

Table 3
LONG-TERM ASSOCIATIONS BETWEEN CHILD CARE QUALITY AND CHILD DEVELOPMENTAL OUTCOMES

CITATION ^a	N	AGE	PROCESS QUALITY MEASURE	STRUCTURAL QUALITY MEASURE	OTHER CHILD CARE MEASURES	FAMILY CONTROLS	CHILD DEVELOPMENTAL OUTCOMES ^c	QUALITY FINDINGS
Blau (1999 c)	Not specified	variable	None	Mother report of group size, C:A Ratio, CG training;	Type of care, no. of arrangements, hours, cost	Mode of Care (CC control)	BPI (Behavior Problems Index) PIAT (math & reading achievement) PPVT (language)	See text
Broberg et al. (1990)	84 children in Sweden	Time 1 =prior to care; M age = 16 mos. Time 2 = 1 yr later; Time 3 = 2 years later	Pos & neg events (Belsky & Walker Spot observ checklist	None	Type of Care	Social status, quality home enviro, parents perceived social support, child temperament, child sociability	Griffith's Developmental Scales-Scale C (Verb/Ling ability at 28 mos and 40 mos)	ANOVA: no care group difference in verbal abilities at 28 or 40 months PLS:- no effect of child care quality nor type of care on verbal ability at 28 or 40 months.
Broberg et al. (1997)	Initial sample of 146 was recruited at 12- 24 mos. 123 assessed at 8 yrs. 123		Composite: Adult Child interact – 16, 28, 40 mos	Composite: C:A Ratio ³ , # hrs in care per day: 16, 28, 49 mos	Time in child care	Social status, inhibition, paternal involvement, home environment	Griffith's Developmental Scales-(Lang Subscales) Standardized School Readiness Test (numerical subscales)	Struct qual related at 40 mos (.30*) & 80 mos (.22*) w/ math 2 nd grades. <u>Verbal</u> in 2 nd predicted by (1) verb at 40 & 80 mos, (2) # mos in CC, (3) consistent high paternal involvement <u>Math</u> in 2 nd pred by (1) mat at 80 mos, (2) struct qual, (3) inhib scores, (4) process qual. Not predicted by # sibs, gender, qual home. SES not entered in equation.
Burchinal et al. (in press)	89	Recruited in first yr; Reassessed at 12, 24, & 36 mos.	ITERS, ECERS	C:A Ratio ³ , Group size, Teacher education		Child age, child Gender, poverty status, home environment	Bayley (Cog: 12, 24, 36 mos) Lang: Receptive & Express (vocab) Communicative Skills (12, 24, 36 mos; Communicative, Social Affective, Symbolic Skills (12, 18, 24 mos)	Quality care increased linearly b/w 12 & 36 mos 12 mos concurrent: process quality related to cognitive skills, receptive language, overall communication C:A Ratio ³ & group sized related to overall communication. HOME related to cognitive & overall communication. 24 mos (concurrent): Process quality related to cognitive skills, receptive language, expressive language, & overall communication skills. Structural not related. HOME related to overall communication. 36 mos (concurrent): process qual related to cog, recept & express lang. Ratio & Gp size related to cog skill, expressive lang. T. Ed related to express lang. HOME not related. HLM (separate for process qual, ratio, T ed) controlling for sex, poverty, HOME <u>Process qual</u> : higher qual over time related to better cog, recept lang, express lang, & overall communic skills. Assoc w/ expressive lang increase w/ age <u>Ratio</u> : related to higher scores over time on receptive lang & overall communic skills; & to rate at which express skills acquired. T. Educ: related to higher cog & receptive lang skills for girls only

