary of imputation results, 9-month data collection: 2001–02	7-30
7-5	ECLS-B and Census poverty thresholds for 2001	7-32
7-6	ECLS-B 9-month composite variables	7-43
7-7	Recoded and suppressed data on the ECLS-B Public-Use Data file: 2001–02	7-75

List of Figures

Figure		Page
1-1	ECLS-B conceptual model	1-6
5-1	Data collection components for wave 1: 2001–02	5-2

List of Exhibits

Exhibit		
1-1	ECLS-B waves of data collection: 2001–07	1-3

TABLE OF CONTENTS (CONTINUED)

List of Exhibits (continued)

Exhibit		Page
2-1	Sources of data and instruments in the ECLS-B 9-month data collection: 2001–02	2-1
2-2	Components and domains covered in the ECLS-B 9-month direct child assessments: 2001–02	2-3
2-3	ECLS-B parent instruments by major content topics: 2001–02	2-10
2-4	ECLS-B 9-month father self-administered questionnaires by major content topics: 2001–02	2-15
3-1	BSF-R mental scale and motor scale proficiencies, 9-month data collection: 2001–02	3-11
3-2	Cut points for the Center for Epidemiologic Studies–Depression (CES-D) scale scores in the 9-month data collection: 2001–02	3-47
4-1	Rules for assigning infant's race/ethnicity based on parents' race/ethnicity from birth certificates, in 9-month data collection: 2001-02	4-4
4-2	ECLS-B cross-sectional weights in the 9-month data collection: 2001–02	4-20
4-3	Variables used to define sample-based nonresponse adjustment cells for each set of weights, 9-month data collection: 2001–02	4-24
4-4	Replicate weights for each set of sampling weights, 9-month data collection: 2001–02	4-27
4-5	Specifications for computing standard errors in the 9-month data collection: 2001–02	4-28
5-1	Training topics and time allocations in the 9-month data collection: 2001–02	5-6
5-2	Additional training topics and time allocation for bilingual training session in the 9-month data collection: 2001–02	5-6
5-3	Sample item from the BSF-R review form, 9-month data collection: 2001–02	5-13

TABLE OF CONTENTS (CONTINUED)

List of Exhibits (continued)

Exhibit		Page
5-4	Preferred order of administration of the home visit components, 9-month data collection: 2001–02	5-22
5-5	Non-English administration of ECLS-B 9-month instruments: 2001–02	5-30
5-6	Interviewer Remarks items, 9-month data collection: 2001–02	5-34
7-1	Standard missing values codes for the ECLS-B 9-month variables: 2001–02	7-3
7-2	Special codes used in the ECLS-B 9-month data collection: 2001–02	7-6
7-3	Prefixes for 9-month variables and weights: 2001–02	7-7
7-4	ECLS-B 9-month birth certificate (BC) data: 2001–02	7-10
8-1	Windows Run screen	8-4
8-2	InstallShield Wizard	8-4
8-3	Welcome window	8-5
8-4	Choose Destination Location	8-5
8-5	Setup Status	8-6
8-6	InstallShield Wizard Complete	8-6
8-7a	Desktop icon	8-7
8-7b	Desktop screen—click start	8-8
8-8	First-time user dialog box	8-8
8-9	ECB splash screen	8-9
8-10	Select Catalog screen	8-9
8-11	Main ECB screen	8-10
8-12	Exit screen	8-11

TABLE OF CONTENTS (CONTINUED)

List of Exhibits (continued)

Exhibit		Page
8-13	Save working taglist dialog box	8-11
8-14	Title Bar	8-12
8-15	Menu Bar	8-12
8-16	ECB main screen	8-14
8-17	Variable List	8-15
8-18	“Go” button	8-17
8-19	Narrow Search Text dialog box	8-18
8-20	No Matches Found message	8-19
8-21	Example of narrowing a search	8-20
8-22	Expand Search Text dialog box	8-21
8-23	No Matches Found message	8-22
8-24	ECB Working Taglist	8-23
8-25	Open Taglist dialog box	8-24
8-26	Add variables buttons	8-25
8-27	Add Taglist dialog box	8-26
8-28	Remove variables buttons	8-26
8-29	Save Taglist As dialog box	8-28
8-30	Save Taglist As dialog box (#2)	8-29
8-31	Pulldown menu to select Taglist Export	8-30
8-32	Export Taglist dialog box	8-30

TABLE OF CONTENTS (CONTINUED)

List of Exhibits (continued)

Exhibit		Page
8-33	Pulldown menu to select Taglist Import	8-31
8-34	Import Taglist From dialog box	8-31
8-35	Delete Taglist selection	8-33
8-36	Delete Taglist confirmation window	8-33
8-37	Code book information	8-34
8-38	Code book view	8-35
8-39	Navigation buttons	8-35
8-40	Printing status screen	8-36
8-41	Export code book selection screen	8-37
8-42	Variable Quick View	8-38
8-43	Add All Variables dialog box	8-39
8-44	View of the entire code book	8-40
8-45	Printer dialog box	8-40
8-46	Limiting fields dialog box	8-42
8-47	Save SAS program file dialog box	8-43
8-48	Save SAS program file location browse screen	8-44
8-49	Save SAS data file dialog box	8-44
8-50	Save SPSS program file dialog box	8-45
8-51	Save SPSS program file location browse screen	8-46
8-52	Save SPSS data file dialog box	8-46
8-53	Save Stata program file dialog box	8-47

TABLE OF CONTENTS (CONTINUED)

List of Exhibits (continued)

Exhibit		Page
8-54	Save Stata program file location browse screen	8-48
8-55	Save Stata data file dialog box	8-48
8-56	Repair database completed screen	8-49
8-57	Menu Bar Descriptions	8-50
8-58	Child catalog required variables, 9-month data collection: 2001–02	8-51
8-59	Child catalog blocks, 9-month data collection: 2001–02	8-52
8-60	Selected child catalog topical variable groupings, 9-month data collection: 2001–02	8-53
8-61	Child catalog—9-month limiting field variables: 2001–02	8-58
8-62	Child catalog Extract Specifications window	8-59
8-63	9-month ECLS-B ECB main screen	8-60

DATA ANOMALIES AND ERRATA

In the course of preparing the data for release, some data anomalies and errata were identified. The anomalies are the result of allowable responses that seem odd when viewed in conjunction with other responses. The errata are due to errors in the programming of either the computer-assisted parent interview or the computer-assisted data entry (CADE) programs or in the design of the interview. These errors resulted in problems such as cases skipping questions that should have been asked or in not having an appropriate response option available. Both data anomalies and errata are described in this section.

Data Anomalies

- There are 4 cases where P1NUMCHO > P1NUMCH. P1NUMCH asks "Altogether, how many biological or natural children do you have?" P1NUMCHO asks, "How many of your biological or natural children live outside of your household?" The number of children reported in P1NUMCHO should be a subset of those reported in P1NUMCH. Either P1NUMCHO or P1NUMCH is in error in these cases.

- There are 31 cases where (P1NUMCH = P1NUMCHO) and X1RSPREL = 1 (respondent is the subject child's biological mother). This result indicates that all of the respondent's biological children are living outside of her household. This result is not possible because the subject child must be living with the respondent. Therefore either P1NUMCH or P1NUMCHO is wrong. Some respondents may have forgotten to include the subject child in the count of P1NUMCH. Other respondents probably misunderstood what was being asked in P1NUMCHO. Of the 31 cases, 10 were non-English-speaking households (X1LANGST = 1).

- There is a similar discrepancy with the parallel questions in the resident father questionnaire (F1NUMCH and F1NUMCHO). There are 5 cases where F1NUMCHO > F1NUMCH and the respondent to the resident father questionnaire is the biological father (F1RELCH = 1). Either F1NUMCHO or F1NUMCH is in error for these cases.

- There are 38 cases where (F1NUMCH = F1NUMCHO) and F1RELCH = 1 (biological father). This result indicates that all of the father's children live outside the household. Again, this result is not possible. Either F1NUMCH or F1NUMCHO is wrong.

- There are 11 cases where X1ASAGE (child's age at assessment) is younger than P1AGMILK (age child first began drinking milk as reported in the parent interview). Child's age at assessment is calculated using the child's birth date and the date of assessment entered into the Child Activity Booklet. The edit for P1AGMILK (age first gave child milk) checked the reported age against the child's current age (calculated using the child's birth date and the date of the parent interview). The 11 discrepancies occur because the assessment date differs from the parent interview date.

Although for the majority of cases the assessments were conducted on the same day as the parent interview, about 1 percent of the households requested that the interviewers return at a later time to conduct or complete the assessments. Usually the interviewers scheduled the second visit in the same week, but occasionally a longer time period elapsed.

- There are 2 cases that report an adult height of less than 4 feet (P1TALLUN, P1TALLFT, and P1TALLIN) and one case that reports a height of 7 feet, 11 inches. There is one case that reports an adult height of 2 feet in the father questionnaire (F1HGHFT).

- There are 48 cases that have a value of −1 (not applicable) for P1TALLIN, but that report valid heights at P1TALLFT. We suspect that these cases have reports such as "6 foot even" and that the interviewer entered "not applicable" at P1TALLIN.

- The responses to P1HHINCY (household income) and P1HMVALU (value of home) that are very low sometimes appear to be straight dollar amounts and sometimes appear to be dollar amounts reported to the nearest 1,000 or 10,000. Users who are particularly interested in the low income and home value ranges may want to review the data with other associated income (such as earnings) to edit these values. The data for P1HHINCY and P1HMVALU are as they were entered during the parent interview.

- There are 9 cases that report their pay before taxes (P1PAYBTX) as $0.1 or $0.01. Similarly, there are 10 cases that report the spouse's pay before taxes (P1SPINCM) as $0.01.

- The 3 cases that have an incomplete parent interview (X1STATP1=2) are twin cases where the interview was completed for the first twin, but was broken off before the interview was completed for the second twin.

- There are 10 cases where there is a biological father in the household who is identified as the spouse/partner of the biological mother respondent, but the response to F1RELCH ("What is your relationship to the child?") identifies someone other than the biological father as the respondent to the resident father questionnaire. Users will need to consider whether to include or exclude these 10 cases when analyzing the father data.

- There are 7 cases where there is a biological mother and another type of mother (e.g. adoptive mother) in the household. For the composite X1HPARNT (X1 CH Parents who reside in household), these cases take a value of 2 (Biological mother and other father). These cases are I_ID=015647, 017608, 130546, 141117, 847346, 397151, and 742941).

- There are 10 cases where the respondent was not the biological mother or the biological father, but the biological father lived in the child's household. For the composite on the status of the nonresident father questionnaire (X1STTNRQ), these cases take a value of 5 (no nonresident

father). These cases could also have been assigned a value of 6 (not asked, respondent not biological mother) on X1STTNRQ. However, it was felt that category 5 (no nonresident father) provided users with more useful information.

- The ECLS-B protocol called for head circumference measurements to be collected for children who were very low birth weight. During data collection, the sampling birth weight measure (W1CBWT) was used to determine which children needed to have head circumference measurements taken. Prior to and during data collection, W1CBWT had missing data for some cases. For sampling and the collection of head circumference measures, these cases were assumed to be very low birth weight. In creating the composite for head circumference (X1CHCRFM), however, an updated birth weight measure from the National Center for Health Statistics (NCHS) natality file was used to determine whether measurements were needed (C1CHHCND). Cases that were determined not to be very low birth weight were given a value of −1 (not applicable) on X1CHCRFM even though measurements had been taken. The measurements collected remain on the file (C1CHHC1, C1CHHC2). A comparison of the birth certificate data from the natality file and W1CBWT yielded other discrepancies. The values for W1CBWT were not updated, however, because it is the variable that was used for sampling.

- There are 35 cases that have a household mother's weight recorded for the composite on mother's weight (X1HMGHT), but the first weight recorded during the interview (C1ADTWT1) was not the mother's weight. For 33 of these cases, the second weight recorded during the interview (C1ADTWT2) was the mother's and the composite takes the value of that second weight. The remaining two cases were foster mothers who were identified as such in an "other, specify" comment during the interview. It was decided to include them in the composite of mother's weight.

Errata

- The valid response ranges for P1NUMCH (number of biological children altogether) and P1NUMCHO (number of biological children living outside the household) are inconsistent. The valid response range for P1NUMCH is 1 to 12; while the valid range for P1NUMCHO is 1 to 17. Thus a response of 12 to P1NUMCH could mean 12 or more. Five (5) cases responded 12 to P1NUMCHO.

- P1RFEE, P1NFEE, and P1CFEE ask "Is there any charge or fee for the care {CHILD} receives from {relative/nonrelative/center} paid either by you or someone else?" The followup questions are "How much does your household pay to {relative/nonrelative/center} to care for {CHILD}?" The design does not allow "zero" as a correct response to the followup questions on how much the household pays for the child care. However, it became clear in reviewing the comments that some households reported that there was a charge or fee for the care, but that someone outside the

household paid for that care. Thus "zero" should have been allowable. To overcome this error in the design, a new code 7 (HOUSEHOLD DOES NOT PAY – SOMEONE ELSE DOES) was added to P1RPDU1, P1NPDU1, and P1CPDU1. The cases that indicated that someone else paid had their values in P1RPDU1, P1NPDU1, or P1CPDU1 set to 7 and their values in P1RPAID, P1NPAID, P1CPAID set to 0.01 for the amount paid.

- A total of 1,188 respondents who answered "Yes" to P1LVBMAA (Did you live with your biological mother at any time until age 16?) and who should have been asked P1AGEBM (How old is your biological mother now?) were not asked P1AGEBM. Similarly, 2,246 cases who responded "Yes" to P1LVBFAA (Did you live with your biological father at any time until age 16?) were not asked P1AGEBF (How old is your biological father now?).

- Skip box SI151BX is incorrect. Three cases that responded "Don't know" or "Refused" to P1SPWORK or P1SPVCTN should have been asked P1SPWKSN, but they were not. The parallel box (RI288BX) in the Respondent Information section is correct.

- The 66 cases who responded "Other, specify" to P1RNLNG (language used for parent interview) were accidentally skipped for the followup question RIPRNTRN (Was an interpreter used?). These cases have been set to −9 on R1PRNTRN and on X1INTRST (interpreter used status indicator).

- There is one case where a Child Activity Booklet was receipted that had valid data for the Bayley mental and motor scales, but because of a programming error, the data were not transferred from the CADE program to the data file. Because of this error, the case did not receive Bayley mental or motor scores. The case has a valid Parent-Child weight, but the Bayley scale scores are set to −9 (Not ascertained).

- There are two cases (I_ID=338198, and 843891) that should have been asked the questions about nonresident fathers. However, due to an error that occurred when the interviewer backed up to correct the identity of the household respondent, the computer-assisted parent interview program did not recognize that the father was not in the household. X1STTNRQ (status of nonresident father questionnaire) for these three cases has been set to "3" (No, nonresident father present but no mother permission).

- There is one case (I_ID=954750) that has a resident biological father in the household, but that was not identified as such. The problem occurred when the interviewer backed up to change the identity of the household respondent from biological father to biological mother. The computer-assisted parent interview program would not allow the interviewer to subsequently identify the father as the biological father. Thus she entered his relationship as "foster father" instead. This change, however, meant that the case did not follow the appropriate paths in the parent interview. Questions designed for resident biological fathers were skipped. The

composite variables X1STTNRQ and X1FTHTYP have been corrected to indicate that there is no nonresident father and that the household father is the biological father. P1DAD_03 has also been corrected to indicate that the father is the biological father. The remaining data, however, are as recorded during the parent interview.

- There was an error in the CAPI program for variable R1PRNOT1. This variable indicates who was present during the home visit. It was intended to be a "code all that apply" item, but the program allowed the interviewer to enter only one response.

- Prior to finalizing the data, 53 cases were identified that consisted of relative/nonrelative female respondents to the parent CAPI interview. Originally, these cases had a value of X1MOMTYP = no resident mother. The composite X1MOMTYP was revised and a new category (Rel/nonrel resp–mother figure) was added to include these cases. Of these 53 cases, 24 were identified as having partners who completed the resident father questionnaires. Originally these cases had a value of X1FTHTYP = no resident father. The composite X1FTHTYP was revised and a new category (Rel/nonrel resps partner–father figure) was added to include these cases. In addition, 2 cases were identified that consisted of relative/nonrelative male respondents. Originally, these cases had a value of X1FTHTYP = no resident father. The composite X1FTHTYP was revised and a new category (Rel/nonrel resp–father figure) was added to include these cases. The parent demographic composite variables, however, were not revised for these cases. In addition, any imputations based on the results of X1FTYTYP, X1MOMTYP or the demographic composite variables were not revised to reflect the new values for X1FTHTYP and X1MOMTYP. To obtain the syntax necessary for updating the demographic composites to reflect the changes to X1FTHTYP and X1MOMTYP, go to http://nces.ed.gov/ecls.

- As described in chapter 2, interviewers were supposed to complete an interviewer remarks questionnaire (IRQ) as soon as possible after completing an interview and leaving the child's home. A substantial number of interviewers, however, did not complete this questionnaire (945 cases have missing IRQ data). Users should be aware that composites based on the IRQ data have missing data for these 945 cases. The following two composites are based on the IRQ: X1LNGPRT (language of parent interview) and X1INTRST (interpreter used status indicator).

This page intentionally left blank.

GETTING STARTED

This document highlights key information you will need to work with the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) data and directs you to the appropriate sections of the User's Manual so that you can get started quickly. To read more about any particular topic, go to the indicated section of the User's Manual. In this document, differences between the public-use and restricted-use files are highlighted, cautions and caveats about using the data are provided, and basic information about using the Electronic Code Book (ECB) is summarized.

Differences Between the 9-Month Public-Use and 9-Month Restricted-Use Data Files

The National Center for Education Statistics (NCES) typically releases both a restricted-use and a public-use data file for each data set it produces. Prior to being released as a public-use file, all data undergo a careful disclosure analysis to ensure the confidentiality of individual respondents. Variables that may pose a disclosure risk are modified to preserve confidentiality. Modifications include, but are not limited to, top or bottom coding outlier categories, collapsing categories for selected variables, and suppressing selected variables. See section 1.4.2 for a description of the modifications that are typically made to data in preparation for their release as a public-use file.

In order to preserve some information on topics for which detailed information was suppressed, 10 composites were added to the ECLS-B 9-month public-use file that are not in the restricted-use file. For example, one of the new composites, X1SYNDRM, is a summary indicator of whether a child has a congenital condition such as Down Syndrome, Turner's Syndrome, or spina bifida. The variables that indicate the specific conditions have been suppressed in the public-use file. See the end of table 7-6 for a description of the 10 composites that were added to the 9-month public-use file. See table 7-7 for a listing of the variables that have been modified or suppressed in the 9-month public-use file.

Cautions and Caveats

Other users of the ECLS-B data may have the same questions as you. NCES has developed a set of responses to users' most common questions. Please see the NCES web site for commonly asked questions and responses: http://nces.ed.gov/ecls.

In addition to the frequently asked questions and responses, there are other aspects of working with the data that are important to know, including the following:

- **Exclusions from the population of 2001 births.** Not all children born in 2001 were eligible to participate in the study. Children born to mothers under the age of 15 or those who were adopted at birth or shortly thereafter were excluded from the sample due to restrictions imposed by several state registrars and institutional review boards. However, such children are included in the target population, and sampling weights have been adjusted to account for the exclusion of these children from the sample since control totals for nonresponse adjustments will include all live births in 2001. On the other hand, infants who did not survive until 9 months will be considered as out of scope. See *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Sampling Report for the Nine-Month Data Collection* (U.S. Department of Education, National Center for Education Statistics, forthcoming) for a discussion of the target population and sampling weights.

- **Not all sample children were 9 months of age at the time of the home visit.** The 9-month data file includes children who were born in 2001. Although every effort was made to assess the sample children and interview their families on or near the children's 9-month birthdays, some home visits occurred earlier and some later than the targeted age. Approximately 50 percent (50.5 percent) of the children were assessed within one month of their 9-month birthday (i.e., from 8.0 to 10.0 months). A small percentage of children (0.4 percent) were assessed before they were 8 months old. Due to practical operational limitations, a large percentage were assessed at 10 months or older (49 percent). Most of the children assessed at 10 months or older were assessed when they were 10 or 11 months of age (66 percent). The mean age at assessment was 9.7 months.

- **There are two different measures of the child's age in the file**. X1ASAGE is the child's age at the direct assessment. For most analyses, this is the age variable that you should use. In addition, there is X1BSIDAG, which is the child's age adjusted for prematurity. See section 7.5.1.1 for a discussion of how these two age variables were created.

- **Pay attention to missing data**. Users should always be sure to recode any missing data properly before conducting analyses. There are 5 different possible missing data codes in the file. See section 7.2 for a discussion of the different missing values codes and the circumstances in which they are used.

  Users may also want to omit some cases from analyses. For example, the Bayley Short Form–Research Edition (BSF-R) was designed to assess the development of children 8 to 11 months of age. Eighty-three percent of the children were assessed within this age range. The standard errors of the scale scores for children outside this age range may be high. Analysts may opt to exclude these cases from some analyses. See section 3.1.1 for a discussion of the BSF-R scale scores. See section 3.1.1.1 for

further information on how and when to consider the impact of the child's age on assessment scores.

- **There may be no perfect weight**. The 9-month data file contains four sets of child-based weights. Because the ECLS-B is based on a sample of children, there are no weights available to produce household- or parent-level estimates. Although there are four sets of weights in the file, there are scenarios for which there may not be a perfect weight. For a discussion of the weights and guidance in selecting an appropriate one, refer to section 4.2.1.

- **Defining special populations.** The ECLS-B includes a number of analytic groups of interest that can be identified and studied separately. The ECLS-B was designed to support statistical analyses of selected race/ethnic groups, low birth weight babies, and twins. Specifically, the design allowed for statistical analyses of the following groups: American Indian, Chinese, Other Asian/Pacific Islander, Hispanic, Black (non-Hispanic) and White (non-Hispanic) births; very low (less than 1,500 grams), moderately low (1,500 to 2,500 grams), and normal (greater than 2,500 grams) birth weight births; and twin and non-twin (single birth and other multiple) births. Some of these groups were oversampled to achieve a sufficient number of cases (i.e., American Indian, Chinese, other Asian, low birth weight, and twin births). For other groups, a sufficient number were present in the sample so that oversampling was not required (i.e., White, Black, Hispanic, and normal birth weight births). See chapter 4, section 4.1.1 for information on how the groups were defined for the purposes of oversampling.

  In addition to the above groups, it is also possible to identify other populations for separate analyses, such as children living in households with incomes below the poverty threshold (X1POVRTY). Users who desire to study a specific subpopulation should search the ECB using the "NARROW" feature of the ECB to list variables that might help them identify their population of interest. See section 8.3.1 for a description of this feature.

- **There are several child's race/ethnicity variables contained in the file.** The file contains variables based on the child's race/ethnicity as reported by the parent respondent. It also contains race/ethnicity as reported on the birth certificate. Finally, there is race/ethnicity as it was defined for sampling purposes (see section 4.1.1 for a description of how race/ethnicity was defined for sampling purposes). The race/ethnicity from these three sources is not always the same. Race as defined for sampling purposes and on the birth certificate is based on the child's parents' race/ethnicity. The parent interview is the first time that race/ethnicity of the child is specifically identified. In addition, the parent interview uses the multi-race classification, which was not in operation for birth certificate data at the time of sampling. Thus, 2001 birth certificates did not allow for multi-race responses, and the sample was therefore selected based on a single race classification. In contrast, the ECLS-B classification employs the current NCES standards that allow for multi-race responses. Analysts will need to decide whether they wish to use race as defined for sampling purposes or race as reported for the child in the 9-month parent component in their analyses. For most analyses, users will probably want to use the race/ethnicity

reported for the child in the 9-month parent component as it will be more consistent with how race/ethnicity is measured in other recent surveys.

Reference Guide

- **Electronic Code Book (ECB).** The ECB is designed to run under Windows 95®, Windows 98®, Windows 2000®, Windows XP®, or Windows NT® on a Pentium-class or higher personal computer (PC). The PC should have a minimum of 20 megabytes (MB) of available disk space. The ECB offers the most convenient way to access the data because it enables users to search the names and labels of variables, to examine question wording and response categories for individual items, and to generate SAS, SPPS for Windows, or Stata programs for extracting selected variables (see section 8.1.2 for a description of the several features of the ECB). Section 8.2 contains detailed instructions on how to install and open the ECB. The data user can create SAS, SPSS for Windows, and Stata programs that will generate an extract data file from the text (ASCII) data file on the CD-ROM. This text data file is referred to as the "child catalog" and is named Child9mP.dat in the CD-ROM root directory. The ECB CD-ROM also contains Portable Document Format (PDF) files of the associated questionnaires and of the User's Manual.

- **Data file.** The 9-month child catalog contains one record for each of 10,688 responding cases. This record contains data from all sources (e.g., parent CAPI instrument, parent self-administered questionnaire, father questionnaires (if applicable), and child assessments. It also contains selected birth certificate items. See chapter 8, section 8.7 for a description of the child catalog. See appendix B on the CD-ROM for the record layout for the child catalog. The file, named Child9mP.dat, is stored in the root directory of the CD-ROM as an ASCII file. It is strongly recommended, however, that users access the data using the ECB software available on the CD-ROM rather than access the ASCII file directly. When accessing the data with the ECB, you will need to have the CD-ROM in the drive.

- **Identification variables**. The 9-month data file contains a case identification variable (I_ID) that contains six digits and uniquely identifies each record. If a twin is sampled, a twin identification variable (I_TWINID) is used to identify the case identification number of the twin record. See section 7.1 for further information on these identification variables.

- **Availability of data on twins.** As mentioned earlier, the ECLS-B has an oversample of twins. In households with twins, the direct child assessments (i.e., BSF-R, Nursing Child Assessment Teaching Scale (NCATS) parent-child interaction videotape, and physical measurements) were administered separately for each child in a sampled twin pair. In the case of the parent CAPI instrument, certain sections applicable for both of the children were asked only once (e.g., family structure), while sections that could be different for each child were asked separately for each twin (e.g., child development, child health). When the data are presented in the file, each child has a separate ID and is presented as a separate case. The parent CAPI instrument data that were collected

only once (e.g., family structure) are copied to both twin records, so that an analyst does not have to do any additional merging. As noted above, the variable I_TWINID in the file can be used to identify twin cases.

- **Instruments.** For the ECLS-B 9-month data collection, a child's primary caregiver (usually the child's mother) was interviewed using computer-assisted interviewing techniques. Self-administered questionnaires were used to collect sensitive information from the parent respondent. Hard-copy (paper) questionnaires were used to collect information from fathers, both those living with the child (resident) and those living elsewhere (nonresident). Chapter 2 provides an overview of the instruments. To help you decide what variables to use in your analyses, you should always review the actual instruments. Seeing the specific wording of the questions and the context in which they were asked is useful in understanding the results of your analyses and can help minimize errors. Appendix A on the ECLS-B ECB CD-ROM contains, with some exceptions, the 9-month instruments. The exceptions are measures that contain copyright-protected materials and instruments covered by agreements with the test publishers that restrict distribution. For this reason, the individual items from the BSF-R and from the NCATS are not included in appendix A.

- **Composite variables.** Numerous composites have been constructed for the ECLS-B data to make it easier for users to use the data set. Most composite variables were created using two or more variables that are in the data file or using information from other sources. Others are recodes of single variables. Composites based on the parent data include parent education (X1PARED), poverty status (X1POVRTY), and socioeconomic status (X1SESL). See section 7.5 and table 7-6 for details on all the composites contained in the 9-month public-use data file. It is strongly recommended that analysts consider using the composite variables because these variables represent the best data the study has, and some include sources not available in the data file.

- **Assessment scales.** A key feature of the ECLS-B data is the assessments conducted on each child. These assessments included direct and indirect measures of children's cognitive, socioemotional, physical, and psychomotor development. Chapter 2 provides a general description of the survey instruments, including the direct and indirect assessments. The direct child assessments included the BSF-R (an adaptation of the Bayley Scales of Infant Development, Second Edition [BSID-II]) and a teaching task from the NCATS. See section 3.1 for details on the direct assessments and the scores that are available for analysis. Section 3.1.1.1 discusses choosing the appropriate BSF-R score for analysis; section 3.1.2 describes the NCATS scales available for analysis.

- **Data on resident and nonresident fathers.** Two separate questionnaires were used to collect data from resident fathers and nonresident biological fathers. Most resident fathers were asked to complete the resident father questionnaire. The only exceptions were if the father was the respondent to the parent CAPI interview or if he was unavailable for an extended period (e.g., hospitalized or traveling). Only a subset of nonresident biological fathers were eligible for the nonresident father questionnaire. To be eligible, two criteria had to be met. First, the father had to have had some contact with either the child or the child's mother in the past 3 months and, second,

the resident mother had to have granted permission for the nonresident father to be contacted. For information on the fathers from whom the ECLS-B collected data, see section 5.3.6. For information on which weights to use when analyzing father questionnaire data, see section 4.2.1.

- **Sample design and weights.** The ECLS-B employs a complex sample design. See chapter 4 for a description of the sample design. In order to obtain accurate estimates, you will need to select the appropriate weights. Section 4.2.1 describes the weights and provides advice for which weight to use for a given type of analysis. See exhibit 4-2 for a summary of the weights available for analysis.

1. INTRODUCTION

This manual provides guidance and documentation for users of the 9-month data of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B). This chapter presents an overview of the ECLS-B study. Subsequent chapters provide details on the instruments and measures used, the sample design, weighting procedures, response rates, data collection and processing procedures, and the structure and contents of the data file.

The ECLS-B is a multisource, multimethod study that focuses on the early home and educational experiences of children during their first 6 years. The study is sponsored by the U.S. Department of Education, National Center for Education Statistics (NCES) in the Institute of Education Sciences, in collaboration with several federal education and health policy agencies. The sponsoring agencies from the U.S. Department of Health and Human Services include the National Center for Health Statistics (NCHS), the National Institute of Child Health and Human Development (NICHD) and other components of the National Institutes of Health (NIH); the Administration on Children, Youth and Families (ACYF); the Office of the Assistant Secretary for Planning and Evaluation (ASPE); the Centers for Disease Control and Prevention (CDC); the Maternal and Child Health Bureau (MCHB); and the Office of Minority Health (OMH). Other sponsoring institutes from NIH are the National Institute of Mental Health (NIMH), the National Institute of Nursing Research (NINR), the National Institute on Aging (NIA), the National Institute on Deafness and Other Communication Disorders (NIDCD), the National Center on Minority Health and Health Disparities (NCMDH), and the Office of Behavioral and Social Sciences Research (OBSSR). The Economic Research Service (ERS) of the U.S. Department of Agriculture as well as the Office of Indian Education (OIE) and the Office of Special Education Programs (OSEP) of the U.S. Department of Education are also participating as sponsors for the study. Westat, a social science research company, is conducting the first two waves of the study for NCES.

The ECLS-B follows a nationally representative cohort of children born in 2001 from birth through first grade. It is part of the Early Childhood Longitudinal Study (ECLS), a longitudinal studies program comprising two cohorts—the birth cohort (ECLS-B) and a kindergarten cohort (ECLS-K). Together, these cohorts provide the breadth and depth of data required to more fully describe children's health, early learning, development, and education experiences. The birth cohort study focuses on those characteristics of children and their families, including children's early health care and in-home and out-of-home experiences, that influence children's development and first experiences with the demands of

formal school (i.e., kindergarten and first grade). The kindergarten cohort follows a national sample of children who were in kindergarten during the 1998–99 school year from kindergarten through fifth grade. The ECLS-K measures key aspects of children's development and their environments (home and school) as they enter school and examines the influences of these on their academic achievement and experiences through elementary school. The two cohorts (ECLS-K and ECLS-B) are designed to overlap in time points (i.e., both have kindergarten and first grade data collections) and measures (e.g., similar direct child assessment and parent interview constructs). An overlapping cohort design aids in following the trajectory of children's development. For example, the ECLS-K has shown that differences between children's cognitive, social, and physical development exist at school entry (U.S. Department of Education, National Center for Education Statistics, 2000). The ECLS-B is designed to explain where, when, and how these differences emerge.

The parents of 10,688 children born in 2001 participated in the first wave of the ECLS-B study when the children were approximately 9 months old. Child assessments were conducted on a total of 10,224 of these children. Since the sampled children were born between January and December 2001, base year data were collected on a rolling basis between the fall of 2001 and the fall of 2002. The term "9 months" is used throughout this document to refer to the data collection that took place between the fall of 2001 and the fall of 2002, at which time most of the sampled children were 9 months of age. Because of the time that was required to locate families and to schedule and conduct the home visit, children ranged in age from approximately 6 months to 22 months at the time of the assessment (see chapter 3, section 3.1.1 for information about age and the use of the Bayley Short Form–Research Edition [BSF-R]). The first followup took place when the children were age 2 and additional waves of data collection are planned at 4 years of age and then in kindergarten and first grade.

Exhibit 1-1 presents the ECLS-B data collection schedule.

Exhibit 1-1. ECLS-B waves of data collection: 2001–07

Data collection	Date of collection
9-months	Fall 2001–fall 2002
2-year-old	2003
4-year-old	2005
Fall-kindergarten[1]	Fall 2006
Fall-first grade[2]	Fall 2007

[1]This collection is planned for the fall of the children's kindergarten year. Because the age requirements for school entry differ across the U.S., children in the sample will start kindergarten in different years. The majority of the children will enter kindergarten in fall 2006. All children will be included in the data collection, even if they are not in kindergarten in fall 2006.
[2]This collection is planned for the fall of the children's first grade year. The children will enter first grade in different years, with the majority entering in fall 2007. All children will be included in the 2007 data collection, regardless of their grade in school.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, 9-month and 2-year-old data collections: 2001–03.

The central goal of the ECLS–B is to provide a comprehensive and reliable set of data that may be used to describe and to better understand children's early development; their health care, nutrition, and physical well-being; their preparation for school; key transitions during the early childhood years; their experiences in early care and education programs, kindergarten, and first grade; and how their early experiences relate to their later development, learning, and experiences in school.

There are several aspects of the ECLS-B design that help to achieve this goal as well as distinguish the ECLS-B from previous studies on early childhood development and growth. These include (1) oversampling of specific groups of children (e.g., American Indian and Asian and Pacific Islander infants, low birth weight infants, and twins), (2) collecting information directly from children's fathers as well as from their mothers, (3) videotaping a parent-child interaction, and (4) observing child care settings serving ECLS-B sampled children.[1] These features enrich the study design and provide in-depth descriptions of children's home and care experiences that can be linked to later development and experiences.

The ECLS-B may be used for both descriptive and analytic purposes. It will provide descriptive data on children's health status at birth and later; experiences in home, nonparental care, and

[1] Child care observations are conducted at waves 2 and 3 of data collection when children are 2 and 4 years of age, respectively. Information collected directly from the providers was not included in the 9-month data collection.

school environments; and children's development and growth through first grade. The ECLS-B will also provide a rich data set that will enable researchers to analyze how a wide range of family, nonparental care, school, community, and individual factors affect children's early experiences, development, and their success in school; to explore school readiness and the relationship between the early care and education experiences and later school performance; and to record children's cognitive, socioemotional, and physical growth from infancy through the first 2 years of formal schooling.

1.1 Background

Vital to any effort to improve the health, early care, and education for all of the nation's children is a research and data collection program that increases understanding of the dynamics that lead to differential school success. The ECLS-B helps to fill a gap in the existing data on early childhood development. It is the first study to follow a nationally representative sample of U.S. children from birth through the early formative years and on to school that collects data about the early experiences young children have in and out of their homes and the services they receive. The study measures children's early development prospectively, using a broad view of child development: the ECLS-B data contain repeated measures of children's cognitive development, physical health and growth, social development, and emotional well-being, along with information on family background and the educational quality of their home environments.

The ECLS-B allows researchers to examine how these developmental areas are affected by such factors as early home educational experiences, nutrition, chronic health conditions, provision of health care, father involvement, and participation in early care and education. Data on these experiences are also collected as they occur, except for retrospective information on prenatal care and newborn (neonatal) factors. This "in-time" collection produces a more accurate measurement of these antecedent factors and therefore a sound basis for drawing inferences about the relationship of early experiences to later growth and development in both cognitive and noncognitive domains. Thus, the ECLS-B can be used to effectively inform policies regarding children, their families, and their health, early care, and education.

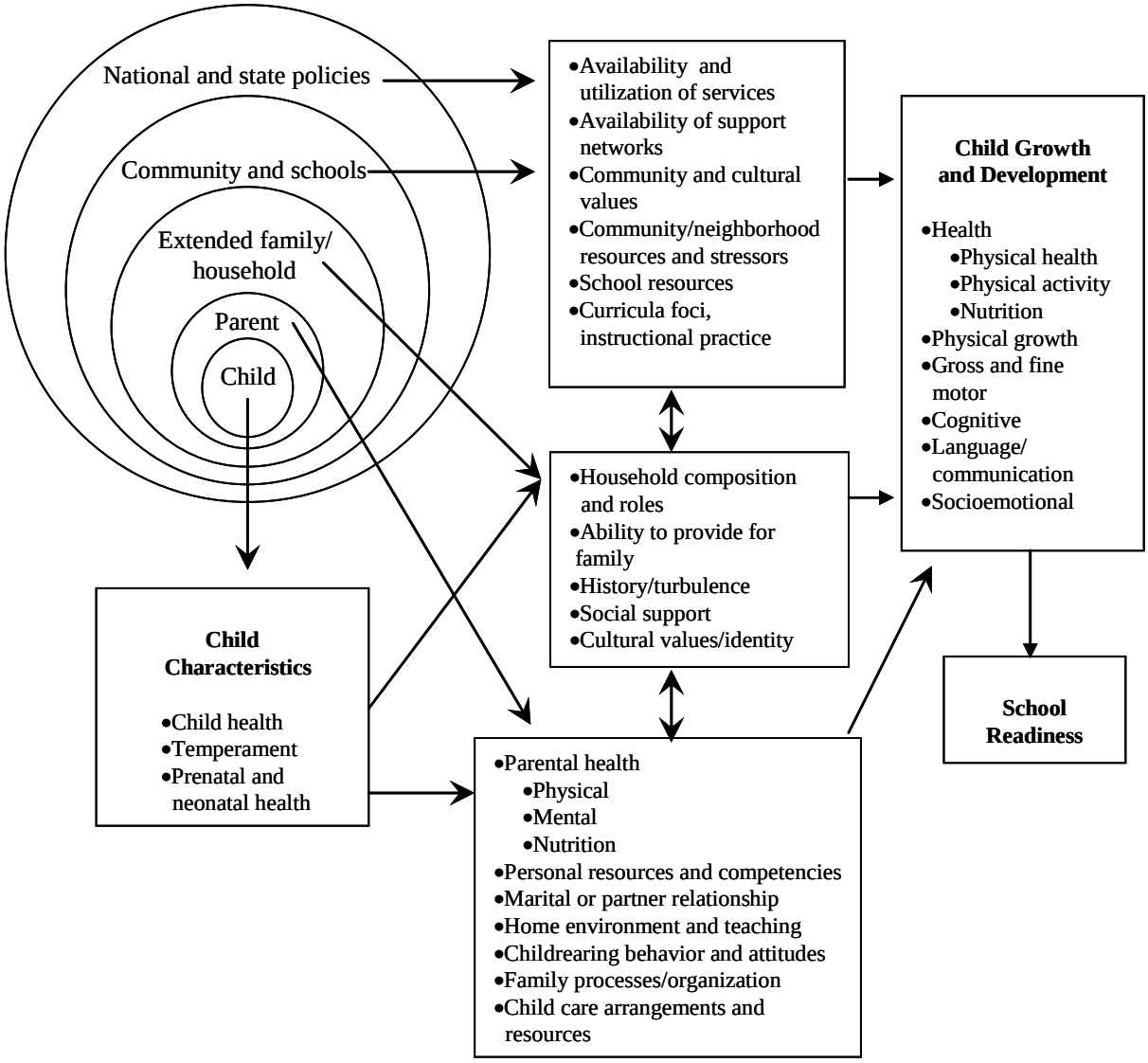
Data collected during the first year of life (around 9 months) serve as a baseline for the study. A goal of the 9-month data collection has been to describe the diversity in the experiences, competencies, and backgrounds of U.S. infants. Because the ECLS-B sample includes substantial

numbers of White, Black, Hispanic, Asian, and American Indian children, the ECLS-B data present many possibilities for studying cultural and ethnic differences in the educational preferences of families, the developmental patterns of children, and the educational resources and opportunities that different groups are afforded in the United States. The ECLS-B sample also includes substantial numbers of children with birth characteristics that may be indicative of later developmental difficulties (e.g., very low birth weight, moderately low birth weight, multiple birth). Thus, the ECLS-B data will enable researchers to analyze the differences in the growth and development of these children as well.

1.2 Conceptual Model

The design of the ECLS-B is based on the assumption that children's preparation for school begins at (or before) birth and continues as they enter school. It is guided by a conceptual model of children's development, care, and schooling that emphasizes the interaction between the child, family, health care access, early care and education programs, and community (figure 1-1). The ECLS-B recognizes the importance and inter-relatedness of factors that affect children's health status, socioemotional development, and intellectual development and incorporates these with factors from the child's family, community, early care and education, and (eventually) school-classroom environments. The study has paid particular attention to the role that parents and families play in supporting children's growth, development, and learning through the first 6 years. As noted earlier, future waves of the ECLS-B will also gather information on the quality and experiences provided by early care and education arrangements.

Figure 1-1. ECLS-B conceptual model



SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, 9-month data collection: 2001–02.

1.3 Study Components

The emphasis given to a broad view of child development and the different environments in which development and learning occur is critically important for the design of the ECLS-B. While parents are the primary reporters throughout the life of the study, at varying points data are also collected from birth certificates, care and early education providers, schools and teachers, and directly from the children themselves.

- Data from **parents/guardians** are collected through computer-assisted personal interviewing (CAPI) and through a self-administered questionnaire. The interview is conducted in the child's home at each data collection point. The parent/guardian interviewed is the individual who is the primary caregiver and the most knowledgeable about the care and education of the child. In nearly all of the cases (99.7 percent), this is the child's mother or female guardian. The parent/guardian interviews gather information about children's early health and development and about their experiences with family members and others. Parents/guardians also provide key information about themselves as caregivers, the home environment, and the neighborhood in which they live.

- **Children's** participation in the study begins at home at the 9-month data collection, in which children participate in activities designed to measure important developmental skills and attributes in the cognitive, socioemotional, and physical domains. The Bayley Short Form–Research Edition (BSF-R), which was designed specifically for the ECLS-B, is utilized in the 9-month data collection and consists of selected items from the Bayley Scales of Infant Development, Second Edition (BSID-II). It allows children's gross and fine motor skills as well as their receptive and expressive language skills and emotion regulation to be assessed. The Nursing Child Assessment Teaching Scale (NCATS) from the Nursing Child Assessment Satellite Training (NCAST) is used to assess the parent-child interaction for early precursors of cognitive and social skills. At the 9-month data collection, children's length, weight, and middle upper arm circumference (MUAC) are measured. Additionally, a measure of their head circumference is taken for children with very low birth weight. At the second wave of data collection (when the children turn 2 years old), the ECLS-B uses an updated BSF-R, a videotaped parent-child interaction (Two Bags Task), and an attachment rating. Children's height, weight, and MUAC are measured again, as is head circumference for very low birth weight children.

- **Fathers** complete self-administered questionnaires on the role they play in the development of their children. The father questionnaire captures information about activities fathers engage in with their children and their attitudes toward fatherhood. Fathers also provide key information about themselves as caregivers. This information is collected when the children are 9 months old and 2 years old, and will be collected again during future waves of the study. Both fathers who live with their children (resident fathers) and biological fathers who live elsewhere (nonresident fathers) complete self-administered questionnaires.

- **Birth certificates** contain a variety of useful data about the children, their mothers, and their families. They contain information on the date of birth, birth weight, gender, plurality (i.e., if multiple birth and birth order), and prematurity. Health characteristics of children, such as congenital anomalies, abnormal conditions of the baby and the baby's APGAR score, are included. Additionally information on parents' education, race, and ethnicity (including Hispanic origin) and mother's marital status is available. Birth certificates also include information on the mother's pregnancy history, prenatal care, medical and other risk factors during this pregnancy, and complications during labor and birth. Information on the obstetric procedures and delivery method is also available.

Beginning with wave 2 of the study, additional components that involve collecting information from children's child care providers, teachers, and schools will be fielded.

- **Care providers and preschool teachers**, like parents, represent a significant source of information on themselves (their backgrounds, teaching practices, and experience), the children in their care, and children's learning environments. Much of the data needed to describe the structure of children's care arrangements and education programs, to develop indicators of the quality of these arrangements and programs, and to profile the background and experience of the persons caring for these children can only be reported accurately by the care providers, teachers, and organizations themselves. Contacting children's care and education providers allows for the opportunity to collect information about children's development from sources other than their parents. Providers are interviewed when the children are 2 years old and again at 4 years of age. In addition to the interview, a subsample of care and education settings will be observed for key aspects in child care quality (e.g., learning materials, room arrangement, safety and health). These observations will also occur when the children are 2 and 4 years of age.

- Once the children enter formal schooling, **school administrators and teachers** become important sources of information on the physical and organizational characteristics of their schools, the schools' learning environments, educational philosophies, and programs.[2] As the ECLS-B cohort enters kindergarten and the first grade, their teachers become valuable sources of information on one of children's most immediate learning environments, the classroom. Teachers also represent important sources of information about children's development, both cognitive and social, and their academic achievement.

1.4 ECLS-B Data Files

The ECLS-B data files are released as part of a CD-ROM application. In addition to containing the actual data from the study, the CD-ROM also includes an Electronic Code Book (ECB)

[2] Prior to the kindergarten wave of the national data collection, NCES, its cosponsors, and contractors will examine the feasibility of collecting data from each child's school and teacher.

that allows easy access to information about the variables and their unweighted univariate frequencies. The CD-ROM also contains documentation on how to better understand the ECLS-B study, the data, the ECB software, and the instruments. A brief overview of these features is provided in section 1.4.1. The ECLS-B data are released in restricted-use and public-use versions. A brief overview of the differences between the restricted-use and public-use files is provided in section 1.4.2.

1.4.1 Availability of ECLS-B Nine-Month Data Files, Documentation, and Questionnaires

Several different materials are available on the ECLS-B 9-month CD-ROM:

- **ECLS-B 9-month child-level file.** The ECLS-B 9-month child-level file contains all the data collected from or about the children, including data from the child assessments, from children's mothers and fathers, and from their birth certificates. These data are all stored on a single data file (Child9mP.dat) on the CD-ROM. The Electronic Code Book (ECB), a software application on the CD-ROM, allows users to easily examine the variables in the data set by searching for variables and by providing their unweighted univariate frequencies. The data user can create syntax files suitable for use in SAS, SPSS for Windows, and Stata programs that will in turn generate an extract data file from Child9mP.dat containing only those variables an analyst wishes to use. See chapter 8 of this manual for specific directions on using the CD-ROM and the ECB. For users who cannot use SAS, SPSS, or Stata, a record layout for the data file (File Layout.pdf) is included in appendix B.

- **ECLS-B 9-month user's manual.** The ECLS-B 9-month CD-ROM also contains an electronic copy of the user's manual (i.e., this document) in Portable Document Format (PDF). To access this document, select the PDF file called *9-Month User's Manual Chapters 1-5.pdf* and *9-Month User's Manual Chapters 6-8.pdf* from the computer's drive (e.g., "D:") where the ECLS-B CD-ROM is located. To read these files, one must have Acrobat Reader® (version 4.05). Additional information on viewing, downloading, and printing PDF files can be found on the World Wide Web at http://nces.ed.gov/help/techissues.asp#pdf. The user's manual can also be accessed through the on-line help function of the ECB and is available on the World Wide Web at http://nces.ed.gov/ecls.

- **ECLS-B 9-month questionnaires.** The ECLS-B CD-ROM also contains copies of the ECLS-B 9-month questionnaires. These include the parent CAPI instrument, the parent self-administered questionnaire, the resident father self-administered questionnaire, and the nonresident father self-administered questionnaire. See chapter 2 for further details on the content of these instruments. These instruments are available in PDF. They are located in a folder (appendix A) on the CD-ROM. To access this document, select the file for the particular questionnaire of interest (e.g., *CAPI_parent.pdf* for the parent CAPI instrument) from the computer's drive (e.g., "D:") where the ECLS-B CD-ROM is located. To read this file, one must have

Acrobat Reader® (version 4.05). Additional information on viewing, downloading, and printing PDF files can be found on the World Wide Web at http://nces.ed.gov/help/techissues.asp#pdf. The instruments can also be downloaded from the ECLS website found on the World Wide Web at http://nces.ed.gov/ecls.

1.4.2 Differences Between ECLS-B Restricted-Use and Public-Use Files

Typically, NCES releases both a restricted-use and a public-use data file for each data set it produces. The restricted-use files generally contain a few more variables than the public-use files because they do not undergo the same level of disclosure risk analysis as the public-use files. However, as a safeguard to respondents, users wishing to obtain access to the restricted-use files must enter into a formal agreement with NCES that includes signing an affidavit stating that they will abide by NCES' standards of confidentiality or be subject to penalties. Because the public-use files are more broadly available, the public-use files undergo rigorous data disclosure analyses to protect the confidentiality of individual respondents. In preparing the public-use files, NCES takes steps to minimize the likelihood that an individual parent or child participating in the study can be identified. This is in compliance with the Privacy Act of 1974, as amended, the E-Government Act of 2002, and the Education Sciences Reform Act of 2002. These laws mandate the protection of confidentiality of respondents and limit the use of the data to research and statistical applications only, the one exception being when the information is acquired under court order by the U.S. Attorney General for investigation and prosecution of acts of terrorism (USA Patriot Act of 2001).

The process of preparing the data for release begins with a formal disclosure risk analysis. Variables identified as posing the greatest disclosure risk are altered, and in some instances, entirely suppressed, and in this way the public-use data files are created. Every effort is made to alter the files as little as possible, consistent with the requirement for confidentiality protection. After altering the variables, the disclosure risk analysis is repeated to verify that the disclosure risk has been reduced to acceptable levels.

The following data modifications account for the differences between the public-use and restricted-use data files for the ECLS-B 9-month data collection:

- Outlier values were top- or bottom-coded;

- Individual cases for which a particular variable posed an especially high risk of disclosure had the value of that variable altered (usually by no more than 5 to 10 percent) to reduce the risk;

- Some continuous variables were modified into categorical variables, and categories in certain categorical variables were collapsed; and

- Certain variables with too few cases and a sparse distribution were suppressed altogether, rather than modified; and

- Ten new composites were added to the 9-month public-use file. These composites provide summary information about topics for which more detailed information has been suppressed in response to the disclosure risk analysis. See the end of table 7-6 for a description of these new composites.

In addition to the above modifications applied to the public-use files only, both the public-use and the restricted-use files undergo some data swapping as another way to protect confidentiality. Swapping is a process by which values for potentially identifying variables are exchanged within pairs of records that have been matched according to key characteristics, such as household income, race/ethnicity of the child, child's sex, child's health, and so forth. The purpose of swapping is to help guard against the risk that respondents may be recognized by users of the database who may be knowledgeable about one or more respondents. The modifications, including data swapping, that were implemented to avoid identification of parents and children do not affect the overall data quality.

Most researchers should be able to find all that they need in the public-use file. While very few of the variables were suppressed, there are a few users who might require the restricted file. Researchers interested in geographic data at a level more detailed than region will need the restricted-use file. There are also certain variables from the birth certificates that are only available on the restricted-use file. Those researchers examining certain rare subpopulations, such as children with specific non-English home languages, will find that the restricted-use file contains a few more variables. However, in many instances the sample sizes are too small to support these analyses. NCES recommends that researchers who are uncertain of which data release to use first examine the public-use file to ascertain whether their specific analytic objectives can be met using those data files.

1.5 Contents of Manual

This manual provides documentation for users of the 9-month public-use data of the ECLS-B. The manual contains information about the data collection instruments (chapter 2) and the

psychometric properties of these instruments (chapter 3). For example, information about the design and content of the assessment measures (e.g., BSF-R) is found in chapter 2. Information about the reliability and validity of these measures is contained in chapter 3. The manual also describes the ECLS-B sample design and weighting procedures (chapter 4); data collection procedures and response rates (chapter 5); and data processing procedures (chapter 6). In addition, this manual shows how the 9-month data file is structured and provides definitions of composite or derived variables (chapter 7). Finally, this manual explains how to use the Electronic Code Book (chapter 8). Additional information about the ECLS program can be found on the World Wide Web at http://nces.ed.gov/ecls.

REFERENCE

U.S. Department of Education, National Center for Education Statistics. (2000). *America's Kindergartners: Findings from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99, Fall 1998* (NCES 2000–070), by Jerry West, Kristin Denton, and Elvira Germino Hausken. Washington, DC: U.S. Government Printing Office.

This page intentionally left blank.

2. DESCRIPTION OF DATA COLLECTION INSTRUMENTS

This chapter describes the survey instruments used during the 9-month data collection of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B).

The ECLS-B 9-month data collection took place from the fall of 2001 through the fall of 2002 (when children born in January through December 2001 turned 9 months of age). Data were collected by parent computer-assisted personal interview (CAPI) instruments and questionnaires, father questionnaires,[1] and direct child assessments during an in-person home visit. Data were also obtained from children's birth certificates and via field staff observation of the children's behavior and home setting during the home visit. Exhibit 2-1 lists all the sources of data in the 9-month data collection.

Exhibit 2-1. Sources of data and instruments in the ECLS-B 9-month data collection: 2001–02

Nine-month data sources and instruments
Direct child assessments
Parent CAPI instrument
Parent self-administered questionnaire
Resident father questionnaire
Nonresident father questionnaire
Child Observations and Interviewer Remarks
Birth certificate

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Nine-Month Data Collection, 2001–02.

Copies of the 9-month data collection instruments, except for the direct child assessments, are available on the ECLS-B CD-ROM, appendix A. The direct child assessment items are not available on the CD-ROM because they are largely copyright-protected materials and agreements with the test publishers restrict their distribution.

[1] During the home visit, self-administered questionnaires were left with the respondent for fathers to complete.

2.1 Direct Child Assessments

One-on-one direct child assessments were administered with ECLS-B sampled children during the 9-month data collection. Children participated in activities designed to measure important developmental skills in the cognitive, social, emotional, and physical domains. The assessments took about 52 minutes to administer. Most assessments were completed in a single home visit at the time of the parent interview. Only rarely (i.e., in less than 1 percent of cases) was it necessary to complete the child assessments over two home visits.

In general, the ECLS-B child assessments serve three purposes: (1) to describe children's developmental status at particular time points, (2) to examine the growth trajectory in children's development over time, and (3) to explore the relationship of early experiences to children's development (where assessment data are the outcomes). Additionally, the ECLS-B assessment enables researchers to accomplish several analytic goals. The data generated from the assessment can be used to explore the relationships between children's developmental outcomes and characteristics of their family, health care, child care, and community. One of the main purposes of assessment in the ECLS-B is to provide data that permit more direct examination of the variation in children's cognitive skills, socioemotional status, and physical well-being by characteristics of their backgrounds and in- and out-of-home experiences.

The ECLS-B uses two approaches to assessment—direct and indirect. Direct assessment includes those measures that involve the child's participation. The child's performance on these activities provides an indication of his or her current developmental level. In the ECLS-B, children's cognitive development and physical development are directly assessed. The indirect assessment consists of rating scales that evaluate the child's current behavior and skills and are completed by others (e.g., parents) who have knowledge of the child. Generally, indirect assessment is used for areas that are difficult to directly assess in young children.

At the 9-month data collection, information on children's development and experiences in the home, child care, and early education programs was gathered through interviews with parents. Data from the direct child assessments complemented these adult reports and provided important descriptive information such as children's achievement relative to key developmental milestones (e.g., sitting up, jabbering expressively) in the physical, cognitive and language, and social and emotional domains.

The ECLS-B 9-month direct child assessments consisted of three components: the Bayley Short Form–Research Edition (BSF-R), the Nursing Child Assessment Teaching Scale (NCATS), and physical measurements. Each of these components is discussed in sections to follow. Exhibit 2-2 displays the major domains measured during the direct child assessments by each component. Interviewers administered the components using a hard-copy booklet called the Child Activity Booklet. BSF-R item scores and physical measurements were recorded in the Child Activity Booklet. The instructions and activity list for the NCATS were also included in the Child Activity Booklet, which was available in both English and Spanish.

Exhibit 2-2. Components and domains covered in the ECLS-B 9-month direct child assessments: 2001–02

Direct child assessment component	Domain coverage
Bayley Short Form–Research Edition (BSF-R)	Cognitive (mental), physical (motor)
Nursing Child Assessment Teaching Scale (NCATS)	Social, emotional, cognitive
Physical measurements (height, weight, middle upper arm circumference, head circumference[1])	Physical

[1] Head circumference was measured only for ECLS-B sampled children who were very low birth weight.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Nine-Month Data Collection, 2001–02.

2.1.1 Bayley Short Form–Research Edition (BSF-R)

In a national study of early childhood, a strong baseline measure of children's development is key. The ECLS-B direct child assessments include a measure of children's developmental accomplishments. At 9 months, the ECLS-B used the BSF-R. This instrument, designed specifically for the ECLS-B, uses a subset of items from the Bayley Scales of Infant Development, Second Edition (BSID-II; Bayley, 1993). The BSF-R assesses children's cognitive and gross and fine motor skills as well as their receptive and expressive language skills. This section briefly describes this new assessment and the reasoning behind its creation. See section 3.1.1 for further information on the properties of and scores derived from this measure, chapter 5 for more detail on field staff training and the administration of the BSF-R, and *Early Childhood Longitudinal Study, Birth Cohort* (ECLS-B), *Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics* (U.S. Department of Education,

National Center for Education Statistics, forthcoming) for more extensive information on the development of the BSF-R.

The BSF-R is a reduced-item set of the original BSID-II. The BSID-II generally takes about 40 minutes to complete when administered in a clinical or laboratory setting by a trained professional. The BSF-R was developed for national use in a home setting with a traditional survey field staff (i.e., trained survey interviewers with basic child development knowledge). It was designed to retain the psychometric characteristics of the full BSID-II, a recognized measure in the field of infant/toddler assessment. The BSF-R (like the BSID-II) consisted of a set of items ranging in developmental difficulty. Items were selected based on both their operational ease and robust psychometric properties. While the full BSID-II features 178 mental items and 111 motor items (that can be used to assess children between the ages of one month and 42 months), the BSF-R for 9-month-olds consisted of 31 mental items and 35 motor items (that could be used to assess children between the ages of 8 and 11 months). Special efforts were made to identify and include items that could result in scoring information for multiple items from a single clustered administration. Therefore, in the BSF-R multiple items could be scored from one clustered administration, and, especially in the motor scale, several items could be scored from observation. For example, a cluster administration of the series of walking items (in which one holds the child's hands to assess standing with support and taking a step forward with support, and then lets go of the child's hand(s) to assess standing without support and taking steps without support) would result in several items being scored from one cluster administration. The number of item administrations was, therefore, fewer than the number of items scored. This also helped to reduce the amount of time to complete the BSF-R, which takes approximately 40 minutes to administer at this age by field staff with no training in child assessment.

The BSF-R for 9-month-olds consisted of three parts: a mental scale, a motor scale, and a set of spontaneous vocalization items. For most items, the children were presented with objects and verbal instructions, and their behavior was observed and recorded. Often the assessor also modeled the behavior required of the child. The BSF-R included stimuli such as blocks, cups, and a bell. The interviewer recorded children's responses in a hard-copy booklet as credit ("C") or no credit ("NC"). For example, one item required the child to put two round toys in a cup. If the child placed two or more toys in the cup he would receive credit ("C"); if he put in no toys or only one toy, he would receive no credit for the item ("NC"). More information on the scoring of items as credit/no credit can be found in chapter 5. The hard-copy assessment booklet (i.e., the Child Activity Booklet) included item-by-item administration steps and scoring instructions as well as score sheets. Assessments were shortened or discontinued if the

interviewer perceived that the child was uncomfortable or distressed. Scores for each BSF-R scale (mental, motor) were computed only if at least two-thirds of the items were scored (i.e., had a "C" or "NC").

Each BSF-R scale (i.e., mental and motor) featured a unique core set of items. The mental and motor core items were administered to all children in the ECLS-B. The BSF-R mental scale had 11 core items (plus 2 spontaneous vocalization items) and the motor scale had 14 core items. The 2 spontaneous vocalization items were scored solely by observation for all children and independently of the mental scale core items. Although the spontaneous vocalization items were not considered part of the mental scale core items in terms of administration, their scores were added into the mental scale scores when data were entered, for a total of 13 mental scale core item scores.

On the basis of their performance on the mental and motor core items, some children received a supplementary set of basal or ceiling items. Separate basal and ceiling sets were developed for each of the mental and motor scales. There were 9 items in the mental basal set and 9 items in the mental ceiling set. There were 11 items in the motor basal set and 10 items in the motor ceiling set. If the child only got a few mental core items correct (e.g., 3 or fewer out of 11 core items, excluding the spontaneous vocalization items), he or she was administered the set of 9 basal items. If the child received credit on almost all of the mental core items (e.g., 9 or more out of 11 items, excluding the spontaneous vocalization items), he or she completed the set of 9 ceiling items. Similarly, on the motor scale, if the child received credit for 3 or fewer core items, the set of 11 basal items were administered, and if the child received credit for 12 to 14 core items, the set of 10 ceiling items were administered.

The use of basal and ceiling item sets provided essential information on children's developmental status. Without the basal items, if the child's ability level was below the core item set difficulty level (i.e., getting very few answers correct), there would be no specific information on how low the child's ability level was. Similarly, if a child got most of the core item set correct, then without the ceiling items it would be difficult to pinpoint the upper range of the child's ability level from the core set alone. The basal and ceiling item sets described the infant's developmental status more accurately and precisely. This is particularly important since the ECLS-B is a national sample of children. The population of infants demonstrates wide variation in early developmental abilities (from very advanced to delay in skills). A national sample represents diverse groups, and this variation in development may be even more prominent because the ECLS-B oversamples children with low birth weight, who may be at risk for developmental difficulties.

Mental Scale. The 9-month BSF-R mental scale included items designed to assess early cognitive and language ability as manifested in memory, habituation, preverbal communication, problem solving, and concept attainment. Children were presented with tasks such as putting blocks in a cup, ringing a bell, and responding to a parent's request (e.g., peek-a-boo). As mentioned previously, multiple items could sometimes be grouped together and scored from one administration. The mental scale contained 13 core item scores that were obtained from 9 administrations (with two administrations each scoring 2 items) and then two spontaneous vocalization items scored solely by observation. The basal item set for the mental scale consisted of 9 item scores from one item that was administered and from 8 items scored solely by observation. The mental scale ceiling item set contained 9 item scores of which 6 were administered and 3 were scored solely by observation. In the BSID-II, items are arranged into age sets by developmental difficulty. In the BSF-R mental scale, the core item set included items ranging in difficulty from 5 to 13 months of age;[2] some of the basal items were appropriate for children as young as 4 months; and some of the ceiling items were appropriate for children up to the age of 19 months. See chapter 3 for more details on the BSF-R mental scores.

Motor Scale. The 9-month BSF-R motor scale included items designed to assess gross and fine motor abilities (e.g., picking up objects, crawling, walking), perceptual-motor integration, and problem solving. Children participated in tasks such as picking up small objects, grasping a pencil, rolling over from being on their backs, sitting and standing unsupported, and walking with help. The BSF-R motor scale core set contained 14 item scores from 8 administered items. Similar to the mental scale, multiple items can be scored through one administration. The motor scale basal item set contained 11 item scores obtained through 4 administered items and 7 observed items. The motor scale ceiling item set had 10 item scores with 5 administered items and 5 observed items. In the BSID-II, items are arranged into age sets by developmental difficulty. In the BSF-R motor scale, the core item set included items ranging in difficulty from 5 to 13 months of age; some of the basal items were appropriate for children as young as 3 months; and some of the ceiling items were appropriate for children up to the age of 22 months. See chapter 3 for more details on the BSF-R motor scores.

[2] The age ranges of the mental and motor scales are based on the BSID-II age sets. An age range of 5 to 13 months indicates that across all of the BSF-R items some are included in the BSID-II 5-month age set and others are included in the BSID-II 13-month age set. It is not necessarily true that a particular item is found in all BSID-II age sets. For example, the mental scale may include two items: one with an age range of 5-7 months (meaning it is found in the BSID-II 5-, 6-, and 7-month age sets) and an item with an age range of 8-12 months (i.e., item included in the BSID-II 8-, 9-, 10-, 11-, and 12-month age sets). For details on the age coverage of individual items, see *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics* (U.S. Department of Education, National Center for Education Statistics, forthcoming).

Vocalization Items. While the interviewer administered items from the BSF-R mental and motor scales, she or he also scored several items related to children's spontaneous verbalizations and communication. Two of these contributed to the mental scale scores, but were not a part of the core mental scale administration (that is, they did not affect the decision for the interviewer to administer the basal or ceiling item sets). One spontaneous vocalization item was part of the basal item set and 2 were part of the ceiling item set. The vocalization items provided information on children's prelinguistic communication and early language development (e.g., production of vowel sounds, use of two distinct words).

2.1.2 Nursing Child Assessment Teaching Scale (NCATS)

The Nursing Child Assessment Teaching Scale (NCATS) is one part of the Nursing Child Assessment Satellite Training (NCAST), which is an entire package of instruments—including two scales (the teaching scale and a feeding scale) that assess parent-child interaction as well as an intervention component for case management (Sumner and Spietz, 1994). The NCATS assesses aspects of parent and child behavior in the context of a semi-standardized teaching interaction. The items assessing parent behaviors obtain information about such aspects as the parent's sensitivity to the child's cues, responsiveness to the child's distress, cognitive growth fostering, and socioemotional growth fostering. The items assessing child behaviors during the interaction obtain information about the clarity of the child's cues and the child's responsiveness to the parent. These aspects of parent-child interaction have been shown to be important to the development of social competence and security of attachment in children (Hartup, 1985; Karen, 1998), cognitive skills such as language acquisition (Snow, 1994), preliteracy (Bus and Van IJzendoorn, 1988; Whitehurst et al., 1994), and problem solving and exploration (Arend, Gove, and Sroufe, 1979; Matas, Arend, and Sroufe, 1978). The NCATS provides important information on the relationship between parent and child (the bi-directional "give and take" between them), as well as information on the child's home environment. At the 9-month data collection, the parent (the main respondent) selected an NCATS task that the ECLS-B sampled child did not yet know how to do and then taught the child that task. Several aspects of both the parent's and child's behavior were observed to assess the interaction. The NCATS gathered information on parental responsivity to cues (e.g., pausing as child initiates action), cognitive growth fostering (e.g., type of instructions and modeling), socioemotional growth fostering (e.g., cheerleading), and response to distress (e.g., rearranging toys). The NCATS also collected data on the child's clarity of cues (e.g., vocalizes) and responsiveness to the parent (e.g., smiles at parent, attempts eye contact).

Typically, a health or social service professional completes the NCATS, coding as the interaction occurs. While the interaction usually lasts less than 5 minutes, live coding in the ECLS-B would have required field staff, who were not all trained social service professionals, to observe and score 73 items of parent and child behavior. In addition, given the other tasks ECLS-B field staff had to complete, live coding would have limited the number of subscales that could have realistically been used, thereby reducing the amount of information gathered. Instead, the ECLS-B, with funding from its Administration on Children, Youth and Families cosponsor, videotaped the parent-child interaction at the 9-month data collection. Tapes were then coded along all subscales, providing information on early parent-child interactions. For more detail on the properties of the NCATS scales, see section 3.1.2. See chapter 5 for more information on the training and procedures for field staff to videotape and for coders to score these tapes.

2.1.3 Physical Measurements

To assess children's physical growth and development, the ECLS-B 9-month direct child assessment included several anthropometric measurements. These complemented the assessment of children's psychomotor skills in the motor scale of the BSF-R. Physical measurements were taken of children's length, weight, and middle upper arm circumference (MUAC) for all sampled children, and head circumference was obtained for very low birth weight (VLBW; 1,500 grams or less) children. These measurements took less than 5 minutes to obtain.

Children's length (or height) and weight are commonly used to chart children's growth, as indicators of general health and well-being, and, when they are older, to calculate a body mass index (BMI) that serves as an indicator of children's overall health and as an index to determine to what extent children are overweight. Children's middle upper arm circumference provides information on their nutritional state (e.g., malnourished). For very low birth weight children, an additional measurement was taken of their head circumference. Low birth weight children are at risk for small head size, which is linked to and predictive of problems with cognitive growth and development. Head circumference is often used in studies of young children as a measure of development and a reflection of brain size and growth. A measure mat (a pediatric length-measuring device) and a digital bathroom scale were used to obtain the length and weight[3] measurements, respectively. A specialized measurement tape was used to obtain the

[3] The child's weight was obtained by subtracting the weight of the respondent alone from the weight obtained by the respondent holding the child.

MUAC and head circumference measurements. All measurements were recorded on a recording form in the Child Activity Booklet. See chapter 5 for more information on the data collection procedures for measuring these attributes.

2.2 Parent Instruments

The 9-month parent data were collected using a parent CAPI instrument and a parent self-administered questionnaire (PSAQ). Parents or guardians were asked to provide important information about the sampled child, themselves, the home environment, parent attitudes, and family characteristics. Questions regarding family structure, child care use, household income, and community and social support were also included in the parent instruments. The interview was conducted as part of a home visit with the parent and child. See exhibit 2-3 for information on the topics and content of the 9-month parent instruments.

2.2.1 Parent CAPI Instrument

The first component of the ECLS-B parent interview was a 60-minute in-person interview in which the interviewer asked questions aloud and entered the responses in a computer (i.e., the parent CAPI instrument). The study design called for the child's mother to be the respondent for the parent instruments whenever possible; however, the respondent could be a father, step-parent, adoptive parent, foster parent, grandparent, another relative, or a nonrelative guardian. The respondent had to be knowledgeable about the child's care and education, 15 years of age or older at the time of the child's birth, and living in the household with the child. If the child's biological mother was under the age of 18 (and met the above conditions), she was still the primary respondent as she was considered an emancipated minor. Respondents for the parent interview were selected according to the following order of preference:

1. The child's biological mother;
2. The child's biological father;
3. Another parent or guardian; or
4. Another household member.

Exhibit 2-3. ECLS-B parent instruments by major content topics: 2001–02

Topic	Section	Content in parent interview
Household composition	FS	▪ Listing and updating household members and selected characteristics of members
Pregnancy, fertility, and neonatal hospitalization	PSAQ[1]	▪ Wantedness of pregnancy
	FH	▪ Receipt of prenatal care (e.g., place, payment, information conveyed during visits) ▪ Pre-pregnancy weight and weight gained ▪ Smoking, drinking, and supplement use pre-pregnancy and in last 3 months of pregnancy ▪ If multiple birth, fertility help sought, and type of help received ▪ If twins, whether identical/fraternal
	PSAQ[1]	▪ Hospitalization/intensive care as newborn ▪ Age when first child born
Child nutrition/feeding	CD	▪ Breastfeeding ▪ Early feeding (e.g., formula, cow's milk)
	HE	▪ Feeding practices (e.g., to sleep with bottle)
	CH	▪ Whether child able to feed self
Developmental milestones	CD	▪ Developmental milestones (e.g., crawling)
Child temperament	CD	▪ Distress to novel stimuli ▪ Self-regulation ▪ Level of difficulty to raise child
Socioemotional development	HE	▪ Frequency separated from child for a week or more
Home learning and language environment	HE	▪ Used any books/magazines on babies or parenting ▪ Frequency respondent engages in selected activities with child (read books, tell stories, sing, errands) ▪ Toys and other materials ▪ Language(s) spoken in home ▪ English literacy level ▪ Frequency someone in household talks to child in language other than English ▪ Frequency respondent engages in selected activities with child (e.g., go to a public place like zoo or museum with child)
Involvement of resident father[2]	HE	▪ Frequency engages in selected activities with child ▪ Frequency takes care of child
Family routines and practices	HE	▪ Sleeping routines
Parental attitudes and childrearing knowledge	PA	▪ Parent authoritarianism ▪ General knowledge of child development
Child care arrangements	CC	▪ Currently or ever in relative, nonrelative, or center care ▪ Age first received care, by care type (e.g., relative, center) ▪ Number of care arrangements ▪ Characteristics of the care where spends most hours (for each care type) ▪ Amount of time spent in care per week ▪ Charges for the care and whether anyone helps financially ▪ What parent looks for in selecting care
Child health	CH	▪ Rating of child's overall health status ▪ Usual place of medical care

See notes at the end of this exhibit.

Exhibit 2-3. ECLS-B parent instruments by major content topics: 2001–02—Continued

Topic	Section	Content in parent interview
Child health (continued)	CH	▪ Number well-baby check-ups ▪ Selected conditions (asthma, respiratory illness, ear infection, gastrointestinal illness), treatment of most recent episode/incident, and emergency room or hospitalization ▪ Injuries (fall, choking, auto, burn, bite, poison) ▪ Other medical conditions, impairments, disabilities ▪ Use of ventilator, apnea monitor ▪ Medical specialist referral ▪ Services received, early intervention ▪ Health insurance
Family health	FH	▪ Any household members have a special need or disability ▪ Respondent's overall health ▪ Usual place of medical care ▪ Respondent's drinking behavior ▪ Respondent's current smoking behavior ▪ Anyone in household smokes ▪ Depression; mental health needs
	PSAQ[1]	▪ Stressful life events
Marital history	MH	▪ Marital status ▪ Marital history ▪ Ever married/lived with biological father and dates of first cohabitation and marriage ▪ Child's biological father living/dead
	PSAQ[1]	▪ Quality of current marriage/relationship ▪ Frequency and type of arguments
Social support	SS	▪ Emotional support ▪ Financial support ▪ Support in case of emergency ▪ Advice for parenting
	RI	▪ Respondent's parents living/dead ▪ Respondent's closeness to parents
Community support	CS	▪ Support from community agencies ▪ Frequency of social gatherings with friends ▪ Attendance at religious service in last year ▪ Participation in community service activities
Respondent's information	IN	▪ Month and year of birth
	RI	▪ Family composition growing up ▪ Educational attainment of respondent's parents ▪ Educational attainment of respondent ▪ School experiences
	HE	▪ Primary language
	RI	▪ Current participation in education or training ▪ Employment history 12 months before child's birth ▪ Current employment/unemployment, characteristics of job (e.g., duties, job title) ▪ Benefits through current job ▪ Maternity leave

See notes at the end of this exhibit.

Exhibit 2-3. ECLS-B parent instruments by major content topics: 2001–02—Continued

Topic	Section	Content in parent interview
Spouse information	SI	▪ How long spouse has lived with child ▪ Date of birth ▪ Educational attainment ▪ Current participation in education or training ▪ Current employment/unemployment, characteristics of job (e.g., duties, job title) ▪ Benefits through current job ▪ Paternity leave
Biological (nonresident) father information[3]	BF	▪ Whether father lived in household and length of time ▪ Date of birth ▪ Educational attainment ▪ Distance of residence from child and time between visits ▪ Frequency look after child ▪ Child support (any change and its effect) ▪ Other forms of support (clothes, medical, child care expenses) ▪ Legal paternity established ▪ Contact with respondent
Welfare and other public assistance	WP	▪ Food Stamps ▪ TANF/welfare ▪ Medicaid ▪ WIC
Household income and assets	HI	▪ Number of adults contributing to household income ▪ Household income in last year ▪ Type of housing (house, apt., rent, own, subsidy) ▪ Value of home ▪ Own automobile ▪ Own stocks, savings
Household food sufficiency	HF	▪ USDA questions on food sufficiency/shortages/availability

[1] Parent self-administered questionnaire.

[2] Because of widespread interest in fathers' involvement in their children's lives, information collected specifically from the father in a self-administered questionnaire is presented separately. The person being referred to in this section is the spouse/partner of the parent respondent. In most cases this person is the child's father who resides in the home, but could in some cases be a stepmother, grandfather, etc., if the parent respondent is not the child's mother. Conceptually, fathers' involvement is part of the home learning environment. These items ask the parent respondent about his/her spouse/partner's involvement.

[3] Information on the nonresident biological father is collected only when the parent respondent is the biological mother and the biological father does not reside with the child.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Nine-Month Data Collection, 2001–02.

The parent interviews were conducted primarily in English, but provisions were made to interview parents who spoke other languages. Bilingual interviewers were trained to conduct the parent interview in either English or Spanish. A Spanish CAPI instrument was used when needed as the parent CAPI instrument was programmed in both English and Spanish. An interpreter, either a community or household member, was used for families who spoke languages other than English or Spanish. Fewer than 0.1 percent of the cases were not completed due to language difficulties (see section 5.4.1.4).

Topics addressed in the 9-month parent CAPI instrument included current household members, family sociodemographic characteristics, languages spoken in the child's home, child care arrangements, home activities, parent education and employment, receipt of public assistance, and household income and assets. The parent CAPI instrument also collected information on the parent's childrearing beliefs and knowledge of child development, the parent's psychological well-being and health, the community resources and social support available to the family, the household's food situation, and, if applicable, information on the child's nonresident biological father. In addition to information on these children's homes, families, and communities, the 9-month parent CAPI instrument also collected data on the children's development. At this young age, certain essential aspects of development are difficult to assess directly (e.g., temperament, past achievement of key milestones); thus, the 9-month parent CAPI instrument included questions on children's socioemotional, cognitive, and physical development (e.g., self-regulation, verbalizing, sitting unsupported, feeding self). This indirect information complements the data from the direct child assessment.

2.2.2 Parent Self-Administered Questionnaire

The ECLS-B 9-month parent interview included a short (about 5 to 10 minutes) self-administered questionnaire (PSAQ) with items that could be considered sensitive. For example, some items involved reporting incidents and opinions that a respondent may not have felt comfortable answering in front of her spouse, partner, or other children (e.g., marital happiness). In the interest of obtaining complete answers, maintaining confidentiality, and not creating any problems in the home, the questions were administered in a hard-copy self-administered format. The parent was given the questionnaire and an envelope and asked to complete and return the questionnaire to the interviewer during the home visit. The PSAQ was only given if the parent had sufficient privacy to complete it; that is, the spouse, partner, or another adult was not in the immediate interviewing area. Self-administered questionnaires were available in English and Spanish. The PSAQ was not administered in a household where the parent interview was conducted in a language other than English or Spanish.

2.3 Father Self-Administered Questionnaires

Because of the important role that fathers play in their children's lives, the ECLS-B collects data from sampled children's fathers. The ECLS-B is one of the few national U.S. studies to involve fathers through self-reporting, asking about their attitudes about being fathers and activities they do with their children during the early years of their children's lives. The father component of the ECLS-B provides an opportunity to examine the unique contributions fathers make to children's well-being and developmental outcomes over time.

At the 9-month data collection, data from fathers were collected directly through two separate father questionnaires: the resident father questionnaire and the nonresident biological father questionnaire. Both resident and nonresident fathers were identified during the parent interview. The resident father was the person who resided in the household and who was either the child's biological father or the person identified as the partner or spouse of the parent interview respondent (i.e., is the father or plays an important role in the child's life). The nonresident father questionnaire was administered to a biological father (not residing in the household with the child) who had contact with the child or mother at least once in the previous three months.[4] Contact was defined as a telephone call or an in-person visit. Therefore, an individual child in the ECLS-B could potentially have various types of father data available:

- No father data;
- Resident father questionnaire data only;
- Nonresident biological father questionnaire data only; or
- Both resident father and nonresident biological father questionnaire data.

The content of the two father questionnaires was similar in key areas (e.g., activities with the child, feelings about being a father, education, employment) and unique in others (e.g., separations from child for resident fathers, child support and legal arrangements for nonresident fathers). Fathers of sampled twin cases only completed one questionnaire. Exhibit 2-4 includes the topics included in the 9-month resident and nonresident father questionnaires.

[4] More specifically, a nonresident biological father was eligible for the nonresident father questionnaire only if the respondent to the parent interview was the child's biological mother, the mother granted permission to contact the father, and the nonresident biological father had (a) seen the child once in the last month or at least 7 days in the last 3 months or (b) the biological mother had been in touch with the biological father at least once a month in the past 3 months.

Exhibit 2-4. ECLS-B 9-month father self-administered questionnaires by major content topics: 2001–02

Topic	Content	Resident	Nonresident
Activities with and feelings about child	▪ Frequency engages in activities with child (e.g., sing songs)	✓	
	▪ Feelings about child/delight in child (e.g., talk about child, show pictures)	✓	✓
Time spent with child	▪ Last time saw child		✓
	▪ Frequency and amount of time spent with child		✓
Knowledge about child development	▪ General knowledge of child development	✓	
Parenting practices	▪ Frequency looks after child	✓	✓
	▪ Amount of influence in decisions (e.g., child care)	✓	✓
Separations from child	▪ Frequency separated from child overnight	✓	
	▪ Frequency separated from child for a week or more	✓	
Prenatal/neonatal experiences	▪ Wantedness of child	✓	✓
	▪ When first held child	✓	✓
	▪ Activities prior to baby's birth (e.g., see sonogram)	✓	
	▪ Present at birth	✓	
Attitudes about being a father	▪ Importance of different things fathers do for their children	✓	
	▪ Self-rating as a father	✓	✓
	▪ Attitudes towards demands of fatherhood	✓	
	▪ Attitude towards future involvement in raising child		✓
Current relationship with spouse/child's mother	▪ Quality of current marriage/relationship	✓	
	▪ Frequency and types of arguments	✓	✓
	▪ Conflict resolution style		✓
	▪ Nonresident father's quality of relationship with child's mother		✓
	▪ Frequency of conversations about child		✓
Father's childbearing and marital/partner history	▪ Number of times married	✓	
	▪ Number of biological children	✓	✓
	▪ Age when his first child was born	✓	✓
	▪ Number of biological children that live outside household	✓	
	▪ Child support for children living elsewhere	✓	
Nonresident father involvement for child and household	▪ Frequency of selected things done for child (e.g., buy clothes, diapers)		✓
	▪ Frequency of selected things done for child's household (e.g., help with repairs)		✓

See note at end of exhibit.

Exhibit 2-4. ECLS-B 9-month father self-administered questionnaires by major content topics: 2001–02—Continued

Topic	Content	Resident	Nonresident
Legal arrangements and child support	▪ Type of child support agreement (e.g., formal, informal)		✓
	▪ Estimated child support payment		✓
	▪ Actual child support payment		✓
Background information	▪ Month and year born	✓	✓
	▪ Country of origin	✓	✓
	▪ Citizenship status	✓	✓
	▪ Age first moved to the United States	✓	
	▪ First language learned to speak	✓	
	▪ English literacy level	✓	
Education and employment	▪ Educational attainment	✓	✓
	▪ School experiences	✓	✓
	▪ Current employment/unemployment, characteristics of job (e.g., duties, job title)	✓	✓
	▪ Current participation in education or training	✓	
	▪ Benefits through current job	✓	
Health	▪ Overall health	✓	
	▪ Depression	✓	✓
	▪ Mental health needs	✓	
	▪ Current smoking behavior	✓	
	▪ Current drinking behavior	✓	
	▪ Stressful life events	✓	
Social support network	▪ Father's closeness to his parents	✓	
	▪ Frequency attends religious services	✓	
	▪ Participation in community service activities	✓	
	▪ Frequency of social gatherings with friends	✓	
Family background	▪ Family composition growing up	✓	
	▪ Receipt of public assistance while growing up	✓	
	▪ Educational attainment of father's parents	✓	
Current living arrangement	▪ Number of other people living in household		✓
	▪ Total income of household		✓
Income	▪ Total income last year		✓

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Nine-Month Data Collection, 2001–02.

2.3.1 Resident Father Self-Administered Questionnaire

Historically, fathers were assumed to be on the periphery of children's lives and, therefore, of little direct importance to children's development. Research on fathers has focused mostly on their role as providers. Recently, however, researchers and policymakers are beginning to recognize that fathers influence their children's development in a variety of ways (Lamb, 1997).[5] Yet, little is known about what fathers think about being fathers or about their relationship with their children. What is known has often been obtained from mothers rather than fathers directly (Marsiglio and Day, 1997; The Working Group on the Methodology of Studying Fathers, 1997). For many topics, however, fathers are better sources of information than mothers.

The ECLS-B 9-month resident father questionnaire was designed to directly collect information from fathers about the role that they played in their children's lives. The resident father was the person identified as the partner or spouse of the parent interview respondent. In rare cases, this person could be female. As the partner or spouse of the parent respondent, the person completing the resident father questionnaire could be the child's grandfather if the child's grandmother was the parent respondent; or the male or female partner of the child's mother.[6] The first item in the questionnaire identified the relationship of the person completing the questionnaire to the sampled child (e.g., birth father). At 9 months, 98.1 percent of persons completing the resident father questionnaire were the child's biological father.

The resident father questionnaire is entitled "Questions for Fathers and Other Important People"; nevertheless, since in the majority of cases the person completing the questionnaire was the child's father, it is referred to throughout this document as the resident father questionnaire. During the parent interview, if the respondent had a partner or spouse residing in the household, then the parent CAPI instrument would prompt the interviewer to present the parent interview respondent (or the father if he was home) with the resident father questionnaire and a letter explaining the study and the instrument. The resident father questionnaire was available in English and Spanish. If an interpreter was used for the

[5] This is further seen in the effort by researchers and federal agencies to coordinate measures on father involvement. The Developing a Daddy Survey (DADS) consortium works to coordinate the design and development of measures of father involvement. See "Bridging research and policy: Including fathers of young children in national studies" (Cabrera et al., 2002) for more information.

[6] In developing the weights for father respondents, 15 completed father self-administered questionnaires were deleted. These cases were ones in which the biological father was the respondent to the parent CAPI questionnaire and the mother responded to the father questionnaire. Although the design allowed for this situation, there was no straightforward way given the design of the weights to weight those 15 mother respondents to the father questionnaire.

home visit, and the father was home, interpreters could translate and administer the English version of the resident father questionnaire to the father.

The 20-minute resident father questionnaire focused on those things unique to fathers and fathering that only fathers could answer (e.g., feelings about being a father, the father's influence on child care decisions). Where appropriate (e.g., constructs overlapped), the resident father questionnaire paralleled the content of the parent CAPI instrument to capture information such as activities with the child, knowledge about child development, and separations from the child as well as information on education, employment, and physical and mental health. In the few cases where the father was the main parent respondent (i.e., completed the parent CAPI instrument and PSAQ), questions unique to the resident father questionnaire were included as part of the parent CAPI instrument. See exhibit 2-4 for information on the constructs included in the 9-month resident father questionnaire.

2.3.2 Nonresident Biological Father Self-Administered Questionnaire

Many fathers do not live with their children. Nearly one-third of all children are born outside of marriage, and the majority of these children do not live with their fathers (Ventura and Bachrach, 2000). The high incidence of divorce and separation in this country leads to an increasing number of children living apart from their fathers as they grow older (U.S. Department of Education, National Center for Education Statistics, 1997). Although many fathers who do live near their children lose contact with them over time and tend to play a smaller role in their children's lives, a significant proportion of nonresident fathers remain involved. This involvement is important to children's lives (Le Menestrel, 1999; Liebman and Abell, 2000; U.S. Department of Education, National Center for Education Statistics, 1997; 2001). To understand children's development, it is, therefore, important to learn more about fathers who live apart from their children.

The ECLS-B 9-month nonresident biological father questionnaire (nonresident father questionnaire) was designed to collect information about the role that fathers play in their children's lives, even if they do not live with their children. As mentioned earlier, the nonresident father questionnaire was administered to the child's biological father (who did not reside in the household with the child) who had contact with the child or mother in the previous three months. Contact was defined as a telephone call or an in-person visit. For the nonresident biological father to be eligible for the nonresident father

questionnaire, the biological mother had to be the respondent for the parent interview and she had to grant permission for the nonresident biological father to be contacted.

The questionnaire is formally entitled "Questions for Fathers." During the parent interview, it was determined whether the sampled child's biological father lived in the household, and if not, the level of contact he had with the mother and/or child. If the father was eligible[7] for the nonresident father questionnaire, permission to contact the child's father and contact information was obtained from the mother. The nonresident father questionnaire was available in English and Spanish. Chapter 5 includes information on administration of the nonresident father questionnaire.

The nonresident father questionnaire was a 10-minute questionnaire that included items about child support, time spent with the child, activities with child, relationship with the child's mother, feelings about himself as a father, and how he helped the family and child as well as information on education, employment, mental health, and income. Many of the items are the same as those found in the resident father questionnaire. Exhibit 2-4 contains information on the constructs included in the 9-month nonresident father questionnaire.

2.4 Child Observations and Interviewer Remarks

After the home visit was completed, the interviewer completed the Child Observations, which were two sets of questions about the child's behavior during the child assessment and about the home environment. The Child Observations collected additional information about the children's home environment and the children's behavior without increasing burden on the family. They also provided another perspective of the child and home, as the interviewer served as an external observer, as opposed to solely parent-report.

The first set of questions was seven items selected from the Behavior Rating Scale (BRS) of the Bayley Scales of Infant Development, Second Edition (Bayley, 1993) that evaluated the sampled child's behavior during the direct child assessment. They provided information on children's positive and negative affect (or emotional behaviors, e.g., smiling, laughing, fussing, crying) in a testing situation. The

[7] A nonresident biological father was eligible for the nonresident father questionnaire if he had a certain level of contact. This was defined as seeing the child in the last month or at least 7 days in the last 3 months *or* contacting the biological mother at least once a month in the past 3 months. The nonresident father information was only collected when the respondent to the parent interview was the child's biological mother and she granted permission for the father to be contacted.

items also assessed children's adaptation to a change in test materials (e.g., relinquishing items willingly), their interest in materials, and their attention to tasks. Information on children's social engagement with the interviewer or parent and their control of muscle movement was gathered as well, thus providing additional data on children's social and physical development.

The second set of questions included eight items from the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell and Bradley, 1984) that assessed the quality of various characteristics of children's home environments. These items considered aspects of the home including parent behavior toward the child (e.g., talking with the child, caressing the child, spanking), the parent's structuring of the home environment (e.g., allowing exploration, providing toys), and the safety of the home environment.

Finally, the interviewer remarks questionnaire was a self-administered, computer-assisted instrument that included questions about the order of the home visit tasks and other aspects of the data collection. These questions were designed to help in the evaluation of the home visit. Both the Child Observations and Interviewer Remarks components were completed on the interviewer's laptop computer as soon as possible after the interviewer left the child's home.

2.5 Birth Certificate Data

The ECLS-B used birth certificates of live births in 2001 as the sampling frame (see chapter 4 for more information). This sampling procedure provided access to data on prenatal and neonatal characteristics at the time of the child's birth. Children's birth certificates contained a variety of useful data about the children, their mothers, and their families. They contained information on the date of birth, birth weight, gender, plurality (e.g., if multiple birth and birth order), and prematurity as well as on parents' education, parents' race and ethnicity (including Hispanic origin), and mother's marital status. Birth certificates also included information on the mother's pregnancy history, prenatal care, medical and other risk factors during this pregnancy, and complications during labor and birth. Information on the obstetric procedures and delivery method was also available. Health characteristics of children, such as congenital anomalies, abnormal conditions of the baby, and the baby's APGAR score, were included. Selected variables from the birth certificates were included in the data set, and the birth certificate data were appended to the ECLS-B 9-month child record.

REFERENCES

Arend, R., Gove, F.L., and Sroufe, L.A. (1979). Continuity of individual adaptation from infancy to kindergarten: A predictive study of ego-resiliency and curiosity in preschoolers. *Child Development*, 50, 950-959.

Bayley, N. (1993). *Bayley Scales of Infant Development, Second Edition Manual*. San Antonio, TX: The Psychological Corporation.

Bus, A.G., and Van IJzendoorn, M.H. (1988). Mother-child interactions, attachment, and emergent literacy: A cross-sectional study. *Child Development*, 59, 1262-1272.

Cabrera, N., Brooks-Gunn, J., Moore, K., West, J., Boller, K., and Tamis-LeMonda, C. S. (2002). Bridging research and policy: Including fathers of young children in national studies in C.S. Tamis-LeMonda and N. Cabrera (eds.) *Handbook of Father Involvement: Multidisciplinary Perspectives* (pp. 489–523). Mahwah, NJ: Lawrence Erlbaum Associates.

Caldwell, B. M. and Bradley, R. H. (1984). *Home Observation for Measurement of the Environment*. Little Rock, AR: University of Arkansas Little Rock.

Hartup, W. (1985). Relationships and their significance in cognitive development. In R. Hinde and A. Perret-Clermont (Eds.), *Relationships and Cognitive Development* (pp. 67-82). Oxford: Oxford University Press.

Karen, R. (1998). *Becoming Attached.* Oxford: Oxford University Press.

Lamb, M. (Ed.) (1997). *The Role of the Father in Child Development (Third Edition).* New York: Wiley.

Le Menestrel, S. (1999). *What Do Fathers Contribute to Children's Well-Being?* Washington DC: Child Trends.

Liebman, S. J. and Abell, S. C. (2000). The forgotten parent no more: A psychoanalytic reconsideration of fatherhood. *Psychoanalytic Psychology*, 17 (1), 88–105.

Marsiglio, W. and Day, R. (March, 1997). *Social Fatherhood and Paternal Involvement: Conceptual, Data, and Policymaking Issues*. Paper presented at the NICHD-sponsored Conference on Fathering and Male Fertility: Improving Data and Research.

Matas, L., Arend, R. A., and Sroufe, L. A. (1978). Continuity and adaptation in the second year: The relationship between quality of attachment and later competence. *Child Development*, 49, 547-566.

Snow, C.E. (1994). Beginning from baby talk: Twenty years of research on input and interaction. In C. Galloway and B. Richards (Eds.), *Input and Interaction in Language Acquisition* (pp. 3-12). London: Cambridge University Press

Sumner, G. and Spietz, A. (1994). *NCATS Caregiver/Parent-Child Interaction Teaching Manual*. Seattle, WA: NCAST Publications, University of Washington, School of Nursing.

U.S. Department of Education, National Center for Education Statistics. (1997). *Fathers' Involvement in Their Children's Schools* (NCES 98–091), by C.W. Nord, D. Brimhall, and J. West. Washington, DC: U.S. Department of Education.

U.S. Department of Education, National Center for Education Statistics. (2001). *Fathers' and Mothers' Involvement in Their Children's Schools by Family Type and Resident Status* (NCES 2001–032), by C.W. Nord and J. West. Washington, DC: U.S. Department of Education.

U.S. Department of Education, National Center for Education Statistics. (Forthcoming). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics.* Washington, DC: U.S. Department of Education.

Ventura, S. J. and Bachrach, C. A. (2000). Nonmarital Childbearing in the United States, 1940-1999. *National Vital Statistics Reports,* 48 (16). Hyattsville, MD: National Center for Health Statistics.

Whitehurst, G. J., Arnold, D.S., Epstein, J.N., Angell, A.L., et al. (1994). A picture book reading intervention in day care and home from children from low-income families. *Developmental Psychology*, 30, 679-689.

The Working Group on the Methodology of Studying Fathers. (March, 1997). *Methodological Issues in Improving Data on Father*. Paper prepared for the NICHD-sponsored Conference on Fathering and Male Fertility: Improving Data and Research.

3. ASSESSMENTS, SCALES, AND OTHER MEASURES IN THE NINE-MONTH DATA COLLECTION

In the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), 9-month wave, information about children's cognitive, socioemotional, psychomotor, and physical development was obtained through both direct and indirect assessments. This chapter describes the scores developed from the direct assessments and the scales derived from the indirect assessments. Information on the direct child assessments is presented first, including descriptions of the scores, descriptive statistics, and guidelines for using the scores. Then, the items comprising the indirect assessments in the parent computer-assisted personal interviewing (CAPI) instrument are summarized.

The 9-month direct child assessments include the following:

- The Bayley Short Form–Research Edition (BSF-R);
- The Nursing Child Assessment Teaching Scale (NCATS);
- The Child Observations during the Bayley Short Form–Research Edition; and
- Physical measurements of children's length, weight, middle upper arm circumference (MUAC), and head circumference for only very low birth weight children (less than 1,500 grams).

The indirect child assessments (in the parent CAPI instrument) include the following:

- Items adapted from the Minnesota Child Development Inventory (MN-CDI) and
- Selected items from the Infant/Toddler Symptom Checklist (ITSC).

In addition, the ECLS-B contains selected items drawn from existing scales that measure the home environment and parent attitudes and knowledge about childrearing. These measures include the following:

- Knowledge of Infant Development Inventory (KIDI);
- Home Observation for Measurement of the Environment (HOME) Inventory;
- Family Practices Scale;
- Father's Perspective on Role of Fathers in Children's Lives;

- How Father Rates Himself as a Father (single item);[1]
- Parent Investment in Children;
- Early Head Start Involvement with Child; and
- Center for Epidemiologic Studies Depression Scale (CES-D).

Descriptions of the scores for the direct assessments and items for the indirect child assessments follow, along with variable names, variable descriptions, and descriptive statistics from the ECLS-B data file. Guidelines for using these scores are also provided in this chapter. Information on the selected items that obtained information about the respondent's parenting attitudes, beliefs and knowledge, family routines, and child's home environment is presented in section 3.3.2.

3.l Direct Child Assessments

The following section describes the scores that were obtained from the direct assessments of the child. This includes the BSF-R, the NCATS, and children's physical measurements (length, weight, MUAC, and, for very low birth weight babies only, head circumference).