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Chin-Quee & Scarr (1994)	127	Recruited preschool, follow-up 5-9 yrs	ECERS Amount & Type of Verbal Interact b/w Child & CG ¹		Childs experiences in CC ⁵ , Age of entry into CC ⁵ , # Hrs. Attendance	Maternal Education & Maternal IQ (PPVT-R), Values Conform, Value Soc Skills	Report Cards (Social & Cog Dev) Teacher report peer relations, cooperative beh, Acad Achieve	HMR: (1) mat ed, mat IQ, values conform, values soc skills; (2) CC Exper: Age began care, Total time in care; (3) Quality: ECERS Quality of Care in infant & preschool yrs→NOT related to school age outcomes HMR: (1) same; (2) same; (3) Prop control utterances, Prop expressive utterance Quality indicators(prop control & express utter) failed to predict school age outcomes
Deater-Deckard, et al. (1996)	141	Time 1 = toddler or preschooler Time 2 = 4 yrs later	Composite of ITERS, ECERS, Profile, CG education, wages	C:A ratio		SES, child sex, child age, parenting stress, harsh parental discipline	Composite scores of mother-reported behavior problems and social withdrawal and teacher-reported behavior problems and social withdrawal	No significant correlations between Time 1 process quality and Time 2 child outcomes or between Time 1 C:A ratio and Time 2 child outcomes Also Time 1 process quality and C:A ratio did not predict Time 2 outcomes in hierarchical regressions that controlled for Time 1 adjustment.
Field (1991) Study 1	28	5-8 yrs in full time care by 2	Not assessed All high qual	C:A Ratio ³ CG ¹ education CG ¹ stability	Amount time in care	Maternal extraversion→ child outcome	BRS: (Sociability, Socioemot Adj) Piers-Harris (Self-Concept) Buck I/E scale	Partial correlations (maternal extraversion): amount time spent in high qual, stable care & later adjust (5-8) associated w/ all child outcomes.
Field (1991) Study 2	56	6 th grade (M = 11.5) full time care by 2	Not assessed All high qual	C:A Ratio ³ , CG ¹ education, CG ¹ turnover	Amount time in care	No family variables associated w/ time in care	BRS (socioem adjust & sociability) Piers-Harris (Self-Concept) Peer Interact Beh Acad Meas: gifted prog, lang arts, math grades	Simple correlations: amount of time in high quality programs. Stable care & later adjustment at 6 th grade <u>Amount of time in high quality care</u> associated with all child outcomes.
Hagekull & Bohlin (1995)	52 Swedish children	Recruited at 6 wks until 4 yrs	Stimulation Emotional Tone b/w Adults & Children	C:A Ratio ³ , Group Size, CG ¹ : Child-oriented Education & Experience, Security Aspects, Available Space	Overall rating of quality of care includes both	SES ⁷ , overall quality of home, child gender, temperament (10, 15, 20 mos)	TBQ PBQ Hagekull & Bohlin: Ego Strength/ Effectance & Soc Comp	<u>29 mos (concurr)</u> : observed day care quality → maternal report positive emotional expression <u>4 yrs (long)</u> : observed day care quality --: aggregated reports internalizing problems & ego strength/effectance HMR: <u>29 mos</u> : children from low quality homes, in good qual DC ⁶ → reduction in externalizing behaviors. Children from medium or high quality homes, DC ⁶ quality not important in explaining externalizing behaviors <u>4 yrs</u> : Children, low SES ⁷ , in good quality care → less aggressive, no effect on higher SES ⁷ . (2) aggressiveness of easy children positively affect by high quality DC ⁶ . Difficult children no decrease in aggressiveness in high quality setting (3) for boys, good qual care associated w/ less internalizing/ social withdrawal problems & more ego strength/effectance
Howes (1988)	87	45-57 mos followed for 2 yrs		CG ¹ training in child development, small group size, low C:A Ratio ³ , planned & indiv educ prog, adeq physical space	Age of entry Length of day # diff arrangements	Maternal education, family struct maternal employ	Academic progress (1 st grade CG ¹ report) CBP: (Behavior Problems, School Skill)	HMR: (1) family characteristics (2) CC ⁵ char Higher child care quality predicted: (1) better acad skills for boys only (2) better social skills both girls & boys (3) fewer behavior problems both girls & boys smaller # arrangements → better academic skills for boys & girls