3.1.1 Bayley Short Form–Research Edition

The Bayley Short Form–Research Edition[2] is derived from the Bayley Scales of Infant Development, Second Edition (BSID-II; Bayley, 1993), which is a standardized assessment of developmental status for children from birth to 42 months of age. A brief comparison of the BSF-R with the BSID-II is provided in this section. A more detailed summary of item selection criteria and procedures and the statistical analyses used to develop the BSF-R is presented in section 3.1.1.2. A full description of the development of the BSF-R can be found in *Early Childhood Longitudinal Study, Birth Cohort (ECLS-*

[1] Adapted and reproduced by special permission of the publisher, Psychological Assessment Resources, Inc., 16204 North Florida Avenue, Lutz, FL 33549, from the Parenting Stress Index–Short Form by Richard R. Abidin, Ed.D., Copyright 1990 by PAR, Inc. Further reproduction is prohibited without permission from PAR, Inc.

[2] Bayley Short Form–Research Edition. © Copyright 2001 by The Psychological Corporation, a Harcourt Assessment company. Adapted from the "*Bayley Scales of Infant Development: Second Edition*" © Copyright 1993 by The Psychological Corporation. Adapted and reproduced by permission of the publisher. All rights reserved.

"*Bayley Scales of Infant Development*" is a trademark of The Psychological Corporation, registered in the United States of America and /or other jurisdictions.

B), Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics (U.S. Department of Education, National Center for Education Statistics, forthcoming [b]).

The BSID-II contains two main scales: a mental scale and a motor scale. The mental scale of the BSID-II measures children's cognitive development, for example, memory, means-end behavior, exploratory competence, object permanence, expressive communication, and receptive communication, among others. Although the BSID-II mental scale contains items that come from a range of domains, factor analytic studies (e.g., see Burns, Burns, and Kabacoff, 1992), primarily carried out using the first edition of the BSID (Bayley, 1969) with selected groups of children, suggest predominance of a single general factor—mental ability—through 2 years of age, with some evidence suggesting the presence of weak subfactors. Beyond 2 years, presumably with the acquisition of language, factor analytic studies provide evidence of a more complex factor structure.

The factor analytic studies were replicated by Westat analysts using BSID-II standardization data. These analyses confirmed a single factor of mental ability from birth through about 28 months of age on the mental scale of the BSID-II. The presence of a strong principal factor of mental ability implies that items can be selected at roughly equal intervals from across the ability distribution of the BSID-II (in the target age range) to represent the BSID-II mental scale as a whole. In addition, every effort was made to include items from as many content domains as possible, but only if the item possessed strong psychometric properties. For example, although puzzle completion items formed their own content domain, they were not retained because their psychometric properties were considered inadequate.

The motor scale of the BSID-II measures children's psychomotor development, including fine motor development and gross motor development. Fine motor development includes skills that use small muscle groups (e.g., fingers and hands), such as reaching and grasping, manipulating small objects, and using a pencil. Gross motor development uses the large muscle groups and includes such skills as sitting, standing, walking, and balance.

The BSID-II items follow a developmental progression (i.e., beginning with easier items for babies and extending through harder items for preschoolers). The test is organized in age item sets, groups of items that psychometric analyses have shown to apply within certain age ranges (based on chronological age). When the BSID-II is administered to children at 9 months of age, the mental scale 9-month age set includes 25 items and the motor scale 9-month age set includes 14 items. However, the

child's performance determines whether the mental scale or the motor scale 9-month age sets need to be supplemented with one or more earlier (basal) age sets or with one or more older (ceiling) age sets.

The full BSID-II was administered during the first ECLS-B field test conducted in fall 1999.[3] Because administration of the BSID-II during the ECLS-B home visit was too burdensome, the decision was made to develop a shortened version of the BSID-II, called the Bayley Short Form–Research Edition (BSF-R; The Psychological Corporation, 2001). Items selected for the BSF-R mental and motor scales were organized into a core set of items that would be administered to all the children in the ECLS-B, analogous to the 9-month age set of the BSID-II. Children's performance on this core set determines whether any supplementary sets of items should be administered. The core set for the BSF-R mental scale includes 11 items (excluding 2 additional spontaneous vocalization items that are scored solely by observation and independently of the mental core items for all children). In addition, a single basal set of 9 items was created that covered a broad range of younger ages, as well as a single ceiling set of 9 items that covered a broad range of older ages. The mental scale core items range in age from 5 months to 13 months, the basal items reach down to 4 months, and ceiling items extend up to 19 months. (Because the spontaneous vocalization items were scored entirely by observation, they were not considered part of the administered mental scale; however their scores were added to the mental scale core items for a total of 13 core scores.)

The core set for the BSF-R motor scale includes 14 items, with 11 additional items in the basal set and 10 additional items in the ceiling set. (The motor scale core items range in age from 5 to 13 months, the basal items reach down to 3 months, and ceiling items extend as high as 22 months). On the motor scale, many items could be scored by direct observation of the child's motor abilities or by clustering similar items into a single administration, bringing down the number of administrations to 8 in the core set, 4 administrations in the basal set, and 5 administrations in the ceiling set. The rules used to determine whether to administer either the basal set or the ceiling set were simplified from those used in the BSID-II so that all decisions were made on the basis of the number of items receiving credit. Table 3-1 compares the content and structure of the BSF-R with the BSID-II.

[3] A test of the 9-month design was conducted during the 1999 field test with a sample of approximately 1,500 cases. A key feature of the 9-month data collection was the administration of the full BSID-II by field staff during the home visit. Problems implementing the design were soon apparent. Interviewer attrition occurred at more than twice the expected rate, and production was less than half the expected rate. In addition, hours per completed interview were about 50 percent higher than expected. The BSID-II was obtained on only about 50 percent of the field test sample. Because the 9-month data collection time-in-home and the total time per completed case were so much higher than expected, and because it proved too difficult for many interviewers to complete the work, it was decided to revise the design to make it shorter and simpler. Therefore, it was decided to develop a shortened form of the BSID-II that would include only a reduced set of items derived from the full BSID-II.

Table 3-1. Comparison of numbers of items per set of the Bayley Short Form–Research Edition and the Bayley Scales of Infant Development, Second Edition: 2001–02

Item set	Mental scale		Motor scale	
	BSF-R	BSID-II	BSF-R	BSID-II
Core or 9-month age set	13 items	25 items	14 items	14 items
Basal set				
1st set	9 items	3 items	11 items	7 items
2nd set	†	5 items	†	7 items
Total core + basal sets	22 items	28-33 items	25 items	21-28 items
Ceiling set				
1st set	9 items	1 item	10 items	2 items
2nd set	†	5 items	†	5 items
Total core + ceiling sets	22 items	26-31 items	24 items	16-21 items

† Not applicable.

NOTE: The BSF-R only had one set of basal items and one set of ceiling items. In the BSID-II additional sets would be administered until the appropriate criterion was met: On the mental scale, the tester would administer additional basal sets until the child received "credit" for five or more items within a set, or additional ceiling sets until the child reached "no credit" for three or more items. On the motor scale, the tester would administer additional basal sets until the child received "credit" for four or more items, or additional ceiling sets until the child received "no credit" for two or more items. To match the age span of the BSF-R, from basal to ceiling, the BSID-II mental scale would include 12 age sets and the BSID-II motor scale would include 14 age sets.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

Interviewers recorded the scores for each item in the Child Activity Booklet, a hard-copy booklet with score sheets, administration instructions, and scoring instructions. The item-level scores (credit/no credit) were data-entered at Westat. Item response theory (IRT) calibration and scoring were used to develop the scores that are described below.

The ECLS-B 9-month data file contains three basic types of IRT scores based on the BSF-R mental scale and the BSF-R motor scale: scale scores, standardized T-scores, and proficiency probabilities. Each of these scores is provided for both the mental scale and the motor scale. These scores are described below; the appropriate use of these scores is discussed in section 3.1.1.1. Table 3-2 presents the variable name, label, and descriptive statistics for all the BSF-R scores.

The BSF-R was designed to assess the development of children 7 months 16 days (which rounds to 8 months using BSID-II test administration rules)[4] to 11 months 15 days (which rounds to 11

[4] To comply with BSID-II administration procedures, the BSF-R was designed to be administered to children from 8 to 11 months, rounded to the nearest the half-month. That is, 7 months, 16 days through 8 months, 15 days is considered 8 months, etc. This is because the BSID-II is based

months) of age. Most of the children (83 percent) were assessed within this age range. The majority of out-of-range children were older than the intended age because of the delayed start of the field period in 2001 and the time that was required to locate families and to schedule and conduct the home visit. As a result, children ranged in age from approximately 6 months to 22 months at the time of the assessment although, as noted above, the majority (83 percent) were within the target range of 8–11 months.

Scale Scores. As mentioned earlier, the BSF-R is an adaptation of the BSID-II. The ECLS-B used a subset of items from the full BSID-II to form the BSF-R. IRT true-score equating was used to report ECLS-B results on the same scale used by the full BSID-II. This makes it possible to compare ECLS-B results with those obtained using the full set of BSID-II items. IRT uses item difficulty and discrimination parameters and the pattern of correct and incorrect responses to determine an ability estimate for each child (using maximum likelihood). This estimate is then used to determine the number-right raw score the child would have obtained had the full BSID-II been administered.

In theory, the ECLS-B mental scale score could range from 0 to 178, and the ECLS-B motor scale score could range from 0 to 111, the same raw score ranges as found in the BSID-II. At 9 months, the raw score for the BSF-R mental scale ranges from 0 to 13 for the core set of items administered to all children, and the motor scale raw score ranges from 0 to 14 for the core set. (On the full BSID-II, the 9-month age set includes 25 mental items and 14 motor items so that raw scores could range from 0 to 25 on the mental scale and 0 to 14 on the motor scale on condition that only the 9-month age set items were required.)

Standard Errors. The standard error of measurement (SEM) represents the precision of the IRT true-score. The smaller the standard error, the greater the precision of measurement. The true-score standard error is obtained by translating the standard error of BSF-R IRT ability estimates into the corresponding BSID-II raw score metric.

Standard errors for IRT ability estimates are based on test information. An important postulate of IRT models is that test information depends entirely on the independent and additive contributions of individual items. The contribution of an individual item is the square of the derivative of the item characteristic curve (ICC), divided by its variance at a given level of ability θ. This contribution is known as the *item information function*:

---

on item age sets, i.e., the "8-month" item age set is intended for children from 7 months, 16 days through 8 months, 15 days, etc. Therefore, the target age range for the BSF-R is 7 months, 16 days through 11 months, 15 days.

$$I(\theta, x_i) = \frac{P_i'^2}{P_i Q_i}.$$

Test information is the sum of item information over all of the *n* items in a test:

$$I(\theta, \mathbf{x}) = \sum_i^n I(\theta, x_i) = \sum_i^n \frac{P_i'^2}{P_i Q_i}.$$

The standard error for the maximum likelihood estimator of ability is the square root reciprocal of the test information function at $\hat{\theta}$:

$$\text{se}(\hat{\theta}) = \sqrt{1/I(\theta, \mathbf{x})}\,.$$

In the ECLS-B, IRT true-scores are used to report results in publisher raw-score metric for comparison purposes. Since these scores are very nearly linear in the case of the BSID-II over the age range studied in the ECLS-B, standard errors for IRT true-scores are obtained by projecting $\text{se}(\hat{\theta})$ onto the same scale metric. For BSF-R reporting at 9 months, IRT true-scores have a number-right mean score of 77.5 items, with an average standard error of ±3.7 items for the sample as a whole. The user should expect to find larger standard errors at the tails of the ability distribution, where standard errors reach to ±4.3 items among the youngest and least able children, while rising to ±7.6 items among the oldest and most able. For the motor scale, IRT true-scores have a number-right mean score of 56.8 items, with an average standard error of ±1.9 items for the sample as a whole. At the extremes of the distribution, these errors reach ±3.1 items among the youngest and least able, while rising to ±6.6 items among the oldest and most able.

Standard errors can be used to determine the probability that any given child has surpassed a specific threshold. For software such as Hierarchical Linear Modeling (HLM) that permits the use of plausible values, plausible values can be generated by taking a series of random draws from within the normal distribution defined by the number-right raw score and the standard error.

Some children in the ECLS-B sample were administered the BSF-R beyond the recommended age range. The standard error of measurement may be high in these cases. To limit the impact of these cases in an analysis, the analyst may choose to weight all individual cases that are part of

an analysis by the inverse of the error variance (i.e., the square of the standard error of measurement) so that the variation in measurement precision will be acknowledged when calculating point estimates.

Standardized Scores (T-Scores). Standardized scores are designed to enable individual comparisons with the corresponding age-reference population. The T-score is based on biological age, adjusted for prematurity as necessary. In the ECLS-B, the standardized T-score represents the position of the child in the corresponding age group of the reference population. The BSF-R mental and motor T-scores have a mean of 50 and a standard deviation of 10. Consequently, a T-score in excess of 50 implies that the child's performance level exceeds the average for children of the same age. This does not mean that the child has mastered a particular set of skills, only that his or her performance exceeds the average for children of the same age. The same line of reasoning applies to groups of children. The average T-score for a group of children can be used to determine whether they are above or below the average level of performance for children of similar age.

BSF-R mental and motor T-scores provided in the ECLS-B data file are scaled to have a mean of 50 and a standard deviation of 10. Mental and motor age-normed developmental index scores in N (50, 10) metric are normed to the ECLS-B population. Age-adjusted developmental index scores are provided for children of all ages. A –99 is used to indicate a missing T-score because –9, which is typically used to indicate a missing composite, can be a valid T-score. A –99, however, cannot be a valid T-score.

Users will note an interesting pattern if they examine the standardized scores by children's age. Children assessed at progressively older ages have lower T-scores than those assessed at younger ages. This pattern does not indicate that the progressively older children are less able. On average, they are much more able than younger children. What the standardized scores show is that at progressively older ages, the children in the ECLS-B sample are less developed than other children of the same age (i.e., the children in the publisher's standardization sample). It is not possible to define a particular age beyond which the scores decline, as if there were a threshold. Rather, the scores show a general, steady decline from 8 months and beyond. Reasons why children were assessed at older ages include the following: difficult to locate; initial refusal; initial language difficulty; initial out of country, state, or normal residence; and illness. Some of these factors do make an independent contribution to lower standardized scores, but they do not explain the age-ability relationship observed. At present, the study cannot explain why children who were interviewed late are less developed mentally than children of the same age.

Proficiency Probabilities. Proficiency probabilities represent mastery of a specific skill or ability within a developmental domain (i.e., mental and motor) and provide information about whether children have reached key milestones thought to be of interest to analysts. As with the scale scores and T-scores, the proficiency probabilities are based on information from the IRT model that equates the BSF-R to the full BSID-II. Proficiency probabilities can take on any values between 0.0 and 1.0 and represent the likelihood that a child has surpassed a given developmental milestone. They provide a means of distinguishing status or gain in specific skills. These probabilities are computed using the overall performance on each respective test.

Milestones are hierarchical in the sense that later developing skills are built upon, and surpass, earlier acquired skills. The proficiency probabilities represent a succession of milestones that describe a developmental sequence during the course of development. This is necessarily so because the proficiency probabilities are built on clusters of items at different difficulty levels in the IRT model. This does not necessarily imply, however, that the milestones are placed at equal developmental intervals. Item clusters, typically of four to six items with similar content and difficulty to represent a specific skill, were selected at several points along the scale score continuum. Each cluster was then treated as a single item in order to estimate the probability of mastery of each skill. The hierarchical nature of skill item sets justifies using the IRT model in this fashion. The items follow a Guttman model, where a child who is able to complete a given task is expected to have mastered tasks at lower levels of ability; a failure to complete a given task implies nonmastery of items at higher levels of ability.

Because the items in each cluster range from easier to harder, if a child receives a score of .25 it means that the child has only just begun to acquire this skill. On the other hand, a child who receives a score of .75 has mastered most of the related items and is likely to be skilled in this cluster. For example, on the sitting cluster, if a child's score implies that she can successfully complete *only the first item*, then she would receive a score of .17, implying that the child is unlikely to have mastered this skill level. On the other hand, if a child's score indicates that she can *complete four out of six* of the related items, then she would obtain a proficiency probability of .67, indicating that she is more likely to have attained this skill level. This child may sit alone well, although not necessarily for long periods of time. Probabilities that are exactly 0 or 1 are rare, and imply that the child's developmental level is far removed from the milestone.

Since the proficiency probabilities are based on overall performance, they can be calculated for all children with scale scores, even though they have not necessarily been given an opportunity to attempt each of the tasks in the cluster. Item parameters estimated from the publisher standardization data set have been used in this way to calculate proficiency probabilities for the ECLS-B sample.

The proficiency probabilities in the 9-month data file are based on four, five, or six items. It is important to point out that the proficiency probabilities do not depend on the number of items. Rather, they represent the probability that a certain milestone has been reached or surpassed. The weighted sum of these probabilities represents the number of children in a group who have reached or surpassed a given milestone. The average of these probabilities represents the proportion of children in a group who have reached or surpassed a given milestone.

Proficiency probability scores can be averaged to produce estimates of mastery rates within population subgroups. The weighted sum of these probabilities represents the number of children in a group who have reached or surpassed a given milestone. The average of these probabilities represents the proportion of children in a group who have reached or surpassed a given milestone. From a longitudinal perspective, these continuous measures provide a close look at the change in individual status over time. Gains in the probability of mastery at each proficiency level allow researchers to study gains in specific outcomes over time. Thus, the exposure and experiences of children can be related to improvements in specific skills.

The five proficiency levels created for the BSF-R mental scale correspond to: exploration of objects; purposeful exploration; early problem solving; and two communications proficiency probabilities, one for babbling and one for word use.

The motor scale items fall into two broad domains: fine motor development and gross motor development. In addition, the motor scale includes items from clearly defined skill areas, such as sitting, pre-walking, and walking. These skill areas also follow the developmental course of psychomotor ability. These skill areas are reflected in the five proficiency levels for the motor scale: eye-hand coordination, sitting, pre-walking, walking, and balancing. It should be noted that the first two motor proficiency levels, eye-hand coordination and sitting, are intercorrelated, indicating that these milestones are at about the same developmental level.

Exhibit 3-1 describes the BSF-R mental scale and motor scale proficiencies.

Exhibit 3-1. BSF-R mental scale and motor scale proficiencies, 9-month data collection: 2001–02

BSF-R Mental Scale Proficiencies:

- **Explores objects.** This proficiency can be characterized as the ability to explore objects, for example, reaching for and holding objects, manipulating objects like a cup or a string, and banging objects in play. The child may have no specific purpose or goal except to play or discover. (6 items)
- **Explores purposefully.** This proficiency refers to children's purposeful exploration of objects, that is, the child now touches and works with the objects for a reason. For example, the child may explore a bell to understand the source of the sound, engage in means-end behavior such as using a string to obtain an object, hold multiple blocks at one time to gather, or look at the pictures in a book. (5 items)
- **Babbles.** This proficiency assesses communication through diverse nonverbal sounds and gestures, for example, vowel and vowel-consonant sounds, gesturing for an object, babbling, and jabbering. (4 items)
- **Early problem solving.** This proficiency can be characterized as engaging in early problem solving types of reasoning, for example, using a tool to retrieve an out-of-reach toy, locating a hidden toy, or knowing how to use a pencil to make marks on paper. (4 items)
- **Uses words.** This proficiency measures communication using words, both receptive (knowing an object by its name) and expressive (saying the name of an object) communication. (4 items)

BSF-R Motor Scale Proficiencies:

- **Eye-hand coordination.** This proficiency refers to children's ability to use visual tracking to guide hand movements to pick up a small object. This is a fine motor skill. (4 items)
- **Sitting.** This proficiency reflects children's ability to maintain control of the muscles used in sitting with and without support. (6 items)
- **Pre-walking.** This proficiency measures children's ability to engage in various pre-walking types of mobility, with and without support, such as shifting weight from one foot to another, making alternating stepping movements, or walking when holding onto furniture. (6 items)
- **Independent walking.** This proficiency measures children's ability to walk and stand independently, without help from others or from holding onto anything. (5 items)
- **Balance.** This proficiency refers to children's ability to maintain balance when changing position, for example, when squatting, shifting weight from side to side while standing, or standing on one foot. (4 items)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine Month Data Collection, 2001–02.

By reporting continuous probabilities, the analyst is free to determine what cut-off probability to use to establish mastery. Although some analysts prefer to use a 50 percent probability to represent a developmental threshold, the public generally expects mastery to imply that an overwhelming majority of children can successfully perform the tasks representing the developmental milestone. The ECLS-B reports the actual probabilities so that alternative mastery thresholds of 50, 60, or 80 percent can be defined by the analyst to represent mastery of the developmental milestone.

Table 3-2 summarizes the BSF-R variables and presents distributional information for each.

Researchers with an interest in children with disabilities may find the last four variables in table 3-2 useful in their research (X1MTLMOD, X1MTRMOD, X1MTLSKP, X1MTRSKP). These variables summarize the modifications and adjustments interviewers made when administering the BSF-R to children with known diagnoses of disabilities or developmental delays, e.g., Down syndrome, cerebral palsy. The BSID-II is often used as part of the diagnostic procedure for identifying children with disabilities. Although there are no standardized instructions for adapting the administration to take into consideration the special needs that children with disabilities may have, it is possible to modify items on a case-by-case basis to provide children an even chance to respond while adhering to the administration rules.

During training, interviewers were instructed about how to modify BSF-R items when working with a child with a disability or developmental delay, such as Down syndrome, blindness, or deafness. They were also trained to skip items when modifications were not feasible or appropriate. The purpose of the modifications was to give such children an even chance with other children to respond on each item. Approved modifications were provided in an item-by-item table, and interviewers were instructed to note any modifications in the Child Activity Booklet. When the Child Activity Booklets were returned to Westat, these modifications were reviewed to ensure their appropriateness. Four composites were created to indicate the number of core items modified or the number of core items skipped (and thus scored as “no credit”) for each scale (i.e., mental and motor). See chapter 3 of the *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Design and Operations Report for the Nine-Month Data Collection* (U.S. Department of Education, National Center for Education Statistics, forthcoming [a]) for more information on both modifications made to accommodate special needs children and on training field staff to administer the BSF-R to special needs children.

Table 3-2. Bayley Short Form–Research Edition scores: 2001–02

Variable name	Variable label (description)	Range	Weighted mean[1]	Standard deviation
X1MTLSCL	X1 MENTAL SCALE SCORE	54.55-112.48	77.32	7.54
X1MTLSSE	X1 STAND ERR IRT TRUE MTL SCR	2.06-7.68	3.72	0.39
X1MTRSCL	X1 MOTOR SCALE SCORE	31.95-79.55	56.47	6.64
X1MTRSSE	X1 STAND ERR IRT TRUE MTR SCR	1.35-7.05	1.99	0.54
X1MTLTSC	X1 MENTAL T-SCORE	-36.11-117.57	50.00	10.00
X1MTRTSC	X1 MOTOR T-SCORE	-29.56-100.46	50.00	10.00
X1MTL1	X1 MENTAL PROB1: EXPLORES OBJECTS	0.73-1.00	0.99	0.01
X1MTL2	X1 MENTAL PROB2: EXPLORES PURPOSEFULLY	0.05-1.00	0.91	0.12
X1MTL3	X1 MENTAL PROB3: BABBLES	0.09-1.00	0.55	0.19
X1MTL4	X1 MENTAL PROB4: EARLY PROBLEM SOLVING	0.00-0.97	0.09	0.15
X1MTL5	X1 MENTAL PROB5: USES WORDS	0.00-0.93	0.03	0.09
X1MTR1	X1 MOTOR PROB1: EYE-HAND COORDINATION	0.28-1.00	0.92	0.07
X1MTR2	X1 MOTOR PROB2: SITTING	0.31-1.00	0.95	0.07
X1MTR3	X1 MOTOR PROB3: PRE-WALKING	0.05-1.00	0.79	0.20
X1MTR4	X1 MOTOR PROB4: INDEPENDENT WALKING	0.00-1.00	0.31	0.30
X1MTR5	X1 MOTOR PROB5: BALANCE	0.00-0.91	0.06	0.15
X1MTLMOD	X1 MENTAL: NUMBER OF ITEMS MODIFIED	0.00-11.00	0.00	0.09
X1MTRMOD	X1 MOTOR: NUMBER OF ITEMS MODIFIED	0.00-14.00	0.00	0.08
X1MTLSKP	X1 MENTAL: NUMBER OF ITEMS SKIPPED	0.00-10.00	0.01	0.18
X1MTRSKP	X1 MOTOR: NUMBER OF ITEMS SKIPPED	0.00-14.00	0.01	0.23

[1] The full sample respondent-child weight W1C0 was used to obtain the weighted mean.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

There is also a status variable for both the BSF-R mental scale and the BSF-R motor scale that indicates whether the assessment was administered with or without modifications, was not administered, or was unscoreable (X1STBMTL and X1STBMTR, respectively). At least 66 percent of core items on the BSF-R mental scale needed to be administered in order to be considered scoreable and thereby receive a scale score. The same is true for the BSF-R motor scale core items.

3.1.1.1 Choosing the Appropriate BSF-R Score for Analysis

Each of the scores described above presents information about children's mental and motor developmental status from a slightly different perspective. The choice of the most appropriate score for analytic purposes should be driven by the context in which it is to be used and by the research question to be addressed in the analyses:

- Scale scores are measures of overall mental or overall motor ability;
- Standardized T-scores are indicators of relative ability at a single point in time, in relation to other children of the same age; and
- Proficiency probabilities are criterion-referenced indicators of status for a specific skill.

The **mental and motor scale scores** are overall measures of children's developmental ability at a single point in time. Scale scores represent children's absolute positions along a developmental continuum. Older children will naturally tend to have higher scale scores than younger children, if only because of their age. This makes scale scores ideal for studies involving longitudinal growth over time, where age is used as a measure of time in order to compare developmental growth rates.

Scale scores are useful to answer the question: At what ability level is the child functioning? Or, alternatively, what is the child's general developmental level? The scale scores provide a summary measure of children's mental and motor development and are useful in regression analyses where development is the dependent variable and characteristics such as family demographics (e.g., mother's education) or family processes (e.g., playing with child) are the independent or explanatory variables. For example, the scale score would be an appropriate dependent variable when examining the relationship between prenatal care or nutritional status and development, or between home environment and

development. Eventually, when subsequent waves of the ECLS-B data are released, the scale scores would also be used in longitudinal analyses of children's developmental growth.

Standardized T-scores are overall indicators of relative ability at a single point in time. They are norm-referenced within each age group to have a mean of 50 and a standard deviation of 10. T-scores are relative measures of development based on age-group norms. Older and younger children will have similar T-score values when they occupy the same relative position in their respective age-groups. Since age has no further bearing once the norming takes place, T-scores are ideal for cross-sectional comparisons examining the relative development of children at different ages.

The T-scores are good for answering the question: How does a particular group of children compare with their peers and with the general population of children born in the year 2001 and having similar demographic characteristics? For example, if an analyst is curious about how urban children's motor development compares to rural children's motor development or how both groups compare to children in the general population, the T-score would be a good choice for a comparison of means test. Since the mean of the general population's T-score will always be 50, the analyst can produce mean T-scores for urban children and rural children separately and then compare these means with the overall population mean. Because it is age-normed, the T-score is also useful for comparing scores between individuals of different ages. The T-distribution (i.e., mean of 50, standard deviation of 10) provides a standard "ruler" for comparing scores between individuals and between subgroups. With a standard deviation of 10, a 5-point difference in scores would mean a difference of one half of a standard deviation between two individuals, or between two subgroups. For example, a mean of 45 for one group and 50 for another group would be the equivalent of one-half of a standard deviation difference.

When subsequent waves of the ECLS-B data are released, the T-scores, because they are age-normed, could be used in a longitudinal fashion to illustrate the increase or decrease in gaps among subgroups over time, but in a somewhat limited manner. They are not recommended for calculation of a change or "gain" score. (The scale score is recommended for this.).

The **proficiency probabilities** represent status in relation to specific skills included in the BSF-R mental and motor scales. They are ideal for studying the stages of mental and motor development, such as children's exploration of objects or their early problem solving. Proficiency probabilities enable the analyst to gain a better understanding of where (e.g., in what skill sets) the child's developmental status gains are taking place, as opposed to the overall scale score. A comparison of the mean scores may

also be used to address more specific questions, such as: How many children in a certain age or demographic group are exploring objects? What percentage of children is walking independently?

In addition, these scores can be used in non-linear regression analyses to investigate the relationship between the attainment of a particular milestone and, for example, the child's health status or home environment. When the data from later waves become available it will also be possible to investigate the longitudinal relationship between early achievement of milestones and subsequent cognitive outcomes. Although proficiency probabilities are continuous variables, as proportions they are by their very nature non-linear. Proficiency probabilities should be transformed into normal deviates or logits prior to their use in regression and correlation analyses.

3.1.1.2 Additional Information on the Computation and Reliabilities of the BSF-R Scores

In the context of the ECLS-B 9-month home visit with administration by lay assessors, the full BSID-II with its complicated age-set rules would not be feasible. Therefore, the BSF-R was developed in consultation with a panel of experts in educational and developmental assessment. (Please see section 3.1.1 for a comparison of the BSF-R and BSID-II.) IRT analyses were used to assist the development of a BSF-R that is as comparable as possible with the BSID-II. In addition to the IRT analyses, items were also reviewed for their feasibility of administration in a field setting. Ideally, an item selected for inclusion in the BSF-R would have strong psychometric properties (see below), would be easy to administer, would require minimal administration materials, and would be as objective as possible to score. This section summarizes the steps that were taken to select the items for the BSF-R, describes the IRT analyses that were conducted, and presents the reliabilities of the mental scale and motor scale.

In order to select the items for the BSF-R, the standardization data set for the BSID-II was obtained from the Psychological Corporation, publisher of the BSID-II. Item calibrations were conducted to determine the IRT difficulty and discrimination parameters for all items in the BSID-II. The difficulty parameter locates each item on a continuum of ability extending from 0 to 42 months of age. In essence, all items are now arranged in developmental order. The discrimination parameter reveals how useful an item is at distinguishing between children who are above or below the level of difficulty represented by the item. All items in the appropriate difficulty range for the ECLS-B target population (i.e., 8–11 months) were reviewed, and a pool of candidate items was identified. The discrimination parameter was used to eliminate those items that were weak discriminators of ability. In general, the goal was to try to keep those items with a discrimination parameter of 0.7 or greater.

Once a list of items in the appropriate ability range with good discrimination was created, items were reviewed again for content and feasibility of administration in the field by a national field staff. In particular, items were selected for their ease of administration, clarity of scoring criteria, number of materials, and appropriate representation of content. Additionally, to prioritize content coverage, factor analyses were conducted by Westat analysts using the standardization data set of the BSID-II from the publisher. Similar to earlier studies (see Burns, Burns, and Kabacoff, 1992) with the BSID (first edition, Bayley, 1969), it was found that the mental scale demonstrates one main factor—ability. Although item content and breadth were considered, appropriate psychometric properties and ease of administration and scoring were the key criteria used in item selection. The BSF-R instrument was field tested, and IRT analyses were again conducted to review the psychometric properties of the selected items. Revisions were made to the BSF-R, replacing items not performing satisfactorily or reformatting administration and scoring procedures for greater clarity. See *ECLS-B Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics* (U.S. Department of Education, National Center for Education Statistics, forthcoming [b]) for more details on the creation of the BSF-R.

The final version of the BSF-R used in the ECLS-B 9-month national data collection has also been analyzed for its psychometric properties. Initially, the complete sets of 178 mental and 111 motor items from the BSID-II were calibrated using an IRT two-parameter model (i.e., ability and discrimination parameters). The 9-month BSF-R mental and motor scales were then calibrated with an identical IRT model using the item scores from the national data collection, and true-score equating was then carried out. Based on these analyses, several items did not equate with publisher items as expected. These items were not included in the true-score equating of the BSF-R, but were still used in scoring. Four mental items and four motor items were disregarded during equating but were subsequently used in scoring.

The overall success of the BSF-R when used with the ECLS-B population is reflected in the reliability coefficient, an indicator of how well the items measure a construct consistently. The IRT reliability coefficient obtained for the 9-month BSF-R mental scale in the ECLS-B is $r_{xx} = 0.80$. The IRT reliability coefficient obtained for the BSF-R motor scale is $r_{xx} = 0.93$. These coefficients represent the reliability of the BSF-R mental scale and motor scale for the target population of the ECLS-B as a whole. The corresponding reliability coefficient for the same set of mental items in the BSID-II is $r_{xx} = 0.87$. The reliability coefficient for the same set of motor items in the BSID-II is also $r_{xx} = 0.87$. The BSF-R was created to measure the developmental status of children for an age range of 8–11 months. Some children

in the ECLS-B were outside this age range when the BSF-R was administered. See *ECLS-B Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics* (U.S. Department of Education, National Center for Education Statistics, forthcoming [b]) for more information on the reliabilities by age.

3.1.2 Nursing Child Assessment Teaching Scale

The Nursing Child Assessment Teaching Scale (NCATS)[5] is an observational coding system for rating caregiver-child interaction patterns that is widely used in clinical practice and research to screen mothers and infants for early intervention programs as well as in maternal and child health research (Sumner and Spietz, 1994). The individual NCATS items are in the file and are clearly identified with the NCATS item number and a brief label that paraphrases the content of the item; e.g., for variable C1CHRCH, the variable description is "C1 NCATS 2 CG PUT CHILD REACH MATERIAL." For the exact wording of all the items, please refer to the NCATS manual (Sumner and Spietz, 1994). To obtain further information about the NCATS, or to place an order for a manual, the analyst is referred to the Nursing Child Assessment Satellite Training (NCAST) web site: http://www.NCAST.org.

The NCATS scale is composed of 73 binary (yes/no) items that are scored by trained observers, usually from direct observation, but also from videotaped interactions. In the ECLS-B, the interviewer videotaped the interaction during the home visit. (Approximately 90 percent of cases required only a single trial to complete the videotape.) When the videotape was returned to Westat, a trained coder viewed the videotaped interaction and scored each item as a "Yes" if the behavior was observed and a "No" if the behavior was not observed.

The NCATS coding system has two main scales: the parent scale, which has 50 items, and the child scale, which has 23 items. The items in the parent scale are grouped into four conceptual categories for ease of scoring: Sensitivity to Cues, Response to Child's Distress, Cognitive Growth Fostering, and Socioemotional Growth Fostering. The child items are grouped into two categories: Clarity of Cues and Responsiveness to Caregiver. In addition, the items measuring contingency, that is, items that have both caregiver and infant components, are singled out and appear in both the subscales and two subscales of their own, the Parent Contingency Scale and the Child Contingency Scale.

[5] The NCATS is used with permission from its developer, Dr. Kathryn Barnard (agreement dated January 28, 2003) who granted NCES permission to include 9-month NCATS item-level scores, the Total Scale Score, Total Parent Scale Score, and the Total Child Scale Score in the public-use files of the Early Childhood Longitudinal Study, Birth Cohort.

The NCATS manual presents alpha reliability coefficients for each of these groups and researchers often use these groups as subscales. However, in the survey setting of the ECLS-B, there was little psychometric support for creating these six subscales as many of the alphas are quite low. [Please see *ECLS-B Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics* (U.S. Department of Education, National Center for Education Statistics, forthcoming [b]) for a detailed discussion of the NCATS subscale reliabilities.] The total parent scale, the total child scale, and the overall total NCATS scale (parent items plus child items), nevertheless, all have high internal consistency as measured by alpha. Therefore, on the ECLS-B data file there are item level data, the total parent scale score (sum of the "Yes" responses to the 50 parent items), the total child scale score (sum of the "Yes" responses to the 23 child items), and the total NCATS scale score (sum of the "Yes" responses to all 73 items).

According to the NCATS manual (Sumner and Spietz, 1994), the NCATS can be used to screen mothers and children who can be considered "at risk" (described in the NCATS manual as "worrisome"). The suggested criterion is that mothers, children, or mother-child pairs scoring in the lowest 10 percent of NCATS scores should be targeted for early intervention programs. The manual further suggests that the 10 percent criterion should also be based on the ethnic grouping of the sample, yielding separate scores for the major subgroups. Analysts interested in screening at-risk mothers, children, and mother-child pairs are referred to the NCATS manual for a table that presents suggested cut-off scores to identify at-risk dyads (Sumner and Spietz, 1994, p. 111). However, as described in the manual, these values refer only to children of normal birthweight and to mothers at least 20 years of age with, at minimum, a high school diploma. No information is provided in the manual for cases that do not meet these criteria. Table 3-3 provides the variable names and descriptions of the three NCATS total scale scores that are included in the ECLS-B data file, along with their distributions. Each of these scale scores is described below along with its appropriate use.

Total Parent Scale Score. The focus of the parent scale of the NCATS is on the caregiver's use of a "teaching loop," which consists of four components: (1) alerting the child by getting the child's attention, and setting up the expectations for what is about to be done; (2) instruction, during which the mother teaches the child by asking questions, making suggestions, giving directives, and so forth; (3) performance, which involves letting the child respond to the caregiver's suggestions or teaching; and (4) feedback, in which the mother comments on or responds to the child's attempts to do the task (Sumner and Spietz, 1994). The total parent scale score is useful for descriptive purposes to summarize the parent's

teaching behaviors during the NCATS interaction. A low score would indicate that the parent did not engage in many teaching-oriented behaviors, and a high score would indicate that the parent was more likely to engage in a broader range of teaching behaviors that include use of the teaching loop.

The total parent scale score is the sum of the "Yes" responses for the 50 parent items. All items in this scale are unidirectional. That is, a "Yes" indicates the presence of a desirable behavioral characteristic (or absence of an undesirable behavior) and a "No" indicates the absence of a positive behavior. For example, if the item "Caregiver positions child so child is safely supported" is checked as "Yes," it means that the caregiver has taken steps to make sure the child is in a safe position; when that item is checked as "No," it means that the caregiver has not taken any steps to keep the child safe. Likewise, if the item "Caregiver avoids yelling at the child" is checked as "Yes," it indicates the absence of a negative behavior; if it is checked as "No," it means that the caregiver yelled at the child.

Table 3-3. NCATS scores in the ECLS-B 9-month data file: 2001–02

Variable name	Variable label (description)	Range of values	Weighted mean[1]	Standard deviation
X1NCATTP	X1 NCATS – Total Parent Score	15.00-49.00	34.68	4.51
X1NCATTC	X1 NCATS – Total Child Score	4.00-23.00	15.50	2.70
X1NCATTS	X1 NCATS – Total Score	23.00-70.00	50.18	5.77

[1] The full sample respondent-child weight W1C0 was used to obtain the weighted mean.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

Individual items are coded as either "Yes" for presence of a positive behavior (or absence of a negative behavior) or "No" (for absence of the behavior in question). These are scored on the file as "Yes" = 1, and "No" = 2. All total scale scores for the NCATS, the total NCATS scale score, the total parent scale score, and the total child scale score are all the sum of the "yeses." Therefore, potentially the total parent score can range from 0 to 50, although the actual range is from 15 through 49.

It is possible to have missing data for the individual items in the Parent Scale. For example, if the video camera was too far away from the dyad, the audio level may be too low to hear the content of the speech but adequate enough to detect changes in tone and inflection. In such a case, it would be possible to code the items focused on warmth of tone, intonation, and inflection but not possible to code the items that assess the cognitive content of the caregiver's speech. If there are missing data that do not

exceed 25 percent of the items, then the score is prorated based on the number of items scored and converted into the 0–50 range using the following simple formula:

Formula for Prorating NCATS Scale Scores:

$$\frac{X}{\text{Total number of items}} = \frac{\text{Number of "Yes" responses}}{\text{Number of items coded}}$$

For example, if 10 parent items were missing for any reason, then the score is based on the 40 scored items but converted into the 0-50 range. That is, if the case had 35 "Yes" responses out of 40 scored items, the total parent score would be 43.75 (35/40 x 50). However, if 16 or more parent items were not scored (more than 25 percent missing data), then the score is determined to be missing (-9). This occurred in less than 0.5 percent of the cases.

The total parent scale score would be the variable of choice for analysts who are interested in the associations between, say, key demographic variables such as family socioeconomic status, caregiver education, maternal age at child's birth, caregiver parenting attitudes, and knowledge of infant development with observed caregiver teaching behaviors on the NCATS. As the data from later waves become available, the analyst might consider examining the longitudinal associations between the total parent scale score and such child outcome measures as language ability and adjustment to school.

Total Child Scale Score. This is the sum of the "Yes" responses for the 23 child items. To participate in a mutual relationship with the caregiver, the child must send clear cues to the caregiver and be responsive to the caregiver. If the child is not responsive to the behavioral cues of the caregiver, and the caregiver is not responsive to the cues of the child, then mutual adaptation will not be possible. The total child scale score is useful for descriptive purposes to summarize the child's ability to communicate clear cues to the parent (e.g., "Child grimaces or frowns during the teaching episode") and to respond in turn to the caregiver (e.g., "Child vocalizes or babbles within 5 seconds after caregiver's verbalization"). A low score would indicate that the child did not communicate clear cues and did not respond easily to the caregiver's attempts to engage the child. A high score would indicate that the child was communicating clearly with the caregiver and responded adaptively to the caregiver's cues.

Again, individual items in the child scale are scored as either "1" ("Yes") or "2" ("No"). The total child scale score is the sum of the "yeses." Therefore, the potential range for the total child

scale score is from 0 to 23. As with the parent scale, all items are unidirectional. However, this unidirectionality is subtle in the case of the child. One subset of items assesses the clarity of the child's cues. The cues themselves may be either positive or negative. At issue is whether those cues were clear or not. A child who communicates clear cues would receive a higher score on this set of items than a child who communicates ambiguous cues. This is also true of the child items that are typically grouped in the responsiveness to caregiver subset of items. A child who responds to the caregiver clearly, either positively or negatively, would receive a higher score on this set of items than a child who responds ambiguously.

If there are missing data that do not exceed 25 percent of the items, then an adjusted score is obtained based on the number of items scored, using the same formula shown earlier. For example, if 3 child items were not scored, then the total child scale score is based on the 20 scored items. That is, if the case had 17 "Yes" responses out of 20 scored items, the total child scale score would be 19.55 (17 divided by 20 and then that ratio multiplied by 23). If 4 or more child items were not scored (i.e., more than 25 percent of child items were not scored), then the total child scale score is determined to be missing (−9). This occurred in less than 0.5 percent of the cases.

The total child scale score would be useful when investigating the relationships between child characteristics (e.g., fussiness, excitability, irritability, health status, or developmental status) and children's clarity of communication to the caregiver and his or her responsiveness to the caregiver. When the data from subsequent rounds become available, the total child scale score would be useful when studying children's later development and adjustment to preschool.

Total NCATS Scale Score. This is the sum of the "Yes" responses for the entire set of items in the NCATS (i.e., 73 items), including both the parent items and the child items. The Total NCATS Scale score is the same as the sum of the parent and child scale scores, provided that at least 75% each of the parent items and of the child items are scored. It is useful for descriptive purposes to summarize the caregiver's use of the teaching loop and the child's responsiveness to the caregiver. A low score would indicate that a dyad (i.e., parent-child) did not engage in many behaviors associated with the teaching loop, whereas a high score would indicate increased use of the teaching loop by both the mother and child. It would not be considered solely a frequency count of teaching loop behaviors, because the NCATS is not a frequency-count measure, per se. Rather, it combines elements of quality of interaction and breadth of behaviors. The total NCATS scale score could be considered a count of the different types of behaviors that make up the teaching loop. For example, a score of 30 would describe an interaction that

likely includes only some of the behaviors associated with the teaching loop, whereas a high score—60, for example—would indicate that both caregiver and child participated to a greater extent in the teaching loop (Sumner and Spietz, 1994).

The analyst might choose the total NCATS scale score as the dependent variable to investigate the associations between, for example, maternal education, parenting attitudes, or knowledge of infant development and use of the teaching loop during the NCATS. The total NCATS scale score would also be useful as the independent variable in analyses that examine use of the teaching loop with various child outcomes, both concurrent and longitudinally when future data become available. Analysts interested in more specific aspects, for example, children's responsiveness within the teaching loop, may optionally choose to recreate the subscales or explore alternative factor structures. Analysts interested in recreating the subscales typically used by researchers are cautioned about the low alphas for some of the subscales in the ECLS-B, as discussed above, and are referred to the NCATS manual (Sumner and Spietz, 1994), and to the NCAST web site presented earlier.

Analysts who are interested in the associations between more specific aspects of the NCATS subscales and various outcome measures may refer to the NCATS manual and use the item-level data to recreate the subscales or to conduct factor analyses to determine whether an alternative factor structure does a better job of identifying interpretable subscales. The analyst is referred to *ECLS-B Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics* (U.S. Department of Education, National Center for Education Statistics, forthcoming [b]) for further information about the NCATS items and subscales. For this reason, individually scored item-level data (i.e., the 73 individual items scored as "Yes" or "No" are included on the data file). These item-level data are provided so that analysts may optionally recreate the subscales or conduct factor analyses to investigate alternative factor structures.

3.1.2.1 NCATS Supplemental Contextual Variables

The data file also includes several additional NCATS-related variables that may be of interest to analysts. These variables include the length of time in minutes (MM) and seconds (SS) of the NCATS interaction, the presence of others during the interaction, the child's state of alertness, whether or not the child displayed any potent disengagement cues during the NCATS (e.g., "tray pounding," back arching, crying), and the caregiver's language to the child during the NCATS.

These supplemental variables are presented in table 3-4, which lists the variable name, its variable description, and its range of values.

Table 3-4. NCATS supplemental contextual variables in the ECLS-B 9-month data file: 2001–02

Variable name	Variable label (description)	Range of values
C1LENGTH	C1 NCATS LENGTH OF TIME TEACHING (MM:SS)	0:45-36:00[1] mm:ss
C1OTHERS	C1 NCATS OTHERS PRESENCE	Yes (1), No (2)
C1CHSTTE	C1 NCATS CHILD'S STATE AT TEACHNG START	Quiet Sleep (1) Active Sleep (2) Drowsy (3) Quiet Alert (4) Active Alert (5) Crying (6)
C1PDC	C1 NCATS POTENT DISENGGMNT CUES OBSERVED	Yes (1), No (2)
X1LNGNCT	X1 LANGUAGE IN WHICH NCATS CONDUCTED	English (1) Spanish (2) Chinese (3) Other (4)

[1] *Tapes that continued past the 5 mm and 30 ss required for reliable NCATS scoring were only coded for the first 5 mm and 30 ss of interaction.*
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

3.1.2.2 Reliability of NCATS Coding

To ensure the quality of the ECLS-B data, the reliability of the NCATS coding was established. The reliability of a scale refers, on one hand, to the stability of scores across different coders, and, on the other hand, to the ability of the items to measure a construct consistently. Reliability was established in two ways for the ECLS-B. First of all, a total of 171 videotaped ECLS-B NCATS interactions (the "reliability tapes") (representing 1.8 percent of the total of 9,437 codeable NCATS tapes), selected at random, were sent to NCAST at the University of Washington to be coded by a certified coder.

Coding of ECLS-B videotapes by NCAST staff was done to establish inter-lab reliability, the standard against which the ECLS-B coders were measured. ECLS-B coders were required to complete one reliability tape per week to establish coder percent agreement with the University of Washington.

(Please see section 5.2.4 for a summary of the NCATS training procedure and requirements for coding certification, as well as for a discussion of the reliability procedure.) Overall, coders averaged 86 percent agreement with the certified NCAST coder at the University of Washington, which exceeded the target of 85 percent agreement between ECLS-B coders and NCAST.

Secondly, reliability coefficients were separately obtained for all ECLS-B NCATS tapes, including the subset of 173 videotapes that were coded at the University of Washington. This was done to establish the internal consistency of the subscales and to supplement the percent agreement inter-lab reliabilities that were obtained on a weekly basis. If Westat coders were in agreement with the coder at the University of Washington, then the alphas would be similar.

If the items of a single subscale are equivalent, then those items should be correlated with each other. Cronbach's alpha, which is based on the split-half reliability correlation coefficients, was obtained for the videotapes that were coded at the University of Washington and for the ECLS-B videotapes that were coded at Westat. Cronbach's alphas for the NCATS Total Parent Scale, Total Child Scale, and Total NCATS Scale are presented in table 3-5 for the total ECLS-B codeable tapes, for the ECLS-B reliability tapes coded at the University of Washington, and, for comparison, for the publisher data set in the NCATS manual.

Table 3-5. Cronbach's alphas for Total Parent, Total Child, and Total NCATS Scales: 2001–02

NCATS scales	9-month ECLS-B NCATS tapes (N = 8520)	U. of Washington reliability tapes (n=171)	U. of Washington (N=1,887, publisher data set)
Total Parent Scale	.68	.74	.87
Total Child Scale	.62	.63	.80
Total NCATS Scale	.72	.77	.87

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

3.1.3 The Child Observations During the Bayley Short Form–Research Edition

The Interviewer Observations of Child Behavior during the Bayley Short Form–Research Edition (Child Observations) consist of a short set of items selected from the Behavior Rating Scale (BRS), a supplementary component of the BSID-II. Only 9 out of the 30 BRS items are included in the ECLS-B. These items were selected to be representative of different domains of behavior. During the

national training, interviewers received extensive training on observing these behaviors using videotapes that included examples of the full range of behaviors in each item. Please see the *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Design and Operations Report for the Nine-Month Data Collection* (U.S. Department of Education, National Center for Education Statistics, forthcoming[a]).