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Howes (1990)	80 children	45 center care b-4 1 yr other full time between 1 & 4	CG involvement/investment in child compliance (toddler period: 18, 24, 30. 36 mos)	Composite: C:A Ratio ³ , CG ¹ training, CG ¹ stability (toddler period)		Family social Family structure Child Age	CBCL CBI	<u>Structural Quality</u> – concurrent (toddler) M.E.: High quality → more compliant at care, more self-regulation in lab. <u>Longit (Preschool)</u> : M.E.: high quality → more social pretend play, more positive affect, less CG ¹ rated difficult. <u>Longit (Kindergarten)</u> : high quality → less CG ¹ rating of hostility <u>Process Qual (Long)</u> , age partialled out: <u>Preschool</u> : CG ¹ involvement/investment → observed social play, social pretend play, positive affect, less CG ¹ rate difficult & hesitant. <u>Kindergarten</u> : CG ¹ involvement → less parent ratings of internalizing & externalizing; less CG ¹ rate of distract, hostile, higher rate verbal IQ, consideration. See summary sheet for further analyses.
Jacobs & White (1994)	36 c Kind, 4 yrs at recruit 32 Kind, not enrolled	Kindergarten	ECERS	None		SES'	PPVT-R: (Recept lang) SSC: (Social)	<u>MANOVAs</u> (same results w/ no covar & w/ SES & PPVT cov) children in center care higher on interest-participation than children in no-care; no difference b/w high & low quality care no care effect on cooperation-compliance children in high-quality center highest on receptive language, followed by no care & then low quality
NICHD (1998) ECCRN	1,085 1,041	24 & 36 mos	ORCE positive caregiving rating at 6, 15, 24, and 36 mos		Quantity, entry age, stability, group type	Income/needs, psych adjust, c. gender, c. temp	Mother reported behavior problems & social competence; caregiver report of problems; laboratory observations of compliance & negativity	C. in higher qual child care during 1 st 3 yrs → more compliant & cooperative during observations; CG reported fewer behavior problems
NICHD (in press-b) ECCRN		6, 15, 24, 36 mos	Positive CG ¹ composite, Language stimulation		Quantity, type	Maternal PPVT-R, child gender, HOME & maternal stimulation	Bayley MDI , Bracken School Readiness, Macarthur CDI; Reynell Dev Lang	Positive caregiving & language stimulation significantly related to cognitive & language outcomes at 24 & 36 mos HMR: 1) selection variables, 2) child gender, 3) family env, 4) quantity & type of care, 5) positive caregiving (PC), 6) frequency of language stimulation (LS) – see summary sheet Cognitive & Lang predicted by Process qual at 15, 24, 36 mos Lagged effects: Cog: at 24 mos only concurr LS pred Lang (express) at 24 & 36, c. w/ higher LS earlier assess better scores. Lang (receptive) at 36 mos, predicted pos by earlier LS
NICHD (submitted) ECCRN	669 612	24 & 36 mos	Positive Caregiving (ORCE)		Amt time in CC ⁵ Available other Children	Maternal education, maternal attitude toward employment, child gender, cog/ ling perf at 24 & 36 mos, mat sens in play, mat psych adjus, fam struc # c in home)	Mother and caregiver report of peer competencies; observed peer interaction in child care and structured task.	24 mos: More Positive Caregiving → Child more positive sociability at 24 mos, lower proportion negative interaction w/ peers observed.

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Peisner-Feinberg et al. (1999)	826-year 1 157-year 2 463-year 3 418-year 5	4.3 (year 1) 5.1 (year 2) 6.0 (year 3) 8.0 (year 5)	ECERS, CIS, UCLA ECOF, AIS, PPS, IEOS, STRS	CG ¹ education, CG ¹ exper ⁴ , gender, ethnicity, beliefs		Maternal education, child gender, child ethnicity	PPVT-R, WJ-R (letter- word, math), CBI, ASB	--Children who attended CC ⁵ w/ higher quality classroom practices had better language & math skills from the preschool years into elementary school. --Children w/ closer CG ¹ -child relationships in CC ⁵ had better classroom social & thinking skills, language ability, & math skills from the preschool years into elementary school. --Better quality CC ⁴ was more strongly related to better math skills & fewer problem behaviors from the preschool years through second grade for children whose mothers had less education.
Pierrehumbert et al. (1996)	47 Swiss	1-5, recruited 3-9 mos	Positive Contact (Ainsworth interactive scale)	None		SES ⁷ , child gender, attachment w/ mom, positive contact w/ mom	Developmental Quotients WPPSI CBCL	Attach security, SES, & <u>positive contact w/ CG¹</u> predicted increase in cognitive index between 2 & 5 years
Vandell et al. (1988)	20	Obs at 4 & at 8 yrs	None	C:A Ratio ³ , Group size, space, materials available, CG ¹ education		Family struc, age of entry in full-time care, family social class	PRS Harter PCS Parent Ratings socioemotional adjust (Santrock & Warshak)	<u>HMR</u> : 1) family social class 2) day care quality Better care quality → 1) more friendly & fewer unfriendly interact; 2) higher observer ratings pos affect & social comp, & 3) fewer peer nominations of shy. No prediction of Parent ratings <u>Partial Correlations</u> (family social class parialled out) Positive interaction w/ adults at 4 yrs = 8 year social competence, peer acceptance, empathy, conflict negotiation, impulse control Unoccup behs at 4 yrs = 8 yr less social comp, conflict negotiation, reaction to frustration, peer acceptance
Vernon-Feagans, Emanuel, & Blood (1997)	67	Recruited before age 1, followed until 4		Adults present (C:A Ratio ³), group size			SICD: (Receptive & Expressive Language)	Children in high quality centers → better expressive language & receptive language.

Note.

^aFull references are available in reference section.

^b**QUALITY MEASURE ACRONYMS ALPHABATIZED:** AIS: Adult Involvement Scale; CIS: Caregiver Interaction Scale; ECOF: UCLA Early Childhood Observation Form; ECERS: Early Childhood Environment Rating Scale; ECOE: Early Childhood Observation Instrument; IEOS: Instructional Environment Observation Scales; ITERS: Infant-Toddler Environmental Scale; ORCE: Observational Record of the Caregiving Environment; STRS: Student-Teacher Relationship Scale

^c**CHILD DEVELOPMENTAL OUTCOME MEASURE ACRONYMS ALPHABATIZED:** ASBI: Adaptive Social Behavior Inventory; ASB: Teacher Assessment of Social Behavior; BCL: Behavior Checklist; Boehm: Test of Basic Skills; BPI: Behavior Problems Index; BRS: Behavior Rating Scale; BSQ: Behavior Screening Questionnaire; Buck I/E Scale: Buck Internalizer/Externalizer Scale; CBCL: Child Behavior Checklist; CBI: Child Behavior Inventory; CBP: Child Behavior Profile; CTBS: Comprehensive Test of Basic Skills; MacArthur CDI: Communication Development Inventory; MDI: Mental Development Index (Bayley II); MSCA: McCartney Scale of Children's Abilities; ORCE: Observational Record of the Caregiving Environment; PBQ: Preschool Behavior Questionnaire; PEI: Parent as Educator Interview PIAT: Peabody Individual Achievement Test; PPS: Peer Play Scale; PPVT-R: Peabody Picture Vocabulary Test-Revised; PRS: Peer Relations Scale; RCSA: Rutter Child Scales (A & B); SCS: Social Competence Scale; SICD: Sequence Inventory of Communication Development; SRA: Science Research Associates Achievement Battery; TBQ: Toddler Behavior Questionnaire; WJ-R: Woodcock-Johnson Tests of Achievement-Revised

¹CG: Caregiver, ²ECE: Early Childhood Education, ³C:A Ratio: Child:Adult Ratio, ⁴Exp: Experience, ⁵CC: Child Care, ⁶DC: Child Development, ⁷SES: Socioeconomic Status