The analyst is advised that the items were not intended to be scaled or factor analyzed. Nor are the psychometric properties of the BRS being summarized here because this subset should not really be considered the "BRS." Seven items were observed by the interviewer during the administration of the BSF-R. Two items are parent reports of the child's behavior and performance on the BSF-R. These nine items provide discrete information about children's interest, engagement, and behavior during the BSF-R that may help the analyst interpret individual mental and motor scale scores.

Table 3-6 presents the variable names and descriptions of the set of Child Observations items in the ECLS-B.

Table 3-6. Child Observations items in the data file: 2001–02

Variable name	Variable label (description)	Range of values
Two Interviewer Observation questions asked of parent respondent:[1]		
C1BBHAV1	C1BSF CG RATE BEHAVIOR TYPICAL VISIT 1 (How typical was your child's behavior? Did {CHILD} play the way {he/she} usually does? Was {he/she} as happy or upset as usual? As alert and active as usual?)	Very atypical (1); Mostly atypical (2); Somewhat typical (3); Typical (4); Very typical (5).
C1BBHAV2	C1BSF CG RATE BEHAVIOR TYPICAL VISIT 2 (How typical was your child's behavior? Did {CHILD} play the way {he/she} usually does? Was {he/she} as happy or upset as usual? As alert and active as usual?)	Very atypical (1); Mostly atypical (2); Somewhat typical (3); Typical (4); Very typical (5).
C1PRFM1	C1 BSF CG RATE PERFORMANCE VISIT 1 (Do you think {CHILD} did as well as {he/she} could? Have you seen {CHILD} do better or worse on the type of things we worked on?)	Poor indicator (1); Barely adequate (2); Adequate (3); Good (4); Excellent (5).
C1PRFM2	C1 BSF CG RATE PERFORMANCE VISIT 2 (Do you think {CHILD} did as well as {he/she} could? Have you seen {CHILD} do better or worse on the type of things we worked on?)	Poor indicator (1); Barely adequate (2); Adequate (3); Good (4); Excellent (5).

See notes at end of table.

Table 3-6. Child Observations items in the data file: 2001–02—Continued

Variable name	Variable label (description)	Range of values
Subset of BRS Questions Completed by Interviewer:[1]		
R1POSAFF	R1 CO035 CHILD DISPLAYS POSITIVE AFFECT	No positive affect displayed (1); 1 or 2 brief displays of positive affect (2); 3 or more brief displays of positive affect (3); 1 or 2 intense, heightened, or prolonged displays of positive affect (4); 3 or more intense, heightened, or prolonged displays of positive affect (5).
R1NEGAFF	R1 CO040 CHILD DISPLAYS NEGATIVE AFFECT	3 or more intense, heightened, or prolonged displays of negative affect (1); 1 or 2 intense, heightened, or prolonged displays of negative affect (2); 3 or more brief displays of negative affect (3); 1 or 2 brief displays of negative affect (4); No negative affect displayed (5).
R1ADAPT	R1 CO050 CHILD ADAPT CHANGE IN MATERIAL	Consistently resists relinquishing materials and/or refused to accept new materials (1); Typically resists relinquishing materials and/or refused to accept new materials, makes 1 or 2 transitions easily (2); Makes poor transitions half the time, makes good transitions half the time (3); Typically relinquishes materials and accepts new materials, 1 or 2 poor transitions (4); Consistently relinquishes materials and accepts new materials (5).
R1INTRST	R1 CO065 CH SHOWS INTEREST IN MATERIAL	No interest (1); 1 or 2 displays of interest (2); Moderate interest (3); Much interest (4); Constant interest (5).

See notes at end of table.

Table 3-6. Child Observations items in the data file: 2001–02—Continued

Variable name	Variable label (description)	Range of values
Subset of BRS Questions Completed by Interviewer[1]—Continued		
R1ATNTSK	R1 CO080 CHILD PAYS ATTENTION TO TASKS	Constantly off task, does not attend (1); Typically off task, attends in 1 or 2 instances (2); Off task half the time (3); Typically attends, attention wanders in 1 or 2 instances (4); Constantly attends (5).
R1SOCIAL	R1 CO110 CH DISPLAYS SOCIAL ENGAGEMENT	No attempts to interact socially (1); 1 or 2 attempts to interact socially (2); Several attempts to interact socially (3); Many attempts to interact socially (4); Constant attempts to interact socially (5).
R1CNTLMV	R1 CO130 CH SHOWS CONTROL OF MOVEMENTS	Consistently jerky or clumsy (1); Typically jerky or clumsy (2); Jerky or clumsy half the time, smooth or coordinated half the time (3); Typically smooth or coordinated (4); Consistently smooth or coordinated (5).

[1] Interviewer Observation materials developed for the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B). Adapted from the *Bayley Scales of Infant Development: Second Edition, Behavior Rating Scale*. Copyright © 1993 by The Psychological Corporation, a Harcourt Assessment Company. Computer adapted and reproduced by permission of the publisher. All rights reserved.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

3.1.4 Physical Measurements

The ECLS-B measures children's weight, length, and middle upper arm circumference (MUAC). For children born with very low birth weight (<1,500 grams or <3 pounds, 4 ounces), head circumference is also measured. Standard procedures were followed to obtain the physical measurements to ensure that all measurements were obtained in the same way for all children. To obtain child weight, the mother first stood on the scale and her weight was recorded. The interviewer then handed the child to the mother and the scale's tare feature (in which the child's weight is automatically subtracted from the combined weight of the mother and child) then displayed the child's weight alone.

Occasionally, another individual other than the mother held the child as the child was weighed, for example, if the mother was not available or refused to be weighed. In most cases, this

"stand-in" was the interviewer, although other adults may have been involved, such as the father, or a grandmother. Whenever this happened, the interviewer recorded on the record sheet that someone other than the mother was tbe adult weighed. If anyone other than the mother (defined as the household mother) was weighed, then X1HMWGHT = −1. If the weight of the mother was obtained, then the value of X1HMWGHT will be the average of the mother's two weights (i.e., C1ADWGT1 and C2ADWGT2) or will be the value of C1ADWGT1 if the second weight is missing, or if someone other than the mother was weighed for the second obtained weight.

In addition, there are approximately 90 cases that have child weight (C1CHWGT1 and C1CHWGT2) information that do not have adult weight information (C1ADWGT1 and C1ADWGT2). It is possible in such cases that the child weight was obtained directly by placing the child on the scale. The scale all interviewers used is sensitive enough to obtain accurate weights to within 0.2 kilogram for weights under approximately 13 kilograms. Therefore, weights obtained from the child alone can be considered accurate. In addition, in one case where the scale malfunctioned, the child weight was recorded by parent report of a well-baby check at a medical facility the day before. The values for this case were retained as reported.

As is standard practice in all major health studies, each of these physical measurements is obtained twice. Therefore, for each measurement there are three variables on the data file, the first measurement, the second measurement, and the average of the two. For further information about procedures used to average the values, please see section 7.5.1.5.

In those cases where only one measurement was obtained (instead of two), the average is the single value that was obtained. In addition, some physical measurements for some cases may have been adjusted at the home office at the time of data entry to correct for errors in data recording made in the field. Adjustments to physical measurement data occurred in approximately 2 percent of cases, mostly early in data collection. Common reasons for adjustments were misalignment of the decimal point with the space provided on the record form, which was corrected by moving the decimal point; not resetting the scale's tare feature such that the child's weight appeared to be greater than the caregiver's weight, which was corrected by subtracting the caregiver's weight; recording the child's length in inches instead of centimeters, both of which were available on the measuring device (resulting in a value that was far out of range, e.g., 25 instead of 63), which was corrected by converting to centimeters; and recording head circumference that was well below range, possible if one read from the wrong side of the SECA tape, which was corrected by reading the value on the correct side of the tape.

When the first cases were received at the home office, physical measurements with any problems (e.g., a mispositioned decimal point) were held aside for review by Child Development staff members, who made appropriate corrections (e.g., correctly positioned the decimal point). A flag, C1ADJSTD, was created to indicate whether or not it was necessary to adjust a physical measurement for any of the above reasons. It soon became apparent that a single flag indicating that a physical measurement had been adjusted was not sufficient, as multiple measurements may have been adjusted. Therefore, additional flags that are specific to the physical measurements were subsequently created. C1ADJSTD indicates to the analyst that one of the physical measurements was adjusted; the analyst should then review the following additional variables to identify what physical measurement was adjusted: C1PMXAW1 and C1PMXAW2; C1PMXCW1 and C1PMXCW2; C1PMXUL1 and C1PMXUL2; C1PMXUP1 and C1PMXUP2; C1PMXUC1 and C1PMXUC2; P1PMXLG1 and P1PMXLG2; and C1PMXHC1 and C1PMXHC2. Each of these variables will have a value of 1 if an adjustment was made. A value of 2 for any of these variables indicates that this variable was not adjusted because an adjustment was not necessary for this variable. It should be noted that C1ADJSTD was created at the beginning of data entry, as the physical adjustments were first being made. However, the flags for the specific physical measurements were added shortly thereafter so that specific information about adjusted values may be missing for a very small number of cases.

In using the MUAC data, analysts should note the occurrence of "out-of-range" data with the upper arm length and midpoint measurements (i.e., C1MUAM1, C1MUAM2, C1MUAL1, and C1MUAL2). This may have occurred due to miscalculation of the midpoint location or errors in measurement by using the wrong side of the SECA tape. The concern here is that if the midpoint is not located correctly, the MUAC measurement may also be incorrect. This occurs in less than 2 percent of ECLS-B cases. These data were retained and, if they were consistent with the criteria (see below for a discussion of how these composites were created), were used in creating the composite average for the child's MUAC (X1CHMUAC). In cases where the MUAC value is 6.5 cm or less, the analyst may want to consider not using these cases in analysis, using the composite MUAC (X1CHMUAC), or using only the measurement that does not fall out of range.

The reliabilities of the physical measurements were quite high, as measured by the correlation between the first recording and the second recording of each set of measurements. For the child's weight, the correlation between the first and second recordings was r = .81; for the child's length,

this correlation was r = .81; for the MUAC, the correlation was .85; and for head circumference, it was r = .84.

Table 3-7 presents the physical measurements variable names, range, and mean and standard deviation for the sample as a whole.

Table 3-7. Physical measurement composites in the ECLS-B 9-month data file: 2001–02

Variable name	Variable label (description)	Range of values	Weighted mean[1]	Standard deviation
X1CHMUAC	X1 PM – CHILD'S MIDDLE UPPER ARM CIRCUMFERENCE (CM)	9.00-23.00 cm	15.87 cm	1.96
X1CHLENG	X1 PM – CHILD'S LENGTH (CM)	47.30-95.00 cm	73.10 cm	4.00
X1CHWGHT	X1 PM – CHILD'S WEIGHT (KG)	2.00-20.00 kg	9.57 kg	1.67
X1CHCRFM	X1 PM – CHILD'S HEAD CIRCUMFERENCE (CM)	35.00-52.00 cm	44.16 cm	2.69

[1]The full sample respondent-child weight W1C0 was used to obtain the weighted mean.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

The Centers for Disease Control and Prevention (CDC) maintains a web site that provides information about the norms for children's physical measurements. To compare the children in the ECLS-B, separately by gender and by age, with the CDC norms, the analyst is referred to that web site: www.cdc.gov/nchs/about/major/nhanes/growthcharts/clinical_charts.htm#Clin%201. However, it should be noted that the size of the ECLS-B sample is much larger than the size of the sample for the CDC norms. It is possible that the ECLS-B will obtain measurements that will differ in some cases from the CDC norms.

3.2 Indirect Child Assessments

The ECLS-B uses two approaches to assessment—direct and indirect. Direct assessment includes those measures that involve the child's participation, and were described above. The child's performance on these direct assessments provides information about his or her current developmental level. For example, the motor items of the BSF-R measure whether the child is able to walk or grasp

objects at the time the BSF-R was administered. In essence, the BSF-R obtains a snapshot of the child's ability at a single point in time.

Generally, indirect assessment is used for areas that are difficult to assess directly or observe directly in young children. Indirect assessment can be characterized as obtaining information about the more enduring abilities, traits, and characteristics of the child over time from a person (or persons) who knows the child well, such as the primary caregiver. At 9 months, the ECLS-B indirect assessments consisted of rating scales that evaluated the child's current behavior and skills and were completed by the child's parents or guardians. The indirect assessments asked the parent to provide information about what the child was generally like, on a daily basis, in a wide range of circumstances and different conditions. In addition, the questions to the parent about the child's acquisition of various developmental milestones addressed the issue of whether the early acquisition of developmental milestones is particularly predictive of developmental status, in general. By comparing and contrasting the information obtained in the direct and indirect assessments, a fuller picture of children's developmental paths results.

Two indirect assessments of children's development were included in the ECLS-B 9-month data collection. Information was obtained from the primary caregiver during the parent interview via

- A subset of questions that obtain information about the age at which children achieved selected developmental milestones and
- A subset of questions that obtain information about difficult child behaviors that could be considered symptomatic of a potential self-regulatory problem.

The set of questions about developmental milestones was derived from the Infant Development Inventory, an age-specific application of the Child Development Inventory. The Child Development Inventory was developed at the University of Minnesota and is generally known as the Minnesota-CDI, or MN-CDI. Although the subset of questions included in the ECLS-B is from the infant version of that inventory, it is still referred to as the MN-CDI, its most common referent. The subset of questions about self-regulatory problem behaviors was selected from the Infant/Toddler Symptom Checklist (ITSC).

3.2.1 Selected Items from the Child Development Inventory (MN-CDI)

The Child Development Inventory (Ireton, 1997) was designed as a parent-report measure to screen young children whose development may not be optimal. Its appropriate age range is from birth through 6 years of age. The age-appropriate infant version, the Infant Development Inventory, measures development in five areas: social, self-help, gross motor, fine motor, and language. According to the standard administration, the parent is asked to read a series of statements that describe young children's behaviors. These statements are ordered according to the ages at which the behaviors are achieved, on average. The parent is then asked to respond "Yes" or "No" to each statement and to report whether he or she has seen the child behave in this way. A "Yes" indicates that the statement describes the child's present behavior or describes behavior that the child used to do but has outgrown. A "No" indicates that the statement does not describe the child's behavior or that it is a behavior the child is just beginning to do or only does sometimes. However, for the ECLS-B parent CAPI instrument, the emphasis of the items was switched from whether the child could do the behavior to when the child first became able to do it. This required that the MN-CDI items be modified to specify the age at which the child acquired an ability. Thus estimates based on the items in the ECLS-B may not be directly comparable with estimates based on the original MN-CDI. For the gross motor skills (sit alone, crawl, pull self to standing position, and walk while holding on to something), if a child was not yet able to perform the skill, the interviewer, on the basis of observations during the BSF-R, entered a value of "95" to indicate that the child did not yet have the skill.

The MN-CDI was used to identify key developmental milestones that should be included in the ECLS-B parent CAPI instrument. In addition, because the information obtained was retrospective, the salience of the milestone was an important consideration. The milestones were selected because they were clearly observable by parents. Presumably, because the milestone was recognizable, the parent was more likely to remember the age at which the child achieved the milestone. Although the MN-CDI was used as the source for the behaviors, the response categories have changed so much that the items should be considered derived from the MN-CDI rather than actual MN-CDI items, per se.

In the ECLS-B the intention for the developmental milestone items was to provide a descriptive measure of children's acquisition of key developmental milestones that would characterize America's children. It was generally assumed that children who pass these milestones early are in some way more developmentally advantaged than children who pass these milestones later, and that this early advantage is sustained. Information about age of milestone acquisition obtained in the ECLS-B

presumably could be compared with research in early childhood education and in child development to examine whether the early acquisition of milestones is associated with positive outcomes in the preschool and early school years. This is the first chance to examine these issues with a national data set.

The developmental milestones included in the ECLS-B parent CAPI instrument derived from the MN-CDI are summarized in table 3-8.

Table 3-8. Developmental milestone questions in the parent CAPI instrument: 2001–02

Variable name	Variable label (description)	Range of values	Weighted mean[1]	Standard deviation
P1AGFSLF	P1 CD075 AGE STARTED FEEDING SELF (MTHS)	1-14 mos.	8.33	2.05
P1AGSIT	P1 CD080 AGE SITTING WITHOUT SPPRT (MTHS)	2-14 mos.	6.07	1.34
P1AGCRWL	P1 CD090 AGE WHEN STARTED CRAWLING (MTHS)	1-14 mos.	7.16	1.46
P1AGSTND	P1 CD100 AGE PULLED SELF TO STAND (MTHS)	2-14 mos.	7.97	1.41
P1AGWALK	P1 CD110 AGE WALKING WITH HELP (MTHS)	3-14 mos.	8.57	1.39

[1] The full sample respondent-child weight W1C0 was used to obtain the weighted mean.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

3.2.2 Selected Items from the Infant/Toddler Symptom Checklist

The Infant/Toddler Symptom Checklist[6] (ITSC; DeGangi, Poisson, Sickel, and Wiener, 1995) is a screening instrument designed to be completed by nonprofessionals, including parents. Its purpose is to identify infants and toddlers with regulatory disorders who, therefore, have the potential to be demanding of their caregivers or unpredictably fussy, or have problems with sleep, feeding, or regulating their behavior and mood. Presumably, such problems may be manifestations of an underlying sensory-integrative disorder (e.g., balance problems, poor motor planning, hypersensitivity to touch), attentional deficit, or behavior problem that may emerge later, in the preschool years. It has been estimated, for example, that up to 70 percent of children with learning disabilities have an underlying sensory-integration disorder (Carte, Morrison, Sublett, Venura, and Setrakian, 1984).

[6] *Infant/Toddler Symptom Checklist*. © Copyright 1995 by The Psychological Corporation. Reproduced by permission. All rights reserved.

"*Infant/Toddler Symptom Checklist* " is a trademark of The Psychological Corporation registered in the United States of America and/or other jurisdictions.

Until recently, the assessment of behaviors related to self-regulation, oversensitivity to sensory stimulation, and attentional problems in young children has fallen under the domain of temperament scales. Temperament scales have as their focus such characteristics as fussiness, adaptability to distress, persistence, and impulsivity, but do not include the assessment of functional behaviors that may be related to behavioral, developmental, or learning difficulties. That is, temperament scales do not examine emotion regulation, self-calming, attention regulation, or self-regulation.

The ITSC, on the other hand, focuses on the infant's responses in the domains of self-regulation, attention, sleep, feeding, sensitivity to tactile stimulation (e.g., when being dressed, bathed, or touched), tolerance of movement, sensitivity to auditory stimulation and visual stimulation, and socioemotional functioning.

The ITSC is used from 7 to 30 months of age and has five age-appropriate versions (e.g., 7–9 months, 10–12 months). At 9 months, the full ITSC includes 19 items, which was too lengthy for the ECLS-B's purpose. Therefore, a subset of 8 items was selected for the ECLS-B parent CAPI instrument on the basis of the items' ability to identify children with regulatory disorders. The items selected cover the domains of self-regulation, sleep-wake regulation, and attending. The parent could respond *never*, *used to be*, *sometimes*, or *most times*. The ECLS-B rating for these items could, therefore, range from 0 to 3. One item, which asks the parent about how difficult the child was to raise, could range from 0 to 5. The items included in the ECLS-B are summarized in table 3-9.

Table 3-9. Infant/Toddler Symptom Checklist items in the ECLS-B 9-month data file: 2001–02

Variable name[1]	Variable label (description)	Range of values
P1FUSSY	P1 CD120A IS FUSSY OR IRRITABLE	Never (0)
		Used to be (1)
		Sometimes (2)
		Most times (3)
P1WHMPR	P1 CD120B GOES FROM WHIMPER TO CRYING	Never (0)
		Used to be (1)
		Sometimes (2)
		Most times (3)
P1ATTN	P1 CD120C DEMANDS ATTENTION AND COMPANY	Never (0)
		Used to be (1)
		Sometimes (2)
		Most times (3)
P1WAKES	P1 CD120D WAKES UP 3 OR MORE TIMES	Never (0)
		Used to be (1)
		Sometimes (2)
		Most times (3)
P1HLPSLP	P1 CD120E NEEDS HELP TO FALL ASLEEP	Never (0)
		Used to be (1)
		Sometimes (2)
		Most times (3)
P1STRTL	P1 CD120F STARTLED BY LOUD SOUNDS	Never (0)
		Used to be (1)
		Sometimes (2)
		Most times (3)
P1NOWAIT	P1 CD120G CRIES FOR FOOD OR TOYS	Never (0)
		Used to be (1)
		Sometimes (2)
		Most times (3)
P1RAISE	P1 CD125 DIFFICULTY TO RAISE ON AVERAGE	Not at all difficult (1)
		Not very difficult (2)
		About average (3)
		Somewhat difficult (4)
		Very difficult (5)

[1] Parent CAPI instrument items CD 120a through 120g (P1FUSSY, P1WHMPR, P1ATTN, P1WAKES, P1HLPSLP, P1STRTL, and P1NOWAIT) are from the *Infant/Toddler Symptom Checklist*. Copyright © 1995 by The Psychological Corporation. Reproduced by permission. All rights reserved.
"*Infant/Toddler Symptom Checklist*" is a trademark of The Psychological Corporation registered in the United States of America and/or other jurisdictions.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

The items selected for inclusion in the ECLS-B all successfully differentiated, on the basis of t-tests presented in the ITSC manual (DeGangi, et al., 1995, pp. 46-47), those children with regulatory disorders and those without such disorders. The results of the published t-tests are for the items included in the ECLS-B and are summarized in table 3-10. These data were obtained in a validity study, conducted by the authors of the measure, that recruited children through pediatric practices and involved two groups of children, one a group of normal children and the other a group of children clinically diagnosed with a regulatory disorder. The value of the t-test is in the second column from the right. In addition, Cronbach's alpha for the set of items was .63, which is adequate and suggests that the items form a scale. Analysts with an interest in the etiology of attention and other learning disorders may consider establishing cut-off scores to identify children at risk for such problems in later rounds.

Table 3-10. Differentiation of regulatory disordered children by items of the Infant/Toddler Symptom Checklist in the ECLS-B: 2001–02

Variable name	Description	Mean normal	Mean regulatory disorder	T-test	Degrees of freedom
P1FUSSY	Self-regulation: Child is frequently irritable, fussy	.34	1.28	- 5.06*	48
P1WHMPR	Self-regulation: Child goes easily from a whimper to an intense cry	.09	1.44	-8.16*	48
P1ATTN	Self-regulation: Child demands your attention and company constantly	.36	1.64	-4.84*	34
P1WAKES	Sleep: Child wakes up 3 or more times in the night and is unable to go back to sleep	.03	1.22	-8.67*	47
P1HLPSLP	Sleep: Child needs a lot of help to fall asleep	.41	1.00	-2.48*	48
P1STRTL	Listening: Child startles or is upset by loud sounds such as a vacuum, doorbell, or barking dog	.06	.39	-2.04*	48
P1NOWAIT	Self-regulation: Child is unable to wait for food or toys without crying or whining	.10	1.36	-5.27*	32

* $p < .05$

NOTE: These results are published in the manual for the ITSC (DeGangi et al., 1995), and are not from ECLS-B data. Mean normal represents the ITSC value for children not diagnosed with a regulatory disorder. Mean regulatory disorder refers to the ITSC value for children diagnosed with a regulatory disorder. Values range from 0 (Child is never like this) to 3 (Child is like this most times). The t-test statistic presented here is the significance of the ITSC item to differentiate children's behavior by regulatory disorder status.

SOURCE: DeGangi, G. A., Poisson, S., Sickel, R Z., & Weiner, A. S. (1995). Infant/Toddler Symptom Checklist: A Screening Tool for Parents. San Antonio, Texas: Therapy Skill Builders, a division of The Psychological Corporation.

3.3 Parent and Home Environment Measures

This section summarizes the constructs that are measured as part of the assessment of the child's home environment. In most cases, a subset of items was selected from an original, well-known instrument (see below) and has been included in the ECLS-B with no modifications. In some cases, however, the items were changed substantially so that they are no longer representative of the original instrument. For this reason, items are categorized as (a) identical to the original scale; (b) slightly modified from the original scale; and (c) no longer bearing much similarity to the original scale. The user should consider whether changes have been made to items and whether and how to create a scale from the items. In most cases, only a few items were selected from a much larger source and some of the items were modified from the original, so the ECLS-B does not claim to be using the scale. Below, two subsets of questions are discussed in detail because they are more complicated in their application or in their scoring—the Knowledge of Infant Development Inventory (KIDI) and the Home Observation for Measurement of the Environment (HOME).

3.3.1 Items from the Knowledge of Infant Development Inventory (KIDI)

The first subset to be described consists of 11 items selected from the Knowledge of Infant Development Inventory[7] (KIDI; MacPhee, 1981), which was designed to assess knowledge of parental practices, developmental processes, and infant norms of behavior. The items included were recommended by the measure's author as being the most successful for differentiating high versus low parenting knowledge. Each of the 75 items on the KIDI questionnaire describes either typical infant behaviors or aspects of parenting that could affect an infant's growth and behavior. Items include knowledge about infants' sleep needs, when children learn right from wrong, when infants typically say their first word, and so forth. The parent indicates where he or she "agrees," "disagrees," or "is not sure." Some of the items also ask the respondent to specify whether the behavior in question can be expected of an older or a younger child. The 11 items used in the ECLS-B were identical to the original KIDI.

Parents are asked to answer on the basis of their knowledge of infants in general and not with regard to their own children or how their children behaved at a given age. Because this is a measure

[7] The KIDI items are used with the permission of its developer, Dr. David MacPhee (agreement dated January 28, 2003) who recommended the subset of KIDI items for use in the Early Childhood Longitudinal Study, Birth Cohort.

of an individual's knowledge of child development, there are correct and incorrect answers. With the full KIDI, a score is obtained by summing the number of correct answers. In the ECLS-B, the individual items are presented with the parent response, not whether the response is correct or incorrect. These items were included in both the parent CAPI instrument (PA005-PA050) and in the resident father questionnaire (Q6 and Q7). In the parent CAPI instrument, the first four KIDI items are straightforward to score as the answer depends on only one question, for example, "All infants need the same amount of sleep, do you agree or disagree?" The rest of the KIDI items in the parent CAPI instrument are two-part questions with the correct score being dependent on the combination of the two parts. For example, "A 1-year-old knows right from wrong. Do you agree or disagree?" is followed by "Would a child be younger or older than 1 year when she first knows right from wrong? Or are you not sure?" The correct answer to the first question is "disagree," and the correct answer to the second question is "older." Together, these two questions would be credited with 1 point. In the 9-month resident father questionnaire, the 2-part KIDI items were simplified because it is a paper and pencil measure. In this situation, the father checked a box to indicate whether he agreed with the statement or whether it was a characteristic of an older or a younger child.

The "answer key" for the set of KIDI items in the 9-month parent CAPI instrument and in the Questions for Fathers is presented in table 3-11, along with the points credited. The analyst then simply sums the correct answers for each case.

Table 3-11. Correct responses for KIDI items, 9-month data collection: 2001–02

Variable name	Description	Correct answer
Parent CAPI Instrument		
P1AMTSLP	P1 PA015A INFANTS NEED SAME AMOUNT OF SLEEP	(2) Disagree (1 point)
P1SIBWET	P1PA015B YOUNG SIBLINGS MAY WET BED	(1) Agree (1 point)
P1CHSPCR	P1 PA015C CHILD THINKS SPEAKS CORRECTLY	(1) Agree (1 point)
P1CHLGCP	P1 PA015D CH LEARN ALL LANG BY COPYING	(2) Disagree (1 point)
P1RIGHTWR	P1 PA020A 1 YEAR OLDS KNOW RIGHT/WRONG	(2) Disagree
P1OYRGWR	P1PA020B OLDER/YOUNGER LEARN RIGHT/WRONG	(2) Older (1 point)
P1KNWSNM	P1 PA025A BABY RESPONDS NAME AT 10 MONTHS	(2) Disagree
P1OYKNNM	P1PA025B OLDER/YOUNGER BABY KNOWS NAME	(1) Younger (1 point)
P1TLTTRN	P1 PA030A CH RDY FOR TOILET TRNG AT 1YR	(2) Disagree
P1OYTLTR	P1 PA030B OLDER/YOUNGER 1 YR.-TOILET TRNG	(2) Older (1 point)
P1REMTOY	P1 PA035A 1 YR-CAN REMEMBER HIDDEN TOYS	(1) Agree (1 point)
P1OYRMTY	P1 PA035B OLDER/YOUNGER 1 HR-HIDDEN TOYS	
P1SHRPLY	P1 PA040A 1 YR OLD SHARE/PLAY TOGETHER	(2) Disagree
P1OYSHPL	P1 PA040B OLDER/YOUNGER 1 YR SHARE/PLAY	(2) Older (1 point)
P1GBRRCH	P1 PA045A BABY CAN GRAB/REACH AT 7 MONTHS	(2) Disagree
P1OYGRRC	P1 PA045B OLDER/YOUNGER 7 MTHS GRAB/RCH	(1) Younger (1 point)
P1WRD1ST	P1 PA050A BABY SAYS 1ST WORD BY 6 MTHS	(2) Disagree
P1OY1SWD	P1 PA050B OLDER/YOUNGER 1ST WRD AT 6 MTH	(2) Older (1 point)
Resident father questionnaire		
F1RGHTWR	F1 Q7A 1 YEAR OLDS KNOW RIGHT/WRONG	(2) Older (1 point)
F1KNWSNM	F1 Q7B BABY RESPONDS TO NAME AT 10 MTHS	(3) Younger (1 point)
F1TLTTRN	F1Q7C RDY FOR TOILET TRNG AT 1 YR	(2) Older (1 point)
F1REMTOY	F1 Q7D 1 YR-CAN REMEMBR HIDDEN TOYS	(1) Agree (1 point)
F1SHRPLY	F1 Q7E 1 YR OLD SHARE/PLAY TOGETHER	(2) Older (1 point)
F1GRBRCH	F1 Q7F BABY CAN GRAB/REACH AT 7 MTHS	(3) Younger (1 point)
F1WRD1ST	F1 Q7G BABY SAYS 1ST WORD AT 6 MTH	(2) Older (1 point)

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

3.3.2 Quality of the Home Environment: Items from the National Household Education Survey and the Home Observation for Measurement of the Environment

There are two sets of items in the ECLS-B that obtained information about the characteristics of the child's home environment. One set of questions was asked of the parent respondent and has been used in previous National Household Education Survey (NHES) data collection rounds. The other set of items was selected from the Short Form of the Home Observation for Measurement of the Environment (HOME) scale (Caldwell and Bradley, 2001; Caldwell and Bradley, 1979). The following paragraphs describe the home environment questions that were adapted from the NHES. A discussion of the eight items selected from the HOME Short Form concludes this subsection.

A comparison of selected home environment items included in both the ECLS-B and the NHES is presented in table 3-12. The NHES is a household-based data collection system designed to address a wide range of education-related issues. The NHES collects timely data about the educational activities of the U.S. population. NHES surveys were conducted in 1991, 1993, 1995, 1996, 1999, and 2001. Of the items shown in table 3-12, only the question on how often the family reads to the child was asked of infants in the NHES (in both the 1999 and the 2001 NHES). The other items were asked of children between the ages of 3 and 6. For the comparisons shown in table 3-12, the age of the NHES children was restricted to 3 years for those items not asked of infants to make the estimates more comparable to those from the ECLS-B.

The estimates for how often the family reads to the child are quite similar for the ECLS-B and the NHES. Approximately a third of parents reported reading to their infants every day and 22 percent reported reading 3 to 6 times per week. Although the remaining items weren't strictly comparable because of the age differences between the children in the ECLS-B and the children in the NHES, the comparisons are suggestive. It appears that as the children got a bit older, parents were more likely to tell them stories. In the ECLS-B, 44 percent of the infants had family members tell them stories three or more times per week, while more than half of the 3-year-olds in the NHES were likely to have parents report that they told their children stories three or more times per week. On the other hand, as the children got older, the parents appeared less likely to take them out on errands (85 percent of the ECLS-B infants were taken on errands three or more times per week compared to 74 percent of the 3-year-olds in the NHES). In spite of the age differences, the estimates from both surveys indicate that parents were actively engaged in their young children's lives.

Table 3-12. Comparison of frequencies between the ECLS-B and the 1999 and 2001 National Household Education Survey (NHES) for selected items on activities families share with their children

Activities family engages in with child in a typical week	ECLS-B (percent)	NHES (percent)
How often read to child[1]		
Not at all	13	18
Once or twice	34	25
3 to 6 times	22	22
Every day	31	35
How often tell stories to child[2]		
Not at all	23	17
Once or twice	32	30
3 + times per week	44	53
How often sing songs with child[2,3]		
Not at all	2	17
Once or twice	10	27
3 + times per week	89	57
How often take child on errands[2]		
Not at all	2	6
Once or twice	13	20
3 + times per week	85	74

[1] The estimates for this item in the ECLS-B were restricted to children less than 1 year old to make them comparable to the estimates from the 2001 National Household Education Survey (NHES). The Early Childhood Program Participation file from the *National Household Education Survey, 2001 Electronic Codebook and Data File* (NCES 2003-078) was used to obtain estimates of children read to in the past week. The NHES question asks about how often someone read to the child in the past week while the ECLS-B asks about a typical week. NHES estimates are for children who were less than 1 year old as of December 31, 2000.

[2] The ECLS-B and NHES estimates are not strictly comparable for these items. The ECLS-B estimates are for all children in the ECLS-B, most of whom were about 9 months of age at the time of the interview. The Parent and Family Involvement in Education File of the 1999 NHES were used to obtain these estimates. The NHES estimates are for children who were 3 years old as of December 31, 1998. These items were not asked of younger children in the 1999 NHES or in the 2001 NHES.

[3] The questions asked are not identical. ELCS-B asks about how often the family sings songs with the child. The 1999 NHES asks how often the family taught songs to the child.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), 9-Month Public-Use Data File and Electronic Code Book* (NCES 2005–014), forthcoming; U.S. Department of Education, National Center for Education Statistics; *National Household Education Surveys Program 2001 Electronic Codebook and Data File*, Early Childhood Program Participation file (NCES 2003-078), April 2003; U.S. Department of Education, National Center for Education Statistics, *National Household Education Survey 1991 to 1999 Electronic Codebook and Data Files* (1999 Parent and Family Involvement in Education file) (NCES 2002-005), March 2002.

The second set of questions was selected from the Home Observation for Measurement of the Environment (HOME), which has been widely used in research. The HOME is an instrument designed to measure the quality and extent of stimulation in the home environment available to a child.

The HOME serves as a screener to identify environments that are not stimulating to children and to assist in the development of interventions that benefit both the caregiver and the child. Because measurement of the environment needs to take developmental appropriateness into consideration, the HOME has separate inventories for infants and toddlers (birth to 3 years old), early childhood (ages 3 to 6), and middle childhood (ages 6 to 10).

The complete HOME was not feasible for the ECLS-B because it has a large number of items that span 6 subscales. There is a Short Form of the HOME (HOME-SF) that contains only 21 items. Not all of the HOME-SF items were used, however. Many of these items were not appropriate for the ECLS-B because they require extended observation of the child's environment beyond the limits of the home visit. In addition, several of the HOME-SF items are quite similar to the above-mentioned items that were adapted from NHES. For example, the two HOME-SF items, "Child is taken to grocery store at least once a week," and "Child gets out of the house at least 4 times a week," are similar to the NHES item, "How often take child on errands." Therefore, these two items were collapsed into the NHES "How often take child on errands" item in order to maximize the content coverage and to enable the comparability of data across the NHES and ECLS-B data sets.

Accordingly, a subset of 8 HOME-SF items was selected on the basis of interviewers' ability to see the target behavior during a routine home visit, maximize content coverage, as well as to ensure comparability with NHES. Typically, the interviewer would usually either see the behavior in question or not see it. However, for the ECLS-B the option "no opportunity to observe" was added for those uncommon situations where, perhaps, the interview was not done with the child present, or took place at some location other than the home setting. These 8 items could be supplemented by the above-listed NHES items that are answered by the parent respondent. These items (reads to child and takes child on errands) did "double duty" with the home environment questions, as described in the paragraphs above, and with the HOME items completed by the interviewer. These NHES items were also included in the resident father questionnaire. Table 3-13 documents the HOME items in the ECLS-B and summarizes the slight changes in wording.

Table 3-13. Comparison of HOME items in NHES and in the ECLS-B Child Observations, parent CAPI instrument, and resident father questionnaire: 2001–02

Variable name[1]	Variable label (description)	Range of values	Similarity to NHES
R1RSPKCH	R1CO165 RESP SPOKE SPONTANEOUS 2 CHILD	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
R1IORSVB	R1 COI070 RESP VERBAL RESPOND TO CHILD	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
R1IOCRSS	R1 CO175 RESP CARESS/ KISS/HUG CHILD	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
R1IORSHT	R1 C0180 RESP SLAPPED/SPANKED CHILD	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
R1IOINTF	R1 CO185 RESP INTERFERED WITH CH ACTION	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
R1IOPTYS	R1 CO190 RESP PROVIDED TOYS TO CHILD	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
R1IOINVW	R1 CO195 RESP KEPT CHILD IN VIEW	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
R1IOENVS	R1 CO200 PLAY ENVIRONMENT WAS SAFE	Yes (1) No (2) No opportunity (3)	Added "no opportunity to observe"
P1READBO	P1 HE102A HOW OFTEN YOU READ TO CHILD	Not at all (1) Once or twice (2) 3-6 times (3) Every day (4)	Time frame—"in the past week" changed to "in a typical week"
F1READBO	F1 Q2A HOW OFTEN YOU READ TO CHILD	Not at all (1) Once or twice (2) 3-6 times (3) Every day (4)	Time frame—"in the past week" changed to "in a typical week"
P1ERRAND	P1 HE102D HOW OFTN TAKE CHILD ON ERRANDS	Not at all (1) Once or twice (2) 3-6 times (3) Every day (4)	Time frame—"in the past week" changed to "in a typical week." The category "Every day" was added to the ECLS-B.

See notes at end of table.

Table 3-13. Comparison of HOME items in NHES and in the ECLS-B Child Observations, parent CAPI instrument, and resident father questionnaire: 2001–02—Continued

Variable name	Variable label (description)	Range of values	Similarity to original
F1ERRAND	F1 Q2D HOW OFTEN TAKE CHILD ON ERRANDS	Not at all (1) Once or twice (2) 3-6 times (3) Every day (4)	Time frame—"in the past week "changed to "in a typical week." The category "Every day" was added to the ECLS-B.
P1TELLST	P1 HE102B HOW OFTN YOU TELL CH STORIES	Not at all (1) Once or twice(2) 3-6 times (3) Every day (4)	Time frame—"in the past week" changed to "in a typical week." The category "Every day" was added to the ECLS-B."
F1TELLST	F1 Q2B HOW OFTEN YOU TELL CH STORIES	Not at all (1) Once or twice (2) 3-6 times (3) Every day (4)	Time frame—"in the past week" changed to "in a typical week." The category "Every day" was added to the ECLS-B.
P1SINGSO	P1 HE102C HOW OFTEN YOU ALL SING SONGS	Not at all (1) Once or twice (2) 3-6 times (3) Every day (4)	Time frame—in the past week changed to "in a typical week." The category "Every day" was added to the ECLS-B. The question wording in NHES is slightly different.
F1SINGSO	F1 Q2C HOW OFTEN YOU ALL SING SONGS	Not at all (1) Once or twice (2) 3-6 times (3) Every day (4)	Time frame—"in the past week" changed to "in a typical week." The category "Every day" was added to the ECLS-B. The question wording in NHES is slightly different.

[1] Variable names with the prefix "R1" are from the interviewer observations of the child (Child Observations) during the home visit. Variable names with the prefix "P1" are from the parent CAPI instrument. Variable names with the prefix "F1" are from the resident father self-administered questionnaire.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

3.3.3 Additional Subsets of Questions

Additional questions were obtained from many sources. Certain sets of questions of particular analytic interest are noted here. Similar to the KIDI and HOME, they are parent and home environment scales; however, they are more straightforward in terms of modifications and scoring. In

most instances, only a few items were selected from each source and some of the items were modified from the original, so the ECLS-B does not purport to be using the original scale. A summary of these items, the construct measured, and how the item was modified is presented in table 3-14.

In the case of the depression questions, a modified version of the Center for Epidemiologic Studies–Depression Scale (CES-D) is used. This modified version was used in the Family and Child Experiences Survey (FACES) and information about the items (FACES items Q2a-g) and their modifications can be found at the FACES web site: http://www.acf.hhs.gov/programs/core/ongoing_research/faces/faces_instruments_parent.html. Then just select the Head Start Parent Interview for 1999.

ECLS-B findings can therefore be compared with the FACES findings. The item scoring is the same as that used for FACES, and a CES-D score can be created as follows. To create the CES-D score:

1. Subtract 1 from the response category for each item so that the range for a particular item is 0-3 instead of 1-4.

2. Count the number of missing or invalid responses for each individual. Code the CES-D score as missing for anyone who has more than 3 invalid (missing or refused) responses on the 12 items.

3. Sum the responses for each individual having a sufficient number of valid responses.

4. Using the following cut points, classify the respondents as nondepressed, mildly depressed, moderately depressed, and severely depressed. (Alternatively, the analyst may want to consider using the CES-D as a continuous variable with higher scores indicating increased severity of depression.)

The cut points are as follows (exhibit 3-2):

Exhibit 3-2. Cut points for the Center for Epidemiologic Studies–Depression (CES-D) scale scores in the 9-month data collection: 2001–02

Classification	Score
Nondepressed	0–4
Mildly depressed	5–9
Moderately depressed	10–14
Severely depressed	15 or higher

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02

Name and Source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
Center for Epidemiologic Studies–Depression (Radloff, 1977)	Parent self-administered questionnaire	P1BOTHER	P1 SAQ3A RESP UNUSUALLY BOTHERED	Depression	(a) Modified version as used in FACES. See website: http://www.acf.hhs.gov/programs/core/ongoing_research/faces/faces_instruments_parent.html
		P1APPETI	P1 SAQ3B RESP POOR APPETITE		
		P1BLUE	P1 SAQ3C RESP CAN'T SHAKE BLUES		
		P1KPMIND	P1 SAQ3D RESP TROUBLE KEEPING FOCUS		
		P1DEPRES	P1 SAQ3E RESP FELT DEPRESSED		
		P1EFFORT	P1 SAQ3F RESP EVERYTHING AN EFFORT		
		P1FEARFL	P1 SAQ3G RESP FELT FEARFUL		
		P1RESTLS	P1 SAQ3H RESP SLEEP RESTLESS		
		P1TALKLS	P1 SAQ3I RESP TALKED LESS THAN USUAL		
		P1LONELY	P1 SAQ3J RESP FELT LONELY		
		P1SAD	P1 SAQ3K RESP FELT SAD		
		P1NOTGO	P1 SAQ3L RESP COULD NOT GET GOING		

See notes at end of table.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02—Continued

Name and source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
Center for Epidemiologic Studies–Depression (Radloff, 1977)	Resident father questionnaire	F1BOTHRD	F1 Q65A HOW OFTEN FELT BOTHERED	Depression	(a) Modified version as used in FACES. See website:. http://www.acf.hhs.gov/programs/core/ongoing_research/faces/faces_instruments_parent.html
		F1NOEAT	F1 Q65B HOW OFTEN HAD POOR APPETITE		
		F1BLUE	F1 Q65C HOW OFTEN FELT BLUE		
		F1TRBFOC	F1 Q65D HOW OFTEN TROUBLE KEEPING FOCUS		
		F1DEPRSD	F1 Q65E HOW OFTEN FELT DEPRESSED		
		F1EFFORT	F1 Q65F HOW OFTEN FELT EFFORT		
		F1FEARFL	F1 Q65G HOW OFTEN FELT FEARFUL		
		F1RESTLS	F1 Q65H HOW OFTEN RESTLESS SLEEP		
		F1TALKLS	F1 Q65I HOW OFTEN TALKED LESS		
		F1LONELY	F1 Q65J HOW OFTEN FELT LONELY		
		F1SAD	F1 Q65K HOW OFTEN FELT SAD		
		F1NOGO	F1 Q65L HOW OFTEN COULD NOT GET GOING		

See notes at end of table.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02—Continued

Name and source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
Center for Epidemiologic Studies–Depression (Radloff, 1977)	Nonresident father questionnaire	N1BOTHRD	N1 Q36A HOW OFTEN FELT BOTHERED	Depression	(a) Modified version as used in FACES. See website: http://www.acf.hhs.gov/programs/core/ongoing_research/faces/faces_instruments_parent.html
		N1NOEAT	N1 Q36B HOW OFTEN HAD POOR APPETITE		
		N1BLUE	N1 Q36CHOW OFTEN FELT BLUE		
		N1TRBFOC	N1 Q36D HOW OFTEN TROUBLE KEEPING FOCUS		
		N1DEPRSD	N1 Q36EHOW OFTEN FELT DEPRESSED		
		N1EFFORT	N1 Q36F HOW OFTEN FELT EFFORT		
		N1FEARFL	N1 Q36G HOW OFTEN FELT FEARFUL		
		N1RESTLS	N1 Q36H HOW OFTEN RESTLESS SLEEP		
		N1TALKLS	N1 Q36I HOW OFTEN TALKED LESS		
		N1LONELY	N1 Q36J HOW OFTEN FELT LONELY		
		N1SAD	N1 Q36K HOW OFTEN FELT SAD		
		N1NOGO	N1 Q36L HOW OFTEN COULD NOT GET GOING		

See notes at end of table.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02—Continued

Name and source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
Delight Subscale From: Parental Investment in Children (Bradley et al., 1997)	Resident father questionnaire	F1FTHTLK	N1 Q5A HOW OFTEN TALK ABOUT CHILD	Paternal delight in child	(b) Some rewording of items Used 5 out of 7 items on the Delight subscale; Delight subscale is 1 out of 4 scales on the 24-item Parent Investment in Children Scale
		F1CCRYPX	N1 Q5B HOW OFTEN CARRY PICTURES OF CHILD		
		F1FTHKCH	N1 Q5C HOW OFTEN THINK ABOUT CHILD		
		F1HLDFUN	N1 Q5D HOW OFTEN THINK HOLDING CH IS FUN		
		F1FTHGFT	N1 Q5E HOW OFTEN THINK BUYING FOR CH FUN		
Delight Subscale From: Parental Investment in Children (Bradley et al., 1997)	Nonresident father questionnaire	N1FTHTLK	N1 Q5A HOW OFTEN TALK ABOUT CHILD	Paternal delight in child	(b) Some rewording of items Used 5 out of 7 items on the Delight subscale; Delight subscale is 1 out of 4 scales on the 24-item Parent Investment in Children Scale
		N1CCRYPX	N1 Q5B HOW OFTEN CARRY PICTURES OF CHILD		
		N1FTHKCH	N1 Q5C HOW OFTEN THINK ABOUT CHILD		
		N1HLDFUN	N1 Q5D HOW OFTEN THINK HOLDING CH IS FUN		
		N1FTHGFT	N1 Q5E HOW OFTEN THINK BUYING FOR CH FUN		

See notes at end of table.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02—Continued

Name and source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
Family Practices Scale From: *Authoritarian Family Ideology* (Ernhart and Loevinger, 1969)	Parent CAPI instrument	P1PCKCRY	P1 PA005A SPOIL BABY BY PICK UP WHEN CRY	Authoritarian vs. authoritative parenting attitudes	(a) No modifications Used 5 out of 49 items
		P1TOITRN	P1 PA005B TOILET TRAINING BEFORE 1 YEAR		
		P1FEEDSC	P1 PA005C FEED BABY ON SCHED OR HUNGRY		
		P1HBVSHP	P1 PA005D CHILD BAD HABIT VS HAPPINESS		
		P1MOMVAL	P1 PA005E MOMS TOO PERMISSIVE OR NOT		
Father's Perspective on Role of Fathers in Children's Lives From: Inventory of Father Involvement (Palkovitz, 1984; Hawkins et al., 2002)	Resident father questionnaire	F1FTHPLY	F1 Q16A AGR/DSG FTH SHOULD PLAY W/ CHILD	Attitude about role of fathers in children's lives	(a) No modifications Used 7 out of 43 items
		F1MENFLG	F1 Q16B AGR/DSG SHOW CH LOVE HARD FOR M		
		F1FTHINV	F1 Q16C AGR/DSG FTH INVOLVED IN CH CARE		
		F1FTHEFF	F1 Q16D AGR/DSG FTH TREAT BBY LONG EFFCT		
		F1FTHACT	F1 Q16E AGR/DSG FTH'S ROLE IS TO PROVIDE		
		F1FSPRTM	F1 Q16F AGR/DSG FTH SHOULD SUPPORT MTH		
		F1FTHREW	F1 Q16G AGR/DSG FATHERHOOD VERY RWARDING		

See notes at end of table.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02—Continued

Name and source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
How Father Rates Self as a Father Adapted from the *Parenting Stress Index* with permission of the publisher	Resident and nonresident father questionnaires	F1FTHSLF N1FTHSLF	F1 Q18 HOW YOU FEEL ABOUT BEING A FATHER N1 Q12 HOW YOU FEEL ABOUT BEING A FATHER	Parenting stress and competence	(a) No modification of single item Adapted and reproduced by special permission of the publisher, Psychological Assessment Resources, Inc., 16204 North Florida Avenue, Lutz, FL 33549, from the *Parenting Stress Index–Short Form* by Richard R. Abidin, Ed. D. Copyright 1990 by PAR, Inc. Further reproduction is prohibited without permission from PAR, Inc.

See notes at end of table.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02—Continued

Name and source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
Involvement with Child Early Head Start Research and Evaluation Project (http://www.acf.hhs.gov/programs/core/ongoing_research/ehs/ehs_intro.html)	Parent CAPI instrument (includes path for father respondents)	P1PEEKA	P1 HE105A PLAY PEEKABOO	Caregiving activities	(a) No modifications
		P1TCKL	P1 HE105B TICKLE CHILD		
		P1PLAY	P1 HE105C OUTSIDE TO WALK OR PLAY		
		P1CGDIAP	P1 HE106A DAD RSP[1] CHANGE DIAPER		
		P1PREPFD	P1 HE106B DAD RSP-PREPARE MEALS/BOTTLES		
		P1FEEDBT	P1 HE106C DAD RSP-FEED/GIVE CHILD BOTTLE		
		P1DPEEKC	P1 HE106D DAD RSP-PLAY PEEKABOO W/ CHILD		
		P1HOLDCH	P1 HE106E DAD RSP-HOLD CHILD		
		P1DTCKL	P1 HE106F DAD RSP-TICKLE CHILD		
		P1PTSLEP	P1 HE106G DAD RSP-PUT CHILD TO SLEEP		
		P1WASHCH	P1 HE106H DAD RSP-BATHE CHILD		
		P1DPLAY	P1 HE106I DAD RSP-TAKE CHILD OUTSIDE		
		P1DRSSCH	P1 HE106J DAD RSP-DRESSES CHILD		

See notes at end of table.

Table 3-14. Summary of items from additional parent involvement, parenting attitudes, and home environment scales in the ECLS-B 9-month data file: 2001–02—Continued

Name and source	ECLS-B instrument(s)	Variable name	Variable label (description)	Construct	Degree of modification
Involvement with Child Early Head Start Research and Evaluation Project (http://www.acf.hhs.gov/programs/core/ongoing_research/ehs/ehs_intro.html)	Resident father questionnaire	F1TAKECH	F1 Q2D TAKE YOUR CHILD ALONG ON ERRANDS	Caregiving activities	(a) No modification
		F1CGDPR	F1 Q3A HOW OFTEN CHANGE CHILD'S DIAPER		
		F1PREPML	F1 Q3B HOW OFTEN PREPARE MEALS/BOTTLES		
		F1FEEDCH	F1 Q3C HOW OFTEN FEED CHILD		
		F1PKABO	F1 Q3D HOW OFTEN PLAY PEEK-A-BOO W/CHILD		
		F1HOLDCH	F1 Q3E HOW OFTEN HOLD CHILD		
		F1TCKLCH	F1 Q3F HOW OFTEN TICKLE CHILD		
		F1SLPCH	F1 Q3G HOW OFTEN PUT CHILD TO SLEEP		
		F1WASHCH	F1 Q3H HOW OFTEN WASH OR BATHE CHILD		
		F1WALKCH	F1 Q3I HOW OFTEN TAKE CHILD FOR WALK		
		F1DRSSCH	F1 Q3J HOW OFTEN DRESS YOUR CHILD		
		F1WAKECH	F1 Q4A GET UP WITH CHILD DURING NIGHT		
		F1STHCH	F1 Q4B HOW OFTEN SOOTHE CHILD WHEN UPSET		
		F1DCTRCH	F1 Q4C HOW OFTEN TAKE CHILD TO DOCTOR		
		F1CARECH	F1 Q4D HOW OFTEN STAY HOME CARE FOR CH		
		F1TKCCCH	F1 Q4E HOW OFTEN TAKE CHILD TO/FROM CARE		

[1] "DAD RSP" indicates that these items are only asked if the child's father is the primary caregiver and therefore the parent respondent.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

REFERENCES

Bayley, N. (1969). *Manual: Bayley Scales of Infant Development.* San Antonio, TX: The Psychological Corporation.

Bayley, N. (1993). *Manual: Bayley Scales of Infant Development, Second Edition*. San Antonio, TX: The Psychological Corporation.

Bradley, R.H., Whiteside-Mansell, L., Brisby, J.A., and Caldwell, B.M. (1997). Parent's socioemotional investment in children. *Journal of Marriage & the Family, 59,* 77-90.

Burns, W.J., Burns, K.A., and Kabacoff, R.I. (1992). Item and factor analyses of the Bayley Scales of Infant Development. In C. Rovee-Collier & L.P. Lipsitt (Eds.), *Advances in Infancy Research, 7,* 199-214.

Caldwell, B. and Bradley R.H. (2003). *Administration Manual: Home Observation for Measurement of the Environment.* Little Rock, AR: University of Arkansas at Little Rock.

Caldwell, B. and Bradley R.H. (1979). *Home Observation for Measurement of the Environment.* Little Rock, AR: University of Arkansas.

Carte, E., Morrison, D., Sublett, J., Venura, A., and Setrakian, W. (1984). Sensory integration therapy: A trial of a specific neurodevelopmental therapy for the remediation of learning disabilities. *Developmental and Behavioral Pediatrics, 5(4),* 189-194.

DeGangi, G.A., Poisson, S., Sickel, R.Z., and Wiener, A.S. (1995). *Infant/Toddler Symptom Checklist.* San Antonio, TX: Therapy Skill Builders, The Psychological Corporation.

Ernhart, C.B. and Loevinger, J. (1969). *Authoritarian Family Ideology: A Measure, Its Correlates, and Its Robustness.* Austin, TX: Society of Multivariate Experimental Psychology.

Hawkins, A.M., Bradford, K.P., Palkovitz, R., Christiansen, S.L., Day, R.D., and Call, V.R.A. (2002). The Inventory of Father Involvement: A pilot study of a new measure of father involvement. *The Journal of Men's Studies, 10,* 183-196.

Ireton, H. (1997). *Child Development Inventories in Education and Health Care: Screening and Assessing Young Children.* Minneapolis, MN: Behavior Science Systems, Inc.

MacPhee, D. (1981). *Manual: Knowledge of Infant Development Inventory.* Chapel Hill, NC: Department of Psychology, unpublished manuscript.

Palkovitz, R. (1984). Role of Father Questionnaire. *Developmental Psychology* 20(6), 1054–60. (Available: University Microfilms Order Number 8105035.)

The Psychological Corporation (2001). *Bayley Short Form–Research Edition.* San Antonio, TX: Author.

Radloff, L.S. (1977). The CES—D scale: A self-report depression scale for research in the general population. *Journal of Applied Psychological Measurement, 1*, 385-401.

Sumner, G. and Spietz, A. (1994). *NCAST Caregiver/Parent-Child Interaction Teaching Manual.* Seattle, WA: NCAST Publications, University of Washington.

U.S. Department of Education, National Center for Education Statistics (forthcoming [a]). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Design and Operations Report for the Nine-Month Data Collection.* Washington, D.C.: U.S. Department of Education.

U.S. Department of Education, National Center for Education Statistics (forthcoming [b]). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Methodology Report for the Nine-Month Data Collection, Volume 1: Psychometric Characteristics.* Washington, D.C.: U.S. Department of Education.

This page intentionally left blank.

4. SAMPLE DESIGN, WEIGHTING, AND VARIANCE ESTIMATION

4.1 Sample Design

The Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) selected a nationally representative probability sample of children born in 2001. Children were mostly sampled via registered births from the National Center for Health Statistics (NCHS) vital statistics system (U.S. Department of Health and Human Services, 1997).[1] Births were sampled within a set of primary sampling units (PSUs) and in some cases secondary sampling units (SSUs) in order to control data collection costs.[2] This clustered, list frame design allowed for maximum, efficient coverage of the target population and was considered preferable to other approaches that would involve large screening efforts or coverage errors (e.g., sampling hospitals and other birthing places, augmenting household surveys, or sampling birth certificates available at a variety of levels: NCHS, state registrars, and county and local records offices).[3] Approximately 14,000 births were sampled and fielded and yielded 10,688 9-month completed cases. This sample size was designed to produce survey estimates with specified precision targets both overall and for specific domains (see section 4.1.1). More details on the sample design and precision targets can be found in *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Methodology Report for the Nine-Month Data Collection, Volume 2: Sampling* (U.S. Department of Education, National Center for Education Statistics, forthcoming [a]).

The ECLS-B target population consists of all children born in the United States in the year 2001 except the following:

- Children born to mothers less than 15 years of age;
- Children who died before the 9-month assessment; and
- Children who were adopted prior to the 9-month assessment.

Children born to mothers less than 15 years of age were excluded from the sampling frame in response to state confidentiality and sensitivity concerns. Sampled children whom the states identified as having died before or been adopted prior to the 9-month assessment were removed from the study in field operations.

[1] In two PSUs, births were selected from lists provided by hospitals.
[2] A PSU is an individual county or group of contiguous counties. An SSU is a subdivision of a PSU.
[3] See Levine and Bryant (1997).

4.1.1 Analytic Domains and Effective Sample Sizes

The ECLS-B was designed to support statistical analyses in the following analytic domains:

1. Child's race/ethnicity (as derived from birth certificate data)

- American Indian;[4]
- Chinese;
- Other Asian or Pacific Islander (i.e., excluding Chinese);
- Hispanic;
- Black, non-Hispanic; or
- White, non-Hispanic.

2. Birth weight

- Very low (less than 1,500 grams);
- Moderately low (1,500 to 2,500 grams); or
- Normal (greater than 2,500 grams).

3. Plurality

- Twin; or
- Non-twin (single birth and other multiple births).

When combined, these analytic domains result in 36 distinct birth certificate sampling strata (hereafter called case strata).

The race/ethnicity domains are mutually exclusive and exhaustive. The American Indian, Chinese, and Other Asian/Pacific Islander groups are rare and required sampling at higher rates than the other race/ethnicity groups. The race/ethnicity of the infant was assigned based on hierarchical rules that used the mother and father's race/ethnicity as they appeared on the birth certificate. Note that birth certificate data do not specify the child's race/ethnicity individually. The hierarchical rules worked to implement specific definitions desired for certain subgroups (i.e., for the American Indian [mother or father] and Chinese subgroups [mother and father]) and to assign cases with missing or unknown

[4] American Indian includes Alaska Natives.

race/ethnicity to subgroups with larger sampling rates (an approach that benefits smaller subgroups analytically). Exhibit 4-1 shows how a child's race/ethnicity for sampling was derived from the mother's and father's race/ethnicity as reported on the birth certificate. The hierarchical logic was as follows:

1. If the mother or father was reported as American Indian, then the child was classified as American Indian;

2. Otherwise, if the mother and father were reported as Chinese, then the child was classified as Chinese;

3. Otherwise, if the mother was reported as Chinese or Asian/Pacific Islander or the father was reported as Chinese or Asian/Pacific Islander, then the child was classified as Other Asian/Pacific Islander;

4. Otherwise, if the mother was reported as Hispanic, then the child was classified as Hispanic;

5. Otherwise, if the mother was reported as Black, non-Hispanic, then the child was classified as Black, non-Hispanic;

6. Otherwise, if the father was reported as Hispanic, then the child was classified as Hispanic;

7. Otherwise, if the father was reported as Black, non-Hispanic, then the child was classified as Black, non-Hispanic;

8. Otherwise, if the mother was reported as White, non-Hispanic or the father was reported as White, non-Hispanic, then the child was classified as White, non-Hispanic;

9. All remaining cases (both mother and father's race/ethnicity was reported as missing): the child was classified as Other Asian/Pacific Islander.

In some cases, the infant's race/ethnicity reported in the survey and appearing on the data file differs from that assigned for sampling. This can occur because of the differences between birth certificate and ECLS-B data collection techniques; differences between parent reports and the hierarchical logic described above; and the fact that the current multi-race classification was not in operation for birth certificate data at the time of sampling. Thus, 2001 birth certificates did not allow for multi-race responses, and the sample was therefore selected based on a single race classification. In contrast, the ECLS-B classification employs the current NCES standards that allow for multi-race responses.

Exhibit 4-1. Rules for assigning infant's race/ethnicity based on parents' race/ethnicity from birth certificates, in 9-month data collection: 2001–02

Mother's race/ethnicity[1]	Father's race/ethnicity[1]						
	American Indian	Chinese	Other Asian/Pacific Islander (PI)	Hispanic	Black, non-Hispanic	White, non-Hispanic	Missing
American Indian	American Indian	American Indian	American Indian	American Indian	American Indian	American Indian	American Indian
Chinese	American Indian	Chinese	Other Asian/PI	Other Asian/PI	Other Asian/PI	Other Asian/PI	Other Asian/PI
Other Asian/Pacific Islander (PI)	American Indian	Other Asian/PI	Other Asian/PI	Other Asian/PI	Other Asian/PI	Other Asian/PI	Other Asian/PI
Hispanic	American Indian	Other Asian/PI	Other Asian/PI	Hispanic	Hispanic	Hispanic	Hispanic
Black, non-Hispanic	American Indian	Other Asian/PI	Other Asian/PI	Black, non-Hispanic	Black, non-Hispanic	Black, non-Hispanic	Black, non-Hispanic
White, non-Hispanic	American Indian	Other Asian/PI	Other Asian/PI	Hispanic	Black, non-Hispanic	White, non-Hispanic	White, non-Hispanic
Missing	American Indian	Other Asian/PI	Other Asian/PI	Hispanic	Black, non-Hispanic	White, non-Hispanic	Other Asian/PI

[1] In cases of multiple races, assignment to race/ethnicity is hierarchical from top to bottom for mother and from left to right for father. Thus, the child of a mother who is American Indian and Hispanic would be assigned race/ethnicity based on the first row of the table, i.e., "American Indian."

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Furthermore, the classification of a multi-race response into a single race category is not straightforward and would not necessarily agree with the response to a single race question. The two methods of classifying race/ethnicity also differ in the classification of cases as Hispanic. Table 4-1 gives the cross-classification of the child's sampling (W1CRAC) and parent report (X1CHRACE) of race/ethnicity.

For any given analysis, users will need to decide how they want to define race/ethnicity. Using the American Indian population as an example, 873 completed cases were classified as American Indian for sampling purposes, but only 286 were classified as American Indian for the composite of child's race (X1CHRACE). Recall that for sampling purposes, a case was classified as American Indian if either parent reported that she or he was American Indian. For the composite X1CHRACE, a much more stringent definition was used. To be classified as American Indian for X1CHRACE, three conditions needed to be met: (1) the parent reported the child was American Indian; (2) the parent did not report any other race for the child (e.g., American Indian and White or American Indian and Black); and (3) the parent reported that the child was not Hispanic. As can be seen in table 4-1, 286 cases met this more stringent definition. The file also contains dichotomous race variables (X1CHAMIN, X1CHASN, X1CHPIC, X1CHBLCK, X1CHWT, X1CHHISP, and X1CHMLRC) that can be used to subset the sample by race. These composites take values of "1" whenever a particular race/ethnicity is reported regardless of whether other races or ethnicities are also reported. For the dichotomous American Indian composite (X1CHAMIN), 749 cases are classified as American Indian, much closer to the number obtained using the sampling definition (873). Users will need to carefully consider which of these available race/ethnicity variables are best suited for their purposes or whether they want to create their own categorizations of race/ethnicity.

The two analytic groups of special interest in the birth weight domain are those with very low birth weight (under 1,500 grams) and those with moderately low birth weight (between 1,500 and 2,500 grams). The analytic group of special interest in the plurality domain is twins. The last groups listed for each of the last two domains (normal birth weight and single births and other non-twins) are included to provide an exhaustive classification of the population, but they are not subgroups that required oversampling. The small proportions of births in the low and very low birth weight and the twin groups were such that each required appreciable oversampling in order to obtain required sample sizes.

Table 4-1. Cross-classification of child's sampling and parent report of race/ethnicity, 9-month data collection: 2001–02

Child's race/ethnicity from sampling (W1CRAC)	Total	Parent report of child's race/ethnicity: American Indian or Alaska Native, non Hispanic	Asian, non-Hispanic	Native Hawaiian or other Pacific Islander, non-Hispanic	Hispanic, race specified	Hispanic, no race specified	Black, non-Hispanic	White, non-Hispanic	More than 1 race	Not ascertained
Total	10,688	293	1,195	49	1,514	679	1,698	4,441	780	39
American Indian	873	286	14	2	148	24	16	127	250	6
Chinese	466	1	458	1	0	0	0	0	1	5
Other Asian/ Pacific Islander	1,345	2	712	40	122	21	22	108	305	13
Hispanic	1,581	0	0	0	974	560	8	34	3	2
Black, non-Hispanic	1,771	0	2	3	53	12	1,619	13	65	4
White, non-Hispanic	4,652	4	9	3	217	62	33	4,159	156	9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Before reporting counts of completed cases, the complexity of the ECLS-B instruments must be acknowledged. The 9-month data collection consisted of three separate components: data were collected from the parent, using computer-assisted personal interviewing (CAPI) and a self-administered questionnaire, from child assessments and observations, and from the father (resident father, nonresident father or both) with a self-administered questionnaire. The parent CAPI instrument was required for all cases included in the respondent data file. Table 4-2 details the number of cases with 9-month data, by component (Parent, Child and Father), overall, and for each analytic subgroup. See section 4.2.1 for a more thorough discussion of component combinations and sets of weights. Note also that these are actual sample sizes. See section 4.3.3 for discussion of design effects, which work to reduce these actual sample sizes to effective sample sizes. Note that some of the cases included in table 4-2 are ineligible due to deaths and adoptions. Such cases could not be identified at the time of sampling and excluded, unlike children born to mothers less than 15 years of age. (See section 4.1 for the description of the ECLS-B target population.)

Note that other analytic subgroups were considered but were not included explicitly in the ECLS-B sample design. For example, children at risk for disability were of particular interest, but this subgroup could not be oversampled effectively via birth certificate data. Children in poverty were also of interest.[5] Although this subgroup could not be oversampled effectively, it was estimated that there would be a reasonable sample size of such children in the ECLS-B sample, as the percentage of children in poverty has hovered around 20 percent since 1981 (Federal Interagency Forum on Child and Family Statistics, 1999).

Table 4-3 gives the actual yields for children in poverty (less than 100 percent of poverty) by children's sampling race/ethnicity, birth weight, and plurality.

[5] Children are considered to be poor if they live in families with incomes less than 100 percent of the poverty threshold for a family of their size. The ECLS-B estimated childhood poverty by comparing parental reports of income against the 2000 weighted poverty thresholds published by the U.S. Bureau of the Census.

Table 4-2. Number of cases with component data, overall and by domain, in the 9-month data collection: 2001–02

Domain	Sample	Target parent completes[3]	Completed interviews			
			Parent	Parent-Child	Parent-Father	Parent-Child-Father
Total	14,197	10,870	10,688	10,221	6,988	6,816
Race/ethnicity[1]						
American Indian	1,086	880	873	835	551	542
Chinese	732	637	466	418	352	324
Other Asian/Pacific Islander	1,832	1,209	1,345	1,287	885	871
Hispanic	2,096	1,517	1,581	1,501	918	900
Black, non-Hispanic	2,161	1,746	1,771	1,715	817	802
White, non-Hispanic	6,014	4,881	4,652	4,465	3,465	3,377
Ineligible[2]	276	†	†	†	†	†
Birth weight						
Very low	1,473	1,268	1,151	1,093	709	685
Moderately low	2,055	1,512	1,647	1,585	1,037	1,013
Normal	10,393	8,090	7,890	7,543	5,242	5,118
Ineligible[2]	276	†	†	†	†	†
Plurality						
Twin	2,023	1,357	1,658	1,585	1,141	1,113
Non-twin (Single birth and other multiple births)	11,898	9,513	9,030	8,636	5,847	5,703
Ineligible[2]	276	†	†	†	†	†

† Not applicable.

[1] Race/ethnicity information was determined from the birth certificate as defined in exhibit 4-1.

[2] Ineligible cases include deaths and adoptions.

[3] The target parent completes represent the expected yield, at the parent component level, of the sample after sample reduction.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Table 4-3. Number of 9-month parent completes with children in poverty, by race/ethnicity, birth weight, and plurality: 2001–02

Children's sampling race/ethnicity	Total 9-month parent completes	9-month parent completes with children in poverty (less than 100 percent of poverty)
Total	10,688	2,603
Race/ethnicity		
American Indian	873	316
Chinese	466	31
Other Asian/Pacific Islander	1,345	208
Hispanic	1,581	591
Black, non-Hispanic	1,771	807
White, non-Hispanic	4,652	650
Birth weight		
Very low (less than 1,500 grams)	1,151	321
Moderately low (1,500 to 2,500 grams)	1,647	446
Normal (greater than 2,500 grams)	7,890	1,836
Plurality		
Twin	1,658	378
Non-twin (Single birth and other multiple births)	9,030	2,225

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, (ECLS-B), Nine-Month Data Collection, 2001–02.

4.1.2 Core Sample Design

The core ECLS-B sample consists of births sampled within 96 PSUs and represents all infants born in the U.S. in the year 2001. In addition, to provide adequate precision in the American Indian analysis domain, an additional sample of 18 PSUs was selected from a supplemental frame consisting of areas where the population has a higher proportion of American Indian births. These PSUs were located mainly in the western region of the U.S.

Births are registered in the state of occurrence, although birth certificates include the state and county of both occurrence and residence. Membership in an ECLS-B PSU could, therefore, be determined based on either occurrence (where the birth occurred) or residence (where the child's mother lived as reported on the birth certificate). Each of these approaches had advantages and disadvantages. The major advantage to sampling by occurrence was that it simplified the sample selection. States were asked to provide the birth certificates only for births occurring in the selected PSUs in their own state, and only states that contained sampled PSUs needed to provide certificates for sampling. In contrast, sampling by residence would have required that all states participate in the ECLS-B, regardless of the states in which the ECLS-B PSUs happen to fall, since the resident of a given state and county may give birth in any state and county.

On the other hand, sampling by occurrence had the disadvantage of a wider geographical spread of births, since the sample could not be clustered into small geographic units by residence. However, an evaluation of the geographical and temporal spread of the 9-month sample and consideration of the increased geographical spread in later rounds due to mobility led to the conclusion that the somewhat wider geographical spread of an occurrence-based sample would not be a serious disadvantage. Therefore, the ECLS-B sample was drawn using birth certificates by occurrence.

As discussed in section 4.1.1, a set of analysis domains were defined based on race/ethnicity (American Indian, Chinese, Other Asian/Pacific Islander, Hispanic, Black non-Hispanic, and White non-Hispanic); birth weight (very low, moderately low, and normal); and plurality (twins versus other births). These subgroups were crossed to define a set of 36 mutually exclusive case strata. A composite measure of size (MOS) that utilized the analysis domains was computed for each PSU using the formula given in Folsom, Potter, and Williams (1987).

First, let

N_k = average number of births in 1994-1996 in the k-th subgroup;
n_k = required sample size for the k-th subgroup; and
f_k = n_k / N_k..

Let M_{ik} denote the number of births in the k-th subgroup within the i-th PSU. The adjusted MOS for the i-th PSU is computed as

$$M_i = \sum_k f_k M_{ik} .$$

Thus, the measure of size is computed as a weighted sum over the analysis domains, with the weight for a given domain being computed as the required sample size divided by overall population size for the domain. The objective of weighting the MOS was to obtain equal workloads within PSUs to meet the sample size requirements discussed in section 4.1.1.

Contiguous counties were combined to form PSUs for the ECLS-B. Westat used metropolitan statistical area (MSA) definitions in large metropolitan areas and the NCHS health service areas[6] (U.S. Department of Health and Human Services, National Center for Health Statistics, 1991) as a guide for combining counties to form PSUs in other areas. The health service areas are relatively self-contained in terms of health service supply and demand; they were especially useful in forming PSUs in rural areas, where it was often necessary to combine several counties because of the relatively low incidence of births. In developing the frame, counts of births were averaged over the years 1994, 1995, and 1996 to obtain annualized estimates for each county.

Twenty-four PSUs were large enough to be selected with certainty. The remaining PSUs were stratified on the following variables:

- Census region (Northeast, Midwest, South, West);
- MSA status (metro area, non-metro area);
- Minority status (high, low);
- Median income (high, low); and
- Size (continuous sort on MOS—see above).

Census region was determined by the Federal Information Processing Standards (FIPS) state and county codes of counties making up a given PSU. PSUs were constructed within census region boundaries. MSA status was also determined by the FIPS state and county codes of the counties making up the PSU, with the entire PSU considered as an MSA PSU when one or more counties within the PSU was a member of an MSA. PSUs were constructed to maintain existing MSA definitions, with the exception of MSAs that involved more than one noncertainty state (i.e., a state where all PSUs within the

[6] The National Center for Health Statistics health service areas were created for the National Health Interview Survey.

state had probabilities of selection less than 1.0). Minority status was determined within the two stratification variables above based on the distribution of non-White births. The high and low categories were stratum-specific and divided the stratum approximately in half with respect to MOS. Median income stratification was done similarly. Stratification by size was carried out using a serpentine (i.e., alternatingly ascending or descending) sort on the MOS within the first four stratification variables given above. Two PSUs were selected per stratum with probability proportional to size, using Durbin's method (Durbin, 1967). In some cases, PSUs were subdivided into secondary sampling units (SSUs) which also consisted of contiguous counties. A sample of SSUs was drawn within PSUs in order to decrease travel-related costs.

4.1.3 American Indian Supplemental PSU Sample Design

It is difficult to select an adequate sample of American Indian (AI) births in a general purpose survey. The proportion of AI births in most areas is quite small; furthermore, many AI births are concentrated in a few, sparsely populated areas. Because of these difficulties, an AI supplemental PSU frame was developed, and an AI supplemental PSU sample was selected.

To develop the AI PSU frame the study identified counties or groups of counties that were large enough to provide an efficient interviewer workload (at least 50 AI births) and had a relatively large proportion of American Indian births. The AI PSU frame contained 108 PSUs, most of which consisted of individual counties. The stratification of the frame was geographic by region with finer breakdowns by state within some regions. A supplemental sample of 18 AI PSUs was selected from the AI PSU frame, of which 6 were selected with certainty because they contained more than 2.4 percent of all AI births, which was the overall sampling rate for the AI supplemental sample. The noncertainty PSUs were selected independently of the core sample PSUs, with probability proportional to the number of AI births. One of these PSUs included the Navajo Nation reservation, whose institutional review board did not approve participation in the study. Sampled cases that were contained within the reservation boundaries were treated as nonresponse. This loss of sample size was taken into account when adjusting rates for the overall sample reduction (see section 4.2.2.)

The full AI supplemental sample consists of AI cases selected within the following:

- The 18 PSUs selected from the AI PSU frame and

- The counties *not* covered by the 108 PSUs on the AI PSU frame, but sampled in the core ECLS-B PSU sample.

This provides 100 percent coverage of the AI population.

Thus, AI births within any given county had a single, known chance of being included in the AI supplemental sample. All counties also had a single chance of being included in the core ECLS-B PSU sample. In total, counties covered by the AI PSU frame have *two chances* of participating in the ECLS-B. However, the two samples—core and AI supplemental—are distinct, and any given county had only one chance of being in the AI PSU sample and one chance of being in the core PSU sample.

4.1.4 Consent Processes and Restrictions

Since birth certificates received through the NCHS vital statistics system were used as the sampling frame, the first step in study enrollment was to obtain permission from state registrars. Birth certificates contain information about the child, the mother and the father, including the mother's address. This information was used both to stratify the birth certificates for sampling and to contact mothers of sampled infants. In several states, obtaining permission for access to birth certificates required approval from the state's institutional review board. In addition, some state institutional review boards or registrar offices had requirements that placed restrictions on contacting parents based on birth certificate information. In some cases, these restrictions would have resulted in low response rates or even complete nonparticipation.

The ECLS-B core and AI supplemental PSU samples included births occurring in counties within 46 states and in Washington, D.C. Ten of the 46 states had state institutional review board or registrar office requirements that put restrictions on the standard ECLS-B contact and consent protocol. The types of restrictions were as follows:

- **Passive consent.** In states requiring passive consent, the state registrar sent a letter to the sampled parents informing them about the study. If the parents did *not* respond, then they were assumed to have given consent for Westat to contact them for enrollment into the study.

- **Active consent.** In states requiring active consent, either Westat or the state registrar sent a letter to parents informing them about the study. However, in this case, parents *must* have responded giving consent to contact them. If they did not respond to the letter, they were considered not giving consent.

- **Active consent states with PRAMS.** Some states require active consent to participate in the Pregnancy Risk Assessment Monitoring System (PRAMS). In these states, there was already a program in place where local officials contacted mothers to get consent for participation in PRAMS. Obtaining consent for ECLS-B could have been included in this program.

- **Consent specified on birth certificate.** In one state, parents filled out an item on the birth certificate that allowed persons to contact them. Although this item did not refer specifically to research studies,[7] the state used the response to this question as an indicator of the parent's willingness to be contacted subsequent to the birth. That is, the registrar released information about the parent only if the parent responded affirmatively to the question.

- **No follow-back.** In some cases, state law prohibited the use of birth certificate information to contact parents for "follow-back" research studies like the ECLS-B.

In some cases, larger sample sizes were selected to offset the additional nonresponse that was expected because of enrollment restrictions. However, in states that required active consent or that prohibited follow-back research studies, substitution and alternative frames were used (see section 4.1.5, below). In one state (Illinois), state law allowed for the Bureau of the Census to conduct the interviews through a subcontract with NCHS.

In the 36 states (and Washington, D.C.) that did not impose restrictions, the standard ECLS-B contact and consent protocol were used. See section 5.3.2 for a description of these procedures.

4.1.5 Substitution and Alternative Frames

Substitute PSUs were selected to replace the PSUs originally selected for ECLS-B in a few states. The substitute PSU "replaced" the original PSU in the sample, meaning that a sample of birth certificates that matched the sample planned for the original PSU with respect to sample size and demographic composition was selected in the substitute PSU.

Wherever possible, substitute PSUs were selected from the same sampling stratum as the original PSU, at least for noncertainty PSUs. Substitute PSUs for the main sample were matched on:

- Median household income;

- Percent minority population;

[7] The item on the birth certificate reads, "Parent(s) authorization to receive infant health care information: Yes or No."

- Percent of population in poverty;
- Birth rate;
- Population density; and
- Census region.

Matching was based primarily on a Mahalanobis distance function (Mahalanobis, 1975). In addition, the study looked at the individual rankings of the absolute differences of the values for the potential substitute PSU from the value for the original PSU for each of the above variables. Also, the geographic profile of each potential substitute was compared with that of the original PSU in order to ensure that the selected substitute was a reasonable match for the original PSU not only demographically, but geographically as well.

In the supplemental sample for AI births, substitute PSUs were matched on the number of AI births, percent of mothers with high school education, percent in which both parents were AI, and mean birth weight. In addition, candidate substitute PSUs were reviewed by an in-house Westat expert on American Indians, who provided information about the social structure, culture, and geographic surroundings of American Indians living in the different regions in the United States. Selection of the substitute PSUs was made taking the latter considerations into account. For example, high-population-density California PSUs with no associated tribal lands and a limited tribal structure were not substituted for low population density PSUs located in reservation areas with a strong tribal structure.

Within the substitute PSU (core or AI supplemental), sampling rates that would deliver the same yield as expected within the original PSU by case stratum (e.g., Hispanic, normal birth weight, or twin) were used. A total of seven PSUs were used as substitutes for original ECLS-B PSUs.

In two instances, an alternative sampling frame was used to draw a sample of births occurring within AI PSUs with enrollment restrictions. Specifically, birth records were selected directly from hospital lists of births in counties that defined the original PSUs.

4.1.6 Sampling Birth Certificates Within Primary and Secondary Sampling Units

Individual birth certificates within PSUs or SSUs (hereafter PSUs) were sampled from data files provided by state registrars. These data files were processed through the NCHS state-based vital statistics system. Sampled children subsequently identified by state registrars as having died or having been adopted after the issuance of the birth certificate were excluded from the sample.

NCHS receives birth certificate data from the states on a flow basis, with the number of births received and months included in a given shipment varying by state and throughout the year. Births were thus sampled systematically throughout 2001 and 2002. The within-PSU sampling rates varied by case stratum and depended on the PSU selection probability such that, within each case stratum, each sampled birth had an equal overall probability of selection. After a particular batch was received, births were selected within sampling strata, within PSUs present in the batch, based on appropriate selection intervals, continuing from the point where the last sample selection left off.

The within-PSU sampling rate for a stratum depended on the PSU selection probability and was determined to give each sampled birth in a given case stratum the same overall probability of selection. The within-PSU selection probabilities for each of the sampling strata were determined from the following equation:

Sampling rate = $P_{hik} = P_k / P_{hi}$,

where

P_{hik} = the within-PSU selection probability for case stratum *k* in PSU *i* in PSU stratum *h*;

P_k = the desired overall selection probability for a birth in case stratum *k*; and

P_{hi} = probability of selection for ECLS-B PSU *i* in PSU stratum *h*

Note that the within-PSU sampling rates cannot exceed 1. As can be seen from the above equation, this implies that the PSU selection probability must be no less than the overall selection probability for every sampling stratum. The construction of PSUs was carried out to satisfy this condition.

4.2 Calculation and Use of Sampling Weights

This section describes the ECLS-B 9-month data weighting procedures. Weights are used to adjust for disproportionate sampling, survey nonresponse, and noncoverage of the target population when analyzing complex survey data. The weights are designed to eliminate or reduce biases that would otherwise occur with unweighted analyses. The ECLS-B weights were developed in three steps:

1. Base weights were calculated using the overall selection probabilities;
2. Base weights were adjusted for survey nonresponse; and
3. Raking was used to adjust for undercoverage and to improve precision of survey estimates.

The following sections describe these steps as well as estimation and variance estimation. Section 4.2.1 describes the four sets of weights that were created for use when analyzing the ECLS-B data. Section 4.2.2 describes how base weights were calculated. Section 4.2.3 describes the weight adjustments for nonresponse and undercoverage. Section 4.3 discusses variance estimation and design effects. Further details on these procedures can be obtained from *ECLS-B Methodology Report for the Nine-Month Data Collection, Volume 2: Sampling* (U.S. Department of Education, National Center for Education Statistics, forthcoming [a]).

4.2.1 Four Types of Sampling Weights

The 9-month data collection consisted of three main components:

1. Parent interviews (parent CAPI instrument and parent self-administered questionnaire);
2. Child assessments (the physical measurements, Bayley Short Form–Research Edition [BSF-R], Nursing Child Assessment Teaching Scale [NCATS]); and
3. Father questionnaires (self-administered resident and nonresident father questionnaires).

For the purpose of constructing the ECLS-B 9-month weights, a completed case was defined at the component level, as follows:

Parent-level complete. Cases where sections up to and including the child development (CD) section were complete. The count of items up to and including the CD section is 58, out of 160 minimum for the entire parent component, or about 36 percent of the parent items. Some 10,688 cases meet these criteria.

Child-level complete. Cases where either the physical measurements or BSF-R mental scale or motor scale sections were complete. There are 10,221 cases that meet these criteria. The 10,688 9-month parent completes break down as follows with respect to these child components (table 4-4):

Table 4-4. Parent completes, broken down by completed and missing BSF-R and physical measurements components, 9-month data collection: 2001–02

Parent completes		
Bayley Short Form–Research Edition	Physical measurements	Number
Total		10,688
Complete	Complete	9,948
Complete	Missing	252
Missing	Complete	21
Missing	Missing	467

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Father-level complete. Father-level completes were defined as cases where the resident father questionnaire (RFSAQ) only, the nonresident father questionnaire (NRFSAQ) only, or both component items were complete (i.e., provided one or more item responses in the relevant self-administered questionnaire), as appropriate for the case. Only a very small proportion of cases required both resident father and nonresident father questionnaires. These cases are treated as father-level completes only if both components were completed. There are 6,998 cases that meet these criteria.

These three main components could be completed in various combinations at the case-level (i.e., sampled birth), resulting in seven possible weights. The seven possible weights involve data from the following:

1. The parent interview only;
2. The child assessment only;
3. The father questionnaire only;
4. The parent interview and the child assessment only;
5. The parent interview and the father questionnaire only;
6. The father questionnaire and the child assessment only; or
7. The parent interview, the child assessment, and the father questionnaire.

In principle, a separate set of weights is appropriate for a given set of measures if the set of measures is of analytic interest and if there is an acceptable level of response for the set. A different set of weights should be constructed for each possible type of analysis to maximize the available sample. However, such a proliferation of weights (and the associated replicate weights) is unwieldy and impractical for analysts. Therefore, the sets of weights were restricted to combinations that are of analytic interest and for which the loss in sample size from using a set of more complete records would be sizable. Cross-component frequencies on the 9-month data indicated that the child assessment was rarely completed without the parent interview. Thus, combinations (2) and (6) above were not useful, since analysis of the child assessment data alone (item 2) or child assessment with the father data (item 6) can be conducted using the weights developed for combinations (4) or (7), respectively.

On the other hand, a sufficient number of cases had parent interview and child assessment data but did not have father data, so weights for both combinations (4) and (7) above are useful. Also, 170 cases had parent interview and father component data but did not have child data, so weights for combination (5) were developed in order to utilize these cases. Finally, a sufficient number of cases had parent interview data only so that weights for item (1) would be warranted. An insufficient number of cases had the father data only, so that possibility (3) was eliminated.

Following the above rationale, four sets of weights were constructed. Exhibit 4-2 gives the variable names for each set of weights, and indicates the kind of variables with which they should be used.

Exhibit 4-2. ECLS–B cross-sectional weights in the 9-month data collection: 2001–02

Weight	To be used for analysis of …
W1R0	9-month parent interview data ("P1" prefixed variables), and/or birth certificate data ("BC" prefixed variables) and a limited set of child characteristics (e.g., sex and race/ethnicity)
W1C0	9-month child assessment measures("C1" prefixed variables) alone or in combination with parent interview and/or birth certificate data
W1F0	Resident ("F1" prefixed variables) and/or nonresident father data ("N1" prefixed variables) alone or in combination with data from the parent interview and/or birth certificate
W1FC0	Resident and/or nonresident father data in combination with child assessment data alone or in combination with parent interview and/or birth certificate data.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, Nine-Month Data Collection, 2001–02.

Weight W1R0 is used to estimate child-level characteristics associated with data collected through the parent interview and/or birth certificate. Examples include the percentage of children whose mothers are currently employed, the percentage of children who are in a particular type of child care, the percentage of children who are in excellent or very good health, and the percentage of children who were low birth weight.

Weight W1C0 is used to estimate child-level characteristics associated with data collected through the child assessments either alone or in combination with data collected through the parent interview and/or birth certificate. Examples include a comparison of children's mean height and weight by children's food security status, a comparison of children's Bayley mental T-scores by family background characteristics, or the NCATS total parent score by household socioeconomic status (SES).

Weight W1F0 is used to estimate child-level characteristics associated with data reported by fathers either alone or in combination with data collected through the parent interview and/or birth certificate. Analysts who are using data from the resident father questionnaire should include the 51 cases where the father is the respondent to the parent interview (X1RSPREL=3). As noted in section 2.3.1, all questions contained in the resident father questionnaire are also included in special paths for father respondents in the parent interview. Examples of analyses using this weight are the percent of resident fathers who read to their children 3 or more times per week, the percent of resident and/or nonresident

fathers who first held their child within an hour after delivery, the percent of resident and/or nonresident fathers who feel that they are very good fathers. This weight should not be used if child assessment data are also being used. For analyses of child assessment data in combination with father data, W1FC0 should be used instead.

The weight W1FC0 is used to estimate child-level characteristics using data reported by fathers in combination with child assessment data. This weight would also be used for analyses involving father data, child assessment data, and data from the parent interview and/or birth certificate data. An example of an analysis using this weight is a comparison of children's Bayley mental T-scores by levels of resident father involvement and family background characteristics such as parent education.

4.2.2 Base Weights

The overall probability of selection for a given birth is computed as the product of each stage's probability of selection. For birth certificates sampled in PSU sampling stratum *h*, PSU *i*, SSU *j*, case stratum *k* at time *t*, the selection probability is

$$p_{kt} = p_{hi}\, p_{hij}\, p_{hijkt}\,.$$

Originally, the sample was designed to yield a constant overall probability of selection for births belonging to a given case stratum. Exceptions to this rule are due to sampling for the American Indian supplement and a reduction in sampling rates; the latter took place in March 2002.[8]

The base weight gives the approximate representation of each sampled birth certificate. The base weight for a given birth record was calculated as the reciprocal of the overall probability of selection:

$$w_{kt} = \frac{1}{p_{kt}}\,.$$

[8] In March 2002, the ECLS-B sample size was reduced in order to control costs.

4.2.3 Weighting Adjustments

The main objective in adjusting base weights is to correct for survey nonresponse and survey undercoverage. All ECLS-B weights were adjusted to correct for survey nonresponse and undercoverage. The data weighting adjustments for the Parent set started with the base weights, whereas the data weighting for the Parent-Child set and Parent-Father set started with the adjusted Parent weight, and the data weighting for the Parent-Father-Child set started with the adjusted Parent-Father weight. Adjusting to population totals through post-stratification or raking can also reduce standard errors. Weighting adjustments can be separated into two general types:

- Sample-based adjustments, such as nonresponse adjustments and
- Population-based adjustments, such as post-stratification and raking.

In sample-based adjustments, data available for both respondents and nonrespondents are used to adjust the respondent sample so that it represents the whole sample (i.e., both respondents and nonrespondents). In population-based adjustments, data from respondents are used to adjust the sample to the population. Sample-based adjustments require that the same data items be available for respondents and nonrespondents. Given the hierarchical nature of the weights being developed for the ECLS-B (see section 4.2.1):

1. Birth certificate data were available for the Parent set of weights;
2. Birth certificate and parent component data were available for the Parent-Child and Parent-Father sets of weights; and
3. Birth certificate, parent, and father component data were available for the Parent-Father-Child sets of weights.

Specifically, the following characteristics were used to define sample-based nonresponse adjustment cells for each set of weights (exhibit 4-3). The characteristics listed were selected based on analyses using segmentation modeling via the Chi-Squared Automatic Interaction Detector (CHAID) (Flores-Cervantes et al., 2002; Kass, 1980; Magidson, 1993). That analysis indicated which characteristics and partitions using those characteristics explain differences in response rates.

Population-based adjustments require that the same data items be available for respondents and the total population. Given the birth certificate data that were available for all sampled cases and for the total population, raking was used to ensure that sums of sampling weights match known population

totals. The raking ratio estimation procedure is based on the iterative proportional fitting procedure of Deming and Stephan (1940) and involves ratio adjustments to two or more marginal distributions of the population counts. Raking was proposed by Deming and Stephan as a way to ensure consistency between complete counts and sample data from the 1940 U.S. Census.

The raking procedure is carried out in a sequence of adjustments: The weights are adjusted to one marginal distribution and then to the second marginal distribution, and so on. One sequence of adjustments to the marginal distributions is known as a cycle or iteration. The procedure is repeated until convergence is achieved. The criteria for convergence can be specified either as the maximum number of iterations or an absolute difference (or relative absolute difference) from the known marginal population totals.

Exhibit 4-3. Variables used to define sample-based nonresponse adjustment cells for each set of weights, 9-month data collection: 2001–02

Parent weights	**Parent-Child weights**
Foreign resident status	Foreign resident status
Population of county of residence	Population of county of residence
Child's race/ethnicity	Child's race/ethnicity
Child's birth weight	Child's health as reported in the parent component [1]
Five-minute APGAR score	Child's hospitalization status as reported in the parent component [1]
Plurality	Five minute APGAR score
Father's race/ethnicity	Plurality
Mother's age	Father's race/ethnicity
Mother's education	Mother's age
Live birth order	Mother's education
Number of prenatal visits	Live birth order
Delivery complications	Number of prenatal visits
Medical risk factors	Medical risk factors
Parent-Father weights	**Parent-Father-Child weights**
Cases where only resident fathers apply:	*Cases where only resident fathers apply:*
Foreign resident status	Foreign resident status
Child's race/ethnicity	Region of residence
Happiness in marriage as reported in the parent component [1]	Child's race/ethnicity
Father's education—composite [1]	Father's education—composite [1]
Delivery complications	Population of county of residence
Father's age—composite [1]	Delivery complications
Medical risk factors	Happiness in marriage as reported in the parent component [1]
Five-minute APGAR score	Medical risk factors
Population size of MSA	Population size of MSA
Father's race/ethnicity [1]	Father's race/ethnicity [1]
Number of hours per week spouse worked [1]	Number of hours per week spouse worked [1]
Population of county of residence	Five minute APGAR score
Plurality	Plurality
Mother's age	Live birth order
Number of prenatal visits	Father's age—composite [1]
Live birth order	Mother's age
Mother's education	Number of prenatal visits
Cases where only nonresident fathers apply:	*Cases where only nonresident fathers apply:*
Child's race/ethnicity	Child's race/ethnicity
Why the biological father hasn't seen the child [1]	Plurality
Population of county of residence	Why the biological father hasn't seen the child [1]
Mother's age	Population of county of residence
Region of residence	Mother's age
How far away the biological father lives [1]	Mother's education
Mother's education	
Cases where both resident fathers and nonresident fathers apply:	*Cases where both resident fathers and nonresident fathers apply:*
These cases were assigned to their own adjustment cell.	These cases were assigned to their own adjustment cell.

[1] These variables came from ECLS-B components; all other variables came from birth certificate data.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Each of the four sets of sample-based nonresponse adjusted weights was raked to the following 11 dimensions (derived from birth certificate data):

1. Child's sex;
2. Child's race/ethnicity based on information from the birth certificate;
3. Child's plurality (singleton, twin, triplets, and higher order births);
4. Population size of MSA;
5. Region of residence;
6. Presence of medical risk factors;
7. Child's birth weight;
8. Mother's age at time of birth;
9. Total birth order;
10. Mother's education at time of birth; and
11. Number of prenatal visits.

These variables were selected because of their substantive interest as well as their relationship to response propensity, as indicated by logistic regression analyses. Table 4-5 reports selected characteristics of the four sets of weights: the name of the full sample weight, the count of records with a non-missing value of that weight, and the mean, standard deviation, coefficient of variation, minimum, maximum, skewness, kurtosis, and sum of that weight.

Table 4-5. Characteristics of cross-sectional weights, 9-month data collection: 2001–02

Variable name	Number of cases	Mean	Standard deviation	Coefficient of Variation (× 100)	Minimum	Maximum	Skewness	Kurtosis	Sum
W1R0	10,688	373.99	349.31	93.40	4.08	1,854.91	0.745	-0.639	3,997,169
W1C0	10,221	391.07	365.54	93.47	4.72	1,981.78	0.769	-0.559	3,997,169
W1F0	6,988	517.76	509.06	98.32	5.53	3,850.44	1.076	1.031	3,618,138
W1FC0	6,816	530.83	525.25	98.95	5.95	4,050.91	1.164	1.578	3,618,138

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

4.3 Variance Estimation

The precision of estimates from a sample survey can be estimated by their sampling variance. Replication and Taylor Series linearization methods have been developed for complex sample designs like the ECLS-B. These methods account for clustering, multiple stages of selection, and differential sampling rates characteristic of more complicated designs. One or both of these methods are supported by software designed specifically for analyzing complex survey data such as AM, Stata, SUDAAN, WesVar, and SAS.[9] The following sections describe the paired jackknife replication (JK2) and the Taylor Series estimation methods as they pertain to the ECLS-B.

4.3.1 Paired Jackknife Replication Method (JK2)

In this method, a survey estimate of interest (e.g., mean BSF-R motor and/or mental score) is calculated from the full sample. Subsamples of the full sample are then selected to calculate subsample estimates of the same parameter. The subsamples are called *replicates*, and the subsample estimates are called *replicate estimates*. The variability of the replicate estimates around the full sample estimate is used to estimate the variance of the full sample estimate. The variance estimator is computed as the sum of the squared deviations of the replicate estimates from the full sample estimate:

$$v\left(\hat{\theta}\right) = \sum_{g=1}^{G}\left(\hat{\theta}_{(g)} - \hat{\theta}\right)^2$$

where

$\hat{\theta}$ is the estimate of the population parameter of interest, θ based on the full sample;
$\hat{\theta}_{(g)}$ is the g^{th} replicate estimate of θ based on the observations included in the g^{th} replicate; and
G is the number of replicates formed.

For the ECLS-B, in which some first-stage units were selected with certainty and the remaining first-stage units were selected taking two units per stratum, the paired jackknife replication method (JK2) is recommended. The variance estimates of selected survey items presented in section 4.3.3 were produced using the paired jackknife replication method in WesVar. The paired jackknife replication

[9] Information about AM, Stata, SUDAAN, WesVar, and SAS can be obtained at http://www.am.air.org, http://www.stata.com, http://www.rti.org/sudaan, http://www.westat.com/wesvar/, and http://www.sas.com, respectively.

method can also be used in SUDAAN with the appropriate statements and keywords. To achieve this in SUDAAN, the statement JACKWGTS with the keyword ADJJACK can be used as follows:

JACKWGTS varlist / ADJJACK = 1,
where varlist is the list of replicate weights.

A set of 90 replicate weights was created for variance estimation for each of the four ECLS-B sets of sampling weights. Each set of replicate weights was calculated using the same adjustment steps as the full sample weight (see section 4.2.3), but using only the subsample of cases that constituted each replicate. The replicate weights for each set of sampling weights are presented in exhibit 4-4.

Exhibit 4-4. Replicate weights for each set of sampling weights, 9-month data collection: 2001–02

Set	Full sample weight	Replicate Weights
Parent	W1R0	W1R1…W1R90
Parent-Child	W1C0	W1C1…W1C90
Parent-Father	W1F0	W1F1…W1F90
Parent-Father-Child	W1FC0	W1FC1…W1FC90

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

4.3.2 Taylor Series Linearization Method

The Taylor Series linearization method produces a linear approximation to the estimate of interest; then the variance of the linear approximation is estimated by standard variance formulas. The stratum and first-stage unit identifiers are required to implement this approach. One set of stratum and first-stage unit identifiers is sufficient for the ECLS-B. The stratum and first-stage unit identifiers are as follows:

Stratum	First-stage unit
W1RSTR	W1RRPSU

The first-stage unit identifier provided for variance estimation (W1RRPSU) is masked to limit the risk of disclosure. That is, units selected within the same PSU share the same values of W1RRPSU; however, the value within W1RRPSU is otherwise meaningless (i.e., does not correspond

with FIPS codes, etc.). Exhibit 4-5 provides a quick reference on which weights and variables to use for estimation and variance estimation for the four main kinds of analysis.

Exhibit 4-5. Specifications for computing standard errors in the 9-month data collection: 2001–02

Type of analysis	Full sample weight	Computing standard errors			Approximating sampling errors
		Replication method (SUDAAN, WESVAR)		Taylor Series method (AM, SAS, Stata, SUDAAN)	DEFT (Median root design effect)
		Replicate weights	Jackknife method	Nesting variables	
Parent component measures	W1R0	W1R1-W1R90	JK2	W1RSTR, W1RRPSU	1.4492
Parent and child component measures	W1C0	W1C1-W1C90	JK2	W1RSTR, W1RRPSU	1.9256
Parent and father component measures	W1F0	W1F1-W1F90	JK2	W1RSTR, W1RRPSU	1.3436
Parent, father, and child component measures	W1FC0	W1FC1-W1FC90	JK2	W1RSTR, W1RRPSU	1.3476

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

4.3.3 Standard Errors and Design Effects for Selected ECLS-B Variables

A large number of variables were collected from parents, children, and fathers in the ECLS-B. The estimate from each variable has its own variance, standard error, and design effect. The design effect compares the statistical efficiency of survey estimates from complex sample designs to what would have been obtained under a simple random sample (SRS) of the same size.

In a stratified clustered design like the ECLS-B, stratification generally leads to a gain in efficiency over simple random sampling, but clustering has the opposite effect because of the positive intracluster correlation of the units in the cluster. Also, the oversampling of rare domains is beneficial for analyses concentrating on those domains, but inefficient for analyses that cut across the oversampled domains due to the differential weighting effect. The basic measure of the relative efficiency of the sample design is called the *design effect* (DEFF), defined as the ratio, for a given statistic, of the variance estimate under the actual sample design to the variance estimate that would be obtained with an SRS of the same sample size:

$$DEFF = \frac{Var_{DESIGN}}{Var_{SRS}}$$

The square root of the design effect, DEFT, is defined as

$$DEFT = \frac{SE_{DESIGN}}{SE_{SRS}}$$

where *SE* is the standard error of the estimate. The design effect indicates the increase or decrease in the variance relative to simple random sampling, and the square root of the design effect indicates the same for the standard error.

The preferred methods of computing variances, standard errors and design effects for ECLS-B variables are the paired jackknife method or the Taylor Series linearization method as described in sections 4.3.1 and 4.3.2, using programs designed specifically for analyzing complex survey data. The standard errors and design effects presented in this section were calculated using the paired jackknife replication method in WesVar.

If a statistical analysis software package such as SPSS (Statistical Program for the Social Sciences) is used, the standard errors should be corrected using DEFT, since these programs calculate standard errors assuming the data were collected with an SRS. The standard error of an estimate under the actual sample design can be calculated as follows:

$$SE_{DESIGN} = \sqrt{DEFF \times Var_{SRS}} = DEFT \times SE_{SRS}$$

Packages such as SAS or SPSS can be used to obtain Var_{SRS} and SE_{SRS}. Alternatively, Var_{SRS} and SE_{SRS} can be computed using the formulas below for means and proportions.

Means

$$Var_{SRS} = \frac{1}{n}\frac{\sum_{1}^{n} w_i\left(x_i - \bar{x}_w\right)^2}{\sum_{1}^{n} w_i} = SE_{SRS}^2$$

where w_i are the sampling weights, n is the number of respondents in the sample, and the sample mean $\bar{x}_w$ is calculated as follows:

$$\bar{x}_w = \frac{\sum_1^n w_i x_i}{\sum_1^n w_i}$$

Proportions

$$Var_{srs} = \frac{p(1-p)}{n} = SE_{SRS}^2$$

where p is the weighted estimate of proportion for the characteristic of interest and n is the number of cases in the sample. In both cases of means and proportions, the standard error assuming simple random sampling should be multiplied by DEFT to get the standard error of the estimate under the actual design.

Tables 4-6 and 4-7 show standard errors and design effects for selected means and proportions based on ECLS-B parent, child, and father component data. For each survey component, the tables present the selected data item, variable name, number of cases, the estimate, the standard error taking into account the actual sample design (Design SE), the standard error under simple random sampling (SRS SE), the design effect (DEFF), and the square root of the design effect (DEFT). The estimate presented for each item in table 4-6 follows particular conventions. If the item is a continuous or interval measure, then the estimate is the mean for all cases (excluding "Don't knows," "Not ascertained" etc.) If the item is discrete (i.e., nominal or ordinal), then the estimate is the proportion of cases responding with the first or lowest possible meaningful value in an ordinal sense (excluding "Don't knows," "Not ascertained" etc.). For more information on the variables used in this section, refer to chapter 3, which describes the assessment and rating scale scores used in the ECLS-B, and chapter 7, which has a detailed discussion of the other variables.

Note that the design effects for assessment estimates (e.g., X1MTLTSC, X1MTRTSC) are higher than the design effects for some other estimates (e.g., P1ATTN, P1CGDTAP etc.) This can be due to either naturally occurring higher intracluster correlations for assessment estimate items or interviewer effects. In the case of the ECLS-B, where the general relationship between interviewer and cluster is one-to-one, the two are difficult if not impossible to disentangle. See section 5.5.5 for a discussion of assessor

effects. Similar observations about the design effects for assessment estimates were made in the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K) data (see the *ECLS-K Third Grade Methodology Report*, section 3.1[U.S. Department of Education, National Center for Education Statistics, forthcoming (b)]).

The results presented in tables 4-6 and 4-7 will allow analysts using the appropriate variance estimation software to check their work. Also, the design effects in these tables give analysts a way to approximate the actual sample design's standard errors when they are unable to use the software suggested. One way to use design effects in roughly approximating the actual sample design's standard errors for either overall estimates or subgroup estimates not presented in tables 4-6 and 4-7, (respectively), is to use an average (more specifically, the median) design effect across a number of variables or for a specific subgroup. Table 4-7 presents median design effects by various analytic subgroups and may be used as described above to inflate SRS standard errors.

For example, suppose that analysts are interested in obtaining the estimate of the proportion of children whose parents characterize them as "never demanding attention and company constantly" (P1ATTN=0), and are unable to use the suggested variance estimation software. They would be able to obtain an estimate of 18.99 via a weighted analysis (i.e., using the full sample weight). A SRS standard error can be obtained by using the weighted estimate in the numerator and the unweighted sample size in the denominator; the standard error for this estimate would be 0.377 (the square root of ((18.99 x 80.01)/10,682)).

Applying the design effects (DEFT, specifically) in table 4-7 (Overall row, Parent DEFT column), they would estimate the design's standard error to be 0.5463 (= 1.4491 X 0.377). Note that this is reasonably close to the true design's standard error of 0.550 (from table 4-6). The degree to which this method will produce reasonable approximations of standard errors will vary across estimates. Analysts should review table 4-6 to grasp this variability, accounting for differences between sets of weights and kinds of variables (e.g., demographic versus assessments scores, etc.).

Analysts looking for estimates for various subgroups would look at the other rows (e.g., male, female etc.) in table 4-7. The same approach can be used for means and parameters in regression models, obtaining weighted estimates of the mean or regression parameters and unweighted estimates of the SRS standard errors.

Table 4-6. Standard errors and design effects for the full sample, 9-month data collection (overall): 2001–02

Weight	Survey item	Variable name	Number of cases	Estimate	Design SE	SRS SE	DEFF	DEFT
P	P1 CD120C DEMANDS ATTENTION AND COMPANY	P1ATTN	2,074	18.99	0.550	0.380	2.100	1.449
P	P1 CH005 STATUS OF CHILD HEALTH	P1CHEALT	6,251	61.70	0.661	0.471	1.973	1.405
P	P1 HE102D HOW OFTN TAKE CHILD ON ERRANDS	P1ERRAND	437	1.91	0.174	0.132	1.738	1.318
P	P1 CD120A IS FUSSY OR IRRITABLE	P1FUSSY	3,729	36.90	0.628	0.467	1.808	1.345
P	P1 CD120E NEEDS HELP TO FALL ASLEEP	P1HLPSLP	5,932	56.17	0.786	0.480	2.680	1.637
P	P1 CD120G CRIES FOR FOOD OR TOYS	P1NOWAIT	2,980	27.86	0.624	0.434	2.070	1.439
P	P1 HE102A HOW OFTEN YOU READ TO CHILD	P1READBO	1,383	12.12	0.479	0.316	2.296	1.515
P	P1 HE102C HOW OFTEN YOU ALL SING SONGS	P1SINGSO	237	2.07	0.197	0.138	2.040	1.428
P	P1 CD120F STARTLED BY LOUD SOUNDS	P1STRTL	6,027	58.46	0.742	0.477	2.421	1.556
P	P1 HE102B HOW OFTN YOU TELL CDH STORIES	P1TELLST	2,480	22.29	0.642	0.402	2.545	1.595
P	P1 CD120D WAKES UP 3 OR MORE TIMES	P1WAKES	7,293	70.12	0.816	0.443	3.391	1.841
P	P1 CD120B GOES FROM WHIMPER TO CRYING	P1WHMPR	4,629	45.95	0.714	0.482	2.190	1.480
P	X1 HSHLD FOOD SECURITY - STATUS CTGRY	X1FSSTAT	9,331	87.73	0.554	0.317	3.046	1.745
P	X1 TYPE RES FATHER-BIRTH/ADOPT/STEP/FOST	X1FTHTYP	8,304	78.73	0.483	0.396	1.488	1.220
P	X1 TYPE OF FAMILY	X1HFAMIL	5,558	49.65	0.538	0.484	1.237	1.112
P	X1 CH PARENTS WHO RESIDE IN HOUSEHOLD	X1HPARNT	8,282	78.55	0.482	0.397	1.471	1.213
P	X1 HH FATHER/MALE GUARD-WRK STAT W/IMP	X1IFTHLB	7,916	94.59	0.332	0.246	1.819	1.349
P	X1 HH MOTHER/FEMALE GUARD-WRK STAT W/IMP	X1IMOMLB	6,221	60.28	0.934	0.475	3.865	1.966
P	X1 POVERTY INDICATOR	X1POVRTY	2,603	22.87	0.600	0.406	2.179	1.476
P	X1 PRIM CARE ARRNGMNT WHERE MOST HRS/WK	X1PRIMNW	5,352	49.95	0.794	0.484	2.695	1.642
P	X1 QUINTILE INDICATOR FOR SOCIOECON SCAL	X1SESQ5	2,110	20.05	0.455	0.387	1.379	1.174
P	P1 CD090 AGE WHEN STARTED CRAWLING(MTHS)	P1AGCRWL	9,056	7.17	0.024	0.016	2.360	1.536
P	P1 CD080 AGE SITTING WITHOUT SPPRT(MTHS)	P1AGSIT	10,268	6.08	0.019	0.013	2.042	1.429
P	P1 CD100 AGE PULLED SELF TO STAND(MTHS)	P1AGSTND	8,842	7.99	0.025	0.015	2.733	1.653
P	P1 CD110 AGE WALKING WITH HELP(MONTHS)	P1AGWALK	7,863	8.61	0.029	0.016	3.364	1.834
P	X1 HSHLD FOOD SECURITY-SCALE SCR (RASCH)	X1FSSCAL	2,485	3.66	0.061	0.042	2.135	1.461

See note at end of table.

Table 4-6. Standard errors and design effects for the full sample, 9-month data collection (overall): 2001–02—Continued

Weight	Survey item	Variable name	Number of cases	Estimate	Design SE	SRS SE	DEFF	DEFT
P	X1 TOTAL NUMBER OF HOUSEHOLD MEMBERS	X1HTOTAL	10,688	4.31	0.017	0.014	1.453	1.205
P	X1 NUMBER OF HH MEMBERS LESS THAN 18	X1LESS18	10,688	2.13	0.013	0.012	1.238	1.113
PC	X1 CHILD BIRTH WEIGHT STATUS	X1BTHWGT	7,501	92.51	0.002	0.000	0.000	0.000
PC	X1 CHILD SEX	X1CHSEX	5,221	51.06	0.087	0.494	0.031	0.176
PC	X1 RACE/ETHNICITY - CHILD	X1CHRACE	4,262	53.38	0.541	0.494	1.197	1.094
PC	X1 MULTIPLE BIRTH STATUS INDICATOR	X1MBRTST	8,486	96.82	0.002	0.000	0.000	0.000
PC	X1 CHILD SAMPLED AS TWIN	X1TWSAMP	1,572	2.94	0.029	0.167	0.030	0.173
PC	X1 PM - CHILD'S WEIGHT (KG)	X1CHWGHT	9,993	9.57	0.044	0.017	7.039	2.653
PC	X1 MENTAL PROB1: EXPLORES OBJECTS	X1MTL1	10,195	0.99	0.000	0.000	3.708	1.926
PC	X1 MENTAL PROB2: EXPLORES PURPOSEFULLY	X1MTL2	10,195	0.91	0.003	0.001	7.287	2.699
PC	X1 MENTAL PROB3: BABBLES	X1MTL3	10,195	0.55	0.005	0.002	7.892	2.809
PC	X1 MENTAL PROB4: EARLY PROBLEM SOLVING	X1MTL4	10,195	0.09	0.004	0.002	6.198	2.490
PC	X1 MENTAL PROB5: USES WORDS	X1MTL5	10,195	0.03	0.002	0.001	5.106	2.260
PC	X1 MOTOR PROB1: EYE-HAND COORDINATION	X1MTR1	10,166	0.92	0.001	0.001	3.601	1.898
PC	X1 MOTOR PROB2: SITTING	X1MTR2	10,166	0.95	0.001	0.001	3.096	1.760
PC	X1 MOTOR PROB3: PRE-WALKING	X1MTR3	10,166	0.79	0.004	0.002	4.117	2.029
PC	X1 MOTOR PROB4: INDEPENDENT WALKING	X1MTR4	10,166	0.31	0.007	0.003	5.576	2.361
PC	X1 MOTOR PROB5: BALANCE	X1MTR5	10,166	0.06	0.003	0.001	5.645	2.376
PC	X1 NCATS - TOTAL CHILD SCORE	X1NCATTC	8,606	15.50	0.048	0.029	2.724	1.650
PC	X1 NCATS - TOTAL PARENT SCORE	X1NCATTP	8,608	34.68	0.082	0.049	2.851	1.688
PC	X1 NCATS - TOTAL SCORE	X1NCATTS	8,608	50.18	0.102	0.062	2.698	1.643
PF	F1 Q3A CHANGE CHILDS DIAPER	F1CGDIAP	3,244	48.77	0.849	0.637	1.778	1.333
PF	F1 Q4D STAY HOME W/ILL CHILD	F1STYHM	783	11.71	0.651	0.411	2.506	1.583
PF	F1 Q4C TAKE CHILD TO DOCTOR	F1DCTR	1,333	18.62	0.598	0.497	1.446	1.202
PF	F1 Q2D HOW OFTN TAKE CHILD ON ERRANDS	F1ERRAND	732	9.81	0.474	0.379	1.564	1.251
PF	F1 Q3C FEED/GIVE CHILD BOTTLE	F1FEEDBT	3,133	45.96	0.892	0.637	1.961	1.400

See note at end of table.

Table 4-6. Standard errors and design effects for the full sample, 9-month data collection (overall): 2001–02—Continued

Weight	Survey item	Variable name	Number of cases	Estimate	Design SE	SRS SE	DEFF	DEFT
PF	F1 Q4A WAKE W/CHILD AT NIGHT	F1GETUP	892	14.06	0.777	0.443	3.074	1.753
PF	F1 Q3D PLAY PEEKABOO W/CHILD	F1PEEKC	2,210	34.68	0.798	0.609	1.718	1.311
PF	F1 Q3B PREPARE MEALS/BOTTLES	F1PREPFD	3,018	45.31	0.836	0.635	1.731	1.316
PF	F1 Q2A HOW OFTEN YOU READ TO CHILD	F1READBO	1,774	27.88	0.775	0.572	1.833	1.354
PF	F1 Q2C HOW OFTEN YOU ALL SING SONGS	F1SINGSO	771	11.30	0.514	0.406	1.605	1.267
PF	F1 Q4B SOOTHE UPSET CHILD	F1SOOTHE	1,194	17.91	0.727	0.491	2.195	1.482
PF	F1 Q2B HOW OFTN YOU TELL CH STORIES	F1TELLST	1,874	29.24	0.722	0.584	1.528	1.236
PF	N1 Q12 HOW YOU FEEL ABOUT BEING A FATHER	N1FTHSLF	11	3.08	1.207	0.666	3.284	1.812
PF	N1 Q9 FATHER WANTED CH WHEN BEC PRGNT	N1FWTBBY	363	54.32	2.797	1.936	2.088	1.445
PF	N1 Q13 HOW IS RELATIONSHIP W/CHILD'S MOM	N1RELM	549	79.18	2.326	1.567	2.203	1.484
PF	N1 Q3 HOW OFTEN SPENT 1+ HOURS W/CHILD	N1SPHR1	15	2.42	0.864	0.626	1.906	1.381
PF	N1 Q6 HOW OFTEN TALK WITH CHILD'S MOTHER	N1TALKM	540	79.77	2.162	1.557	1.929	1.389
PF	X1 TYPE RES FATHER-BIRTH/ADOPT/STEP/FOST	X1FTHTYP	6,218	86.15	0.481	0.413	1.355	1.164
PF	X1 HH FATHER/MALE GUARD-WORK STATUS	X1HFEMP	5,177	85.60	0.623	0.450	1.914	1.383
PF	X1 NON-RES FATHER WORK STATUS	X1NRFEMP	362	60.88	2.529	1.956	1.671	1.293
PF	N1 Q2 SEEN CHILD IN LAST 3 MONTHS	N1SEE3MO	576	50.80	1.766	1.393	1.607	1.268
PF	X1 HH FATHER-OCC GSS PRESTIGE SCORE	X1FTHSCR	5,674	42.85	0.180	0.135	1.776	1.333
PCF	F1 Q3A CHANGE CHILDS DIAPER	F1CGDIAP	3,173	48.83	0.857	0.644	1.769	1.330
PCF	F1 Q4D STAY HOME W/ILL CHILD	F1STYHM	766	11.78	0.661	0.418	2.504	1.582
PCF	F1 Q4C TAKE CHILD TO DOCTOR	F1DCTR	1,304	18.75	0.596	0.504	1.397	1.182
PCF	F1 Q2D HOW OFTN TAKE CHILD ON ERRANDS	F1ERRAND	706	9.60	0.514	0.379	1.835	1.355
PCF	F1 Q3C FEED/GIVE CHILD BOTTLE	F1FEEDBT	3,067	46.07	0.899	0.645	1.943	1.394
PCF	F1 Q4A WAKE W/CHILD AT NIGHT	F1GETUP	868	13.98	0.778	0.447	3.028	1.740
PCF	F1 Q3D PLAY PEEKABOO W/CHILD	F1PEEKC	2,164	35.05	0.822	0.618	1.771	1.331
PCF	F1 Q3B PREPARE MEALS/BOTTLES	F1PREPFD	2,953	45.45	0.858	0.643	1.781	1.335
PCF	F1 Q2A HOW OFTEN YOU READ TO CHILD	F1READBO	1,741	28.03	0.794	0.580	1.871	1.368

See note at end of table.

Table 4-6. Standard errors and design effects for the full sample, 9-month data collection (overall): 2001–02—Continued

Weight	Survey item	Variable name	Number of cases	Estimate	Design SE	SRS SE	DEFF	DEFT
PCF	F1 Q2C HOW OFTEN YOU ALL SING SONGS	F1SINGSO	746	11.29	0.540	0.411	1.723	1.313
PCF	F1 Q4B SOOTHE UPSET CHILD	F1SOOTHE	1,163	17.98	0.749	0.497	2.274	1.508
PCF	F1 Q2B HOW OFTN YOU TELL CH STORIES	F1TELLST	1,827	29.38	0.724	0.592	1.497	1.224
PCF	N1 Q12 HOW YOU FEEL ABOUT BEING A FATHER	N1FTHSLF	11	3.18	1.239	0.688	3.246	1.802
PCF	N1 Q9 FATHER WANTED CH WHEN BEC PRGNT	N1FWTBBY	352	54.49	2.635	1.966	1.797	1.341
PCF	N1 Q13 HOW IS RELATIONSHIP W/CHILD'S MOM	N1RELM	533	79.24	2.453	1.591	2.377	1.542
PCF	N1 Q3 HOW OFTEN SPENT 1+ HOURS W/CHILD	N1SPHR1	15	2.47	0.891	0.643	1.920	1.386
PCF	N1 Q6 HOW OFTEN TALK WITH CHILD'S MOTHER	N1TALKM	521	79.08	2.254	1.601	1.983	1.408
PCF	X1 TYPE RES FATHER-BIRTH/ADOPT/STEP/FOST	X1FTHTYP	6,067	86.14	0.472	0.418	1.274	1.129
PCF	X1 HH FATHER/MALE GUARD-WORK STATUS	X1HFEMP	5,059	85.54	0.621	0.456	1.853	1.361
PCF	X1 NON-RES FATHER WORK STATUS	X1NRFEMP	352	60.96	2.575	1.987	1.680	1.296
PCF	N1 Q2 SEEN CHILD IN LAST 3 MONTHS	N1SEE3MO	558	50.61	1.680	1.419	1.402	1.184
PCF	X1 HH FATHER-OCC GSS PRESTIGE SCORE	X1FTHSCR	5,538	42.87	0.178	0.137	1.694	1.302

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Table 4-7. Median design effects in the 9-month data collection, by component measure and subgroup: 2001–02

Domain	Parent		Parent-Child		Parent-Father		Parent-Father-Child	
	DEFF	DEFT	DEFF	DEFT	DEFF	DEFT	DEFF	DEFT
Overall	2.1000	1.4491	3.7080	1.9256	1.8055	1.3436	1.8160	1.3476
Sex								
Male	1.8690	1.3671	2.5780	1.6055	1.8560	1.3624	1.8765	1.3699
Female	1.8950	1.3766	2.7995	1.6725	1.9220	1.3864	1.9380	1.3921
Race/ethnicity								
American Indian or Alaska native, non-Hispanic	1.6690	1.2919	3.2740	1.8094	1.7180	1.3107	1.7245	1.3132
Asian, non-Hispanic	1.6220	1.2736	2.3110	1.5199	1.6230	1.2740	1.5920	1.2617
Native Hawaiian or other Pacific Islander, non-Hispanic	1.8690	1.3671	1.7645	1.3283	1.8985	1.3778	1.8290	1.3524
Hispanic, no race specified	1.4860	1.2190	2.0720	1.4393	1.5330	1.2381	1.5675	1.2520
Hispanic, race specified	1.5630	1.2502	1.6140	1.2703	1.8000	1.3416	1.7880	1.3372
Black, non-Hispanic	2.4425	1.5627	1.5895	1.2607	2.2870	1.5120	2.2780	1.5090
White, non-Hispanic	1.5270	1.2357	1.7420	1.3195	1.4765	1.2125	1.5530	1.2452
More than one race specified	2.4660	1.5704	2.9060	1.7047	2.6050	1.6140	2.8560	1.6900
Plurality								
Singleton	1.8620	1.3646	3.5460	1.8831	1.5385	1.2404	1.5530	1.2462
Twin	1.7900	1.3379	2.1585	1.4692	2.2835	1.5110	2.2340	1.4947
Higher order	1.6760	1.2946	1.4125	1.1883	1.7245	1.3119	1.7055	1.3050

See note at end of table.

Table 4-7. Median design effects in the 9-month data collection, by component measure and subgroup: 2001–02—Continued

Domain	Parent		Parent-Child		Parent-Father		Parent-Father-Child	
	DEFF	DEFT	DEFF	DEFT	DEFF	DEFT	DEFF	DEFT
Birth weight								
Very low birth weight	1.6950	1.3019	3.3670	1.8346	1.5160	1.2312	1.5680	1.2522
Moderately low birth weight	1.4060	1.1857	1.3845	1.1766	1.5595	1.2488	1.6110	1.2692
Normal birth weight	1.2700	1.1269	1.6020	1.2651	1.3390	1.1572	1.3760	1.1730
Region								
Northeast	3.1090	1.7632	3.9090	1.9771	2.0940	1.4470	2.1940	1.4809
Midwest	2.0710	1.4391	4.6190	2.1492	1.8675	1.3663	1.8655	1.3657
South	2.5070	1.5834	4.4820	2.1171	2.0740	1.4401	2.0400	1.4283
West	2.3110	1.5202	3.2810	1.8114	2.1060	1.4512	2.0800	1.4422
Poverty level								
Below poverty threshold	1.8435	1.3577	2.2160	1.4886	1.9695	1.4033	1.9730	1.4046
At or above poverty threshold	2.1100	1.4526	3.4860	1.8671	1.9105	1.3822	1.9240	1.3871

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

REFERENCES

Deming, W.E., and Stephan, F.F. (1940). On a Least Squares Adjustment of a Sampled Frequency Table When the Expected Marginal Totals are Known. *Annals of Mathematical Statistics*, 11, 427-444.

Durbin, J. (1967). Design of multi-stage surveys for the estimation of sampling errors. *Applied Statistics*, 16, 152-164.

Federal Interagency Forum on Child and Family Statistics. (1999). *America' Children: Key National Indicators of Well-Being*. Washington, DC: U.S. Government Printing Office.

Flores-Cervantes, I., Brick, J.M., Jones, M.E., DiSogra, C. and Yen, W. (2002). Weighting for Nontelephone Households in the 2001 California Health Interview Survey. *Proceedings of the Section on Survey Research Methods, American Statistical Association* (pp. 1002–1007). Alexandria, VA: American Statistical Association. (Available for purchase on CD: http://www.amstat.org/publications.)

Folsom, R.E., Potter, F. J., and Williams, S.R. (1987). Notes on a Composite Site Measure for Self-Weighting Samples in Multiple Domains. In *Proceedings of the American Statistical Association*, Section on Survey Research Methods (pp. 792-96). Alexandria, VA: American Statistical Association. (Available: http://www.amstat.org/sections/srms/proceedings/papers/1987_141.pdf)

Kass, G. (1980). An Exploratory Technique for Investigating Large Quantities of Categorical Data. *Applied Statistics*, 29, 119-127.

Levine, D.B. and Bryant, E.C. (1997). *An Examination of Alternative Approaches to Selecting a Sample of New Births*. (Prepared under contract to the National Center for Education Statistics). Rockville, MD: Westat, Inc.

Magidson, J. (1993). SPSS for Windows: CHAID, Release 6.0. Statistical Innovations Inc.

Mahalanobis, P.C. (1975). On the Generalized Distance in Statistics. In Multivariate Statistical Methods: Among-Groups Covariation; Within-Group Covariation (a collection of reprints), 124-130.

U.S. Department of Education, National Center for Education Statistics. (Forthcoming [a]). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Methodology Report for the Nine-Month Data Collection, Volume 2: Sampling.* Washington, DC: U.S. Department of Education.

U.S. Department of Education, National Center for Education Statistics. (Forthcoming [b]). *Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K), Third Grade Methodology Report* (NCES 2005–-18). By Karen Tourangeau et al. Elvira Germino Hausken, project officer. Washington, DC: U.S. Department of Education.

U.S. Department of Health and Human Services, National Center for Health Statistics. (1991). *Health Service Areas for the United States*, Series 2, No. 112. Hyattsville, MD: National Center for Health Statistics.

U.S. Department of Health and Human Services, National Center for Health Statistics (1997). *U.S. Vital Statistics System* (DHHS Publication No. (PHS) 97-1003). By Alice M. Hetzel. Hyattsville, MD: National Center for Health Statistics.

This page intentionally left blank.

5. DATA COLLECTION METHODS AND RESPONSE RATES

The following sections discuss the procedures used in the 9-month wave of data collection of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B). Section 5.1 summarizes the methods employed in collecting data from the parent, the child, and the father. Section 5.2 provides an overview of the field staff training procedures that were used to prepare interviewers and field supervisors for the data collection task and describes the measures taken to certify that data collection staff could successfully collect the data. Section 5.3 describes the data collection procedures themselves, beginning with an advance letter to parents and continuing with the initial household contact; it presents information on conducting the parent interview, the child assessments, and the father questionnaires. Section 5.3 also describes the protocol for collecting data from households with limited English proficiency and presents information on the Child Observations and Interviewer Remarks. Section 5.4 presents the response rates for the parent interview, the child assessments, and the father questionnaires. Section 5.5 describes the quality assurance procedures for the data collection task.

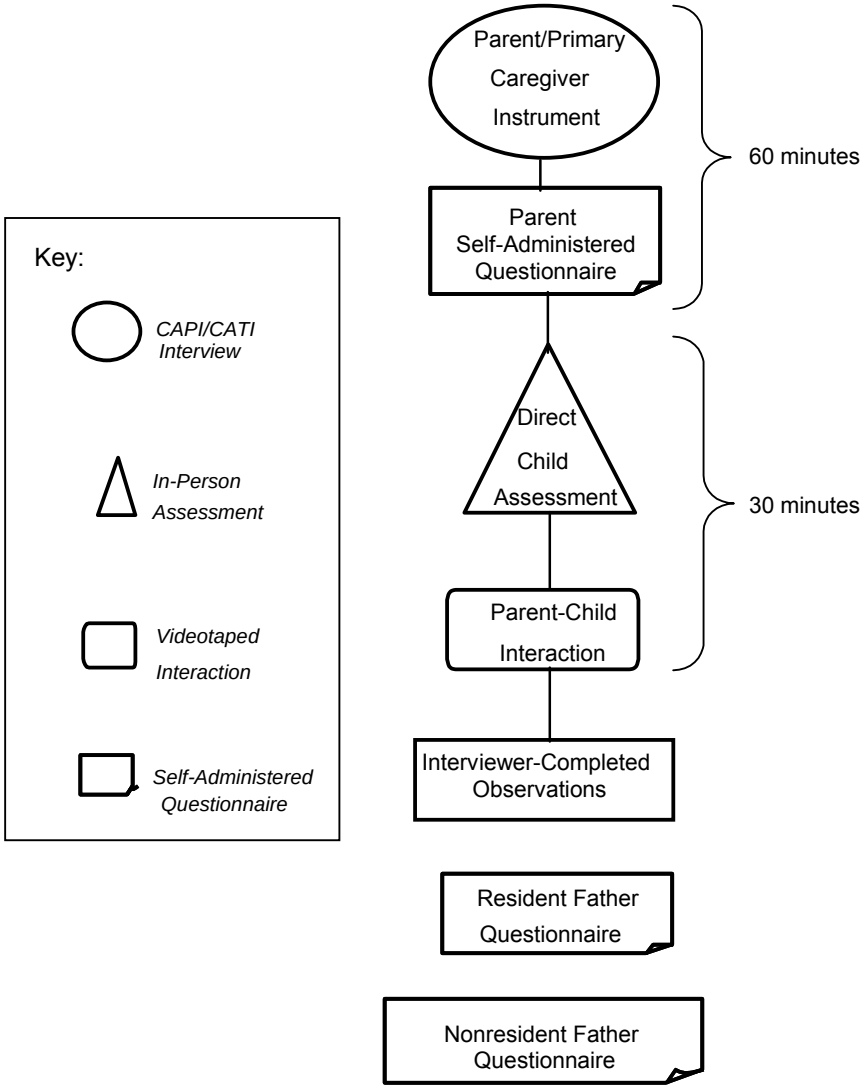
5.1 Data Collection Methods

The 9-month wave of data collection began in October of 2001 and continued through December of 2002. Figure 5-1 shows the different methods used to collect the data. Computer-assisted personal interviewing (CAPI) was the principal mode of data collection for the parent interview; self-administered questionnaires were used for gathering information from the spouse or partner of the parent interview respondent (i.e., resident father questionnaire) and for asking sensitive items of the parent respondent. Data were also collected from the child by several means: a series of structured, standardized activities were scored by the field interviewer; a structured interaction with the parent was videotaped for coding; physical measurements (e.g., length and weight) were obtained; and behavior was observed throughout the home visit.

The ECLS-B sample included about 800 twin pairs. Data collection methods were tailored somewhat for twins. Parents of twins were asked to participate in only one twin interview; the sequence of questions was identical to the sequence for parents of singletons and other multiple births. General home and family items were asked only once. Questions specific to the child were asked twice—once for each child (e.g., Child Development section of the parent CAPI instrument). The parent CAPI instrument

went through and asked about one of the twins, and then at the end of the sequence of questions that was common to all parents, the instrument looped back to the specific child questions about the other twin. Only one parent self-administered questionnaire was completed. Separate assessments were conducted for the two twins. The father was asked to complete only one questionnaire for twins.

Figure 5-1. Data collection components for wave 1: 2001–02



SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

5.2 Field Staff and Field Staff Training

For data collection management, the ECLS-B primary sampling units (PSUs) were distributed among 13 regions. Each region was staffed by one field supervisor and between 14 and 19 interviewers, for a total of 256 field staff who were ever active across the length of the field period. Interviewers were responsible for making in-person contact with the sampled cases and completing all data collection activities associated with the cases assigned to them.[1]

In-person training was conducted to prepare field staff for the 9-month data collection tasks. Two different types of training sessions were conducted, one for field supervisors and lead trainers and one for interviewers. Interviewers were trained in two sessions.

The training session for field supervisors and lead trainers was held from August 26 to August 30, 2001, in Rockville, Maryland; 24 individuals were trained. Most of the field supervisors selected for the study had prior experience as field supervisors with Westat, experience on the ECLS-B field test, or experience as field supervisors with another major survey research company. Lead trainers were drawn from the contractor's child development or survey operations staff.

The first interviewer training session was held from October 10 through 17, 2001, in Los Angeles, California; 202 interviewers were trained. A second session was held the week of December 3, 2001, to add more interviewers to the field staff; 41 were trained in the second session in Rockville, Maryland. The focus in hiring interviewers was on those who had worked on the ECLS-B field test or had some other experience working with very young children. This "other" experience included working on studies that involved working with young children (such as work on the ECLS-K study) or work in the field of early child development. The interviewers hired had a mix of experience ranging from prior work on the ECLS-B, education in early childhood development, and/or prior interviewing experience to no background in early childhood development (other than as a parent or grandparent) or in household interviewing.

Before the in-person training, all field staff received 4 hours of home study training. The home study materials covered the study design and procedures for making initial contact, how to conduct a home visit, documenting work, and other study protocol. The training included reading the field

[1] The staff who collected the data are referred to as interviewers, because the activity that required the most time in the home visit was the interview with the parent. However, the reader should keep in mind that the home visit included a number of activities that are not commonly included in an interviewer's tasks (e.g., assessing the child's mental and motor abilities and videotaping a parent-child interaction).

representative manual, viewing a videotape that introduced the home visit, and completing a short-answer exercise on materials covered in the manual and on the video. The home study also included a self-paced CAPI tutorial on using the computer and explaining standard features of conducting a CAPI interview.

5.2.1 Field Supervisor Training

The field supervisor training had several major goals:

1. Develop expertise in ECLS-B interviewing tasks among the field supervisors;
2. Develop supervisor skills in using field management tools; and
3. Build content knowledge and training skills for trainers.

Field supervisor training preceded the interviewer training and lasted for 4 days. The training covered field procedures and protocol as well as using the Interviewer Management System (IMS) and the Field Management System (FMS). The IMS, which resided on the interviewer's laptop, was used by the interviewers to manage their assigned casework and to collect data about the sampled child and his or her family. The FMS was used throughout the data collection period to transmit data from the interviewer's laptop computer to the contractor's home office; to send data (including case assignments) from the home office to the laptop; to manage casework and workload of interviewers; and to monitor production on all data collection activities. During training, supervisors were given hands-on experience in using both systems.

In addition to training on using the IMS and the FMS, topics covered in the field supervisor training session included a review of materials and protocol for making initial contact with the parent; interactive lectures that covered the content and administration of the parent CAPI instrument, the hard-copy parent and father questionnaires, and the Child Observations and Interviewer Remarks; lectures and role plays on conducting the child assessments; and review of administrative materials and procedures, including conducting quality control visits of all interviewers. Supervisors were trained and certified on all activities performed by field interviewers during data collection in the home.

5.2.2 Field Interviewer Training

The major goals of field interviewer training were as follows:

1. Develop skills in gaining cooperation and provide field interviewers with confidence in answering respondent questions about all aspects of the study.

2. Develop skills in conducting the CAPI parent instrument and administering the child assessments.

3. Acquire mastery in applying the study protocol and all administrative procedures associated with the study and field work.

There were 7 days of classroom training, spanning an 8-day period. There were 13 training classrooms each comprising between 18 and 24 field interviewers, two trainers, and at least one support staff. The training approach included interactive lectures; practice in pairs using role-play scripts; practice with children recruited specifically for the training; and videotapes and written material on techniques and strategies for working with the 9-month-old child. The various training activities provided trainees with hands-on experience with all data collection tasks required by the study as well as experience using the IMS and the CAPI programs prior to actual data collection.

Time allocated across training topics is shown in exhibit 5-1:

Exhibit 5-1. Training topics and time allocations in the 9-month data collection: 2001–02

Training topic	Training hours
Total	56.0
Introduction to the ECLS-B	0.5
Making contact	4.5
Parent interview (includes parent CAPI instrument and parent self-administered questionnaire)	10.5
Father questionnaires	6.0
Child assessments (Total)	23.0
Bayley Short Form–Research Edition (BSF-R)	14.5
Nursing Child Assessment Teaching Scale (NCATS)	3.0
Physical measurements	3.5
Child Observations	2.0
Quality control	2.0
Reporting	3.0
Administration/assignments	6.5

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Spanish bilingual staff received one additional day of training, immediately following training of all staff. This training focused on the aspects of data collection that were affected as a result of conducting the home visit in a language other than English. Staff bilingual in Asian languages received similar training by telephone. Aspects of data collection that were discussed and the allocation of training time for each appears in exhibit 5-2.

Exhibit 5-2. Additional training topics and time allocation for bilingual training session in the 9-month data collection: 2001–02

Training topic	Hours allocated
Total	8.0
Welcome/introduction	0.25
Making contact	1.75
Parent interview	3.0
Father questionnaires	1.0
Child assessments (Total)	1.0
Bayley Short Form–Research Edition (BSF-R)	0.50
Nursing Child Assessment Teaching Scale (NCATS)	0.25
Physical measurements	0.25

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

5.2.2.1 Training on the Parent CAPI Instrument and Other Nonassessment Instruments

The trainees used laptop computers configured with cases that were part of a training database. The laptops were used to select training cases and complete all of the components associated with data collection, including those components that were a part of the home visit (e.g., parent CAPI instrument) and those that were to be completed after the home visit (e.g., Child Observations and the Interviewer Remarks).

Training on the parent interview utilized an interactive lecture format to introduce the parent CAPI instrument, make specific points about questionnaire content, and provide an opportunity for each interviewer to practice with the group. The trainer worked with a script of answers and played the role of the respondent in a practice case. Interviewers took turns asking the questions and entering the responses. Frequently the trainer used the practice case to make a scripted training point. The first interactive lecture was followed by practice in pairs, with one interviewer playing the role of a respondent following a script and the other interviewer asking the questions and entering the responses into the laptop. Then the interviewers reversed roles. More complex cases were introduced in subsequent interactive lectures, followed by more challenging role-play experiences in pairs. This training approach was also used for the other nonassessment instruments (such as the parent self-administered questionnaire and the resident father questionnaire).

There was no formal certification process for the parent interview *per se*. Each trainee was observed in a number of training contexts for the parent interview throughout the training. The most difficult skills for most interviewers were related to CAPI functions, and almost all interviewers found CAPI easier than the child assessments to learn. From the first day, interviewers who were observed having difficulty achieving mastery of parent interview skills were routed into tutorial sessions, and all were judged capable of administering the parent interview well by the end of classroom training.

5.2.2.2 Training on the Assessment Instruments

A major goal of the interview training session was to train field staff in the proper procedures to conduct the child assessments, including the Bayley Short Form–Research Edition (BSF-R), the Nursing Child Assessment Teaching Scale (NCATS), and the physical measurements. Training on the child assessments began on the first day with a general overview of the three instruments, the purpose

of the assessments, and the materials required. The requirements for certification on the assessments were also presented during this introduction. The three different child assessment instruments were introduced in more detail over the next two days as follows.

5.2.2.2.1 Training on the Bayley Short Form–Research Edition

As shown in exhibit 5-1, a considerable amount of training time was devoted to the BSF-R. To achieve consistency in all the classrooms, the training approach relied heavily on a series of ECLS-B videotapes created by the contractor's child development staff. The BSF-R training began with a detailed introduction that included viewing an introductory videotape of a complete administration conducted by a child development staff member under conditions similar to what field staff would encounter during a home visit. This introduction emphasized that the BSF-R is a standardized assessment and that interviewers needed to adhere closely to the instructions. The required setting for the BSF-R administration (i.e., a quiet, well-lighted, well-ventilated space with the child seated at a table directly facing the interviewer) and the application of the basal and ceiling rules (see chapter 2, section 2.1.1 for a discussion of these rules) rounded out the contents of this introduction.

The foundation for training on the BSF-R was a second training videotape. This second, detailed videotape included the complete instructions for administering and scoring all the mental and motor items of the BSF-R. Supplementary information on the tape included the purpose(s) of an item as well as troubleshooting tips, for example, what to do if the child responded in some unexpected way on an item. This videotape also explained the basal and ceiling rules in detail.

The detailed training videotape had several purposes. The first was to ensure that all trainees received the same comprehensive information about the BSF-R. The second purpose was to streamline and standardize the training of the lead trainers who were not from the child development group; the BSF-R is a complex instrument, and standardizing the instruction in this way ensured that the trainers also received the same information. A third purpose was to support additional opportunities for practice, outside the classroom. All trainees received a copy of the videotape to take home with them so that they could review the administration and scoring of the items, as needed, to improve their administration.

The detailed videotape was presented in two parts over a 2-day period beginning on the second day of training. On the first day, the instructions for administering and scoring the mental scale

items, including the core, basal, and ceiling items, were presented over a 2-hour period. This also included instruction about how to determine whether the basal set of items or the ceiling set of items should be administered to the child. Following the videotape presentation of the mental items, all trainees then participated in "directed practice" that involved following the trainer's instructions for administering and scoring all the mental scale items. This directed practice is similar to role plays in which trainee pairs practice administering an instrument, one trainee taking the role of respondent and the other the role of interviewer. Training on the vocalization and language items of the BSF-R proceeded similarly. A separate (third) videotape of children's vocalizations was presented. Trainees then practiced saying the different types of vocalizations to learn to recognize the sounds and then practiced scoring the sounds according to the BSF-R criteria.

The motor scale items on the second, detailed videotape were presented the next day over a 1½ hour session (shorter than the mental scale because there are fewer motor scale items in the BSF-R). This was followed by a 1-hour directed practice session in which trainee pairs administered the motor items to a cloth doll following the instructions of the trainer.

Trainees then viewed the first introductory videotape again. During this viewing, trainees completed a BSF-R review form in which they scored the child's performance on each item and rated how well the tester adhered to the administration instructions for the items. This gave trainees further practice scoring BSF-R items and practice with the administration instructions. This also exposed trainees to the same review form that would be used by the contractor's staff and field supervisors during quality control visits in the field. This practice session was followed by a precertification quiz (see section 5.2.3 for more details) in which another videotape (the fourth tape used in the training approach) of a complete BSF-R was presented. Using the same BSF-R review form, trainees scored the child's performance on the items and scored the tester's adherence to the BSF-R administration instructions for each item. This precertification quiz served as a standardized tool for identifying trainees who needed to improve understanding of administration instructions or scoring before advancing to the live practice session.

Establishing rapport is a critical requirement for obtaining a BSF-R that accurately measures a child's ability. Therefore, trainees were given tips about how to establish and maintain rapport with an infant, how to monitor the child's gaze to help them adjust the pace of item administration, and how to adjust the order of items to keep the child interested and move through the BSF-R efficiently. During this instruction, trainees were also taught how to modify any item administration in order to provide children with disabilities an equal opportunity to perform.

As an adjunct to this formal training, trainees were also encouraged to work in pairs or small groups in their rooms at night to practice BSF-R administration and scoring or, alternatively, to attend nightly help labs conducted by the contractor's child development staff members. These nightly help labs were exceptionally well attended. During these help labs, trainers reviewed the BSF-R item by item, and trainees practiced administering and scoring the items as well as administering the basal and ceiling rules.

5.2.2.2.2 Training on the Nursing Child Assessment Teaching Scale

The NCATS was introduced on the fourth day of training in a 2-hour training session. During the first hour, the administration of the NCATS activity was emphasized, including the need to obtain a high quality videotape of the interaction. During this time, trainees viewed a videotape that included examples of a high quality videotape and a low quality videotape. In the second hour, trainees were introduced to the camera, learned how to operate the camera, and then practiced in pairs to administer and videotape the NCATS to each other. Because the videotapes would be coded by trained coders upon receipt at the home office, the focus of this training was on the proper administration of the NCATS task and quality videotaping of the interaction. The forms that would be used to review the quality of the tapes were also discussed so that interviewers would be familiar with the methods that would be used to review their performance in the field as well as reinforce the different elements of a high quality NCATS taping.

5.2.2.2.3 Training on the Physical Measurements

Training on the physical measurements included understanding the purpose of the measurements and becoming familiar with the equipment. The equipment included the SECA scale, the SECA measuring tape (for obtaining the middle upper arm circumference, or MUAC, and, when necessary for very low birth weight babies, the head circumference), and the SECA MeasureMat (a device for measuring child's recumbent length). The trainer demonstrated each measurement, using oversize dolls and other training staff. Hands-on practice was an important part of this training; each trainee practiced weighing a partner and measuring the partner's MUAC and head circumference. (Practice measuring recumbent length was not feasible due to the obvious limitations of the MeasureMat).

5.2.2.3 "Live Practice" of the Child Assessments

On the fifth day of training, all trainees had the opportunity to administer all the child assessments to infants during a live practice session. Each trainee administered the child assessments to an infant.[2] Trainees were instructed to begin the parent CAPI instrument with the volunteer and then break off to begin the child assessments. The child assessments were then administered in the order of the BSF-R, the NCATS, and the physical measurements.

Trainees worked in pairs, with each partner taking turns administering all the child assessments to a child while the other partner videotaped the administration. After the first partner completed an administration of the child assessments, trainees switched roles. A new child was brought in, and the second partner then administered all the child assessments while the first partner videotaped this administration. Thus, trainees gained experience administering the assessments to children in a way that was very similar to what was expected on a home visit. Furthermore, in addition to providing trainees with live practice, the session also served as the means by which trainees were certified on their administrations. The sections that follow describe in greater detail the certification procedures that were undertaken to ensure that field staff administered the child assessments competently and to required standards in the field.

5.2.3 Certification on the Bayley Short Form–Research Edition

As described in chapter 3, the BSF-R is derived from the Bayley Scales of Infant Development, Second Edition (BSID-II). The BSID-II is a comprehensive, standardized measurement that is used to assess children's developmental status from birth through 42 months of age. The BSF-R, as described in chapter 2, was designed to measure the developmental status of children ranging in age from approximately 8 months to 11 months of age and to be administered by lay interviewers in a home-based setting. As a standardized assessment, the BSID-II, and therefore the BSF-R, requires that the administrator follow clear instructions when administering an item and follow clear criteria when scoring the child's performance on an item. It also requires that the administrator establish and maintain good rapport with the child in order to elicit the best performance possible from the child. Maintaining good

[2] For the interviewer training in October, two market research firms (Savitz Field and Focus and Ask Southern California) recruited 300 infants. For the interviewer training in December, the contractor's home office staff recruited 57 infants. For both trainings, each infant's mother was paid $50.

rapport requires that the interviewer be able to adjust her pace to match the child's ability to receive the instructions and for the interviewer to monitor the child's positive or negative mood to keep the child motivated. In order to monitor the child's performance and mood in this way, interviewers must be in command of the BSF-R item administration procedures.

For these reasons, it was important to ensure that, before collecting data from ECLS-B cases in the field, trainees were able to administer the BSF-R to matching standards for administration and scoring. Standards were developed by the contractor's child development experts, with guidance from external reviewers. A three-level certification component was incorporated into training, beginning with in-class exercises, progressing to a written precertification exam, and culminating in the complete administration of the BSF-R during a "live" practice session with infants. Certification on the BSF-R during the live practice session involved evaluation of the trainees' ability to administer the items according to the standardized instructions, knowledge of each item's scoring criteria, and ability to establish rapport and to interpret the children's responses.

There were several in-class written quizzes beginning when the BSF-R was first introduced. Beginning on the second day of training, when the mental items of the BSF-R were first introduced on the BSF-R training videotape, trainees were quizzed on the scoring of all items, including core, basal, and ceiling items. In addition, trainees were introduced to the vocalization items of the mental scale, practiced saying a wide range of vowel sounds to learn to recognize them, and then completed a quiz on scoring the vocalization items from a videotape. The correct answers for all the quiz items were reviewed immediately after the quiz so that trainees could learn from their mistakes. The same quiz procedure was followed on the third day of training (which was the second day of BSF-R training) when the motor items of the BSF-R were presented on the BSF-R training videotape. The purpose of these quizzes was not to assign grades but to identify individuals who were having trouble scoring the BSF-R items from the videotape. Those identified were then required to attend help labs in the evenings to improve their understanding of the scoring criteria.

On the third day of training, after 2 days of direct BSF-R instruction, modeling, and directed practice role plays, trainees completed a practice exam in preparation for a precertification written exam, which immediately followed the practice exam. The precertification exam included a videotape presentation of a complete BSF-R administration, with core, basal, and ceiling items. Two videotapes showed two people, each administering the core, basal, and ceiling items of the BSF-R, to a number of children. Trainees, as a group, viewed the videotapes item by item and recorded the scores (credit or no

credit) they would give for the child's performance on each item. Using a standard BSF-R review form, they also scored the accuracy of the administration of the individual administering the BSF-R on the videotape. The following sample item (exhibit 5-3), which is similar to those on the BSF-R review form, shows that the administration instructions were included so that trainees could compare what the administrator did with the standard instructions, and the scoring instructions were included so trainees could assign credit or no credit for the child.

Exhibit 5-3. Sample item from the BSF-R review form, 9-month data collection: 2001–02

3. Uses Means-End Behavior to Retrieve Object

Administration:

During this item, does **administrator**

1. If using tray table, turn it lengthwise to child?	❑YES	❑NO	❑NA
2. Suspend object and swing 8-10 from child s face at eye level?	❑YES	❑NO	
3. Place object out of reach; string toward child?	❑YES	❑NO	

4. Make any other errors?_____

Scoring:

During this item, does **child**

Play with string (doesn t need to grab object)? (Basal Item).....	❑YES	❑NO
Bang object in play? (Basal Item).....	❑YES	❑NO

Score box: Record C/NC in box.	
Uses Means-End Behavior to Grab Object 3.	

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

The practice exam included time for trainees to review their own scoring and receive clarification on any item. The answers for each item were reviewed by the group, and questions were discussed. After completing the practice exam, each trainee completed the precertification exam. Although the videotape was paused between items to give trainees time to complete the item, there was no discussion of the answers, and no questions were permitted. Again the trainees scored the child according to the performance in the video (credit/no credit) and critiqued the administration of each item. In order to pass the precertification exam, each trainee had to receive 90 percent or higher on scoring the items and 85 percent or higher on review of the administration. The higher criterion for scoring accuracy was imposed because scoring errors can result in misapplication of the basal or ceiling rule and therefore the loss of data.

Any trainee who did not pass either of these precertification criteria was required to attend a mandatory help lab to improve her or his understanding of the administration instructions or the scoring rules before being able to advance to the live practice session. This precertification exam identified 27 out of 243 trainees (11 percent) who were required to attend the help lab. In practice, however, almost half of all trainees voluntarily attended all or some help labs. On average, trainees received scores of 91 percent for critique of administration and 87 percent for accuracy of scoring on the precertification exam.

The certification process culminated in the live practice session in which each trainee administered the BSF-R to a child who ranged in age from about 8 to 12 months, the approximate age range trainees would encounter during the ECLS-B data collection. (Although the BSF-R was designed to measure the status of children ranging in ages from approximately 8 to 11 months, most 12-month-olds were more than adequate subjects for certification purposes.) While one trainee administered the BSF-R, the other trainee videotaped the assessment. To ensure that all trainees were obtaining a clearly visible and audible videotape of the BSF-R administration, trainers and technical support staff circulated around the rooms and viewed trainees' camera display screens to make sure that the BSF-R was framed properly.

After the live practice sessions, all BSF-R videotapes were reviewed by the ECLS-B training staff. The qualifications of the training staff to judge trainees' BSF-R administration had been established prior to training. To certify the training staff, four core child development staff members, who had graduate training in child development, early childhood education, or another social science and who had been directly involved in the creation of the BSF-R, were each videotaped while administering the BSF-R to a child. These videotapes were then sent to an expert consultant on the BSID-II. Videotapes were critiqued for administration of items and establishing good rapport with the children. These core child development staff members then trained the other lead trainers in one-on-one tutorials followed by practice with child volunteers. After these trainers had sufficient practice with child volunteers and were confident that they knew the BSF-R administration, they administered a complete BSF-R to a new child and were live-coded by one of the child development staff members using the standard BSF-R review form for certification. All trainers passed this certification exam with a minimum of 90 percent for administration accuracy and 90 percent for scoring accuracy.

After the live practice session, this ECLS-B training staff used the same BSF-R review form that was used during the precertification exam to review each trainee's BSF-R videotape for accuracy of administration, accuracy of scoring the child's responses, and the trainee's ability to maintain rapport. In order to be certified on administration of the BSF-R, each trainee had to earn 90 percent or higher on

scoring the child's responses and 85 percent or higher on accuracy of administration. Trainees who did not pass certification during live practice were required to attend a special help lab where they were given feedback on their performance and guidance for improvement. They were then required to complete a second live practice administration of the BSF-R with another child. There were 21 trainees who were required to do a second live practice, 13 of whom then went on to pass their certification. Five trainees who were not able to achieve certification were released from the study, and three trainees who refused a second practice were also released. Including both training sessions (i.e., October and December), trainees received an average score of 93 percent for BSF-R administration accuracy and an average score of 92 percent for scoring accuracy on the live practice certification. Seven percent of the staff who attended training failed to meet the study standards for the BSF-R and were released.

5.2.4 Interviewer Certification on the Nursing Child Assessment Teaching Scale

The NCATS is a semi-structured parent-child interaction in which the parent is instructed to teach her child a new and challenging task. The parent is given a standard list of age-appropriate activities and told to select one that the child is not yet able to do, such as pretending to drink from a cup. (See sections 2.1.2 and 3.1.2 for more details about the NCATS.) Interviewers were trained to administer the activity the same way to all parents. To ensure standardization of administration, all the NCATS administration instructions, including a script to be read to the parent, were presented in unambiguous detail in the NCATS section of the Child Activity Booklet. The interviewer only needed to follow the step-by-step instructions in the booklet to administer the NCATS accurately. Role plays were conducted during the training to familiarize the interviewers with the NCATS. In groups of three, trainees each took turns administering the NCATS, playing the role of the parent and then playing the role of the child. As trainees participated in the role plays, trainers and all available technical support staff monitored the groups to intervene and correct any problems and to recommend attendance at help labs when necessary.

The NCATS is usually coded *in vivo* by individuals trained on this coding system. For the ECLS-B, however, interviewers were instructed to obtain a videotape of this interaction because live-coding of the interaction within the context of the home visit would be too burdensome for them to do reliably. The NCATS tapes were later coded by trained coders at Westat using the NCATS coding system (see section 5.6). For details about the NCATS and its score, see chapters 2 and 3, respectively.

The main emphases of NCATS certification at training were the following:

- Correct administration of the NCATS;
- Proficient use of the video camera; and
- Production of a high quality videotape.

To ensure that these skills were achieved, trainees received hands-on review of each of these skills during the live practice. During the ECLS-B training, interviewers were trained to introduce the NCATS task to the parent, assist the parent to select an appropriate teaching task, and end the task appropriately. To end the task, interviewers were trained to instruct the parent twice to "tell me when you are done"; record until the parent says something like "We are done"; if five minutes had elapsed and the parent had not yet indicated completion they were to ask "Are you finished yet or do you want to continue?" If the parent chose to continue, the interviewer would tape for 30 more seconds and then say "That's good. Thank you very much." After the videotape session was over, the interviewer would rewind the tape and play it back to make sure the camera was recording.

Since the NCATS was not live-coded, high videotape quality was essential for reliable coding. Field staff were trained and certified on videotaping techniques that would produce codeable tapes (e.g., adequate lighting and sound, seeing the parent and child's facial expressions, hearing vocalizations). Certification procedures for the NCATS therefore focused on obtaining a codeable videotape of the NCATS interaction.

Training on correct procedures for videotaping the NCATS interaction included viewing NCATS training films that showed the interactions between a parent and child during the NCATS teaching task. The films also provided examples of good and bad camera angles, framing, and visual shots for capturing verbal and nonverbal behavior to enable coding the NCATS. During the live practice, each interviewer administered the NCATS task and videotaped a parent and child engaged in the activity. Trainers and technical support staff observed this administration, paying particular attention to the image being captured in the camera's viewfinder. Hands-on quality control was done to address issues such as inappropriate framing or camera angle during the live practice. Trainers and support staff intervened as appropriate to make corrections and to make sure that the trainee was videotaping appropriately. Recommendations for mandatory help labs on the NCATS (both administration and videotape skills) were made for those trainees showing problems that would compromise NCATS coding.

In addition to hands-on review of their videotaping skills during live practice, interviewers were precertified on the basis of the quality of their videotapes of their partner's BSF-R administration. (As noted earlier, each trainee videotaped his/her partner administering the BSF-R during live practice. See section 5.2.3.) A final certification of NCATS videotape quality during training was not possible because trainers and technical support staff were rigorously monitoring BSF-R videotape quality to ensure that all BSF-R administrations could be clearly evaluated. In addition, NCATS videotape certification would require the partners to switch the camera, insert a new videotape, and remember to put on a new label with the NCATS filmer's name. This seemed to introduce too much potential for error in the context of the scale of the ECLS-B training. Therefore, it was decided to concentrate on final certification after the first NCATS tapes were received from data collection in the field.

Final certification of videotaping skills took place when NCATS tapes were receipted at the home office and were quality checked by trained NCATS coders using the NCATS Videotape Quality Control Checklist. This checklist consists of 11 aspects of quality that are critical to the success of the NCATS coding, such as quality of lighting, sound level, and camera position and angle. The first three NCATS videotapes that each interviewer sent in were coded and reviewed for quality immediately upon receipt to assess a final certification and to make sure that any potential errors would not be duplicated on incoming tapes. If, after three videotapes, an interviewer did not achieve 85 percent on the checklist scores, a discussion was held with the contractor's project management and the individual's field supervisor to determine a further course of action, such as additional home study or additional training on the NCATS in the contractor's office. No trainees were released because of NCATS administration problems. Of the 9,439 videotapes processed in the coding activity, 731 (8 percent) were uncodeable. The uncodeability rate was higher during the early months of the coding effort.

Immediate feedback on an ongoing basis was given to field staff to correct videotaping techniques, as required. Problems reported on the Videotape Quality Control Checklist covered a number of items, some more critical to codeability of the tape than others. For example, the Quality Control score of field interviewers was marked down if he or she failed to provide an appropriate date stamp or failed to note the language used during the NCATS administration, though neither had impact on the codeability of the tape. However, field interviewers were also given feedback on items critical for coding the tapes such as improper camera position (e.g., shaky or not properly framing the child and parent) or inadequate volume level. Regardless of the nature of the problem, field interviewers received complete and thorough feedback. Over the course of the field period, feedback to correct videotaping techniques was given to about 20 percent of the field interviewers. In a typical month (selected from the middle of the data

collection so as to be representative), videotape quality control scores averaged 85 percent across all interviewers (range 35 to 100 percent).

The videotape quality review also included the appropriateness of the chosen NCATS activity, capturing the introduction of the materials by the mother to the child, ending the task appropriately, and not interrupting the interaction. Feedback about administration errors was given to field supervisors on a weekly basis, who then followed up with the interviewers.

5.2.5 Certification on the Physical Measurements

Training on the physical measurements involved hands-on practice during which trainees worked in triads to role play obtaining physical measurements from the mother and child. The triad included one interviewer obtaining measurements, one interviewer being measured, and a third interviewer observing the interaction. During that role play and others, trainers and technical support staff monitored trainees' administrations of the physical measurements, correcting them as necessary. See chapters 2 and 3 of this manual for further information about the procedures and characteristics of the physical measurements.

The physical measurements were the final activity during the live practice session and included the child's weight, the mother's weight, the child's length, the child's middle upper arm circumference (MUAC—this measurement includes the upper arm length, the midpoint of the upper arm length, and the circumference around this midpoint), and the child's head circumference (for very low birth weight babies only). As standard procedure, all measurements were obtained twice. Certification was defined as a less than 5 percent difference between the two sets of measurements. If any measurement had more than a 5 percent difference between the two recordings, the trainee was required to demonstrate to the trainer that she or he knew how to obtain the measurement. The purpose of this certification procedure, therefore, was not to quantify how many trainees were "certified" but rather to catch those with large discrepancies while they were still at training, identify the problem, retrain them on the problem measurement, and require them to demonstrate that they knew how to administer and record the measurement properly. All trainees were certified on the physical measurements before leaving training. No trainees were released because of errors in the physical measurements procedures.

5.3 Nine-Month Data Collection Procedures

This section details the procedures employed to administer the instruments of the 9-month data collection. Procedures for conducting the data collection included advance mailing to the parents of sampled children; making initial contact; conducting the parent interview; administering the child assessments; presenting and prompting for the resident and nonresident father questionnaires; recording Child Observations; and completing field Interviewer Remarks. The first two procedures established contact with the family. The parent, child, and father instruments were a part of an in-home visit. The final two procedures were completed by field interviewers after the home visit.

5.3.1 Advance Mailings

Beginning in mid-September 2001, advance packages were mailed to the parent respondent of each of the sampled children about 3 weeks before the child's 9-month birth date. The advance package included a letter signed by the contractor's project director. The letter described the study and the data collection at 9 months, explained how the child was chosen, and detailed the confidential and voluntary nature of the study. It informed the children's parents that a representative from the contractor would be contacting the family soon.[3] The advance package also included a color brochure with additional information about the study, why it was important, and how it would be conducted. A small incentive, a bib imprinted with the study logo for the infant and a small, colorful board book, was also included in the advance package to encourage participation in the study.

Advance letters and brochures were translated into Spanish and six Asian languages (Hmong, Vietnamese, Japanese, Khmer, Korean, traditional Chinese, and simplified Chinese). All respondents were sent a letter and brochure in English. If the birth certificate indicated that the mother was Hispanic and that she was born outside the U.S., a letter and brochure in Spanish were sent as well. If the birth certificate indicated that the mother was Asian and that she was born outside the U.S., an insert to request a letter and brochure in one of the six Asian languages was sent along with the English materials. (The insert itself included statements in all six languages, to enable the parent to understand the statement and make the request for additional information by checking a box next to the statement.)

[3] Special letters were sent to families in three states. Those letters were similar in content to those sent to families in the other states, but featured slightly different wording based on requirements by either the state registrar's office or the state institutional review board.

Advance letters that were returned either with a forwarding address or as undeliverable were entered into a tracking database. Advance letters were re-mailed to the updated addresses, and returned letters having no forwarding address underwent intensive tracing efforts by the home office. These tracing efforts were implemented by the contractor's Telephone Research Center staff who had extensive background in tracing activities. The tracing efforts included Internet searches, contact with direct assistance, use of criss-cross directories, and contact with local institutions that might be sources of address information, such as schools and local post offices. Requests for addresses and telephone numbers for 14,214 cases were sent to a database search firm, and 6,803 (48 percent) were confirmed; 15,263 post office confirmation letters were sent, and 10,783 (71 percent) were confirmed; 3,371 cases were submitted for Internet tracing, and 159 (5 percent) were confirmed; 1,130 were submitted for telephone tracing, and 379 (34 percent) were confirmed. Altogether, 15,509 cases were traced in this pre-field effort, and 87 percent were confirmed.

5.3.2 Initial Contact

Initial contact with the household was usually made in person at the most current address provided. However, if a case was more than 50 miles from his or her home, remote from all other work, and a telephone number was available, the field interviewer called the household first and determined whether anyone would be present on the day and time that the field interviewer planned to travel there. If the field interviewer had difficulty locating the sampled child's family at the address provided, the field interviewer implemented field tracing procedures. Such tracing procedures included going to the local post office and talking with the landlord, neighbors, and current residents.

When the sampled child's family was contacted, first it was determined whether the child was living in the home.[4] Next, the parent respondent was identified. In most instances, the person named as the birth mother was identified as the parent respondent. If the mother did not live in the home, another parent or guardian responsible for the care of the sampled child was identified as the parent respondent. In

[4] The ECLS-B home visit was conducted in the residence of the sampled child. If it was determined that the child was not living at the contacted address, contact information was obtained to locate the child.

99 percent of the cases the parent respondent was the child's biological mother. Respondents for the parent interview were selected according to the following order of preference:

1. The child's biological mother.
2. The child's biological father.
3. Another parent or guardian.
4. Another adult household member.[5]

After identifying the parent respondent, the study was explained. For most of the participating cases, the introduction to the study was all that was needed to gain the cooperation of the parent respondent. However, there were times when respondents were hesitant to cooperate. Extra reassurance was given to those parents by using various other outreach materials such as study brochures. Field interviewers were trained to avert refusals in as many of these cases as possible by clearly explaining the study and answering specific questions from the parent respondent.

In addition to gaining initial cooperation from the parent respondent, signed informed consent was obtained from the respondent before the parent interview began. The consent form was available in English and Spanish. It explained the purpose of the ECLS-B to parent respondents, that their participation was voluntary, and that all information they provided would be kept confidential.[6] Before the interview began, the parent consent form was presented and explained to the parent respondent, and the respondent was asked to read and sign the form. If a signed parent consent form was not obtained, the home visit was not conducted and the case disposition was set to "refused."

During initial contact, if the field interviewer determined that the respondent did not speak English very well, she or he attempted to determine what language the respondent did speak well. If the respondent spoke Spanish, the interviewer arranged for the home visit to be conducted in that language by a qualified bilingual ECLS-B interviewer. If the respondent spoke some other language (e.g., Chinese or Vietnamese), the interviewer attempted to find someone else in the household who spoke the respondent's

[5] The term "adult" was not defined for interviewers.

[6] Confidentiality was defined for respondents. The following example is from the Washington State consent form: "Only the study team will know your answers to the interview or see information about your baby. All study files will be kept locked. We will assign a code number to you and your family members to protect your privacy. We plan to allow researchers to use a special version of the study information without any names. These researchers must promise to follow very strict confidentiality procedures to protect your privacy. We will not use any names of parents or children in our study reports. There are three exceptions to our promise of confidentiality. You need to be told that we are required by law to report any child abuse or neglect we may see or hear about to DSHS Child Protective Services. We are also required to make a report and to get help if we are concerned that you may hurt yourself or someone else. As required by law, the Attorney General of the United States could get information collected in this study under court order to use to investigate and prosecute acts of terrorism."

language in addition to English. This person was asked to introduce the field interviewer to the respondent and explain that he or she would like to make an appointment to meet with the respondent and introduce the study through the use of an interpreter. (A small number of interviews were conducted in Mandarin/Cantonese, Vietnamese, Khmer, and Korean by local interviewers who spoke those languages, but these interviewers could not travel to cover most of the Asian language-speaking families in the study. In some distant cases a decision was made for these interviewers to conduct the parent interview by telephone; most of the time when this occurred, no child assessments were conducted.)

5.3.3 Conducting the Home Visit

Exhibit 5-4 shows the preferred order of administration for all of the home visit components. This order was selected to ensure standardization and to allow the child to become familiar with the field interviewer. Interviewers were trained to begin with the parent CAPI instrument. Watching friendly interaction between the field interviewer and the parent respondent enhanced the child's level of ease and fostered the best possible performance by the child during the administration of the child assessments. Interviewers were encouraged to interrupt the parent interview and administer the Child Activity Booklet, once they observed that the child was comfortable in their presence. Optimal conditions varied by case, and sometimes required departures from the preferred protocol for administration order.

Exhibit 5-4. Preferred order of administration of the home visit components, 9-month data collection: 2001–02

Parent questionnaires	Child assessments
	These instruments are all packaged into the Child Activity Booklet.
1. Parent CAPI instrument	2. Bayley Short Form–Research Edition (BSF-R)
5. Resident father questionnaire (if applicable)	3. Nursing Child Assessment Teaching Scale (NCATS)
6. Parent self-administered questionnaire	4. Physical measurements
7. Parent respondent contacting and locating form	
8. Father contacting and locating information (if applicable)	
9. Nonresident father questionnaire (if applicable)	

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

5.3.4 Conducting the Parent Interview

The parent interview included two instruments: the parent CAPI instrument and the parent self-administered questionnaire. The parent interview was conducted in person by trained field interviewers using computer-assisted personal interviewing techniques. The parent CAPI instrument consisted of 18 sections covering 22 topics (see chapter 2, exhibit 2-3) that obtained information from the parent respondent about aspects of the child's health, growth, and development and environmental factors that affect children's growth and development (see section 2.2). The parent CAPI instrument took on average about 60 minutes to administer.

Most of the interviews were conducted in English, but provisions were made to interview parents who preferred Spanish or some other language. Thirty bilingual field interviewers were trained and certified to conduct the parent interview in English or Spanish. When the parent respondent preferred Spanish, but the field interviewer was not certified to conduct interviews in Spanish, the case was turned over to the field supervisor who reviewed the case and either assigned it to a certified Spanish-speaking field interviewer or (if none was available) assisted the field interviewer in locating an interpreter to conduct the interview. Most interviews in other languages were conducted with the aid of interpreters (although, as noted above, some were conducted in an Asian language in person or by telephone by ECLS-B interviewers who received special training via telephone). About 9 percent of the parent CAPI instruments were conducted in a language other than English; about 77 percent of the non-English interviews were conducted in Spanish. Less than 0.1 percent of the parent interviews could not be conducted because of language problems (e.g., respondent and family spoke Bengali and no interpreter was found; respondent spoke an unknown Asian language and no interpreter could be found).

In addition to the parent CAPI instrument, parent respondents were given the parent self-administered questionnaire to complete during the home visit. The paper and pencil instrument was presented during the parent CAPI instrument for the respondent to complete and return in a sealed envelope. The parent self-administered questionnaire was short—23 questions on topics some people might prefer to answer privately (see section 2.2.2). The parent self-administered questionnaire was translated into Spanish. If the parent CAPI instrument was conducted in another language (i.e., neither English nor Spanish), then the parent self-administered questionnaire was not given to the parent respondent. Ninety-five percent of the complete parent self-administered questionnaires were in English, and 5 percent were in Spanish. A total of 119 cases were not given a parent self-administered questionnaire because of language issues.

The closing section of the parent interview combined a number of tasks. It began by thanking the parent respondent for his or her participation in the study. Next, the parent respondent was asked to provide updated information about the family's address and telephone number and information about any new address, if applicable, that could be used to locate and contact the family for the next home visit. In addition, respondents were asked to give the name, address, and telephone numbers of persons who would always know their whereabouts. This information was collected using a self-administered form. The section concluded with paying the parent $50 for her or his participation in the study ($100 for twins) and presenting a gift book for the child (a book for each child in twin cases). This occurred after the child assessments were completed.

In order to build response rates for the home visit, parent refusal conversion letters were developed. Letters were sent to all parents who were initially coded as "refusal," except those that were judged to be extremely firm in their decision not to participate, and parents in Washington State.[7] Different versions of the refusal conversion letters were prepared including a general refusal letter and letters more specific to the type of refusal, such as concerns about confidentiality, the government's role, and time constraints. A refusal conversion letter addressed to apartment managers and landlords was also developed to help gain access to respondents in apartment buildings. Spanish versions of these letters were also created to help in refusal conversions. These letters were mailed directly to respondents by field supervisors or field interviewers (who often had a mailing address closer to the respondent's address), usually within several weeks of the respondent's initial refusal.

5.3.5 Conducting the Child Assessments

The child assessments were administered in the home visit along with the parent interview.[8] The ECLS-B field staff arranged to work with the infants at their best time. Home visits were scheduled at times when the child was awake and alert.

[7] Washington State's institutional review board requested this protocol change.

[8] Although for the majority of cases the assessments were conducted on the same day as the parent interview, about one percent of the households requested that the interviewers return at a later time to conduct or complete the assessments. Usually the interviewers scheduled the second visit in the same week, but occasionally a longer time period elapsed.

5.3.5.1 Overview of the Child Assessments

In the three-part assessment, the child's developmental status was measured using the BSF-R; a videotape of the NCATS (caregiver-child interaction) was created, and the child's physical measurements were obtained. To facilitate interviewer-child rapport, the recommended order of activities was to begin with the BSF-R, follow with the NCATS, and conclude with the physical measurements.

Information was gathered using hard-copy materials. Interviewers recorded information in the Child Activity Booklet. The Child Activity Booklet also included administration and scoring instructions and record forms. A Spanish version of the Child Activity Booklet was also developed. If the family spoke a language other than English or Spanish, interviewers used an interpreter recruited either through the family or through nearby community agencies or organizations.

To conduct the child assessments in a home setting, interviewers worked with the parent to find a well-lit, quiet setting, away from sources of noise, such as a television or radio, and away from any other distractions, such as the child's toys, family pets, and so forth. The presence of other family members was discouraged whenever possible.

Interviewers conducted the BSF-R with the child in a high chair, tray removed, and pulled up to a kitchen or dining room table whenever possible. If the household did not have available table space, the BSF-R was conducted at a small folding table provided for this reason, with the child sitting in the parent respondent's lap. Interviewers were encouraged to sit facing the child in all circumstances in order to facilitate rapport and for accurate scoring.

For the NCATS, interviewers videotaped the interaction with the parent and child seated on the floor, or at the same table used for the BSF-R. If other siblings, family members, or friends were present, interviewers requested a quiet space with no interruptions. Typically, interviewers brought crayons and coloring books to keep siblings busy and away from the testing area.

The physical measurements were obtained at the end of the home visit because the procedures for obtaining the middle upper arm circumference are intrusive and infants become distressed and try to pull away. In addition, obtaining the child's length with the child recumbent on the MeasureMat also leads children to become distressed and fussy. By completing these at the end of the home visit, the other two child assessments could proceed smoothly.

5.3.5.2 Standardization in Conducting the Child Assessments

Data collection procedures for each of the three components of the child assessment are described below. For more information on the instruments or their scores, see chapters 2 and 3, respectively.

The BSF-R. The BSF-R is a standardized measure of the mental and motor developmental functioning of young children. (For further details about the contents of the BSF-R and how it was developed, see section 3.1.1.) Interviewers worked one-on-one with each child, using standardized toys, verbal prompts, and modeling to administer a variety of tasks. The necessary standardization of administration and scoring was pursued in three ways. First, a training videotape was produced that included item-by-item instructions for administering and scoring the items, which was given to all field interviewers to take home so that they could review the information as needed. Second, item-by-item administration instructions were included in the Child Activity Booklet, along with the scoring instructions, closely based on the BSID-II manual. Additional instructions and clarifications were added to assist interviewers. Third, a videotaped BSF-R administration was sent to interviewers quarterly. The interviewers used a review form to critique the administration and to assign item scores for the child's performance. Interviewers were required to score 85 percent or higher for their critique and 90 percent or higher for scoring. For further information about quality control procedures for the BSF-R in the field, please see section 5.5.4.

The NCATS. The NCATS is a measure for describing characteristics of mother-child interaction, such as how they communicate, their responsiveness to each other, and their adaptability to each other. For the NCATS, the interviewer videotaped a parent-child interaction in which the parent taught the child how to do a new and previously unknown activity. To ensure standardization of administration, step-by-step instructions were included in the NCATS section of the Child Activity Booklet. Furthermore, the interviewer helped the parent choose an activity from a standard list of age-appropriate activities based on a standard set of toys or materials. Once the parent respondent selected the activity, the interviewer then presented the parent with the necessary materials and then videotaped the interaction. Per the NCATS design, interactions typically lasted no longer than 5 minutes and 30 seconds. If an interaction lasted longer than that, then only the first 5 minutes 30 seconds were coded. An interaction was defined as uncodeable if it lasted less than 45 seconds.

The Physical Measurements. The physical measurements component included the child's weight, length, and middle-upper arm circumference (MUAC) (and head circumference for very low birth weight babies). The administration of the physical measurements generally followed the administration of the NCATS, but could be done at any time during the home visit, at the interviewer's discretion. Interviewers used a variety of equipment to conduct the physical measurements. A scale was used to measure the child's weight; first the parent was asked to step on the scale while holding the child; the parent stepped on the scale a second time without the child, and the difference between the two weights was taken as the child's weight. If the parent was unable to perform this task, the interviewer or another adult could perform it. Note that not all children were measured by the same method. Some children (less than 1 percent) were not weighed with an adult, but rather alone on the scale. (In addition, as noted in chapter 3, in one case the scale malfunctioned, and the child weight was recorded by parent report of a well-baby check at a medical facility the day before. The values for this case were retained as reported.) Children's length was assessed with a measure mat; the interviewer laid the child down on the mat with the head at one end; the parent was asked to hold the child straight, and length was measured with the soles of the feet at right angles to the mat. Children's MUAC and head circumference was measured with a tape measure formed into a loop. For the MUAC, dots were placed on the right elbow and the shoulder joint; the distance was measured between the two dots, and a point exactly halfway between them was marked. The tape measure was placed snugly around the arm at the mark. Head circumference was measured around the crown of the head at its point of greatest circumference. As with the BSF-R and NCATS, to ensure standardized administration, step-by-step instructions for obtaining the physical measurements were included in the Child Activity Booklet. Furthermore, all of the measurements were taken twice in keeping with standard procedures used in major health studies to ensure the accuracy. All physical measurements were recorded in a form in the Child Activity Booklet.

5.3.6 Data Collection for Resident and Nonresident Fathers

Resident and nonresident fathers were identified in the closing section of the parent CAPI instrument, based on data that were collected about the members of the household. During the parent interview, the person living in the household who was identified as the partner or spouse of the parent

respondent was defined as the "resident" father.[9] A "nonresident" father was the sampled child's biological father who did not live in the house with the child.

The resident father information was collected through a hard-copy self-administered questionnaire. If a household member was identified as the parent respondent's partner or spouse, the field interviewer prepared the questionnaire package for the resident father. The questionnaire was titled "Questions for Fathers and Other Important People" (referred to often as the resident father questionnaire). A Spanish version of this questionnaire was also available. Besides the questionnaire, the package contained a cover letter for the father, a self-addressed postage-paid envelope, and a gift pen. (No monetary incentive was offered to the resident father. The household incentive was intended to compensate the family for participation in the entire set of activities for the 9-month wave of the study, including the parent interview, the child assessments, and the resident father questionnaire.) If the father was present during the home visit, he was asked to complete the questionnaire before the field staff interviewer left the home. Otherwise, the resident father questionnaire was left in the home for the parent respondent's spouse/partner to complete and send back to the contractor's home office. In 99 percent of the cases, the resident father was the sampled child's biological father.

In cases where the child's biological father did not reside with him or her, information was gathered from the biological mother about the biological father. A nonresident biological father may have been asked to complete a nonresident father questionnaire. This was dependent on whether the biological mother was the respondent to the parent interview, the father's frequency of contact with the child or the birth mother, and whether the mother granted permission to contact the father. The contact level to be eligible for the questionnaire was one of the following: (1) the father had seen the child at least once in the last month; (2) the father had seen the child at least 7 days in the last 3 months; or (3) the father had been in touch with the child's birth mother at least once a month in the 3 months preceding the parent interview. If the biological mother was the respondent to the parent interview and the nonresident father had sufficient contact, the parent CAPI instrument was programmed to prompt the field interviewer to introduce the nonresident father questionnaire. The field interviewer then asked the child's mother for permission to contact the father and for information to contact and locate the nonresident father. If the mother would be seeing the nonresident father in the next 7 days, then the nonresident father package, including the nonresident father questionnaire, cover letter for the father, a check for $20, and a self-

[9] If the biological father resided in the home but was not identified as the spouse/partner of the parent respondent, he was not given the resident father questionnaire. Similarly, if the biological father was identified as the parent respondent, then he was not given a resident father questionnaire; rather, the resident father items were part of the CAPI parent instrument. If he had a spouse/partner living in the household, that person was given a resident father questionnaire.

addressed postage-paid envelope, was left with her for him to complete. If the mother would not see the nonresident father within the week following the home visit, the field interviewer contacted the nonresident father by telephone with no advance letter.[10] A Spanish version of the nonresident father questionnaire was also available. In 12 percent of the cases with a completed parent interviewer, a nonresident father was identified. Of the completed nonresident father cases, 94 percent of the questionnaires were received by mail without telephone followup. See section 5.4.3 for more information on nonresident and resident father questionnaire response rates.

If the contractor's home office did not receive the resident or nonresident father questionnaires within 2 weeks of the completion of the home visit, interviewers were instructed to follow up by telephone. The field interviewers used a telephone script to introduce themselves and the study to the father. The script also included consent information that had to be read to the father. Either the interview was completed over the phone or another questionnaire was sent to the father to complete and return in a postage-paid envelope. Field interviewers completed 3.25 percent by telephone.

Response rate problems became apparent during the course of father data collection. Although the same followup procedures were in place for the national study that were used successfully in an earlier field test, some interviewers on the national study did not follow up with fathers who had failed to return their questionnaires in a timely fashion. Furthermore, although the majority of interviewers implemented the followup protocol correctly, the initial response rates for fathers (especially nonresident fathers) did not meet expectations established by field test results. These problems were not recognized during the first half of the data collection period because they were overshadowed by production and cost problems with the home visits.

Once the father response rate problems were recognized and diagnosed, a number of steps were taken to remedy the situation. First, about 500 cases that had not received appropriate telephone followup were reassigned to senior interviewers in September 2002. These interviewers were instructed to devote about 20 hours per week to telephone calls to these fathers, in an intensive effort to increase the response rate. Second, for the remainder of the data collection period, all field interviewers were routinely sent a report to alert them that the field management system on their laptop computers showed father followup activity was required, to focus interviewer attention on the followup calls. Third, if these activities did not produce the desired results, in December 2002 another questionnaire was mailed to

[10] Given the sensitivity of paternity in these cases, a decision was made to send no letters in advance of the telephone call. The Institutional Review Board at the National Center for Health Statistics was concerned that mail addressed to the father might be opened by another member of his household.

about 1,000 fathers who had refused to answer the questions by telephone, but had agreed in the followup call to complete the questionnaire if it were remailed to them. No questionnaire had been received from these fathers in response to the remailing. For many, this was the third questionnaire mailing, because (as noted above) they had reported earlier in the followup telephone calls that they had not received the first questionnaire, and a second one had been mailed. This final questionnaire mailing increased resident father response rates by around 1 percent; nonresident father rates were not affected.

5.3.7 Data Collection Protocol by Component for Spanish-Speakers and Speakers of Other Languages

Exhibit 5-5 summarizes the approach for collecting ECLS-B 9-month data in languages other than English. All data collection instruments were translated into Spanish. For other languages, interpreters were used for most, but not all of the instruments. Three percent of the home visits employed interpreters.

Exhibit 5-5. Non-English administration of ECLS-B 9-month instruments: 2001–02

Instrument	Spanish version	Procedure in other non-English language households
Child Activity Booklet	Yes	English version used, interpreter translated instruction/question
Parent CAPI instrument	Yes	English version used, interpreter translated instruction/question
Parent self-administered questionnaire	Yes	Not administered
Resident father Questionnaire	Yes	English version used, interpreter translated instruction/question if father at home
Nonresident father questionnaire	Yes	Not administered

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

As part of the initial contact, the field interviewer determined whether the parent interview would best be conducted in English, Spanish, or another language. Interviewers were trained to ask the

respondents in the Spanish-speaking and Asian language-speaking households which language the respondent preferred before the interview began.

For areas where Hispanic births are concentrated, Spanish-speaking interviewers were recruited who resided in those areas. Twelve percent of the ECLS-B field interviewers were bilingual in Spanish; they conducted 4 percent of the ECLS-B home visits in Spanish. In the event that a non-Spanish-speaking interviewer encountered a family who preferred to (or could only) speak Spanish, the situation was reported to the field supervisor, who transferred the case to a Spanish-speaking field interviewer. In areas where there was no Spanish-speaking interviewer, the supervisor determined whether it was economically feasible for a Spanish-speaking interviewer to travel to the area to complete the case. The guidelines for "economically feasible" were defined for the supervisors.[11] If it was not feasible to send a Spanish-speaking interviewer to the parent's home, the supervisor attempted to identify a local interpreter who could work with the interviewer or authorized use of an adult member of the household as an interpreter.

For other languages, interviewers were instructed to use a member of the local community or a household member as an interpreter.[12] Where language minority populations were concentrated in an ECLS-B primary sampling unit (e.g., Los Angeles), local groups (churches, charities, and immigrant action organizations) and universities that have experience with the population were canvassed to identify qualified translators with ties to the community. In smaller communities, where the interviewer might encounter only one case where the parent of the sampled child spoke a particular language (e.g., Mandarin) and had limited English proficiency, the interviewer was authorized to use a household member as an interpreter.

Community interpreters were required to sign a notarized affidavit of confidentiality. Household interpreters had to be 15 or older. A job aid with instructions was presented to interpreters, encouraging them to try their best to convey the exact meaning of the English words in each question, to remain neutral, and to maintain the family's confidentiality. Interviewers were instructed to review these instructions with the interpreters before the interview and to make sure the interpreter was familiar with the informed consent language and comfortable summarizing it for the respondent. During the second half

[11] In general, the guidelines for determining whether a case was economically feasible were based on the estimated total cost of traveling a Spanish-speaking interviewer into the area to conduct the home visit. If the cost was estimated to be greater than $1000, it was considered infeasible.

[12] A small number of ECLS-B bilingual interviewers were available who spoke Mandarin, Cantonese, Vietnamese, Khmer, and Korean, but (as noted in section 5.3.2) these interviewers were not able to travel to areas where most families who spoke these languages lived.

of the data collection period, additional procedures were developed to certify community interpreters' skills by telephone from the home office, using a protocol similar to that used for certifying bilingual ability for interviewers.

Interviewers were advised to read the questions aloud in English, to frequently ask the respondent "Did you understand the question?", to enter all responses in the laptop, and to invite the interpreter and the respondent to look at the computer screen to follow along with the interview.

The Child Activity Booklet (both English and Spanish versions) contained a number of instructions for the interviewer to say specific phrases to the child during the BSF-R, as part of the process of engaging the child in a set of standardized activities. Interpreters were asked to say these phrases to the child in the child's language. The booklet also included a short set of instructions for the parent in preparation for videotaping the NCATS**.** Interpreters were asked to convey these instructions in the parent's language.

The NCATS videotapes were coded in a central location, typically with three viewings of the each tape. The coding staff included individuals proficient in English and Spanish. For NCATS videotapes that featured a different language, an interpreter was identified. The interpreter sat with the coder during the second viewing of the tape and conveyed the English meaning of any words that were exchanged between the parent and child. Fourteen percent of the videotapes included dialogue in languages other than English. A total of 8.5 percent of these were in Spanish, and 5.8 percent were in an Asian language. A total of 37 tapes (0.39 percent) were not coded because of a foreign language for which an interpreter could not be obtained.

The parent self-administered questionnaire and the nonresident father questionnaire were not administered if the respondent did not speak English or Spanish. Given the prevalence of nonresident fathers in the population, the ECLS-B contact frequency requirements for them, and the need to obtain the mothers' cooperation to approach the fathers, the total number of ECLS-B eligible nonresident fathers in the sample was expected to be less than 25 percent of the number of resident fathers. Only a very small subset of the nonresident fathers who did not speak Spanish was expected to have limited proficiency in English. Of those with limited proficiency, it was not possible to predict with confidence whether one or more than one would speak a particular language. Therefore, developing translations of the nonresident father questionnaire in other languages or arranging for an interpreter in the telephone conversation was not cost effective.

5.3.8 Child Observations and Interviewer Remarks

After the home visit, the Child Observations and Interviewer Remarks components had to be completed in order to finish the case. The Child Observations component included questions about the child's behavior during the child assessments and questions about the home environment. It took about 10 minutes for the interviewers to complete. The Interviewer Remarks component was a self-administered questionnaire consisting of case-specific information. The Child Observations and Interviewer Remarks were computer-assisted instruments (CAI). Each was done by the field staff interviewers using laptops to answer questions and to record responses. The components were completed as soon as possible after the interviewers left the homes.

The Child Observations consisted of two parts—selected questions from the Behavior Rating Scale (BRS; see sections 2.4 and 3.1.3) and items from the Home Observation for Measurement of the Environment[13] (HOME; see sections 2.4 and 3.3.2). The first part, a set of seven questions from the BRS,[14] a subsection of the Bayley Scales of Infant Development, Second Edition, contained questions about the child's reactions during the BSF-R assessment. None of these items was answered if the BSF-R was not completed in the home.

The second part of the Child Observations component was a set of eight questions from the HOME, an inventory of items that assessed the quality of various characteristics of children's home environments. The eight HOME items were always completed as long as the baby was present and interacted with the parent respondent during the home visit. Most of them could be scored "Yes" from one observation during the home visit, whereas others had to occur more frequently.

The Interviewer Remarks component included questions about the administration of the parent interview and other aspects of data collection. This information can be used to evaluate the home visit. For example, some questions referred to the order in which home visit tasks were completed, such as whether the field staff interviewer began the home visit with the parent CAPI instrument or the child assessments. Other questions referred to whether certain aspects of the home visit were of concern to the parent respondent. Exhibit 5-6 presents a list of interviewer remarks that are included on the ECLS-B 9-month restricted-use data file as well as the 9-month public-use data file.

[13] Note that the items selected do not necessarily represent the HOME scale or a short form of it.

[14] Note that the items selected from the BRS are intended to be single-item indicators of child behavior during an assessment. They do not represent a short form of the BRS.

Exhibit 5-6. Interviewer Remarks items, 9-month data collection: 2001–02

Variable name	Variable description[1]
R1CMPPRN	R1 IR010 Parent interview completed before child assessments performed
R1PRNSAQ	R1 IR030 PSAQ caused anger/confusion/discomfort for respondent
R1CABUNU	R1 IR050 Any unusual events occurred during Child Activity Booklet administration
R1PSQSLF	R1 IR070 PSAQ completed alone
R1NRFCNT	R1 IR090 Issue occurred when asking to contact nonresident father
R1RFQSLF	R1 IR097 RFSAQ completed alone
R1CAPICN	R1 IR100 Unusual/concern about CAPI administration
R1PRNLNG	R1 IR120 What language used for parent interview
R1PRNTRN	R1 IR125 Was an interpreter used during parent interview
R1PRNOBS	R1 IR127 An observer was present during the home visit
R1PRNOTH	R1 IR130 Were others present during the home visit
R1PRNOT1	R1 IR131 Who was present during the home visit
R1OTHEVS	R1 IR132 Were others present for entire visit
R1OTPPSQ	R1 IR133 Were others present during-PSAQ
R1OTPBSF	R1 IR133 Were others present during-Bayley
R1OTPNCT	R1 IR133 Were others present during-NCATS
R1OTPPM	R1 IR133 Were others present during-physical measurements
R1OTPOTH	R1 IR133 Were others present during-other, please specify
R1ONEDAY	R1 IR140 Parent interview and child activities occurred in one day
R1VSTINT	R1 IR160 Interruptions occurred during home visit
R1SCHPRB	R1 IR192 Any problems scheduling the home visit
R1XFRCAS	R1 IR220 Was this case transferred between interviewer staff
R1TOTCNT	R1 IR222 # Total contacts for case
R1INPCNT	R1 IR223 # In-person contacts for case
R1TELCNT	R1 IR224 # Phone contacts for case

[1] R1 refers to the first data collection wave, when the ECLS-B children were about 9 months old.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

5.4 Nine-Month Response Rates

The proportion of the sample responding to a survey can be an important indicator of survey quality. The National Center for Education Statistics has adopted standards for achieving acceptable response rates in surveys, and for computing and reporting response rates, "… encouraging high rates of response across all strata … since high response rates help ensure that results are representative of the target population." (U.S. Department of Education, National Center for Education Statistics, 2002). Standards for calculating and documenting response rates have also been published by the American Association for Public Opinion Research (2000) and the Council of American Survey Research

Organizations (1982), to allow users to evaluate potential for bias and to support comparison of results with other surveys. The American Association for Public Opinion Research and Council of American Survey Research Organizations standards are generally consistent with the NCES standards.

There are a number of approaches for calculating response rates, and surveys with complex designs such as the ECLS-B may require the use of more than one approach. For example, in a longitudinal survey, one might report the response rate for each wave of data collection using the initial eligible sample as the denominator; alternatively, the response rate for each wave might be calculated using the number of sampled cases that were assigned for data collection in the wave. In order to monitor data collection activities, unweighted response rates may be used, but response rates for evaluating survey estimates should be weighted. Response rates may be calculated based only on cases with all items or components complete, or calculations may treat partially complete cases as complete.

The approach chosen for the 9-month data collection wave of the ECLS-B is based primarily on the parent CAPI instrument. The response rate is calculated as the number of completed parent interviews divided by the number of eligible sample children, following the NCES standards. All response rates are at the child level. All sampled children were eligible except those children who died before the home visit occurred, children born to mothers younger than 15 years, children who were adopted before the age of 9 months, and those who were removed from the sample as part of a cost reduction process in February 2002. (See section 5.4.2.)

The parent CAPI instrument was chosen as the primary vehicle for determining the overall response rate for the ECLS-B 9-month data collection because there were very few instances (0.3 percent of the total sample) in which other components of the study (i.e., direct child assessments or father questionnaires) were complete for the sampled child, but the parent interview was not complete. Most completed parent CAPI instruments (96 percent) were accompanied by direct child assessment data. The parent CAPI instrument was the largest component of the home visit, representing more than half of the time required in the household. In addition, the data from this instrument alone were regarded as having a high level of interest for a broad range of analysts.

5.4.1 Steps to Improve Response Rates

Through the course of development activities for the ECLS-B, and throughout the data collection period for the 9-month wave, a number of steps were taken to improve response rates. This section discusses four major aspects of the response rate improvement efforts in the data collection task: the use of incentives, the refusal conversion process, procedures for locating the sampled cases, and procedures for other nonresponse cases.

5.4.1.1 Incentives

Offering incentives to potential respondents can have a positive effect on response rate. A variety of monetary and nonmonetary incentives were employed in the 9-month wave of the ECLS-B. As part of the advance package, parents of all sampled children were mailed a small book, an ECLS-B magnet, and a child's bib bearing the ECLS-B logo. In appreciation for the household's participation in the ECLS-B, the parent respondent was offered a check for $50. Households with twins were offered $100. The check was presented at the end of the home visit and was targeted toward the entire household, including the parent, the child or children, and the resident father (if identified in the household). In addition, a book was offered to the parent to give to the child at the end of the home visit; households with twins were offered two different books. Fathers were given an ECLS-B ballpoint pen to use in completing the questionnaire. Nonresident fathers were sent checks for $20 upon receipt of the completed nonresident father questionnaire. The effectiveness of these incentives can be evaluated in part by a comparison of response rates between the 2000 field test and the national study. The parent interview response rate improved somewhat with the increased incentive (from 73.7 to 76.8 percent, both unweighted),[15] but the response rate for both groups of fathers decreased. The resident father rate (75.1 percent, unweighted, a decrease of more than 9 points from the field test)[16] may have been affected negatively by the elimination of a targeted prepaid monetary incentive. However, the nonresident fathers rate (50.9 percent, unweighted, 16 points less than the field test) decreased despite an increase in the monetary incentive. This is likely to have been the result of less than universal, timely prompting for nonresponse, as discussed in section 5.3.6.

[15] Weights were not developed for the field test, so the appropriate comparison is between unweighted response rates.

[16] The field test response rate for fathers was higher than the field test response rate for parents. Father response rates were conditional on the completion of a parent interview.

5.4.1.2 Refusal Conversion

On most voluntary surveys, the largest component of nonresponse consists of sample members who refuse to participate, and the ECLS-B 9-month data collection is no exception. To minimize refusals, ECLS-B interviewers were trained to gracefully exit interactions with potential respondents that seemed likely to lead to a refusal to participate. These cases were given dispositions of "initial refusal." A letter tailored to the potential respondent's concerns was mailed. An interviewer was assigned to visit or call the respondent again, to determine whether the respondent's concerns had been addressed by the letter. Whenever possible, a different interviewer was assigned to follow up on the initial refusal. This process is known as "refusal conversion." It was not attempted when the potential respondent indicated clearly in the initial interaction that he or she was adamantly refusing to participate in the study; all such cases were classified as "final refusal" and were not subjected to the refusal conversion process. A total of 1,168 cases were classified as initial refusal in the 9-month round; 22 percent were completed after refusal conversion was attempted. At the end of data collection, 14.0 percent of the sampled cases (unweighted) were classified as "final refusal."

5.4.1.3 Locating Activities

A unique feature of the ECLS-B study design that has an impact on nonresponse is its dependence on the nation's birth records as a sample frame. The birth record is almost always completed in the hospital when the birth occurs. The hospital transmits the record to the state's vital statistics department, which in turn passes it to the National Center for Health Statistics (NCHS). Early in the development of the study design, it was determined that the flow of birth records to NCHS was not uniformly rapid enough to support data collection in the child's home earlier than 9 months after the birth occurred, or to support pre-field locating activities earlier than 7 months after the birth. Thus, locating information was 9 months old by the time the home visit was scheduled.[17]

"Unlocatable" was a large component of nonresponse, second only to refusals. Of the completed parent CAPI instruments in the 9-month data collection wave, 34 percent were conducted at a different address than indicated on the birth record, indicating the high degree of mobility of families in

[17] In order to get the birth record information within seven months of the birth, special arrangements were made with the National Center for Health Statistics, Centers for Disease Control and Prevention in the U.S. Department of Health and Human Services, which administers the National Vital Statistics System, and with each state's vital statistics department. Otherwise, the address information would have been much older.

early stages of formation. To minimize "unlocatable" as a component of nonresponse, a number of locating steps were undertaken. Before assignment to a field interviewer, address correction requests were mailed to post offices, and telephone number and address searches were conducted using large electronic databases of American households. Locating specialists were assigned to call directory assistance and explore Internet sources to find cases with unconfirmed addresses. All cases without confirmed addresses were assigned to field interviewers, and if the interviewer could not locate the household at the address provided, a number of field locating steps were implemented, including talking to residents and neighbors of the address provided, talking to the landlord, and visiting the local post office and library. In the end, 6.1 percent of the sample (unweighted) could not be found.

5.4.1.4 Procedures for Other Nonresponse Cases

The "other nonresponse" category (3.2 percent of the eligible sample) includes cases that posed a language barrier, as well as a residual "other" category. Language barriers were a subject of considerable concern to the ECLS-B. For the population of children born in the U.S. in 2001, 23 percent had mothers born outside the U.S. Many of these mothers did not speak English very well. This problem was addressed in the ECLS-B 9-month data collection by determining the language spoken by the parent respondent and transferring the case to an interviewer who spoke the language or identifying an interpreter who spoke the language. A set of procedures was developed to ensure that standard practices were followed in collecting data from households with limited English proficiency and in using interpreters. In the end less than 0.1 percent of cases could not be completed because of language issues.

The residual "other" category includes cases that were judged too far to interview, based on an estimate of travel cost. Some of these were households that moved far away from the PSU in which the child was born, and far from any other ECLS-B PSU. Others were households that, even when the child was born, lived far way from the place of birth. The sample included some cases residing outside the U.S. The cost of traveling to each of these were evaluated, and those deemed too costly were considered too far to interview and treated as nonresponse. Other types of cases included in the residual "other" group were cases that could never be contacted despite many attempts, and cases where the parent was not capable of participating in the interview, due to illness or disability. About 3.1 percent of the sample (unweighted) was too far to interview, never contacted, or unable to participate.

5.4.2 Overall Response Rate

As discussed in chapter 4, sections 4.1.4 and 4.1.5, the ECLS-B 9-month sample included cases selected as substitutes for cases in PSUs with severe state registrar or institutional review board restrictions. The response rates presented in this section treat all substitute cases as original cases; that is, the substitute cases contribute to both the numerator and denominator of the unweighted and weighted response rates. See chapter 5 of the *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Design and Operations Report for the Nine-Month Data Collection* (U.S. Department of Education, National Center for Education Statistics, forthcoming [a]) for more details on substitution and response rates before and after substitution.

The response rate for the 9-month data collection was 74.1 percent (table 5-1), based on weighted data (i.e., using the base weights). The response rate is the number of completed parent interviews divided by the total eligible sample. To be considered complete, the parent interview had to have successfully passed through the child development section of the CAPI program (that is, the first three sections—Introduction (IN), Family Structure (FS), and Child Development (CD)—see exhibit 2-3). Ineligible cases were excluded from the denominator in the response rate calculation. Ineligibles consisted of 4 groups: (1) deceased cases;[18] (2) cases where the child was adopted before 9 months of age; (3) cases where the child's mother was younger than 15; and (4) cases that were removed from the sample as part of a sample reduction in February 2002, in an effort to reduce costs. All cases completed before the sample reduction were considered eligible, but cases selected for sample reduction and completed after the reduction were considered ineligible.

The unweighted and weighted response rates in table 5-1 can differ for two reasons:

1. Differences in response rates across the 36 birth certificate sampling strata, which have different weights.
2. Differences in response rates between cases before and after sample reduction.

The sample was reduced during the course of data collection, before sufficient effort had been expended to achieve the highest possible response rate for cases fielded with early birth months, and

[18] The biggest effect of this group was on very low birth weight cases, where 26.4 percent of the sample was deceased by the time of the home visit. (This percentage includes a small but unknown number of adoptions, because some states did not distinguish between deaths and adoptions in reporting to NCHS on selected cases that should be considered ineligible. It does not include some deaths that were identified by states and removed from the list of births prior to sampling.) This experience was consistent with expectations; the sample design assumed a 26.0 percent mortality rate for very low birth weight children in the first 9 months of life, based on an analysis of birth and mortality files from prior years, and this assumption was incorporated in the sample selection rates.

before cases with later birth months had been fielded. The weighted response rates (the right column in table 5-1) use the base weights, which incorporate the adjustment for cases completed before the sample reduction.

Nonresponse cases were classified in three categories. "Unlocatable" signifies that the case could not be found at the parent's residential address on the birth record, and attempts to determine a current address were unsuccessful. "Refusal" indicates that the case was found but the parent did not agree to participate in the study. "Other" represents all other types of nonresponse, including final language barrier, too far to interview, out of the country, and other reasons the parent interview could not be completed. The (weighted) unlocatable rate was 6.9 percent, the (weighted) refusal rate was 16.0 percent, and the (weighted) other nonresponse rate was 2.9 percent.

Table 5-1. Final case status of the 9-month data collection, based on parent interview status: 2001–02

Status	Number	Unweighted percent	Weighted percent
Total	13,921	100.0	100.0
Complete	10,688	76.8	74.1
Unlocatable	848	6.1	6.9
Refusal	1,943	14.0	16.0
Other	442	3.2	2.9

NOTE: All unweighted and weighted response rates based on completion of the parent CAPI instrument. The base weight was used (W1BASEWT).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

5.4.3 Component Response Rates

The overall response rate was based on the completion of the parent interview. However, it was possible to complete the parent CAPI instrument, but not one or more of the other study components. The response rates for the child assessment component included the BSF-R, NCATS, the physical measurement data, and the Child Observations. Completed child assessments were defined as cases with either (1) scores for the BSF-R mental or motor scales or (2) complete physical measurements (both length and weight). The response rate was 96.9 percent. It was conditioned on a completed parent interview. In other words, only completed parent interviews were included in the denominator; the numerator is the number of completed child assessments amongst completed parent interviews. This

approach was chosen because most child assessments were preceded by the parent CAPI instrument. Relatively few child assessments were not associated with a completed parent interview, and the value of the child assessment data is greatly enhanced by the parent data. An alternative approach to calculating component response rates would use all eligible cases (regardless of parent interview completion status) as the denominator. With that approach, the child assessment component unweighted response rate would be about 73.4 percent, and the weighted response rate would be about 70.8 percent.

The response rate for the resident father questionnaire is also conditioned on the completion of the parent CAPI instrument.[19] This approach is appropriate because the resident father could only be identified through the parent CAPI instrument. This response rate, based on the identification of a spouse or partner of the parent respondent who was living in the same household, was 76.1 percent (weighted). It is the number of completed resident father questionnaires received divided by the number of eligible resident fathers. The response rate for the nonresident father questionnaire (conditioned on the completion of the parent CAPI instrument and based on (1) the identification of the biological father by the mother in the parent interview, (2) her consent to his participation in the study, and (3) criteria for frequency and recency of contacts with either mother or child) was 50.0 percent (weighted).[20] It is the number of completed nonresident father questionnaires received divided by the number of eligible nonresident fathers.

Tables 5-2 and 5-3 show the response rate for all of the ECLS-B components in the 9-month wave. A nonresponse bias analysis was conducted; see *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Methodology Report for the Nine-Month Data Collection. Volume 2: Sampling* (U.S. Department of Education, National Center for Education Statistics, forthcoming [b]). The evaluation consisted of the following elements:

- Evaluation of response rates;
- Comparison of frame data between respondents and nonrespondents;
- Comparison of survey data between respondents and "proxy" nonrespondents;
- Sensitivity analysis of potential for nonresponse;
- Comparison of ECLS-B data with other surveys; and
- Analysis of factors that influence likelihood of survey response; and

[19] Note that the overall response rate for resident fathers was 56.4 percent (76.1 percent times the parent response rate of 74.1 percent).
[20] Note that the overall response rate for nonresident fathers was 37.1 percent (50.0 percent times the parent response rate of 74.1 percent).

- Evaluation of the impact of substitution on nonresponse bias.

The analysis benefited from the usually rich information available on the frame. The birth record contains a number of important variables on the mother and the child that support many comparisons between respondents and nonrespondents. For fathers, many additional data items were collected in the parent interview.

In table 5-3, the column for all fathers represents children for whom a parent interview and the appropriate father questionnaire or questionnaires were completed. Table 5-4 provides the number of cases that passed through each stage of father identification and completion. For resident fathers, the number of "children identified with fathers" (8,344) was determined in the parent interview; these fathers were identified as spouses or partners currently living in the child's household with the parent. For nonresident fathers, the number of "children identified with fathers" (2,238) was determined in the parent interview as the biological fathers identified by the parent who were not currently living in the child's household. (Note that for 120 completed parent interviews, no father was identified. These children were living in households where the parent had no spouse or partner and did not identify the biological father.) Table 5-4 shows the effects of the contact and consent criteria that were applied in the parent interview on nonresident father eligibility. Note that the father and nonresident father types are not mutually exclusive. Both resident and nonresident fathers were identified for 27 children. Thus the number of children identified without fathers plus the number of resident and nonresident fathers in tables 5-4 and 5-5 does not sum to the total number of children. Table 5-5 provides the final case status of the father questionnaires. For each father type, the final outcomes (completed, unlocatable, refused, or other nonresponse) are shown for all eligible cases.

Table 5-6 shows the child-level response rate (conditioned on the completed parent interviews) by the different sample domains and other characteristics of the child. The three sample domains (race/ethnicity, birth weight, and plurality) overlap so that all sample children can be classified in each domain. The percent in the "Complete" column is calculated in the same way as the weighted response rate (with base weights) in table 5-1.

Table 5-2. Unit response rates for the 9-month data collection, by parent CAPI instrument and child assessments: 2001–02

Child characteristics	Parent CAPI instrument			Child assessments		
		Response rates[1]			Response rates[1]	
	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent
Total	10,688	76.8	74.1	10,221	95.6	95.6
Race/ethnicity						
American Indian or Alaska Native	873	79.2	79.3	835	95.6	95.6
Chinese	466	63.7	63.2	418	89.7	90.8
Other Asian/Pacific Islander	1,345	73.4	70.1	1,287	95.7	95.5
Hispanic	1,581	75.9	72.3	1,501	94.9	94.6
Black	1,771	82.0	79.7	1,715	96.8	96.8
White	4,652	77.4	73.7	4,465	96.0	95.6
Birth weight (in grams)						
Less than 1,500	1,151	78.1	76.6	1,093	95.0	94.6
≥ 1,500 and < 2,500	1,647	80.1	77.3	1,585	96.2	96.0
2,500 or more	7,890	75.9	73.9	7,543	95.6	95.6
Plurality						
Twin	1,658	82.0	80.7	1,585	95.6	95.5
Non-twin (single birth or other multiple births)	9,030	75.9	73.9	8,636	95.6	95.6
Household poverty level[2]						
Less than 100 percent of poverty	2,603	†[3]	†[3]	2,491	95.7	95.5
100–149 percent of poverty	1,633	†[3]	†[3]	1,557	95.3	95.3
150–199 percent of poverty	1,735	†[3]	†[3]	1,659	95.6	95.7
200 percent or more of poverty	4,717	†[3]	†[3]	4,514	95.7	95.6

See notes at end of table.

Table 5-2. Unit response rates for the 9-month data collection, by parent CAPI instrument and child assessments: 2001–02—Continued

Child characteristics	Parent CAPI instrument			Child assessments		
		Response rates[1]			Response rates[1]	
	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent
Household SES quintile						
1 – lowest	2,110	†[2]	†[2]	2,007	95.1	94.9
2	2,141	†[2]	†[2]	2,055	96.0	96.0
3	2,086	†[2]	†[2]	2,000	95.9	95.8
4	1,986	†[2]	†[2]	1,896	95.5	95.8
5 – highest	2,365	†[2]	†[2]	2,263	95.7	95.3
Region of residence						
Northeast	1,646	72.5	68.4	1,538	93.4	93.0
Midwest	2,460	79.4	76.5	2,399	97.5	97.7
South	3,705	77.6	75.0	3,577	96.5	96.4
West	2,871	76.5	75.1	2,701	94.1	94.0
Outside the 50 states and the District of Columbia	6	25.0	20.9	6	100.0	100.0
Mother's highest grade						
Less than 4 years of high school	2,115	77.2	73.8	2,027	95.8	95.2
Four years of high school	3,241	76.9	73.6	3,106	95.8	96.0
Some college	2,214	77.3	74.8	2,113	95.4	95.3
Four or more years of college	2,868	75.8	74.4	2,742	95.6	95.9
Not classifiable	250	78.1	74.9	233	93.2	90.4

† Not applicable.

[1] All response rates are computed at the child level. The parent CAPI instrument component rates are based on the entire eligible sample. The child assessment rates are conditioned on completing the parent CAPI instrument.

[2] Poverty level was determined using data on household income and household size obtained during the parent interview. This information was compared to the U.S. Bureau of the Census' weighted poverty thresholds for 2001 for households with children. For example, a household was defined as being at 100 percent of poverty if their household income was below the poverty threshold for a family of that size.

[3] Household poverty level and SES quintile rate are not available on the birth record, so it is not possible to calculate a parent CAPI instrument response rate for households by income level.

NOTE: The base weight (W1BASEWT) was used. Source of information for household poverty level and SES quintile was the parent questionnaire. Source of information for all other child characteristics was the birth record. Race/ethnicity here represents the race/ethnicity of the child, as derived from the mother's race/ethnicity on the birth record (and the father's race/ethnicity on the birth record, for Chinese and American Indian or Alaska Native births).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Table 5-3. Unit response rates for the 9-month data collection, by resident father questionnaire, nonresident father questionnaire, and all fathers: 2001–02

Child characteristics	Resident Father Questionnaire			Nonresident Father Questionnaire			All Fathers[3]		
		Response rates[1]			Response rates[1]			Response rates	
	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent
Total	6,270	75.1	76.1	679	51.2	50.0	6,937	71.8	72.6
Race/ethnicity									
American Indian or Alaska Native	470	72.6	71.7	82	61.2	62.1	548	70.5	69.8
Chinese	347	75.9	75.8	‡	‡	‡	348	75.8	75.7
Other Asian/Pacific Islander	833	70.5	70.2	43	49.4	49.0	876	69.2	68.9
Hispanic	848	67.3	66.1	68	44.4	44.1	913	64.9	63.9
Black	461	62.6	62.0	351	51.9	51.5	811	57.6	56.9
White	3,311	81.5	81.5	134	47.3	48.7	3,441	79.3	79.3
Birth weight (in grams)									
Less than 1,500	615	74.3	73.3	88	50.3	50.0	701	70.1	69.2
≥ 1,500 and < 2,500	922	75.1	73.6	107	45.7	48.2	1,026	70.6	69.2
2,500 or more	4,733	75.3	76.3	484	52.2	49.8	5,210	72.3	72.8
Plurality									
Twin	1,052	78.2	77.4	77	43.5	43.8	1,129	74.3	73.7
Non-twin (single birth or other multiple births)	5,218	74.6	76.0	602	51.9	49.8	5,808	71.4	72.5
Household poverty level[2]									
Less than 100 percent of poverty	915	67.0	67.3	378	52.4	50.5	1,289	62.0	61.7
100–149 percent of poverty	775	67.2	66.5	134	51.0	49.1	906	64.2	63.4
150–199 percent of poverty	1,050	74.6	75.7	95	49.2	49.5	1,143	71.7	72.7
200 percent or more of poverty	3,530	79.9	81.3	72	45.3	47.4	3,599	78.8	80.0

See notes at the end of table.

Table 5-3. Unit response rates for the 9-month data collection, by resident father questionnaire, nonresident father questionnaire, and all fathers: 2001–02—Continued

Child characteristics	Resident Father Questionnaire			Nonresident Father Questionnaire			All Fathers[3]		
		Response rates[1]			Response rates[1]			Response rates	
	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent
Household SES quintile									
1 – lowest	692	61.7	62.2	294	53.1	48.3	984	58.9	57.9
2	1,054	68.9	69.5	174	47.8	50.5	1,224	65.0	66.1
3	1,201	73.1	73.0	140	52.0	52.2	1,337	70.2	70.3
4	1,432	80.5	82.8	56	50.0	50.9	1,487	78.7	81.0
5 – highest	1,891	83.3	85.8	15	39.5	42.5	1,905	82.3	84.8
Region									
Northeast	1,001	76.2	74.5	78	44.3	45.1	1,078	72.5	71.1
Midwest	1,571	81.3	83.2	148	48.4	47.0	1,709	76.8	78.6
South	2,058	75.9	77.0	345	55.6	54.4	2,403	72.2	73.1
West	1,634	68.7	69.0	108	46.0	42.9	1,741	66.7	66.7
Outside the 50 states and the District of Columbia	6	100.0	100.0	‡	‡	‡	6	100.0	100.0
Mother's highest grade									
Less than 4 years of high school	878	67.0	67.3	226	50.2	49.6	1,101	62.6	63.0
Four years of high school	1,619	70.6	71.7	295	52.4	50.9	1,909	67.1	67.8
Some college	1,432	78.4	78.5	105	47.5	47.2	1,536	75.2	75.5
Four or more years of college	2,232	81.5	83.9	31	59.2	50.4	2,261	80.8	83.1
Not classifiable	109	62.6	62.0	22	59.5	51.9	130	61.9	59.6

See notes at the end of table.

Table 5-3. Unit response rates for the 9-month data collection, by resident father questionnaire, nonresident father questionnaire, and all fathers: 2001–02—Continued

Child characteristics	Resident Father Questionnaire			Nonresident Father Questionnaire			All Fathers[3]		
		Response rates[1]			Response rates[1]			Response rates	
	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent	Number	Unweighted percent	Weighted percent
Parents in household									
Biological mother, biological father	6,162	75.3	76.3	†	†	†	6,162	75.3	76.3
Biological mother, other father	63	61.2	61.4	9	50.0	52.2	60	58.3	60.6
Biological father, other mother	5	100.0	100.0	†	†	†	5	100.0	100.0
Biological mother only	†	†	†	670	51.1	49.8	670	51.1	49.8
Two adoptive parents	13	100.0	100.0	†	†	†	13	100.0	100.0
Related guardian(s)	22	78.6	73.7	†	†	†	22	78.6	73.7
Unrelated guardian(s)	5	55.6	34.5	†	†	†	5	55.6	34.5

† Not applicable.

‡ Reporting standards not met.

[1] All response rates are computed at the child level. The resident father questionnaire and the nonresident father questionnaire are conditioned on completing the parent CAPI instrument. Response rates for the resident father and nonresident father questionnaires do not add to the response rates for all fathers, because a case could have both questionnaires completed. The weights were developed for all fathers; cases eligible for both questionnaires have a positive weight only if both were completed for the case.

[2] Poverty level was determined using data on household income and household size obtained during the parent interview. This information was compared to the U.S. Bureau of the Census' weighted poverty thresholds for 2001 for households with children. For example, a household was defined as being at 100 percent of poverty if their household income was below the poverty threshold for a family of that size.

[3] "All fathers" includes both resident and nonresident fathers. A child could have a resident father, a nonresident father, both, or neither. Children with both father types are counted as having unit response if both father questionnaires were complete.

NOTE: The base weight (W1BASEWT) was used. Source of information for household poverty level and SES quintile was the parent questionnaire. Source of information for all other child characteristics was the birth record. Race/ethnicity here represents the race/ethnicity of the child, as derived from the mother's race/ethnicity on the birth record (and the father's race/ethnicity on the birth record, for Chinese and American Indian or Alaska Native births).

SOURCE: U.S. Department of Education, National Center for Education Statistics (ECLS-B), Nine-Month Data Collection, 2001–02.

Table 5-4. Stages in identifying and completing father questionnaires, by father type, 9-month data collection: 2001–02

Stage	Number	Unweighted percent[1]	Weighted percent[1]
Total	10,688	100.0	100.0
Children with no father identified	120	1.1	†
Resident father questionnaire			
Children identified with fathers	8,344	100.0	100.0
Completed interviews	6,270	75.1	76.1
Nonresident father questionnaire			
Children identified with fathers	2,238	100.0	100.0
Children with fathers who met the contact frequency eligibility criteria	1,778	79.4	78.4
Children whose mother provided information to contact father	1,326	74.6	74.5
Completed interviews	679	51.2	50.0

† Not applicable.

[1] All response rates are computed at the child level. The resident father questionnaire and the nonresident father questionnaire are conditioned on completing the parent CAPI instrument.

NOTE: The base weight (W1BASEWT) was used. Source of information for stage was the parent and father questionnaires. Race/ethnicity here represents the race/ethnicity of the child, as derived from the mother's race/ethnicity on the birth record (and the father's race/ethnicity on the birth record, for Chinese and American Indian or Alaska Native births).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, (ECLS-B), Nine-Month Data Collection, 2001–02.

Table 5-5. Final case status of the father questionnaires, by father type, 9-month data collection: 2001-02

Father type and status	Number	Unweighted percent[1]	Weighted percent[1]
Resident father questionnaire			
Total	8,344	†	†
Complete	6,270	75.1	76.1
Unlocatable	22	0.3	0.3
Refusal	161	1.9	1.8
Other	1,891	22.7	21.8
Nonresident father questionnaire			
Total	1,326	†	†
Complete	679	51.2	50.0
Unlocatable	42	3.0	2.7
Refusal	88	6.6	6.3
Other	517	39.0	41.0

† Not applicable.

[1] All response rates are computed at the child level. The resident father questionnaire and nonresident father questionnaire are conditioned on completing the parent CAPI instrument.

NOTE: The base weight (W1BASEWT) was used. Source of information for father status was the field management and receipt control system.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, (ECLS-B), Nine-Month Data Collection, 2001–02.

Table 5-6. Final case status of the 9-month data collection, based on parent interview status, by child characteristics: 2001–02

Child Characteristics	Complete[1]		Unlocatable		Refusal		Other		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	10,688	76.8	848	6.1	1,943	14.0	442	3.2	13,921	100.0
Child's race/ethnicity										
American Indian/ Alaska Native	873	79.2	94	8.5	111	10.1	24	2.2	1,102	7.9
Chinese	466	63.7	43	5.9	150	20.5	73	10.0	732	5.3
Other Asian/Pacific Islander	1,345	73.4	94	5.1	301	16.4	92	5.0	1,832	13.2
Hispanic	1,581	75.9	244	11.7	173	8.3	86	4.1	2,084	15.0
Black	1,771	82.0	163	7.5	169	7.8	58	2.7	2,161	15.5
White	4,652	77.4	210	3.5	1,039	17.3	109	1.8	6,010	43.2
Birth weight (in grams)										
Less than 1,500	1,151	78.1	95	6.4	179	12.2	48	3.3	1,473	10.7
≥ 1,500 and <2,500	1,647	80.1	106	5.2	259	12.6	43	2.1	2,055	14.7
2,500 or more	7,890	75.9	647	6.2	1,505	14.5	351	3.4	10,393	74.6
Plurality										
Twin	1,643	81.9	54	2.7	271	13.5	37	1.8	2,005	14.4
Non-twin (single birth or other multiple births)	9,045	75.9	794	6.7	1,672	14.0	405	3.4	11,916	85.6
Mother's highest grade										
Less than 4 years of high school	2,115	77.2	346	12.6	191	7.0	169	3.1	2,821	19.7
Four years of high school	3,241	76.9	280	6.6	572	13.6	222	2.9	4,315	30.3
Some college	2,214	77.3	112	3.9	460	16.1	129	2.7	2,915	20.6
Four or more years of college	2,868	75.8	87	2.3	691	18.3	156	3.6	3,802	27.2
Not classifiable	250	78.1	23	7.2	29	9.1	42	5.6	344	2.3

[1] A complete is defined as having at least completed a parent interview. The parent interview is considered complete if the interviewer successfully passed through Section CD (child development).

NOTE: Percents may not sum to 100 due to rounding. Source of information for child characteristics was the birth record. Source of information for final case status was the field management system. Percentages are unweighted data. All are row percentages, except for Total column. Race/ethnicity here represents the race/ethnicity of the child, as derived from the mother's race/ethnicity on the birth record (and the father's race/ethnicity on the birth record, for Chinese and American Indian or Alaska Native births).

SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort, (ECLS-B), Nine-Month Data Collection, 2001–02.

5.5 Quality Assurance for Data Collection Activities

Several types of quality control methods were used during the 9-month data collection. Those methods included validation interviews (a short telephone re-interview with parents), home visit observations, the contractor's home office review of the completed child assessment booklets, and feedback (notes to field staff about specific performance issues) for the hard-copy instruments and videotape. The following sections describe these aspects of quality control methods that were used.

5.5.1 Nine-Month Validations

For about 10 percent of the completed parent CAPI instruments, respondents were recontacted by telephone and asked a limited number of questions to validate the original interview and home visit. Because the father questionnaires were typically completed as self-administered instruments (98 percent of the resident father questionnaires and 79 percent of the nonresident father questionnaires), it was determined that validation of these questionnaires was not necessary; concerns about whether the father was actually the one who filled out the questionnaire were not supported by any evidence (e.g., in the course of prompting by telephone, interviewers did not report encountering any instances in which a member of the household volunteered that the father questionnaire was completed by someone else; telephone interviewers conducting the validation reinterviews with the parent respondents did not hear about father questionnaires completed by others; data entry staff reviewing the completed father questionnaires did not see any signs that would suggest the documents were completed by someone else); and interviews to validate self-administered questionnaires are not common practice.

For the home visits, cases were randomly selected for validation, stratified by the number of interviews completed by each field interviewer. For example, if a field interviewer completed only eight home visits, one of those eight cases was selected for validation. Each field interviewer's validation rate was set to equal at least 10 percent of her or his completed work. Cases selected for validation that were unreachable by phone were replaced with substitute validation cases. No in-person validation was done. A total of 941 validations were conducted for the home visit. The field supervisors completed home visit validations for 125 cases (13 percent), but because the supervisors had higher priorities during the first half of the data collection period (i.e., field supervisors were addressing severe production and cost problems for the home visits), the validation activities lagged behind home visit activities. Beginning in June 2002, the telephone validations were conducted by the contractor's Telephone Research Center staff.

The responsibility for doing validation was moved from the field supervisors to the Telephone Research Center to reduce the elapsed time between the home visit date and the completed validation date. Validations were conducted in both English and Spanish.

A formal script was developed for the validation. For the home visit, it included questions such as whether the 9-month parent respondent remembered the interview and if the field interviewer used a computer. The respondent was also asked if the interview was conducted in person or over the telephone, the length of the home visit, whether the BSF-R was administered, and whether the child's physical measurements were taken. Respondents were asked to provide feedback on the BSF-R administration and the physical measurements, and to share other thoughts they had about the home visit experience. Types of feedback included comments about the interviewer, about the survey, and about the child's performance (e.g., "I had no idea my child could do some of the things she did with the interviewer"). The validation form included specific case information including the field interviewer's name; date of the interview; respondent's name, address, and telephone number; respondent's relationship to the child; and the child's name and gender. The validation interviews took about 5 minutes to complete over the telephone.

Discrepancies between the interview data and the validation data were reviewed by the supervisor. Discrepancies between data for validation cases conducted by the Telephone Research Center were reviewed by project staff. An example of a discrepancy is a difference in the date of the home visit as reported in CAPI and by the respondent during validation. If the discrepancy could not be resolved by additional information (for example, the respondent did not acknowledge having been contacted to participate in the study), more cases completed by the field interviewer were selected for validation. Of the 243 field interviewers who ever worked during the 9-month data collection, there were no discrepancies discovered during validation that required pulling additional case work for the field interviewer. Interviews completed by all field interviewers who were active during 9-month data collection were successfully validated (i.e., selected data about a case pulled for validation was confirmed by the respondent in all instances.)

5.5.2 Home Visit Observations

During the 9-month data collection, each field interviewer was observed during a home visit at least once by his or her supervisor or a home office project staff member, in accordance with the data

quality plan (revised September 30, 2002). Field interviewers who scored low in their BSF-R certification in training were targeted for an early observation. Most of the observations (73 percent) were completed by the end of February 2002, 4.5 months after the start of the study. During the home visit, observers completed an in-person observation form that covered specific aspects of both the parent CAPI instrument and the child assessments. Field interviewers were rated on a scale of 1 to 5 with 1 being unacceptable and 5 being excellent. On overall administration the field interviewer rating averaged 4.3. On each of the individual components the average rating was 4.6 for the parent CAPI instrument, 4.2 for the BSF-R, 4.1 for the NCATS, and 4.4 for the physical measurements. Observers who were certified in administering or scoring the BSF-R also completed a BSF-R review form that calculated the accuracy of the BSF-R administration and scoring, using the same form that was used for certification in training. The review and critique form was completed for 87 percent of the observations. For these observations, the average percentage administration score on the BSF-R was 95 (range 76–100 percent), and the average percentage scoring accuracy was 97 (range 76–100 percent).

After the home visit, the observers usually met with the field interviewer to share their observations and provide feedback on specific aspects of the home visit. Examples of the type of feedback given include comments on how adequately the interviewer addressed parent concerns, critiques of the order of component administration and of the positioning of the child relative to the interviewer during the BSF-R, and observations on the quality of the NCATS videotaping. In some instances interviewers were directed to review sections of the interviewer manual to improve their understanding of the correct protocol; in others, interviewers were instructed to complete an additional practice BSF-R on videotape and send it to Westat for review.

5.5.3 Audiotapes of Home Visits

In addition to observations, all of the field interviewers were instructed to submit an audiotape of the parent CAPI instrument from their third home visit. The field supervisors critiqued the audiotapes and provided appropriate feedback to the field interviewers regarding their interviewing techniques. About 75 percent of interviewers had audiotapes reviewed.[21] They were critiqued using a standard form collecting information on the parent interview (for example, accuracy of reading questions as worded). The main outcomes of this review were to reinforce proper interviewing technique and to discourage improper technique.

[21] Interviewers did not submit audiotapes for review if their third case was observed, or if they completed fewer than three interviews.

5.5.4 Quality Control Procedures for the Direct Child Assessments

The quality of the direct child assessments was monitored and evaluated in three ways: quality review of the home visit, quality review of recordkeeping in the Child Activity Booklet, and establishment of reliability of administration of the child assessments, or, in the case of the NCATS, reliability of scoring.

Home Visit Quality Review. Interviewers' administration of all aspects of the home visit was reviewed and evaluated during the home visit observation (described above). Additional procedures were implemented within Westat and in the field to continuously assess interviewers' performance. This included having field interviewers score and critique videotaped administrations of the BSF-R in order to ensure the reliability of their administrations. In addition, after case materials were receipted at Westat, each NCATS videotape was reviewed for quality. The contents of the Child Activity Booklet were also reviewed for quality and accuracy, including recordkeeping for the BSF-R, the NCATS and the physical measurements. Finally, NCATS coders were required to establish reliability in coding on a weekly basis. Each of these procedures is described below.

Quality Review of the Child Activity Booklet. The Child Activity Booklet contains the administration instructions and record forms for the direct child assessments including the BSF-R, the NCATS, and the physical measurements. For approximately the first 3 months of data collection, all completed Child Activity Booklets were reviewed and checked for thoroughness, accuracy, and consistency upon receipt at Westat by design staff and computer-assisted data entry (CADE) staff. Design staff reviewed the first 100 receipted Child Activity Booklets, and they developed guidelines for CADE staff review. CADE staff reviewed each page of the booklet and noted missing or out-of-range values and other discrepancies. A standard form was used to record these problems. Feedback based on this form was forwarded to field supervisors on an as-needed basis whenever consequential problems were identified. For example, miscounting the number of credits or no credits on the core item set of one of the subscales of the BSF-R could cause the basal or ceiling item sets not to be administered as required. Interviewers who repeatedly made systematic errors, such as forgetting to fill in the assessment start/stop time or failing to complete comments page about modifications and skips, were notified through their field supervisors. At the beginning of the field period, when the first 1,440 cases were reviewed, approximately 25 percent (out of 180 interviewers) had recordkeeping problems. (This percentage also includes such nonconsequential errors as not including the start/stop times for the child activities. Errors of consequences affected the child's score.) Over the entire data collection, errors declined sharply, so that

only 2 out of 144 interviewers were identified as having problems by the end of data collection, and these "errors" were attributable to missing physical measurements on a case due to the child's lack of cooperation.

Administration and Scoring of the BSF-R. In addition to being observed during an in-person home visit, each interviewer was required to complete four BSF-R video scoring assignments over the course of data collection, at a rate of approximately one each 3 to 4 months. These assignments helped to track the scoring accuracy and reliability of each interviewer and served as a review of the administration procedures for the interviewers. The first videotape was sent out one month after the study went into the field. After interviewers watched and scored the tape using the standard BSF-R review form, they returned the forms to the home office, and their scores were calculated. If they achieved the dual criteria of 85 percent correct in their review of administration and 90 percent accuracy in their scoring for BSF-R items (i.e., correctly noted credit vs. no credit for the child's performance), then they continued data collection. If they did not achieve these criteria, they were instructed to review feedback on the items they failed before continuing to work (as detailed below). Overall, the percentage of field staff who met the passing criteria on the first review assignment was 86 percent. Performance on the review tapes continued to improve as data collection continued, with passing scores for the second tape at 91 percent, the third tape at 94 percent, and the last tape at 96 percent.

Field interviewers (24 total) who did not meet these criteria on the first review assignment were sent a detailed email explaining the mistakes that they made. After reviewing the feedback from the first tape, they carried on with data collection, and a second videotaped BSF-R was sent shortly thereafter. Six interviewers did not pass on the second review. A conference call was held with them to determine how best to correct the problems. After the conference call, interviewers were asked to videotape the administration of the BSF-R during their next home visit and send in the videotape for review at Westat. They were to stop work on all other cases until notified by Westat. If the videotaped administration met the certification criteria, the interviewer was allowed to resume data collection. Of the six interviewers who were required to videotape a BSF-R administration, four returned to work immediately after their videos were reviewed, one was given additional retraining and was re-certified by a field supervisor, and one was released after two failed attempts at re-certification.

Administration and Videotape Quality of the NCATS. In addition to the in-home observation by a member of the supervisory staff, which included review of the NCATS administration, a videotape quality control form was filled out by the NCATS coders for each tape received at the home

office. Major NCATS administration or taping errors were addressed immediately by contacting supervisors with specific feedback for the interviewer, and minor errors were addressed by sending written feedback to supervisors every month. Major errors were those that resulted in loss of data due to items not being codeable, such as "Caregiver gets the child's attention before beginning the task, at the start of the teaching interaction." This item would not be codeable if the interviewer failed to capture the first few seconds of the interaction when the parent introduced the NCATS activity to the child. Minor errors had no consequences for coding and included such problems as not having a complete voice stamp on the tape or not recording the language the mother used on the tape label. Approximately 33 percent of interviewers received feedback and corrective training concerning their NCATS administration over the course of the data collection period; feedback was much more frequent in the early months. Videotape quality control scores averaged 86 percent for all interviewers over the entire field period.

Improvement was generally seen immediately after interviewers received feedback from the field supervisors during the weekly supervisor-interviewer progress calls. The success of this fast feedback system is reflected in the fact that there were no cases where the NCATS was not scoreable because of missing items due to poor videotape quality or poor administration. That said, there were approximately 8 percent of cases that did not have NCATS scores, primarily due to parent refusal to allow videotaping, short tapes that lasted less than 45 seconds and were therefore uncodeable, the presence of more than one caregiver (defined by NCAST at the University of Washington as uncodeable), and camera malfunctions.

Physical Measurements. In addition to the home visit observation by supervisors and other Westat staff, the information in the Child Activity Booklet for each set of physical measurements was reviewed for accuracy by the computer-assisted data entry (CADE) staff. Identifiable errors were reported on a weekly basis to field supervisors who in turn would follow up with interviewers and give detailed feedback regarding these errors. (For further details about corrections to physical measurement errors, please see section 3.1.4.) Identifiable errors included recording the child's length in inches instead of centimeters, a difference between repeat measurements that was greater than 5 percent, failure to tare the child's weight, and misplacing the decimal points in the space provided in the record form. Although there was a high percentage of physical measurements recordkeeping errors at the beginning of the data collection (most of the interviewers' record-keeping problems mentioned above were in physical measurements), these problems were eliminated with a field memo reminding interviewers to check all measurements to make sure they were within 5 percent of each other. The memo also reminded interviewers to use the decimal point already on the record form and to record the measurements to the

nearest tenth. By the end of the data collection period, detectable errors were eliminated from the physical measurements record form entirely.

5.5.5 Assessor Effects

The results of IRT reliability analyses are summarized in section 3.1.1.2. This section presents the results of hierarchical linear modeling (HLM) analyses that were conducted to assess interviewer effects on the BSF-R. The BSF-R is an individually administered assessment. Therefore, the quality of the administration may introduce unwanted sources of variance into children's performance on the BSF-R.

A three-level multilevel analysis (Goldstein, 1995; Bryk and Raudenbush, 1992) was carried out to examine sources of variance. Table 5-7 presents maximum likelihood estimates of the components of variance for supervisor (level 3), interviewer (level 2), and child (level 1) for the mental scale of the BSF-R. That is, with children nested within interviewers, nested within supervisors. The addition of these variables progressively reduces the residual variance at level 1.

These results suggest that on the BSF-R mental scale, interviewers account for as much as 14 percent of the total variance in mental scale scores. This implies that as much as 14 percent of the total variance depends on the particular interviewer selected to conduct the assessment. However, since interviewers work in different geographical areas, interviewer differences are confounded with any real differences between areas. True-score differences between children account for fully 86 percent of the total variance and are confined to Level 1 of the model.

Table 5-7. Components of variance associated with the child, interviewer, and supervisor for the BSF-R mental scale, scored with publisher item calibrations, 9-month data collection: 2001–02

Partitioning the variance in mental scale scores						
	Multilevel Model					
	Unconditional (Partitions the variance between levels)		Age[1]		Age and BSID age[2]	
Variance	Estimate	Percent	Estimate	Percent	Estimate	Percent
Total	0.93478	100.0	0.55676	100.0	0.54957	100.0
Children	0.81406	87.1	0.47926	86.1	0.47135	85.8
Interviewers	0.10714	11.5	0.07553	13.6	0.07668	14.0
Supervisors	0.01358	1.5	0.00197	0.4	0.00154	0.3

[1] Includes child's age as an explanatory variable at the child level of the model (level 1).
[2] Includes both child's chronological age and BSID age as explanatory variables (level 1). BSID age is child's chronological age adjusted for prematurity, following procedures recommended by the National Center for Health Statistics (NCHS).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Similar analyses were conducted for the BSF-R motor scale and are presented in table 5-8.

Table 5-8. Components of variance associated with the child, interviewer, and supervisor for the BSF-R motor scale, scored with publisher item calibrations, 9-month data collection: 2001–02

Partitioning the variance in motor scale scores						
	Multilevel Model					
	Unconditional (Partitions the variance between levels)		Age[1]		Age and BSID age[2]	
Variance	Estimate	Percent	Estimate	Percent	Estimate	Percent
Total	1.55702	100.0	0.79274	100.0	0.77775	100.0
Children	1.42045	91.2	0.74587	94.1	0.73133	94.0
Interviewers	0.09721	6.2	0.04103	5.2	0.04178	5.4
Supervisors	0.03936	2.5	0.00584	0.7	0.00464	0.6

[1] Includes child's age as an explanatory variable at the child level of the model (level 1).
[2] Includes both child's chronological age and BSID age as explanatory variables (level 1). BSID age is child's chronological age adjusted for prematurity, following procedures recommended by the National Center for Health Statistics (NCHS).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Nine-Month Data Collection, 2001–02.

Similar to the mental scale, HLM analyses indicate that interviewer differences do exist, although they do not appear to be generally a major source of error. Table 5-8 shows that on the BSF-R motor scale, interviewers account for only 5.4 percent of the total variance in motor scale scores suggesting that interviewers were more reliable on the administration and scoring of the motor scale than on the mental scale.

5.6 NCATS Coder Training and Certification

NCATS videotapes were returned to the home office where they were coded by certified NCATS coding staff according to the NCATS coding system, developed by Dr. Kathryn Barnard at the University of Washington School of Nursing. Information about the NCATS is available from the Nursing Child Assessment Satellite Training (NCAST) web site *http://www.ncast.org*.

Among the key reasons why the NCATS was chosen was that the University of Washington conducts standardized training for individuals to become certified NCATS trainers. In addition, inter-lab reliability could be obtained between the University of Washington and the contractor's coders, which would ensure the comparability of the contractor's NCATS coding with both the University of Washington and other studies that have used the NCATS, such as the Early Head Start Research and Evaluation Project.

In order to train NCATS trainers, four staff members from Westat's Child and Family Studies group attended the standardized training for NCATS trainers at the University of Washington. One staff member was designated to be the lead trainer on the NCATS, with the other three serving as assistant trainers. Of these four staff members, one was the coding supervisor for the entire 9-month data collection, one assumed the role of liaison between the NCATS coding staff and the child development group, but left about two-thirds through the data collection effort, and one assumed that role as her replacement. The remaining staff member was a backup trainer in case there was a high attrition rate for coders and multiple coder training sessions needed to be conducted. Training multiple trainers was also helpful to establish a consensual understanding of the coding system that formed a strong foundation of knowledge for the coding process.

The entire training period took 5 days. Westat developed procedures for screening candidates. At the beginning of the first day, candidates were prescreened in a three-part process that

began with a personal interview and with a (non-standardized) quiz of general observational skills. Following the initial interview, candidates were presented with a set of 6 still photos and line drawings. They were allowed to review each picture for up to 5 minutes. Each picture was then followed by up to 10 questions that asked about various details in the pictures. The candidate was not allowed to refer back to the picture when answering the questions. This is a procedure that is commonly included as a subtest in some aptitude tests, for example, statewide aptitude tests for admission to police officer candidate training.

These pictures and their questions were pilot tested within the contractor's child development group among individuals who had previously been trained on the NCATS (in previous rounds of field testing), and it was found that those who scored highest on this picture-based observational quiz also scored high on the NCATS. A criterion of 90 percent was set on this observational ability screener on the basis of empirical findings of the contractor's pilot testing.

Candidates who reached 90 percent accuracy on the observation test were then given an overall introduction to the ECLS-B and participated in a self-paced, self-instruction screening. Candidates reviewed the NCATS training videotapes, reviewed the NCATS manual, and completed the exercises in the manual. The goal was to invite those candidates who scored at 85 percent agreement with NCATS standards on these exercises to participate in the formal training. All candidates who scored 90 percent or higher on the observational ability screener also scored 90 percent or higher on the NCATS self-instruction. At the completion of the self-instruction, candidates were re-interviewed to determine whether they would be interested in work as a coder.

Candidates who obtained 90 percent on the observational ability screener and 90 percent on the self-instruction were invited to participate in the formal classroom-style NCATS training. Formal NCATS training lasted 3 days, culminating in the official reliability testing scored by the NCATS training staff at the University of Washington. Eighteen candidates passed NCATS reliability at 90 percent (within 3 attempts) and received research certification from the NCATS staff at the University of Washington. These coders began coding ECLS-B NCATS videotapes as soon as they received their certification.

5.6.1 Quality Control Procedures for NCATS Coders

In any study that requires large scale coding to be done over a long period of time, there is always the chance that coders will drift from the coding standard and become unreliable in their coding. In order to prevent this from happening to the NCATS coding on the ECLS-B two steps were undertaken. First, as mentioned above, the "passing grade" for coder certification was raised from 85 percent to 90 percent agreement with the standard, called the "research certification." This was done upon the recommendation of Dr. Barnard who found that the extra 5 percent leads to more reliable coding in the long run, suggesting that coders who can score that high during training are less likely to drift from the standard, or even if they do drift are less likely to fall below the acceptable criterion.

The second step that was taken to prevent coder drift over the long term of the data collection was the establishment of a reliability system. There are two possible ways that reliability could be maintained. One way is to do intra-lab reliabilities with the contractor's coders. It is important, however, that the ECLS-B NCATS results be comparable with the standard maintained by the University of Washington. It was determined that reliability should be measured against the standards set by NCATS coders at the University of Washington exclusively and to forgo intra-lab reliability. Therefore, NCATS videotapes from approximately 2.5 percent of cases (n = 219) were selected at random and were sent, over the data collection period, to NCATS coders at the University of Washington. These procedures conformed to the original plan for reliability review. However, the University of Washington coders returned scores for only 171 videotapes, due to resource constraints.

A certified coder at NCAST at the University of Washington coded the tapes. This information was data entered by Westat. On a weekly basis and on a day selected at random during the week, Westat's coders were required to code one of these reliability tapes. They had to score 85 percent or higher to continue coding. Coders who fell below this criterion were given targeted feedback and asked to code additional reliability tapes until a score of 85 percent or better was obtained. Coders were not able to code any videotapes from the ECLS-B home visits until they had regained this level of 85 percent agreement with the tapes coded by the University of Washington over the coding period.

NCATS coding began in December 2001 with 18 certified coders who completed approximately 50 NCATS videotaped interactions each day (2.6 interactions per coder). In February, 2002, when the ECLS-B sample size was reduced, 8 coders, selected because they scored lowest on reliability, were released from the study. By the end of the data collection period, 4 full-time and 2 part-

time coders remained, averaging approximately 25 tapes per week each. In all, a total of 9,340 videotapes were coded over the year of data collection. The average inter-lab reliability between the contractor's coders and the University of Washington's certified coder was 86 percent.

REFERENCES

American Association for Public Opinion Research. (2000). *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys.* Ann Arbor, Michigan: AAPOR.

Bryk, A., and Raudenbush, S. W. (1992). *Hierarchical Linear Models for Social and Behavioral Research: Applications and Data Analysis Methods*. Newbury Park, CA: Sage.

Council of American Survey Research Organizations. (1982). *On the Definition of Response Rates: A Special Report of the CASRO Task Force on Completion Rates.* Port Jefferson, NY: CASRO.

Goldstein, H. (1995). *Multilevel Statistical Models.* New York: Halstead.

U.S. Department of Education, National Center for Education Statistics. (2002). *NCES Statistical Standards* (NCES 2003-601). Washington, DC: U.S. Department of Education.

U.S. Department of Education, National Center for Education Statistics. (Forthcoming [a]). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Design and Operations Report for the Nine-Month Data Collection*. Washington, DC: U.S. Department of Education.

U.S. Department of Education, National Center for Education Statistics. (Forthcoming [b]). *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) Methodology Report for the Nine-Month Data Collection, Volume 2: Sampling*. Washington, DC: U.S. Department of Education.

This page intentionally left blank.